Studies on the Agricultural and Food Sector in Transition Economies

Agricultural Transition in Post-Soviet Europe and Central Asia after 25 Years

International Workshop in honor of Professor Zvi Lerman

Edited by
Ayal Kimhi, Zvi Lerman

Leibniz Institute of Agricultural Development in Transition Economies

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The Center for Agricultural Economic Research

and The Hebrew University of Jerusalem

March 20-22, 2013, Rehovot, Israel

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IAMO

Volume 79

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IAMO
2015

Bibliografische Information Der Deutschen Bibliothek
Die Deutsche Bibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.ddb.de abrufbar.

Bibliographic information published by Die Deutsche Bibliothek
Die Deutsche Bibliothek lists the publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the internet at: http://dnb.ddb.de.

Diese Veröffentlichung kann kostenfrei im Internet unter <*www.iamo.de/dok/sr_vol79.pdf*> heruntergeladen werden.

This publication can be downloaded free from the website <*www.iamo.de/dok/sr_vol79.pdf*>.

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http://www.iamo.de
ISSN 1436-221X
ISBN 978-3-938584-95-8

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FOREWORD

AYAL KIMHI

The transition from Socialism to Capitalism occurred in many countries worldwide, but nowhere was it so sharp as in Eastern Europe and the Former Soviet Union. Many researchers studied this process since the fall of the Berlin Wall in the autumn of 1989. Twenty-five years later, an international workshop was organized by the Center for Agricultural Economic Research in Rehovot, in collaboration with the Hebrew University of Jerusalem and the Leibniz Institute of Agricultural Development in Transition Economies (IAMO) in Halle, Germany. The purpose of the workshop was to provide a retrospect on the transition process through the lenses of researchers who studied it in the past and those who are still studying it. The focus was on agricultural transition, since it was a crucial step in ensuring food security and providing a basis for non-agricultural development.

This volume includes a collection of papers presented in the workshop. The papers are organized in four parts. The first part deals with the transition process in general, with a focus on agricultural transition in the realms of land markets, product markets and labor markets. In the opening chapter, Jo Swinnen, Kristine Van Herck and Liesbet Vranken provide an overview of the transition process and the integration of transition counties into the European Union. They claim that land privatization was an important component of this integration. However, vast institutional heterogeneity in land markets still exists among EU member countries. The chapter discusses the causes and consequences of this heterogeneity, and concludes that a good combination of liberalization and regulation of land markets may address political sensitivities and at the same time allow much of the economic benefits to occur.

The chapter by Csaba Csaki and Attila Jambor examines the impacts of joining the EU on the agricultural sector in the New Member States. These impacts are not uniform across countries, have both positive and negative components, and are sensitive to policy decisions. On the whole, the chapter concludes that EU accession had a positive effect on agriculture in the New Member States, stemming from access to markets, access to EU funding, and an improved institutional framework. However, the experiences of the different countries varied

quite a lot, due to differences in initial conditions, pre-accession policies and post-accession policies.

Ulrich Koester is trying to deal in his chapter with the fact that transition countries that were more conservative in their adoption of a market economy had more favorable growth trajectories than transition countries that followed the advice of western economists more enthusiastically. He suggests that poor performance after adopting a market economy is largely due to lack of morality in the population, combined with legislation that has been affected by influential lobby groups. He claims that this is particularly evident in the transformation of the agricultural sector, which could have been more effective had the institutional framework been designed more adequately.

The chapter by Thomas Herzfeld, Thomas Glauben, Liesbeth Dries and Ramona Teuber also highlights the impact of institutions on agricultural transition, but focuses on the context of the agricultural labor market. In particular, it analyzes the reasons behind the very different changes in agricultural labor use in different transition countries, placing this issue within the notion of occupational migration. Using panel data covering both European and Asian transition countries for two decades, the authors show that characteristics of the pre-transition land market largely affect the process of occupational migration. In particular, occupational migration seemed to respond more strongly to economic incentives in transition countries that had nominal private ownership of land under central planning. After controlling for pre-transition land ownership and unobserved country-specific effects, the authors find that occupational migration was not affected by current institutional quality and speed of economic reforms.

The chapters in the second part of the volume provide perspectives on the transition experience of specific countries. William Meyers and Kateryna Goychuk analyze the somewhat disappointing transition process in Ukraine. Despite the remarkable growth in production and trade, the country is far from realizing its agricultural potential, mostly because of ill-functioning markets, poor infrastructure and unfavorable business and policy environments. The authors are unsure whether Ukraine is likely to reform its policy priorities from short-term objectives to long-term development. It should be noted that the chapter was written before the current political turmoil in Ukraine, which is far from being resolved and does not leave much room for economic policy reform.

Leonid Krasnozhon also deals, in his chapter, with the transition process in Ukraine, but focuses on a specific policy reform, the 1999 agricultural property rights reform that reorganized several thousand collective farms and created two main forms of farm organization: sole proprietorship and employee-owned corporation. The outcomes, in terms of farm performance, were mixed. While

sole proprietorships did relatively well, employee-owned corporations lagged behind in many indicators. Through an empirical analysis of micro data, the author shows that sole proprietorships outperform employee-owned corporations by as much as 50 % in terms of output and in terms of revenue per worker, and by 27 % in terms of revenue per hectare. Overall, the findings indicate that the arrangement of property rights has profound effects on agricultural production in Ukraine.

The chapter by Martin Petrick examines the evolution in farm organization in a major grain-producing region in northern Kazakhstan, using recent farm-level data, and evaluates it vis-à-vis the reform objectives of the 1990s. The reform, which aimed at downsizing the former state farms, has led to a structure in which super-large agroholdings, large-scale enterprises and smaller individual farms coexist. Somewhat surprisingly, the empirical analysis shows that the enterprises belonging to an agroholding parent organization have been those with the highest factor productivity and the strongest competitiveness on land and labor markets. However, individual farms also seem to do quite well, with their median size doubling between 2003 and 2011. These results indicate that a polarized farm size distribution is likely to prevail in the region, and call into question the denunciation of large-scale agroinvestments as a desirable way of organizing agricultural production.

Utkur Djanibekov, Kristof Van Assche, Daan Boezeman, Grace Villamor and Nodir Djanibekov discuss another bimodal agricultural system, that of land-abundant commercial farms and labor-abundant rural households in Uzbekistan. Rural households and commercial farms are closely connected through various forms of contractual agreements. In their chapter, the authors use survey results from a specific study area to describe the existing contractual arrangements and analyze the external factors that influence their formation and the enforcing mechanisms. They find that the mix of fixed-wage, fixed-rent, and flexible contracts depends, among other things, on the availability of non-agricultural activities.

The chapter by Zvi Lerman discusses policy solutions to climate-change vulnerability in the context of Tajikistan, an example of a mountainous country with limited availability of cultivable land and prevalence of smallholders. It identifies the characteristics that are responsible for the country's high sensitivity and low adaptive capacity, and elaborates on policy measures for increasing the resilience of land use and their implementation. The chapter suggests that agricultural policy should follow several directions: increase the land endowment of the rural population, increase land use efficiency and sustainability, improve access to farm services, increase farm commercialization and livestock productivity, and encourage diversification into additional crops and new income sources. These

policies have been implemented to some extent in specific locations, and the author claims that expanding their scope to the country as a whole is likely to provide opportunities for the rural population in Tajikistan to become more climate-resilient.

The chapter by Ayal Kimhi examines the distributional implications of the land reform process in Georgia. While the purpose of the reform was mainly to distribute state-owned land to private households, it also created land market mechanisms that, in the presence of constraints such as credit market imperfections, allowed for concentration of land in the hands of large and wealthy farmers. The empirical analysis examines changes in the landholding distribution between 1996 and 2003, focusing on the role of access to non-farm income sources. It shows that while average landholdings increased substantially during the period, the increase was concentrated among farm households which derived at least half of their income from non-farm sources. This can be explained by either entrepreneurial advantage for these farm households or by lack of access to financial resources of households deriving less income from non-farm sector. If the second reason is important, it calls for land reforms to be accompanied by supplementary measures such as credit availability, in order to allow all farmers to enjoy the benefits of the reform.

The third part of the volume deals with trade policy. Sandro Steinbach and Mariusz Rybak analyze the food trade among the 15 successor states of the Soviet Union for 1995-2012 in relation to a benchmark of 152 countries. The econometric results show that, despite political disintegration of the Soviet Union, agri-food trade among the Soviet successors is still driven by the Soviet legacy: the Soviet legacy effect is positively correlated with economic recovery, but gradually diminishes over time due to adjustment of preferences at the consumer side and innovation as well as modernization at the producer side. The authors conclude that agri-food trade integration in the region has to be reconsidered with allowance for the strong Soviet legacy among the trade partners and the consequences of the common past have to be explicitly taken into account in trade policy design.

The chapter by David Sedik, Zvi Lerman and Vasilii Uzun analyzes the implications of the recent WTO accession on agricultural policy in Russia. The chapter establishes that, currently, much of producer support in Russia is distorting trade and production decisions, in the form of protective tariffs and budgetary allocations that are directly linked to production and inputs. The authors indicate that such policies should be constrained by the terms of Russia's WTO accession, but predict that the commitments Russia has assumed as part of accession do not guarantee a systematic change in agricultural policy. The conclusion is not that Russian agricultural policy does not have to change dramatically, but rather

that the hope that WTO accession will drive the necessary changes is probably unsubstantiated.

The final part of the volume deals with structural transformation in agriculture, in particular the decollectivization process, through two case studies. The chapter by Alfons Balmann, Heinrich Hockmann, Karin Kataria and Franziska Schaft analyzes the growth of agroholdings in Russia and Ukraine, through a comparison of of agroholding members and independent farms according to various performance measures. In Russia, agroholding members tend to be larger but employ less labor than independent farms. Despite that, factor productivities are quite similar in the two types of farms, and they seem to use similar production technologies. On the other hand, Ukrainian agroholding members seem to enjoy some efficiency advantages over independent farms, while both types of farms exhibit large heterogeneity in terms of efficiency and productivity.

Yoav Kislev devotes his chapter to the institutional evolution of cooperative farms in Israel. Due to changes in ideology as well as economic and financial crises, the two main forms of agricultural cooperatives, the *moshav*, a cooperative village, and the *kibbutz*, a commune, went through dramatic structural changes over the years. The trigger of the structural changes was the financial crisis of the mid-1980s that brought both *kibbuzim* and *moshavim* to the brink of bankruptcy. Facilitated by government rescue programs, institutional restructuring was key to recovery, with more than two-thirds of *kibbutzing* transforming into renewed (or partially privatized) *kibbutzim*, and *moshavim* being practically emptied of their cooperative functions. The author claims that both transition processes were accompanied by resource reallocation. The agricultural activity in most *kibbutzim* remained intact, though, while farms in *moshavim* went through a relatively rapid process of adjustment, with many farmers quitting agriculture while others increasing their activity. The experiences of both types of cooperateves indicates that ideology is set aside when a traumatic economic crisis occurs, and the lesson is perhaps that the institutional structure of cooperatives need to be flexible enough and to better respond to the changing environment, in order to avoid painful changes resulting from avoidable crises.

Overall, this volume includes a collection of chapters that provide a perspective on the transition process from different angles, and should serve as a reference for researchers working on this topic. We would like to thank deeply the contributors, the other participants in the workshop, and the supporting institutions: the Hebrew University, the Center for Agricultural Economic Research, and IAMO – the Leibniz Institute of Agricultural Development in Transition Economies.

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A. THE TRANSITION SCENE AFTER 25 YEARS

TWENTY-FIVE YEARS OF TRANSITION AND EUROPEAN INTEGRATION: SOME OBSERVATIONS ON THE GOVERNANCE OF LAND MARKETS IN AN INTEGRATED EUROPE

JOHAN SWINNEN, KRISTINE VAN HERCK, LIESBET VRANKEN

1 Introduction

Twenty-five years ago, the transition process in Eastern Europe and the former Soviet Union started with the fall of the Berlin Wall in the autumn of 1989. Land reforms, and privatization in general, were a very important, and politically very sensitive, aspect of the transition from the centrally planned economic systems to a market economy (LERMAN et al., 2004; ROZELLE, SWINNEN, 2004). They were also an important component of the integration of eleven countries from Central and Eastern Europe (CEE) into the EU, with the first CEE countries joining in 2004. The EU accession conditions included specific requirements on land exchange and property rights and the EU accession implied a common agricultural policy, including market regulations and subsidies, across all EU Member States (SWINNEN, VRANKEN, 2009).

In the economics literature there are many theoretical and empirical studies on the role of land rights and institutions for land exchange in the process of development and for enhancing efficiency of the agricultural economy (fir reviews see, e.g., BINSWANGER et al., 1995; PLATTEAU, 2000; KEEFER, KNACK, 2002; DEININGER, 2003). A key result from this literature is that the optimality of specific land institutions is conditional on the state of the economy, resource constraints, macro-institutions and government policies. For this reason, one would expect to observe similar types of land governance (how land is exchanged and what is regulated by the state) in countries which are close in their economic development, geographic location and political institutions.

Yet, after 25 years of transition and 10 years after most of the CEE countries joined the EU, it is remarkable how much variation in land governance one observes among EU countries, i.e. countries which are relatively close in geographic location and economic developments. In a European Union of 27 countries (EU-27), a political and economic union of countries with a fully integrated economy and a common agricultural policy for many years (up to the past 50 years for the founding members and up to almost ten years for the New Eastern EU

Members), one observes major differences in how land is exchanged and in how land markets are regulated. For example, the share of rented land in total agricultural land varies from less than 20 % to more than 80 % in EU Member States. In addition, land regulations vary from mostly liberal systems with very little regulation to highly regulated land markets which specify conditions on land prices, land transactions etc.

What is even more remarkable is that the differences are not closely correlated with institutional history, such as between Eastern "New" Member States and Western "Old" Member States. In fact the variation in each of these blocs is almost as large as in the EU-27 as a whole.

In this chapter, we first document some of these large variations in land institutions (both markets and regulation) in (Eastern and Western) Europe, and then discuss some of the causes for these observations, focusing mostly on Eastern Europe. In the final section we discuss some lessons from our findings.

2 Land markets

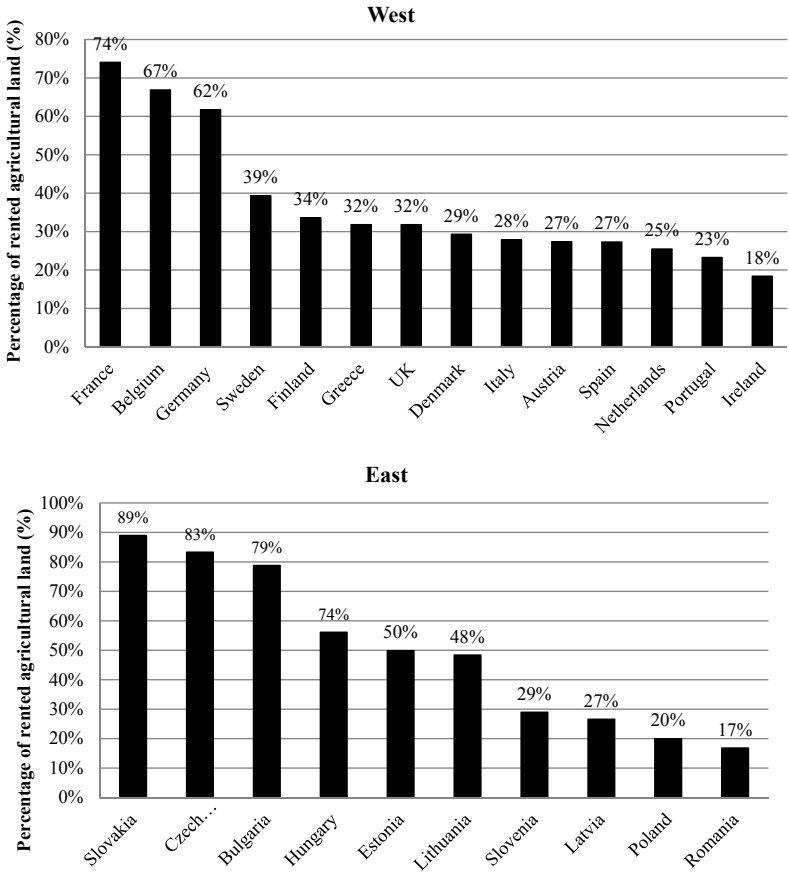
Figure 1 shows that there are major differences in the role of land sales and rental markets between countries in Europe. In the EU-27, the share of rented land in total agricultural land varies from less than 20 % to more than 80 %. What is even more remarkable is that the differences are not closely correlated with geographic location or large geo-institutional history, such as between Eastern "New" Member States and Western "Old" Member States. In fact, as figure 1 shows, the variation in each of these blocs is almost as large as in the EU-27 as a whole. For example, in Western Europe the share of agricultural land rented by farmers varies from less than 20 % in Ireland to around 70 % in Belgium and France.

In the CEE countries land governance changed dramatically over the past 25 years. Under the Communist regimes (as in the Soviet Union, China and Vietnam) land was mostly managed by huge collective and state farms[1], and land transactions were controlled, and often forbidden, by the state. Over the past decades, most of these countries in Europe and Central Asia reformed their land rights and tenure systems and deregulated land exchange (LERMAN, 2001; LERMAN, 2008). Yet, despite the common point of departure and the shared process of privatization and deregulation of land exchange, the current land market situation is vastly different across the countries. In Eastern EU countries like Czech Republic and Slovakia the vast majority (80-90 %) of agricultural

[1] An exception is Poland and the former Yugoslav Republics where there were mainly individual land holdings during the pre-transition era.

land is rented, while in other Eastern EU countries like Poland and Latvia much less land is rented (20-30 %).

Figure 1: Share of land rented by farmers in 2007 (% of utilized agricultural area)



Source: EUROSTAT.

This variation extends beyond the Eastern EU Member States. For example, in transition countries like Russia, the vast majority of agricultural land is rented (LERMAN, SHAGAIDA, 2007; LERMAN, 2009). In contrast, very little renting is going on in countries such as Albania, Azerbaijan, or Kyrgyzstan. Moreover, the differences cannot be simply related to regional or broad political-institutional differences as there are major differences between countries in the same sub-regions (such

as e.g. Slovakia (89 %) versus Slovenia (27 %) in Eastern EU, or Kazakhstan (60 %) versus Kyrgyzstan (16 %) in Central Asia) (SWINNEN et al., 2006).

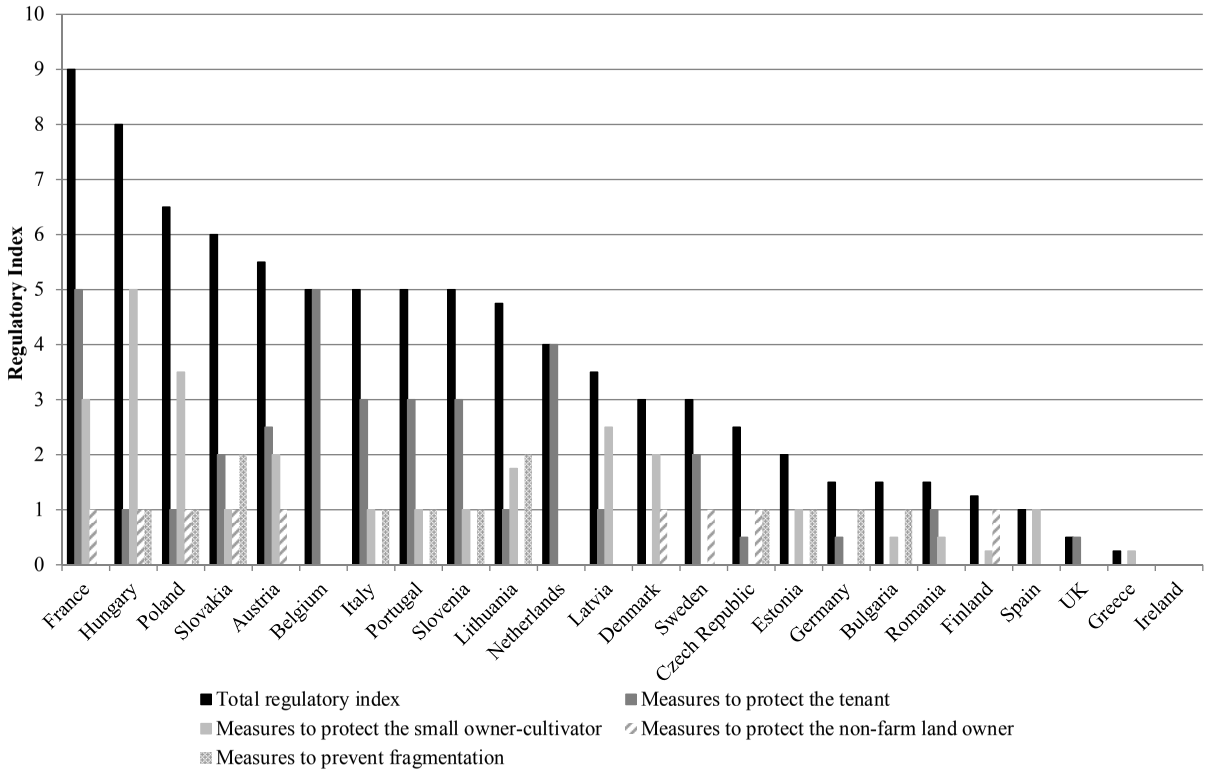
3 LAND REGULATIONS

Not only are there major differences in the nature of land markets in Europe, both over time and across countries, but there are also major differences in regulations of land exchanges. In some countries, land prices, sales and rental contracts are regulated by the government, in others not. One can identify several categories of land market regulations: (1) measures to protect the tenant; (2) measures to protect the owner-cultivator; (3) measures to protect the owner; and (4) measures to prevent fragmentation.

To assess the importance and stringency of land regulations and to illustrate the differences between countries, we have collected data on land regulations, and we have developed a set of regulatory indices to compare countries, based on a series of studies of local land markets (e.g., CIAIAN et al., 2010). See SWINNEN et al. (2013) for details.

To get a quantitative indicator of the regulations, we constructed sub-indicators of regulation and a total regulatory indicator (TRI) (Figure 2). The indicators reflect the large differences among the EU countries in land market regulations, and again the variation in interventions is not a simple East-West divide. Both among the New and among the Old EU Member States there are strongly regulated and very liberal approaches in land governance.

Figure 2: Land regulation indicators



Source: SWINNEN et al. (2013).

Among the 24 EU countries for which we have data, the most regulated land "markets" are in France (TRI = 9) and Hungary (TRI = 8). In France, regional organizations – the so-called SAFERs[1] – determine a minimum and maximum price bracket within which the tenant and the owner can agree a contract price. These organizations effectively control the local land markets through their powers to buy, sell and rent out agricultural land. Effectively, they ensure that land is only owned by working farmers. The SAFERs also control the level of farm restructuring and growth by requiring farmers to get authorization from them for farm expansion (LATRUFFE et al., 2013). In Hungary, land can only be owned by individuals or families ("natural persons") – not by farming companies which operate a large share of the land. Ownership is restricted to Hungarian nationals and owners have an obligation to farm the land. The most liberal regulations exist in Ireland (TRI = 0), Greece (TRI = 0.25), and the UK (TRI = 0.5) among the Old Member States and in Romania (TRI = 1.5) and Czech Republic (TRI = 2.5) among the New Member States.

The aggregate numbers may bias to some extent the conclusions, in particular for countries with medium levels of the TRI. For example, Belgium has a TRI of 5 but all the regulations are in the rental market, which is very important in Belgium (approximately 70 % of the land is rented) and which is highly regulated: the tenant protection indicator (TPI) is 5 which is the highest of all countries (together with France). However, they have no other regulations (the other indices are all 0). The Netherlands is similar to Belgium in that it has quite significant regulations in the rental markets to protect the tenants (TPI = 4) but no other land regulations (other indicators are 0).[2] This contrasts with France which has extensive regulations both in the rental and in the sales markets.

Another example is Poland. Poland's TRI is 6.5, but there is a large difference between the sales and rental market regulations. In Poland, where most of the land is owned and operated by (small) family farms (only 20 % is rented), there is very little protection for tenants (TPI = 1) but significant regulations protect (family) farms who operate on land they own: their owner protection index (OPI) is 3.5. Together with Hungary, where the OPI = 5, this is the highest of all countries.

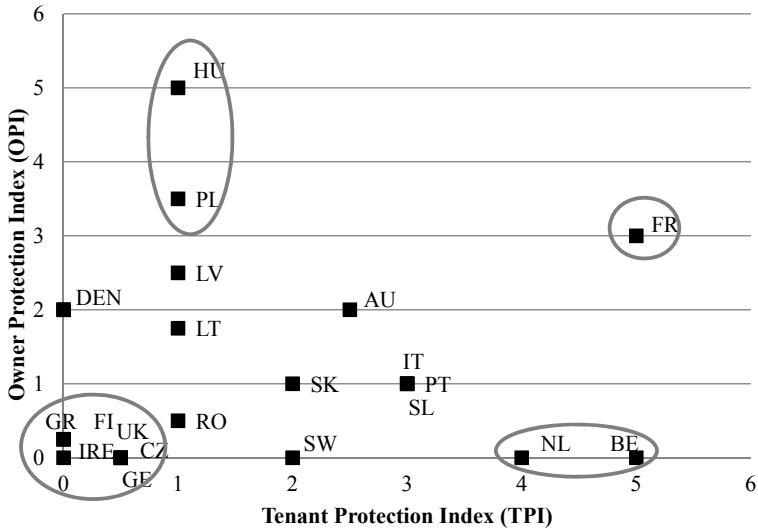
Figure 3 summarizes these different regulatory "patterns". France has a high regulatory index for both rental and sales markets. Belgium and the Netherlands have a high regulation index for rental markets but not for sales markets; and Poland and Hungary vice versa. Then there is a group of countries

[1] Sociétés pour l'aménagement foncier et l'établissement rural (SAFER).

[2] As we will document later, tenant (rental) regulations have been significantly liberalized in the Netherlands in the 1960s and in 2007 – they were more stringent before.

(including Ireland, Greece, the UK, Finland, Germany and the Czech Republic) with very little regulations in either land rental or sales markets.

Figure 3: Correlation between the Tenant Protection Index (TPI) and the Owner Protection Index (OPI)



Source: SWINNEN et al. (2013).

4 FACTORS INFLUENCING LAND INSTITUTIONS AND REGULATIONS (IN EASTERN EUROPE)

SWINNEN et al. (2013) show that the relationship between land insitutions (rental versus sales markets) and the extent of regulation is quite different in Western versus Eastern Europe. They show that the correlation between the share of land renting and land regulations (in particular measures to protect tenant security) is strong in Western European countries, while this is not the case in Eastern EU Member States. They offer hypotheses for the relationship in Western Europe. Here, we focus on Eastern Europe.

4.1 Legacy of the communist era and post-communist reforms

The nature of the land markets in Eastern Europe cannot be understood without considering the communist control over land between 1950 and 1990. Virtually all countries have gone through some form of land reform, farm privatization and restructuring, heavily affecting their current land markets

(WEGREN, 1998; MEYERS, KAZLAUSKIENE, 1998; TILLACK, SCHULZE, 2000; ROZELLE, SWINNEN, 2004). Yet the resulting land markets and land use differ strongly among countries.

4.2 Land reforms and land markets

Various factors, including land reform procedures (who themselves are the result of political economy equilibriums)[3], production factor endowments, market imperfections, existing institutions, and transaction costs have all affected the recent development of land markets in Eastern Europe (PETRICK, WEINGARTEN, 2004; SWINNEN et al., 2006).

In particular, there is a relationship between the organization of the farms and the development of land markets. The large differences in renting land between countries are related to the importance of corporate farms. For example, in the Czech and Slovak Republic 70 % of the total agricultural land area or more is used by corporate farms. Also in Hungary, Bulgaria, Kazakhstan or Moldova, corporate farms still use around half of all land. In contrast, corporate farms have virtually disappeared in countries such as Albania and Azerbaijan, where more than 95 % of the land is used by family farms. These differences have important implications for the development of land rental markets, since these corporate farms rent most of the land they operate on.

In an attempt to explain these differences, SWINNEN and VRANKEN (2007) and MACOURS and SWINNEN (2002) identify several "patterns of land market development". One pattern (A) is that of capital intensive agricultural economies where land controlled by state and collective farms under the Communist regime was restituted to former owners and where large scale corporate farms continue to dominate. In these systems, after restitution, very extensive and active land rental markets developed. Renting is mostly from households to large scale corporate farms, often long term and based on formal contracts.

Examples of this pattern are Slovakia and the Czech Republic (and parts of Hungary). In the Czech Republic and Slovakia the rental market is very active. Large corporate farms, who use more than 70 % of the land, rent in 99 % of their land.

A very different pattern (B) is that of more labor intensive agricultural economies where land was either still owned by small farmers or where land was (at least partly) distributed in kind to rural households and where small scale family (household) farms dominate. There is relatively little land renting, mostly household to household and (initially) mostly informal.

[3] See SWINNEN (1999) and SWINNEN, HEINEGG (2002) for an explanation of the different land reform choices.

Examples of this pattern within the EU are Poland and large parts of Romania.[4] In Poland and Romania most agricultural land is operated and owned by farms, mostly small family farms. Less than 20 % is rented (see Figure 1). Initially, this land renting was short term and informal renting. However, renting has become more formal since EU accession because farmers can only receive EU subsidies for land on which they have formal rental contracts.

The strong differences in land market developments result from a combination of factors: differences in privatization and land reform choices, and differences in technology and the role of agriculture in employment and in the economy. In Pattern A countries land was restituted to former owners in the 1990s, most of whom were no longer active in agriculture, with the share of agriculture in employment as low as 11 % by the 1990s. Farming was capital and land intensive: the labor/land ratio in the Czech Republic and Slovakia was around 0.13 workers per hectare. In combination the technology and land reform choice contributed to a consolidation of the large-scale farming structures, which use more than two-thirds of all land in the Czech Republic and Slovakia. These farms continued to use the land on which they had been operating, but now had to pay rents to the new owners. As farming companies, with formal administrations and official book-keeping, the farms use written rental contracts. The companies prefer longer term contracts as it provides them stability in their operations – and possibly locks the owners into lower payment contracts, as payments were generally low at the start of transition. Hence, with land mostly used by large farms and mostly owned by non-farming households, who received the land through restitution, formal renting is very widespread.

In contrast, in Pattern B countries, agricultural employment was much higher: in Poland and Romania more than 25 % of total employment was in agriculture in the early 1990s. Farming was much more labor intensive: the labor/land ratio was 0.27 in Poland and 0.21 in Romania, about two times higher than in Slovakia and the Czech Republic. In Poland, farms owned (most of) this land throughout the Communist regime. In Romania, they received it through a combination of land distribution in kind to rural households and restitution. The combination of the land property rights distribution and the labor intensive technology caused the domination of small household farms who use much of the land. As a consequence, rural households themselves generally use most of the land they own.[5]

[4] Examples outside the EU are Albania, Azerbaijan and the Kyrgyz Republic.

[5] Some of the land renting also takes place within families and is related to migration, which is very extensive in countries like Romania. Informal renting allows use of the land while some of the members of the households are abroad, often temporary.

4.3 Land regulations

Unlike in West European countries, where rental regulations are stronger if the share of rented land is higher, this is not the case in Eastern Europe. The reason is the very different structure (and history) of the rental markets in Eastern (vs. Western) Europe. In Eastern Europe, a large part of land renting is from small land owners to large farms – the opposite of what was the case in Western Europe historically. Hence, in Eastern European countries there was much less political pressure from the tenants on governments to protect their operations and improve tenure security through regulations. The "power balance" in this (reverse tenancy) relationship is clearly very different than in Western Europe when the tenure regulations were introduced.

The main land regulations in Eastern Europe are rules to prevent foreigners from purchasing farm land. In fact, if one excludes for the regulations related to foreign ownership, the OPI reduces to 2 or less in all New Member States (except for Hungary where it reduces to 3). While these restrictions were introduced in all Eastern Member States (with the exception of Slovenia) the implementation of the rules has been quite different among the Member States. There are differences in the way "foreigners" are defined in the legal restrictions, and in the conditions that foreigners have to fulfill in order to (exceptionally) obtain ownership of agricultural real estate. The restrictions have been strongest in countries like Poland and Hungary, two countries with strong political representation of small farmers and bordering on (much) richer neighbors (Germany and Austria, respectively).

The restrictions on foreign ownership have affected the efficiency of land exchanges, land allocation and productivity growth, but the impact was mitigated by several factors (SWINNEN, VRANKEN, 2009). First, there are no restrictions on renting land to foreigners. Second, the restrictions are only one element constraining the functioning of the land markets in the New Member States. Several other impediments are affecting the development of the land markets, such as high transaction costs (DALE, BALDWIN, 2000). Third, there are exceptions to the restrictions on foreign ownership of agricultural land.[6] Furthermore, in several countries informal arrangements have emerged.

A key factor is also that, while the restrictions have held back the direct benefits of foreign investment, agriculture in the New Member States has benefited extensively from large amounts of foreign capital in the food industry and agribusiness. These investments have had significant, positive spillover effects on

[6] For example, in Lithuania, land ownership by foreign companies is not restricted and others allow ownership up to a maximum amount. In several countries, there are no restrictions on foreign ownership of land for intensive animal husbandry.

the farms, as foreign companies have introduced technology, know-how and capital into the food chain, which has contributed to greater investment and enhanced product quality in agriculture (DRIES, SWINNEN, 2004, 2010; WORLD BANK, 2005).

Where a liberalization of these regulations is politically difficult, one way to reduce their negative impact is to focus on a relatively moderate liberalization, such as increasing the maximum amount of land that foreigners could acquire without restrictions and allowing foreigners to acquire farm buildings and the land on which these are built without restrictions. Such reforms would still prevent the purchase of large areas by foreigners but could result in substantial economic effects because they would allow those foreign investors to combine renting and owning land for their farm operations; as do many farms in developed countries.

5 CONCLUSION

There is enormous heterogeneity in land markets and regulations in Europe. The diversity in how land is exchanged and in how land rights and exchanges are regulated within a "single" agricultural market and a "common" agricultural policy in the EU is remarkable.

Most of the discussions on land reform in Eastern Europe in the early 1990s focused (often implicitly) on the efficiency of land sales markets and land ownership. Yet, European land governance systems clearly illustrate that a modern agricultural system can thrive in a land tenure system when a large part of the land used by farmers who do not own (most of) the land. Choosing between buying (owning) land and renting land implies a trade-off between security of operations, capital requirements, and shorter term contracts allowing for adjustments to reflect change in market conditions. The latter is particularly important in volatile or uncertain environments. For these reasons, many farms prefer a mix of ownership and renting of land, where the optimal mix will depend on local institutions and regulations.

The restrictions that Eastern European countries imposed on foreign investment in their land markets may yield lessons for countries which are considering strategies of optimal governance for large scale land acquisitions by foreign investors (DEININGER, 2013). Restrictions on foreign ownership constrain the inflow of much needed capital, know-how and technology for agricultural development. Yet a good combination of (moderate) liberalization and regulation of land markets, for example by imposing maximal foreign ownership and allowing secure rental agreements, may address both political sensitivities and allow much of the economic benefits to occur.

It is also important to point out that much of the benefits from foreign investment in agriculture come indirectly from the spillover effects of foreign investment in the food industry and agribusiness which led to improved access to finance, increased investments, and considerable technology and quality improvements of local farms (DRIES, SWINNEN, 2004).[7] Similar effects can be observed in modern supply chains in developing countries (MAERTENS, SWINNEN, 2009; MINTEN et al., 2009).

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[7] There were horizontal and vertical spillover mechanisms through which this has happened. First, subsequent to foreign investment, processing companies initiated a process of vertical coordination through contracting with local suppliers thereby interlinking input and output markets. This contracting was associated with enhanced quality of supply while at the same time companies provided assistance programs to improve management and to enhance supplier access to technology, credit and other inputs. In combination, these contracts and assistance programs were designed to overcome market imperfections. This process led to important positive vertical spillovers for suppliers (GOW, SWINNEN, 1998; DRIES, SWINNEN, 2010). Second, horizontal spillovers occurred when domestic companies having observed this successful vertical integration, embarked upon similar strategies (GOW t al., 2000). In combination, these effects have caused significant improvements in small suppliers' investments, productivity and product quality.

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AFTER THE TRANSITION: THE IMPACTS OF EU MEMBERSHIP UPON THE AGRICULTURE OF THE NEW MEMBER STATES[1]

CSABA CSAKI, ATTILA JAMBOR

1 INTRODUCTION

In 2004 and 2007, 12 New Member States (NMS)[2] joined the European Union, causing several changes in the field of agriculture. CSAKI and JAMBOR (2009) analyzed the impacts of the first five years of EU accession on NMS agriculture and concluded that EU accession has had an overall positive impact in the region, although member states capitalized their possibilities in a different manner. KISS (2011) echoed the above conclusion and added that accession has created an incentive to NMS agriculture but also had negative effects due to tough competition in the enlarged market. MÖLLERS et al. (2011) analyzed structural changes in NMS agriculture and rural livelihoods and drew several policy recommendations in light of initial experiences, especially considering the ongoing debate on the reform of the Common Agricultural Policy (CAP).

Despite the apparent importance of the topic, there is a limited number of research dealing with impacts of EU accession on NMS agriculture. Therefore, the aim of this chapter is to assess the developments in NMS agriculture and to evaluate the status of the sector in the light of latest available data as well as to identify those factors lying behind different country performances. In order to achieve these goals, the present chapter is structured as follows. Section 2 analyses changes in agricultural performance after accession, followed in Sections 3 and 4 by agricultural trade and price-income issues. Section 5 considers the positive and negative effects of EU accession, while Section 6-8 identify agricultural policy factors lying behind different country performance. Section 9 concludes.

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[1] A version of this chapter has been previously published *in Post-Communist Economies, 25(3)*: 325-342 (2013).

[2] Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined in 2004, while Bulgaria and Romania joined in 2007 to the European Union.

2 CHANGING AGRICULTURAL PERFORMANCE

As to agricultural production performance, impacts of accession can be measured by a number of indicators such as the role of agriculture, values and indices of agricultural output and productivity.

The role of agriculture in a national economy is best characterized by the share of agriculture in GDP, which is shrinking all over the world. This tendency continued after accession in the NMS as well. The highest role of agriculture in GDP can be observed in Bulgaria (14 %), Romania (13 %) and Lithuania (6 %) in 2000, whereas other NMS countries had a share of 3-5 %. After EU accession, shares in all cases decreased, though largest falls can be seen in countries with originally high values. In 2010, the share of agriculture in GDP was below 7 % in all countries analyzed (the majority was between 2-4 %) but we should note that it is consistently higher in all countries if food industry is taken into account. Note that shares of individual NMS were still higher than EU27 average.

Table 1: Share of agriculture in GDP in the NMS (percentage)

Country	2000	2003	2006	2010
Bulgaria	13.56	11.20	7.17	5.36
Cyprus	3.60	3.41	2.40	2.08*
Czech Republic	3.89	3.13	2.60	2.40
Estonia	4.82	3.99	3.21	2.86*
Hungary	5.40	4.30	4.01	3.53
Latvia	4.60	4.13	3.51	4.14
Lithuania	6.35	5.00	4.30	3.51
Malta	2.35	2.89	2.74	1.83**
Poland	4.96	4.39	4.29	3.54
Romania	12.51	13.03	10.51	7.14
Slovakia	4.47	4.52	3.59	3.86
Slovenia	3.30	2.50	2.39	2.46
EU27	2.31	2.03	1.65	1.48

Source: Own composition based on WORLD BANK (2012).

Notes: * Data for 2008, ** Data for 2009.

The development of agricultural production is another key indicator of assessing the impact of accession. As Table 2 suggests, there are significant differences regarding the index of agricultural output in the NMS. It can be seen that Baltic countries and Poland increased gross agricultural output significantly in real terms from 2000 to 2011, while agricultural output in real terms decreased or remained stable in all other countries concerned. Note that the latter trend is valid for EU15 as well as for EU27. The highest increase is observable in the Baltic countries and Poland (approximately +40 % in a decade), while the largest

decrease was in Bulgaria and Malta (around -25 % in a decade). Moreover, as a consequence of unfavorable weather conditions, agricultural output in 2009 was consistently lower than in 2006 in all countries but Czech Republic and Malta.

Table 2: Index of agricultural output in real terms in the NMS (2000=100)

Country	2003	2006	2009	2011*
Bulgaria	84.30	78.24	69.98	74.76
Cyprus**	100.00	93.28	78.31	92.18
Czech Republic	83.58	87.18	90.97	94.21
Estonia	99.65	110.96	80.99	134.60
Hungary	86.54	88.29	79.63	100.87
Latvia	120.99	152.32	120.39	146.18
Lithuania	99.64	109.61	108.42	145.08
Malta	91.35	83.48	119.74	76.46
Poland	97.95	110.46	96.77	141.96
Romania	120.46	97.09	83.05	101.91
Slovakia	97.68	86.53	84.94	85.99
Slovenia	89.80	95.24	72.08	96.21
EU15	95.79	86.84	85.77	95.97
EU27	94.98	85.12	84.60	93.40

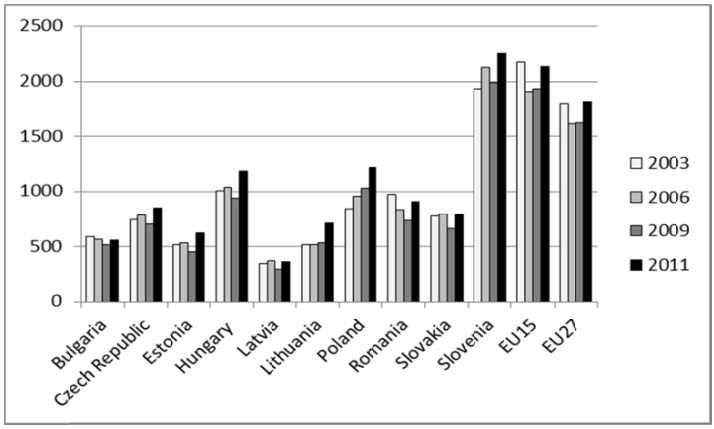
Source: Own composition based on EUROSTAT (2012).

Notes: * Estimated data, ** For Cyprus, 2003=100.

Similar conclusions can be drawn if analyzing agricultural output per hectare in the NMS after accession (Figure 1). This indicator varied between 500-1000 euro/ha in the years analyzed. The highest values of agricultural output per hectare are observable in Slovenia (around 2000 euro/ha), while lowest values show up for Latvia in all years analyzed. Agricultural output per hectare increased significantly after EU accession in the NMS and thereby Hungary and Poland could reach the 1000 euro/ha level by 2011. Figure 1 also well presents the effects of climatic conditions and the economic crisis, showing consistently lower values for 2009. Note the gap between EU15 and NMS in land productivity and that it was only Slovenia reaching EU15 average.

Another measure closely linked to agricultural production performance is productivity. Figure 2 shows the diversity of cereal yields in the NMS. In 2010, the highest yield was observable in Slovenia (5.97 tons/ha), while the lowest in Cyprus (1.60 tons/ha). After EU accession, all NMS but Cyprus and Lithuania could increase their cereal yields somewhat after accession, of which the Hungarian growth was the biggest (almost 60 per cent). However, NMS still lags behind EU15 levels in land productivity.

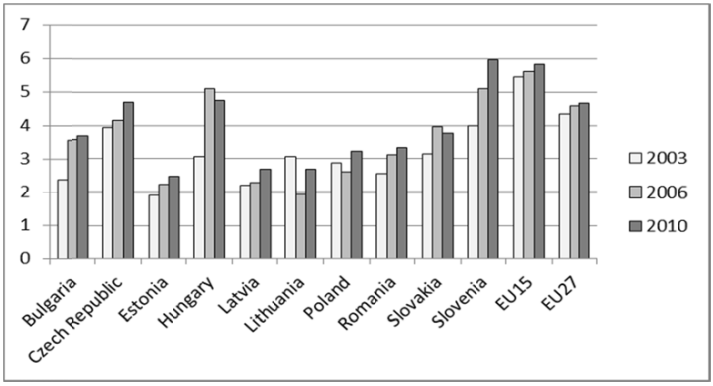
Figure 1: Agricultural output per hectare in real terms in the NMS (euro/ha)*



Source: Own composition based on EUROSTAT (2012) and FAO (2012).

Note: * Data for 2011 based on estimations.

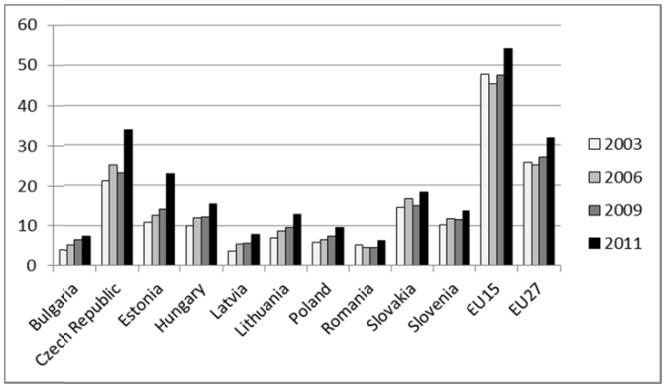
Figure 2: Yield of cereals in NMS (tonnes/ha)



Source: Own composition based on FAO (2012).

As to changes in labor productivity, all NMS showed an increase after accession, though a considerable 4-5 times lag still exists compared to EU15 countries (Figure 3). In 2011, the highest value was in the Czech Republic (34,000 euro/AWU), which is around EU27 average, while the lowest was in Romania (6,000 euro/AWU).

Figure 3: Agricultural output per annual work unit in real terms in the NMS (1000 euro/AWU)*

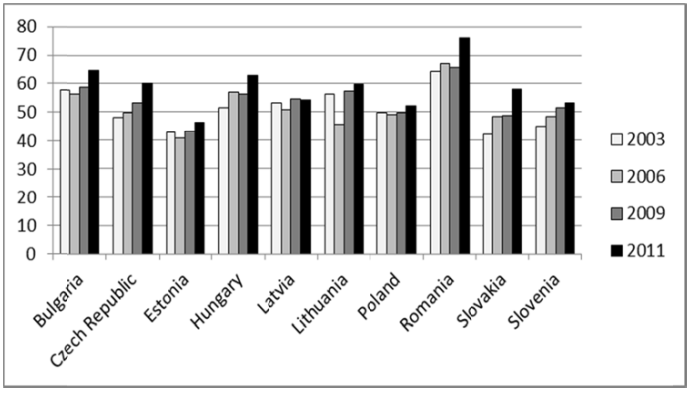


Source: Own composition based on EUROSTAT (2012).

Note: * Data for 2011 based on estimations.

EU accession has also affected the structure of agricultural production in the NMS (Figure 4). The structure of production after the accession has moved towards a more extensive direction, namely towards crop production. In 2011, the share of crop output reached almost 75 % of total agricultural output, while it was around 50-60 % in the majority of the cases. Such a change was mainly due to the grain intervention system of the Common Agricultural Policy, increasing feed prices in the region, causing hard times for the anyway capital-poor livestock sector.

Figure 4: Rate of crop output in total agricultural output (percentage)



Source: Own composition based on EUROSTAT (2012).

Note: * Data for 2011 based on estimations.

On the whole, it can be concluded that EU accession has had a considerable impact on agricultural performance of the NMS. The role of agriculture has decreased, agricultural output has changed to a limited extent, while productivity lag has decreased somewhat but has still remained significant. Moreover, accession has made the agricultural production structure of the NMS to become more extensive, resulting in a decline of the animal husbandry sector in the region.

3 INCREASED AGRI-FOOD TRADE

Besides agricultural production, accession has had a significant impact on agri-food trade in the NMS. First of all, the value of agri-food trade has measurably increased in nominal terms after 2004 (Table 3). The agri-food export of Hungary doubled from 2003 to 2011, while that of Latvia and Romania increased almost six times. At the same time, agri-food import tripled in the majority of the cases. The biggest increase was observable in Latvia for export and in Slovakia for import, while the smallest increase in agri-food trade was in Malta in the period analyzed. Note that export growth was faster than import growth in most cases.

Table 3: Changes in agri-food trade in nominal terms in the NMS (2003=100)

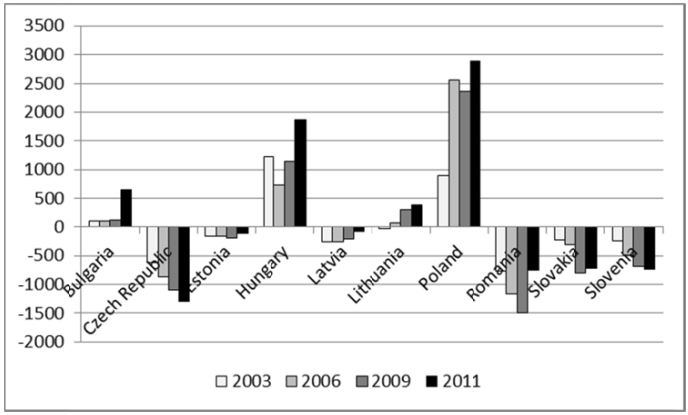
Country	Export			Import		
	2006	2009	2011	2006	2009	2011
Bulgaria	158	281	465	172	322	429
Cyprus	127	124	164	159	201	220
Czech Republic	189	245	310	173	224	278
Estonia	179	214	336	152	182	239
Hungary	128	164	225	205	244	310
Latvia	275	414	650	178	229	304
Lithuania	233	359	514	207	284	411
Malta	157	87	158	123	142	152
Poland	212	268	351	188	271	362
Romania	172	341	618	159	250	290
Slovakia	258	329	477	224	338	433
Slovenia	147	194	279	168	230	290

Source: Own composition based on EUROSTAT (2012).

However, agri-food trade growth in nominal terms has not resulted in an improvement of agri-food trade balance in most cases, as indicated by Figure 5. Only Bulgaria, Hungary, Lithuania and Poland showed a positive agri-food trade balance in the period analyzed, out of which the Polish balance exceeded 2.5 billion euro and the Hungarian almost reached 2 billion euro in 2011. However, accession has further deteriorated agri-food trade balance in the majority

of the NMS. The biggest deficit was observable in the Czech Republic and Romania (around 1.5 billion euro in 2011).

Figure 5: Agri-food trade balance in the NMS (million euro)



Source: Own composition based on EUROSTAT (2012).

However, country performances are based on different product structure (Table 4). The share of raw materials in agri-food export has increased everywhere but Cyprus, Poland and Romania in the region after accession, while that of processed products in agri-food import has also increased in the NMS except for Latvia, Lithuania, Malta and Slovakia. These changes clearly refer to the deteriorating agri-food trade structure in the region. The biggest raw material oriented agri-food exporter was Romania in the NMS, while Malta imported the most processed product in her agri-food import.

Regarding agri-food trade performance, it can be concluded that both export and import has increased in the region in nominal terms after accession, while country performances have differed significantly. The largest agri-food exporters of the region were Poland and Hungary, while eight countries have experienced an increasing deficit in the region after 2004. Moreover, there was a high and increasing share of raw materials in agri-food export of the NMS together with a same trend of processed products in agri-food import in the majority of the cases. It is important to notice that Poland had a remarkable success in its agricultural trade performance since from an agricultural importer it became the largest exporter in a region in a decade.

Table 4: Share of raw materials and processed products in NMS agri-food trade (percentage)

Country	Raw materials in export				Processed products in import			
	2003	2006	2009	2011	2003	2006	2009	2011
Bulgaria	39	45	50	57	76	80	77	78
Cyprus	56	57	50	51	73	73	75	75
Czech Republic	22	32	36	35	67	71	75	74
Estonia	12	20	20	29	77	79	81	78
Hungary	33	34	38	35	72	73	75	76
Latvia	18	23	43	35	75	75	71	72
Lithuania	33	34	43	43	71	67	64	56
Malta	10	28	21	29	81	76	81	81
Poland	28	24	25	20	62	66	68	67
Romania	67	68	68	61	60	79	74	70
Slovakia	26	32	36	35	75	73	77	75
Slovenia	13	34	44	48	70	68	68	65

Source: Own composition based on EUROSTAT (2012).

4 INCREASING PRICES AND INCOMES

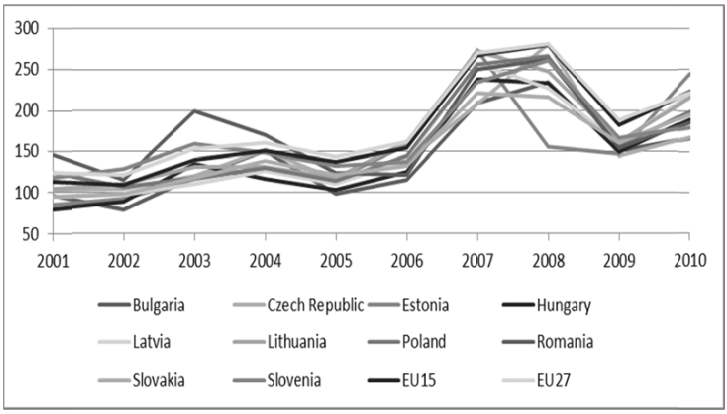
EU accession has also had a significant impact on agricultural prices and incomes. Agricultural raw material prices have shown a remarkable increase for a few years, usually demonstrated by changes in wheat producer prices (Figure 6). Wheat producer prices in the NMS have followed EU respective average prices to a great extent and by 2008, they increased by roughly 2.5 times compared to 2000. According to general price trends, the initial decline was followed by another price hike in 2011 in world agricultural product markets (FAO, 2011), which was also valid for the NMS.

Similarly to wheat producer prices, those of fresh cow milk have also shown a significant increase during the past few years (Figure 7). However, milk prices varied to a great extent country by country and ranged between 207 USD (Lithuania) and 635 USD (Romania) per ton in 2009. Compared to 2000, milk producer prices have increased by 50-80 % in the NMS except for Bulgaria and Romania where the growth was two and five times, respectively. NMS milk prices were generally below EU15 prices apart from Romania. Note that the largest price adjustment occurred where pre-accession producer prices were lower.

Increasing producer prices have also resulted in an increase in producer incomes in the NMS after accession. Real farm income per annual work unit (AWU) has grown in each and every country in the region from 2003 to 2011, though to a different extent (Figure 8). The biggest increase was observable in Estonia (almost three times), while the smallest in Romania (almost stagnation).

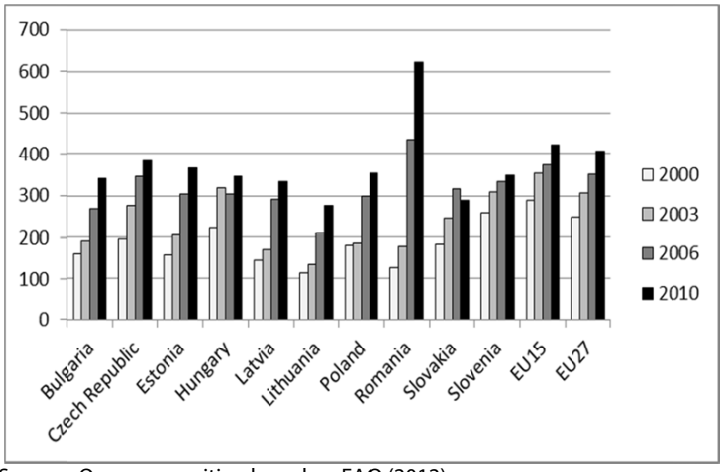
EU average farm incomes have hardly changed in the period analyzed and thereby agricultural income adjustment, similarly to price adjustment, has begun between old and new members.

Figure 6: Wheat producer prices in the NMS (USD/ton)



Source: Own composition based on FAO (2012).

Figure 7: Fresh cow milk producer prices in the NMS (USD/ton)

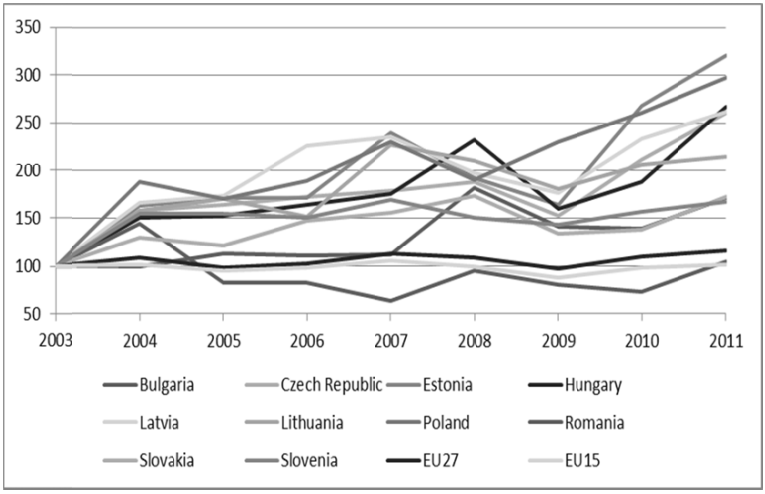


Source: Own composition based on FAO (2012).

On the whole, a significant increase has occurred in NMS agricultural producer prices in nominal terms, while real producer prices have still remained below EU15 levels. Price adjustment was larger in countries with lower pre-accession levels. There has been a significant increase of farming incomes in the NMS,

mainly due to agricultural subsidies, while initial differences have remained among countries.

Figure 8: Index of real farm income per annual work unit in the NMS (2003=100)



Source: Own composition based on EUROSTAT (2012).

5 POSITIVE AND NEGATIVE AGRICULTURAL EFFECTS OF ACCESSION

EU accession has had an overall positive impact on NMS agriculture. First, the enlarged EU market, containing around half a billion people, offers tremendous opportunities for their agricultural sectors. Second, as discussed above, EU accession has increased farmers' incomes. Third, the accession has provided a solid and uniform policy and institutional framework under which national agricultural policies are implemented.

However, besides these benefits, several difficulties of EU membership have emerged. First of all, the accession has made the NMS part of a large, rather competitive market, where they have limited potential to withhold competitive pressure. This situation is due to the rapid emergence of vertically coordinated food chains including hypermarkets, supermarkets and multinational agro-processing companies with regional procurement systems, thus creating new and much more competitive conditions both for producers and consumers; the market share of foreign-origin products has increased significantly, while domestically produced products have to compete with the free flow of foreign produce. Due to very strong price competition, consumers are generally the beneficiaries of these changes. At the same time producers are not always able to adjust, or

to cope with business practices employed by the large chains. The concentrated and Europe-wide procurement systems of the major chains create high requirements for suppliers and impose strong price pressures as well. Farmers' adjustment to the enlarged integrated food markets is one of the most pressing demand of the post accession situation and requires public involvements (CSAKI, JAMBOR, 2010).

The evolving food crisis has also resulted in several difficulties. High prices of agricultural raw materials and energy, in addition to the obligatory EU standards after accession, have all made the manufacture of processed products more expensive. These additional costs are difficult to pass on to consumers due to the fierce price competition. As a result, the regional food industry has found itself under extreme pressure, from which it still has not recovered.

The subsidy policy of competitors is also a source of concern. The traditionally high agricultural subsidies of the EU15 have artificially increased the competitiveness of agri-food products imported by the NMS after accession, generating unequal competitive market positions in EU27 markets (CIAIAN et al., 2010). This argument is strengthened if account is taken of the small proportion of direct payments that have been received by the NMS immediately after accession. Moreover, adjustment to EU subsidy levels, coupled with gaining acquaintance of the new system and the creation of the necessary institutional infrastructure, have been time consuming, which has delayed the response of the region to address its competitive disadvantages.

The handicap of small farmers also raises serious problems. As discussed earlier, one of the major characteristics of NMS agriculture is the diversity of farming structures. This diversity means that large as well as small farms exist in national agricultures at the same time, differing in terms of both attitudes towards commercialization and factual circumstances. However, the large number of subsistence and semi-subsistence farms is a special characteristic of the NMS since these farms are fundamentally different from those which are called "small farms" in the EU15 and they are hardly comparable to any segments of the EU15 farming sector and that they require special attention and policies (MÖLLERS et al., 2011). However, it appears that subsistence and semi-subsistence farms are handicapped in many ways. Before accession, agricultural policies mainly neglected these farms and currently the CAP provides almost nothing for these farms. As a result, on the one hand, the agricultural incomes of small farms fail to provide them with an acceptable level of living in most cases. The majority of small farms hardly have any relationship with national or regional markets, making it difficult for them to sell their produce. On the other hand, the number of jobs outside agriculture is also limited in rural areas, therefore family members are often forced to leave the rural area permanently. Specific

policies are needed for managing this problem including policy actions focused on small farms (CSAKI, JAMBOR, 2010).

Moreover, one of the major problems of accession for NMS was the widening urban-rural income gap. Rural population and rural areas have been lagging behind since the beginning of the transition in the early 90s and this has not yet been solved by accession.

On the whole, it can be concluded that the "one size fits all" approach of the CAP does not work as it fails to recognize the structural diversity of individual member states. More targeted and locally adjusted agricultural policy programs are needed in the future.

It can be well seen from the analyses above that EU accession has had an overall positive impact to regional agriculture, though individual country performances have significantly differed. These differences have evolved due to a number of reasons.

6 INITIAL CONDITIONS

The first reason behind different country performances lies in initial conditions. Different distribution of agricultural land quality and quantity together with the differences in agricultural labor and capital endowment definitely had an impact. Poland and Romania had the biggest agricultural land and labor among NMS, while the largest capital endowment could be found in Slovenia. In other words, initial differences in the factors of production have had a considerable impact on country performances after accession.

Another important difference lies in farm structures. Except for Poland and Slovenia where small scale agriculture proves to be beneficial, present farm structures in the NMS are the result of a complex process of land privatisation and farm restructuring where both end of the "dual" farming system are still suffering by a kind of "transition phenomena". The small farms are generally too small and farmers are inexperienced and lack of resources, while large farms still have some heritage of the collective farming system with some embedded inefficiencies. Moreover, one of the key characteristics of the region is the high but decreasing number of small farms (MÖLLERS et al., 2011).

Besides these factors, national agricultural policy and institutional framework basically determine individual country performances. The assessment of these policies before and after accession provides a better understanding of such differences.

7 IMPACTS OF PRE-ACCESSION POLICIES

The post-accession performance of the NMS has been influenced strongly by the agricultural policy framework prevailing in the individual countries during the pre-accession period especially from 1998 to 2004. The candidate countries implemented quite different policies some with positive, others with negative impacts after accession.

Measures in favor of competitiveness enhancement have definitely proven to be beneficial. On the one hand, those countries where agricultural subsidies to farmers remained at a low level (e.g. Poland) have gained with the accession which has provided visible incentives for production and led to the increase of agri-food trade balance. On the other hand, those countries providing initially high and uneven price and market support (e.g. Hungary, Romania) are considered to lose with accession as it has brought hardly any price increase. Agricultural policy not in favor of measures aiming to enhance competitiveness was a failure, resulting in a situation where the majority of farmers were not prepared for the accession (SWINNEN, ROZELLE, 2006).

Differently implemented land and farm consolidation policies have also had diverse effects on post-accession country performance. Restrictive pre-accession land policies and the lack of land and farm consolidation (e.g., in Hungary) has negatively influenced the capacity to take advantage of the enlarged markets by constraining significantly the flow of outside capital to the agricultural sector (CIAIAN et al., 2010). Conversely, liberal land policies (e.g., in Baltic countries) helped the agricultural sector to obtain more resources and utilize better the possibilities created by the accession.

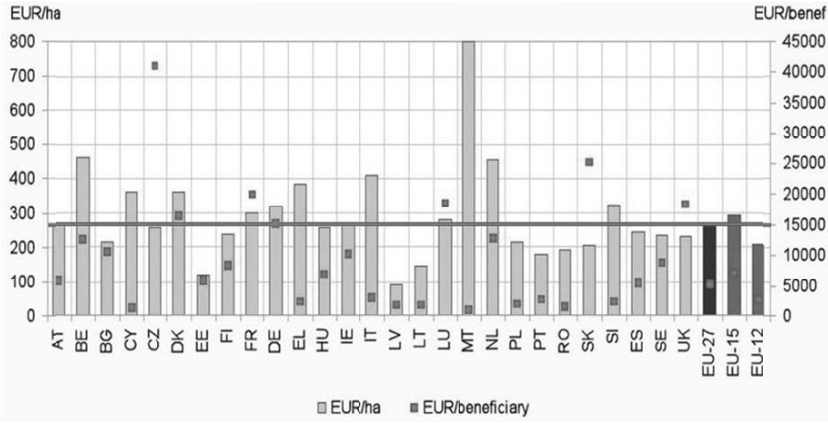
The ways in which the countries used EU-funded pre-accession programs such as SAPARD, ISPA and PHARE was also important. Those who focused on competitiveness enhancement and production improvement were better placed to realize the benefits post-accession. On the contrary, delays in creating the required institutions as well as the initial disturbances of implementation resulted in the loss of some EU funds in a number of countries (SWINNEN, ROZELLE, 2006).

8 IMPACTS OF POST-ACCESSION POLICIES

Besides pre-accession policies, individual country performances were also affected by policies implemented after 2004 and 2007. One of the most important issues in this regard was the introduction of the CAP based on the Copenhagen Agreement which provided a uniform framework for national agricultural policies. According to the agreement, the countries could choose between a simplified area-based payment system (SAPS) complemented with additional support for rural development and for implementing the EU15 type CAP. All

the countries, except Slovenia and Malta, opted for the simplified payment system, whereby the direct payment was 25 per cent of the EU15 level in 2004. The countries had the freedom to top up the direct payments which initially were set at 25 per cent of the EU15 level. They could transfer part of the rural development support to the direct payment or use national funds (initially a maximum of 30 per cent above the set EU level); all of the countries used this latter opportunity but to different degrees. Despite the fact that the NMS was not eligible for the total payments of the EU15, the CAP has significantly increased farmers' incomes, as shown before in Figure 8.

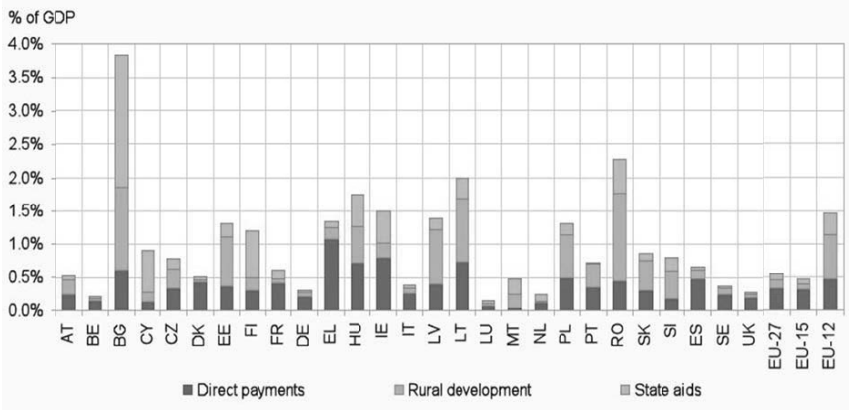
Figure 9: Average direct payments per hectare and per beneficiary in EU27 in 2008



Source: DG AGRI (2011).

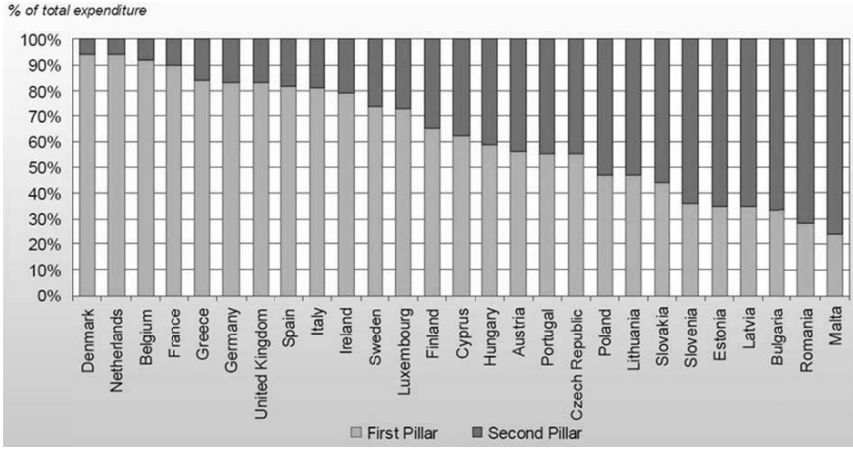
However, it is important to note that the level of support was set on the basis of the yields in the pre-accession period, causing a huge diversity in the distribution of direct payments at the European level (Figure 9). Direct payments varied between 100 euro and 800 euro per hectare and between 1000 euro and 40,000 euro per beneficiary in 2008 in EU27. The average level of direct payments was 300 euro/ha and around 6000 euro/farm, while the respective values for NMS were 200 euro/ha and approximately 2500 euro/farm. These differences have had a significant impact on country performances in the NMS after accession.

Figure 10: Total payments for agriculture in EU27 as share of their GDP (2009)



Source: DG AGRI (2011).

Figure 11: CAP expenditure between pillars in 2009



Source: DG AGRI (2011).

Total payments for agriculture have also measurably differed in the NMS after accession. As Figure 10 suggests, direct payments played a significant role in total national payments for agriculture. It can also be seen that Bulgaria and Romania spent a relatively high share of their GDP to agriculture, while there also existed significant differences between old and new member states (the average of EU15 was 0.5 %, while that of NMS was 1.5 %).

Besides direct payments, the second pillar of CAP also provides support for farms and for broader rural development purposes. However, individual country priorities in this regard were also different, as indicated by Figure 11.

Most NMS give priority to the second pillar, while EU15 countries mainly focus on the first pillar. Inside rural development, the biggest support goes to competitiveness enhancement and agri-environmental measures.

The grain market intervention system of the CAP has also proved to be important as a post-accession policy, experiences of which are controversial in the region. On the one hand, the intervention system helped to ease crop farmers' problems and provided them significant income, while on the other hand, it stabilized grain-feed prices on a significantly higher level prior to accession resulting significant difficulties for the livestock sector.

Finally, it is important to emphasize that the Common Agricultural Policy has brought safety for NMS agriculture. During the years of the economic crisis, national budgets under pressure might not have been able to appropriately subsidize agriculture and ease the impacts of the crisis.

9 Conclusions

The review of developments in the agricultural sector of the NMS has led to a number of conclusions. First of all, EU accession has had a significant impact on NMS agricultural performance. The role of agriculture has further decreased in the national economies, agricultural output has somewhat changed, while the productivity lag has decreased but remained remarkable. Furthermore, the accession has strengthened extensive ways of production. Regarding agri-food trade performance, it can be concluded that both export and import has increased in the region in nominal terms after accession, while country performances have differed significantly. The biggest agri-food exporters of the region were Poland and Hungary, while eight countries have experienced an increasing deficit in the region after 2004. There was a high and increasing share of raw materials in agri-food export of the NMS together with a same trend of processsed products in agri-food import in the majority of the cases. As to agricultural producer prices, a significant increase has occurred in the NMS in nominal terms, while real producer prices have still remained below EU15 levels. Price adjustment was larger in countries with lower pre-accession levels. There has been a significant increase of farming incomes in the NMS, mainly due to agricultural subsidies, while initial differences have remained among countries.

On the whole, results suggest that EU accession has had an overall positive impact on NMS agriculture. First, the enlarged EU market, containing around half a billion people, offers tremendous opportunities for their agricultural sectors.

Second, EU accession has increased farmers' incomes as well as provided a solid and uniform policy and institutional framework under which national agricultural policies are implemented. However, besides these benefits, several difficulties have also emerged after accession, out of which the limited potential to withhold competitive pressures, the lack of harmonized support levels, the handicap of small farmers and the rural-urban income gap should be emphasized.

It is also clear from the analyses that the NMS have significantly differed in using the possibilities of the enlarged market which has generated different performances due to initial conditions, pre-accession policies and post-accession policies. Among initial conditions, different distribution of agricultural land quality and quantity together with the differences in agricultural labor and capital endowment have to be mentioned. Regarding pre-accession policies, measures in favor of competitiveness enhancement, liberal land and farm consolidation policies as well as efficiently used pre-accession funds have proven to be beneficial. As to post-accession policies, the uniform policy framework has to be emphasized together with different levels of national support and the impact of macro policies.

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MARKETS AND MORALITY: THE RELEVANCE FOR TRANSFORMING THE AGRICULTURAL SECTOR IN TRANSITION COUNTRIES

ULRICH KOESTER

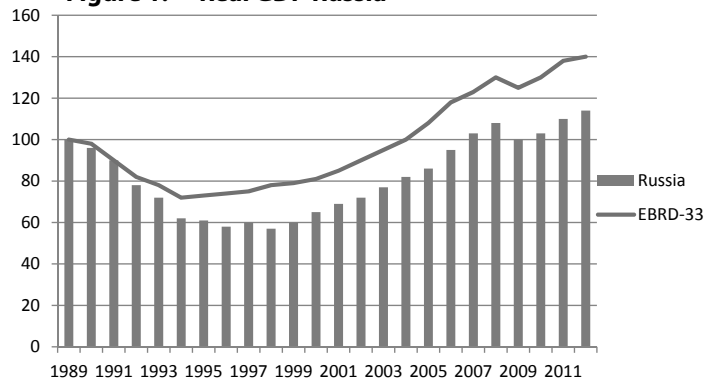
1 INTRODUCTION

More than two decades have passed since the beginning of transition in many countries from a planned to a market economy, and the expectations have not yet been met. There are still many countries in the Commonwealth of Independent States (CIS) where more people suffer from a lower standard of living than before 1990. Figures 1 and 2 illustrate that, despite the reforms, the Gross Domestic Product (GDP) in Ukraine and Russia, the two dominant Eastern European countries, is still lower than in 1989 and even lower than in the 33 countries classified by the European Bank for Reconstruction and Development (EBRD) as transition countries. In contrast, Belarus, a country that has largely avoided moving toward a market economy, fared much better than its two sister countries (see Figure 3), and also performed better than the average of the 33 transition countries. Not surprisingly perhaps, countries that followed, at least partly, the advice given by western economists lag in performance behind those who were less willing to accept market reforms. It is no wonder that belief in the market economy has declined in transition countries. It is obvious that many of the recommendations put forward by western economists, based on neoclassical economics, have not produced the desired effect.

The aim of this chapter is to highlight the importance of morality for the functioning of markets and, by doing so, to identify some of the shortcomings of neoclassical economics. The chapter will examine how the lack of morality and the recommendations based on neoclassical economics have contributed to the slowness of the transition. We will also argue that the legal design of transition was partly driven by moral concerns, as well as by the political power of influential lobby groups. Laws, which may have been based on the moral beliefs of the population, have had occasionally positive, but often negative effects on economic performance. Further, it will be demonstrated that the transformation of the agricultural sector has not only been slowed down by the specifics of morality and by the adopted legislation and its enforcement, but has likely long-lasting and irreversible effects. Finally, there will be some speculation

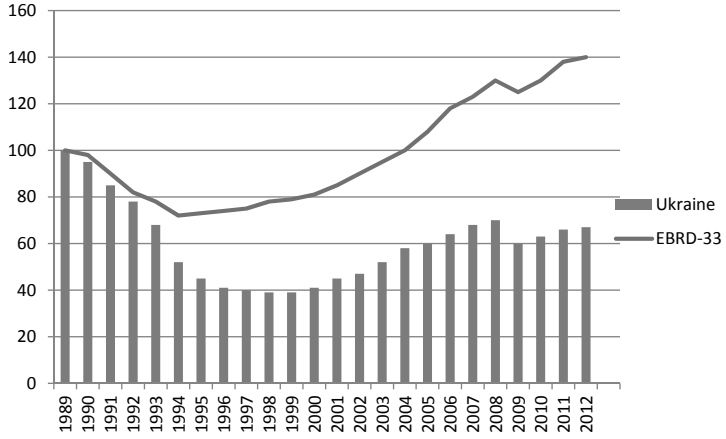
on how transformation of the agricultural sector would have looked if some of the key decisions in the first phase of transition had been different.

Figure 1: Real GDP Russia



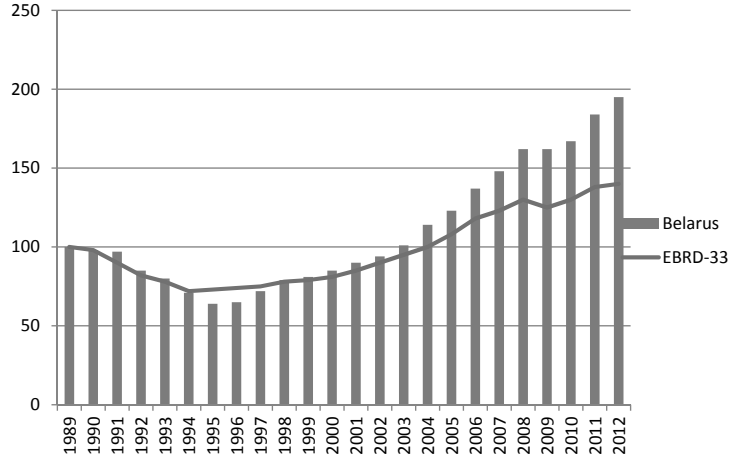
EBRD, Transition Report 2012

Figure 2: Real GDP Ukraine



EBRD, Transition Report 2012

Figure 3: Real GDP Belarus



EBRD, Transition Report 2012

2 THE IMPORTANCE OF MORALITY FOR THE FUNCTIONING OF MARKETS

It is widely understood among non-economists that a market economy invites immoral and thus unsocial behavior, which is in contrast to the opinion of mainstream economics. The often quoted title from a popular article in the New York Times, "The Social Responsibility of Business is to Increase its Profits" (FRIEDMAN, 1970), may serve as a representative reflection of the view of neoclassical economists. Indeed, Friedman's statement might be acceptable if a specific definetion of social responsibility or morality was accepted and if markets were to function in a very specific way. Hence, whether morality is of importance for the functioning of markets and whether the market mechanism is accepted from a moral point of view depends on what a specific society understands by morality and how markets work under the specific underlying conditions in a given country. Hence, it may well be that the market mechanism as coordinator of individual decisions may be accepted in one country and society and not in another.

Unfortunately, there is no general agreement on a clear definition of the term "morality." A widely held definition is as follows: Morality is a system of rules, moral norms and values, which are accepted by a society and which affect the social behavior of people. Morals are the rules of the game that may be laid down in legislation or may have evolved over time in verbal form. If this definetion were generally accepted there would not be "good" or "bad" morality. This

definition is only a description of the moral norms of a society. It is quite clear that these norms differ across societies and will change over time as they are partly determined by culture. It will be shown below that these values differ significantly between transition countries and countries with mature market economy.

The term "morality" can also be used normatively to refer to a code of conduct. Individual behavior can be classified as morally "bad" or "good" depending on the norms of the society under consideration. Whether alternative individual actions are rated as morally acceptable may differ among societies. Moreover, some philosophers recommend basing the assessment on a trilogy, which states that what matters is the motive of the action, the action itself, and the consequence. If one of these three does not match moral standards, the individual has acted immorally. The *homo economicus*, who by definition only tries to maximize his socially independent utility function, behaves immorally from the point of view of this group of philosophers. Consequently, there is a huge divide between morally acceptable behavior on one side and economic behavior by the *homo economicus* on the other side.

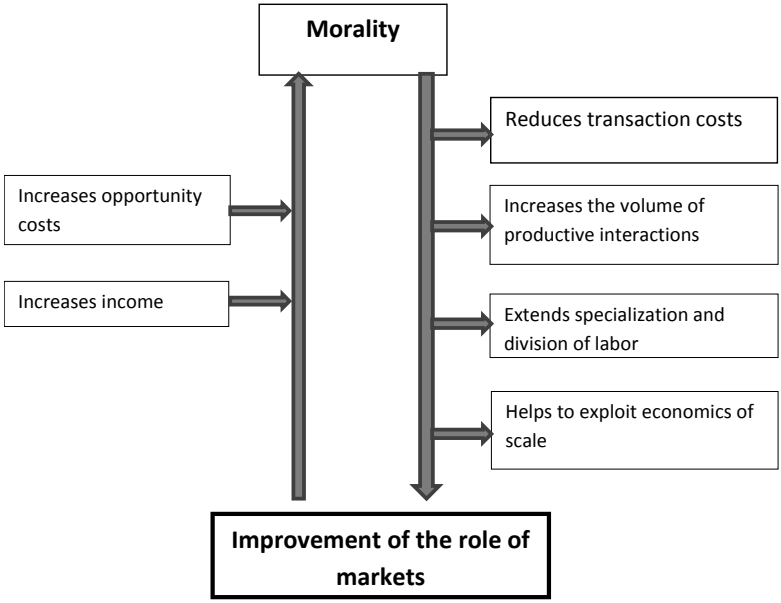
Economists and some philosophers of moral ethics tend to define moral behavior differently. They only focus on the consequences of individual actions. The motive does not matter from a society's point of view if the consequences are acceptable. One may accept this definition – which, of course, is a value judgment – if one wants to justify individual coordination by the market mechanism as morally acceptable. It may be argued that this second approach is more practical; well-intended motives may lead to negative effects because the individual can hardly foresee the consequences in the highly interwoven modern world. There are many cases where well-intended actions lead to undesired consequences. The individual may not be able to foresee the consequences of his action in a highly interdependent world. This leads us to the first interim conclusion.

> *Whether markets and morals can be happily intertwined first depends on the definition of morality. However, even if the economists' definition of morality is accepted, it cannot be taken for granted that markets can always be rated positively from a moral point of view.*

3 THE RELATIONSHIP BETWEEN MORALITY AND MARKETS

Markets and morality have an important characteristic in common: both can constrain individual behavior and make it predictable. Thus, both can contribute to reduced transaction costs, thereby increasing the volume of productive interactions between agents. Actually, there can be a positive interrelationship between moral behavior and the volume of market transactions. Figure 4 highlights a possible relationship.

Figure 4: Interdependency between morality and markets



The level of transaction costs largely depends on the certainty of the contracting agents' behavior. With predictable behavior, transaction costs are lower. Hence, a high standard of morality may reduce transaction costs. However, as highlighted above, moral behavior is assessed by the society which the agent belongs to. It may be a closed society where individuals treat each other according to specific codes of conduct, but treat outsiders quite differently. Thus, a high standard of morality will reduce transaction costs within a given society, but not for interactions with outside members. The functioning of markets will only be improved within the society. Actually, such closed societies may even forgo formal market regulation as everyone is constrained by moral standards.

A good example of a closed society with high moral standards and narrow markets seems to be the functioning of kibbutzim in Israel. At one time, the kibbutz was largely a closed society where transactions were mainly limited to the members and concerned both output and labor markets. Understandably, income growth of the organizations was limited and fell behind overall growth in the economy. Eventually, as the kibbutzim ran into debt and the gap widened, the closed society could no longer provide a qualified internal work force, which is needed to fulfill the division of labor and increase the volume of productive

interactions. Hence, it should be no surprise that many kibbutzim ceased to exist in their original form.

Another example of the negative effects of high moral standards that are limited to small societies concerns favoritism. Members of these societies, relatives, friends, or party members, often rely on partisanship for hiring administrative public servants or granting public services or projects to members of the clan. The consequences are deterioration of public services and an inflation of expenditure for public services.

If instead the same moral standards are applied to members within and outside a given society, the volume of productive interactions will increase, benefiting from specialization and economies of scale. Coordination of individual interactions will not mainly depend on moral standards, but also on reactions to market signals.

The history of trade expansion based on individual actions shows some specifics. There was one route where trade between countries started between relatives and well-acquainted persons (GREIF, 2006). The other route was that members of one society spurred trade with another society by guaranteeing the moral behavior of its members to the members of the other society (ORMROD, 2003). Finally, long-term trade ties developed based on mutual trust between the trading partners. Hence, past experience is important.

Functioning markets that improve efficiency and income directly strengthen moral behavior. Traders who do not meet the moral code of conduct will be recognized in a well-functioning market economy and will lose business – the price paid for immoral behavior. Thus, markets can enforce morality. However, this relationship can only evolve if markets exist and function well. Hence, the conditions for the emergence of markets and for their functioning have to be discussed.

It can hardly be assumed that widespread markets would spontaneously emerge in transition countries. It is now well accepted that some markets are property-right intensive and only emerge if the state defines and secures the property rights (OLSON, 2000; FRIEDMAN, 2008). It is also common knowledge today that markets will only emerge if the state establishes adequate institutions (NORTH, 2000; ACEMOGLU, ROBINSON, 2012; BESLEY, PERSSON, 2011; REINERT, 2007). There is not much known about how different standards of morality may have influenced the move from a planned to a market economy in an environment where the state was not able or willing to establish the institutional framework from the outset. It can be hypothesized that moral standards are more important for the move from a planned to a market economy if a formal institutional framework is not in place.

Another point concerns the functioning of markets. Economists are well aware that there are no all-encompassing objective criteria to assess market performance. However, there is agreement that market failure persists in many markets. This observation does not only concern a lack of efficiency, but also a divergence between social and marginal costs and social and marginal willingness to pay, as well as market power. If market failure exists, compatibility does not produce incentives. Individual decision makers respond to incentives, which lead to effects that are not in line with results assessed positively or at least neutrally from the point of view of the society at large.

Moreover, markets may lead to distributional effects that are largely rejected by the majority in a particular society. However, market failure and the lack of achievement of non-economic policy objectives does not necessarily require state interference. A society that has no adequate institutional framework and no policy makers who are knowledgeable, accountable, and incorruptible may be better off living with significant market failure than with government actions to reduce market failure, which leads to even greater policy failure. The state may not offer a helping hand, but may use its "grabbing hand" (SHLEIFER, VISHNY, 1998). Therefore, without having the institutional framework in place to support morality and thus functioning markets, one can hardly expect a prosperous economy and to convince the society of the advantages of a market economy.

4 SOME EMPIRICAL EVIDENCE OF MORALITY ACROSS COUNTRIES

One of the most important elements of morality is trust. Trust governs the relationship between private actors and between private actors and the government. As explored above, a lack of trust increases transaction costs and reduces the volume of productive interactions.

Unfortunately, it is difficult to quantify trust and compare it across countries. Nevertheless, some indicators can be used. One possibility is to compare the main variable of trust in the value of money that affects the exchange in a market economy. Trust in the value of money will be lower if there is a high rate of inflation in the country (Table 1). Hence, it was not surprising that bilateral exchange in the first years of transition was mainly based on barter exchange. Income per capita declined due to a smaller volume of productive interactions.

Shift in trade towards barter also leads to a change in the production pattern. The move from plan to market needed an adjustment pattern in investments in order to react to conditions in a market economy. However, the period of high inflation and barter provided incentives to produce what could be used by the workers employed in the enterprise, and/or could be easily exchanged for products useful to the enterprise or its workers. This change in the production pattern did not improve the allocation of resources in line with comparative

advantages in an open economy. Thus, a lack of trust in the monetary system of most of the transition countries facilitated the decline in GDP.

Table 1: Rate of inflation in selected countries (year-to-year change in CPI, %)

Year	Russia	Hungary	Ukraine	USA	Germany
1990	6	29	4	5	3
1991	93	34	91	4	3
1992	1353	23	1445	3	5
1993	895	23	4735	3	4
1994	308	19	891	3	3
1995	198	28	377	3	2
1996	48	23	80	3	1
1997	15	18	16	2	2
1998	28	14	11	2	1
1999	86	10	23	2	1
2000	21	10	28	3	2

Source: WORLD DEVELOPMENT REPORT, various issues.

Table 2: Attitude toward trust and the legal system (percent of agreement)

Country	Age			Income		
	16-29	30-49	50+	Low	Middle	High
	I trust my family completely					
Russia	50	55	58	53	54	58
Hungary	97	96	96	95	97	98
West Germany	95	96	94	92	96	96
USA	98	98	99	97	99	99
	Trust people of my own nationality					
Russia	41	43	49	42	47	45
Hungary	49	49	57	53	51	59
West Germany	56	63	74	66	67	65
USA	72	74	78	75	74	77
	Do you trust the legal system?					
Russia	35	33	47	38	38	36
Hungary	65	53	64	60	59	59
West Germany	62	63	70	64	65	67
USA	56	61	57	60	56	60
	Confidence in the state: the state should take more responsibility to ensure that everyone is provided for					
Russia	32	31	34	35	30	49
Hungary	49	49	51	58	46	41
West Germany	26	21	21	27	23	18
USA	18	13	11	15	14	12

Source: INGLEHART et al. (1998).

This tendency was enhanced by a lack of trust in the society and particularly in the legal system (Table 2). There are significant differences between Russia and Hungary on one hand, and Germany and the United States of America (USA) on the other.

One finding deserves special interpretation: trust is generally lower in Russia than in other countries, but the confidence in the state is surprisingly higher than in Germany and the USA. It seems that past experience has affected people's mental models (LINDSAY, 2000) in Russia. Individuals have not learned to base their fate mainly on themselves, but have been largely used to relying on state interference. Past experience seems to have undermined the capacity of people to stand on their own and to make their own decisions. The experience with the market economy has only marginally changed the attitude with respect to the government (Table 3), but more in Ukraine than in Russia. People in Ukraine seem to expect less from the government than the Russian people. The difference is not necessarily due to a move toward greater individualization in Ukraine than in Russia. It may well be that people in Ukraine are more disappointed by government interference.

Table 3: The task of the government: The state should take more responsibility to ensure that everyone is provided for (percent of agreement)

Country	Age			Income		
	16-29	30-49	50+	Low	Middle	High
Russia						
1990	32	31	34	35	30	27
1995	49	54	67	67	57	50
1999	30	39	47	49	42	29
Hungary						
1990	49	49	51	58	46	44
1995	60	65	72			
1999	45	48	50	57	49	41
Germany						
1990	26	21	21	27	23	18
1997	42	33	28	36	31	38
1999	14	19	15	19	15	9
USA						
1990	18	13	11	15	14	12
1995	22	19	13	21	17	15
1999	25	20	16	21	18	20
Ukraine						
1996	54	64	76	73	66	61
1999	37	34	55	58	43	39

Source: WORLD VALUE SURVEY http://www.worldvaluessurvey.org/.

Society's perception of the task of the government is also related to the change in economic welfare over time (Table 4). In cases where individual welfare changed positively over time, people were likely to be more satisfied with the government and the economic system. Unfortunately, most people felt that their financial situation had deteriorated over time; hence, the rules of the market economy were not held in high regard and a lack of compliance with these rules was widespread. Lack of acceptance of the officially declared rules of a society implies immoral behavior.

Table 4: Satisfaction with the financial situation of the household (percent of responses with satisfaction score over 7 on a scale of 1 to 10)

Year	Age			Income		
	16-29	30-49	50+	Low	Middle	High
Russia						
1990	24.8	24.9	32.2	19.2	28.1	38.1
1995	11.0	8.1	8.6	3.9	7.7	15.1
Hungary						
1991	30.6	29.4	29.4	23.7	24.1	39.9
1998	35.5	17.4	17.1	n.a.	n.a.	n.a.
Germany						
1990	47.8	60	66.5	47.6	60.6	71.3
1997	50.3	56.7	62.6	58.3	56.7	54.8
USA						
1990	48.1	58	71.4	43.4	62.3	77.2
1995	48.7	48.8	67.6	42.5	54.8	72.6
1999	54.0	51.6	70.0	42.7	59.1	78.0
1996	8.5	8.1	4.2	3.7	5.0	12.6

Source: WORLD VALUE SURVEY http://www.worldvaluessurvey.org/.

Another important element of morality in terms of its relationship to transformation concerns work attitude (Table 5). People who spend their life in a planned economy appear to have a different perspective about work attitude. Most have not been trained to accept responsibility in their job; hence, they do not perceive this characteristic as important, nor do they want to assume more responsibility on their job.

5 THE IMPORTANCE OF MORALITY FOR AGRICULTURAL TRANSFORMATION

5.1 Specifics of agricultural production

There are some specifics of the agricultural sector that have likely enhanced the negative impact of the lack of morality on agricultural transformation.

First, agriculture produces not only search goods as some other sectors, but also experience goods and credence goods. Consumers often learn after consuming

a particular food item whether it was as tasty as expected and whether it was not harmful to their health. Hence, they have to trust the seller that the product quality is as expected. Trust is even more important for credence goods. These goods are not only characterized by special physical appearance, but also occasionally by a particular method of production. Organically produced food items are a special case in point. Consequently, transaction costs are higher for experience and credence goods. These costs could have been reduced if governments had instituted specific laws and enforced them. Unfortunately, that has not been the case and could have hardly been expected.

Table 5: Attitude toward work and business (percent of agreement)

Country	Age			Income		
	16-29	30-49	50+	Low	Middle	High
It is important to have a job where I can achieve something						
Russia	34	28	23	23	27	33
Hungary	64	60	54	52	59	69
West Germany	65	63	59	55	62	68
USA	71	71	72	68	71	77
It is important to have a responsibility on the job						
Russia	15	22	23	19	21	23
Hungary	41	53	53	48	52	52
West Germany	52	56	52	45	54	63
USA	54	57	56	50	58	62
The owners should run their own business or should appoint the managers						
Russia	16	12	08	10	12	14
Hungary	19	27	24	20	24	39
West Germany	39	45	55	45	46	50
USA	52	51	65	55	57	58
I like to assume responsibility						
Russia	20	24	28	21	28	28
Hungary	38	60	50	47	53	67
West Germany	53	59	53	47	54	65
USA	56	67	57	60	59	69

Source: INGLEHART et al. (1998).

Second, seasonality and regional dispersion of agricultural production requires storage capacities and linkages between stock keepers and producers. Moreover, dispersion of production requires interaction between producers and transporters. Such linkages did not exist in the era of the planning system. Understandably, it takes time to set up the needed connections, which must be based on trustworthiness. A particular obstacle was the shortage of liquidity in the period of extreme high inflation. Farmers could hardly rely on timely payments and had even less trust in the real money value of payments received in the future. Fortunately, farmers had the possibility to change the production pattern, moving to more self-subsistence and to products that could be partly

processed and stored on the farm. Even if this strategy was appropriate from the point of view of the individual farmer it contributed to a decline of overall production due to a reduced division of labor.

5.2 Specifics of organizing agricultural production

Farms in market economies are predominantly organized as private entities and most are run as family farms. These farms are much smaller than the former farms in most transition countries. Moreover, the managers of the farms need very different qualifications and above all entrepreneurship. It was not realistic to expect former workers on the collective farms to possess the necessary qualifications to start a private farm. First, they had never had to acquire the broad qualifications to manage a farm. Second, the land resources received via the privatization process were, in most cases, too small and there was seldom a chance to expand the land area as land markets were not functioning (see below). Third, would-be family farmers had nearly no access to credit as credit markets did not function. Finally, there was extreme uncertainty during the first years of transition, and this would have constrained even the best qualified would-be farmers.

Tables 5 to 7 inform on findings of several surveys. It is obvious that at least Russia and Ukraine (Table 7) did not have the human and social capital to move smoothly from a planned agricultural sector to one which had to be driven by market forces.

Table 6: Preferences of employees of agricultural entities with respect to use of land Russia, 1995 (percent of respondents)

Intention	Mean	Range
Leave in collective use	78	59-94
Sell	1	0-3
Lease	4	0-13
Increase the size of private residence	4	0-9
Start a private farm	2	0-3
Uncertainty	11	2-27

Source: BOGDANOVSKY (2000).

Table 7: Reasons not to become a private farmer (percent of rural households surveyed)

	Russia	Ukraine	Moldova
Insufficient capital	75	71	52
Difficulties with inputs	59	84	48
Afraid of risk	56	84	48
No wish to change lifestyle	56	72	33
No legal guaranties	40	65	20

Source: LERMAN et al. (2004), p. 159.

5.3 Specifics of agricultural policy

It is well accepted nowadays that pure market forces will not lead to the best results from a society's point of view. Market forces have to be constrained by specific institutions and enforced. However, the kind of institutions to be chosen largely depends on the morality of the people and in particular of the policy makers. Morality is part of the mental models of people. These models contain "deeply ingrained assumptions; generalizations, or even pictures or images that influence how we understand the world and how we take actions" (SENGE, 1990). A mental model consists of beliefs, inferences, and goals that are first-person, concrete, and specific. It is a mental map of how the world works. Agricultural policy, like any other specific policy, is not only based on economic considerations, but also on mental models of policy makers.

The following elements of policymakers' mental models have affected agricultural policy and governmental intervention:

1. Belief that the government had to enact a moratorium on sales of land
2. Belief that large-scale farms are more efficient than small-scale family farms
3. Belief in the role of the government to secure food security
4. Belief that the government has to intervene on agricultural credit markets

Below we elaborate on each of the four elements.

1: Belief that the government had to enact a moratorium on sales of land

Privatization in most of the former Soviet Union countries was based on the free allocation of land to workers on the kolkhoz and sovkhoz farms and other citizens in rural areas. However, the land allocated to individuals was not demarcated and could not be sold. Hence, a land market could not emerge. This form of privatization seemed to express the understanding of fairness. Those who received a gift should not be allowed to monetize it immediately. Moreover, the moratorium helped to stabilize the new collective farms.

2: Belief that large-scale farms are more efficient than small-scale family farms

The belief in the comparative advantage of large farms has been a strong belief of policymakers in communist countries. Hence, it was understandable that they decided on a form of privatization where the large farms could continue and the individuals only became owners of undemarcated land areas. This morally sound decision missed two main points of land privatization: competetion on the land market and transfer of land to the best tiller; and competition of farms on the labor market. Land was allocated based on criteria that did not take into account ability and willingness of the former working force to adjust to a market environment

3: Belief in the role of the government to secure food security

Ensuring food security is certainly an important task of any government. However, the main question is how food security is defined and with what instruments it is to be achieved. Policy makers in transition countries generally assumed that food security was related to food self-sufficiency. Policy makers in the region were even tempted to force the new collective farms to produce what was needed in the region. Hence, the mental models of regional policy makers hindered the adjustment of farms to international competitiveness. Even worse, policy makers supported the new collective farms with cheap credit to secure their survival and their expected positive contribution to food security. The soft budget constraints had implications on the functioning of the new collective farms (KOESTER, VON CRAMON-TAUBADEL, 1997). In most cases, the members of the collective farms who worked on them had their own household farms. They were entitled to buy feed from the collective farms at reduced prices. Generally, they had more incentives to increase the productivity of the household farm than to increase the efficiency of the collective mother farm. They could do this either by buying inputs at reduced prices from the mother farm, thus lowering its profitability, or by legally reducing their labor input on the mother farm, thus enhancing production on the household farm at the expense of the mother farm.

Another alternative was to steal resources from the mother farm. Of course, the latter was only possible if the workers' principal, the farm manager, was not enforcing the labor contracts efficiently. Reacting to the existing incentive system, the manager was likely better off not to enforce labor contracts accurately. At least on paper the manager had to report to the assembly of the owners (i.e., those who hold shares of the new collective farms). As mentioned above, most of these shareholders – those who worked on a household farm – had an incentive to strip the mother farm of its assets, and were therefore interested in a manager who allowed them to do this. In exchange, the manager could expect that he would be able to serve his personal interests. He could possibly

sign sales contracts where the buyer paid him an extra amount "under the counter" in addition to the price noted on the invoice. Thus, the incentive system for the member and the manager of the collective farm contributed to the decline of the collective farms, mainly due to a lack of morality and soft budget constraints.

4: Belief that the government has to directly intervene on agricultural credit markets

Credit markets suffer the most of all markets from lack of trust. The agricultural sector was strongly affected by the poorly functioning credit markets as it had to undergo significant restructuring, which required medium- and long-term credit. These credits were not readily available as the new collective farms did not have a reliable credit history. Credits in the era of socialism were mostly written off and only seldom repaid. Moreover, the chosen form of land privatization and the consequential lack of land markets did not allow offering land as collateral for creditors. Hence, it was understandable that the government strongly intervened in agricultural credit markets offering credit at low interest rates. This practice undermined the development of a private credit market. Moreover, it allowed the central and regional governments to exert power on the farms, forcing them to deliver specified product quantities to state organizations. A further byproduct of soft budget constraints was the distorted incentive system for the members of the new collective farms.

Summary

1. There can be a happy marriage between morality and markets, but only if we accept the definition of morality used by most economists. In contrast to mainstream philosophers, economists assess moral behavior by the consequences of individual decisions and not by the motives as suggested by philosophers.
2. However, even if the economists' definition is accepted, market performance will only be assessed positively from a moral point of view if and only if incentive compatibility prevails. The individual decision maker should respond to incentives leading to results that are positively or at least not negatively assessed by the society at large.
3. Morals and markets both constrain individual actions and make them predictable. Morality and markets can reinforce each other. Both can contribute to lower transaction costs and to a larger extent of the markets.
4. Morality is society specific, may change over time, and may depend on the size of the society. Moral codes specific to small societies may improve the functioning of their markets, but may hinder market exchange with other societies.

5. Some of the former socialist societies had some standards of morality that were not supportive to the emergence of a market economy. Surveys revealed the lack of trust, lack of honesty, corruption, and favoritism depressed the development of markets and produced a GDP that even in 2012 was lower than in 1989.
6. The agricultural sector likely suffered more from lack of morality than other sectors. Some specifics of the agricultural sector, such as the production of experience and credence goods, as well as the regional and seasonal dispersion of production, drove many agricultural farms to barter exchange and resulted in production pattern adjustments that were not in line with changes toward a market economy.
7. Morality of a society is also reflected in the mental models of policymakers. These models make up for specific beliefs of policy makers and influence policy decisions. Some of these beliefs negatively affected agricultural transformation.
8. In retrospect, transformation of the agricultural sector in transition countries would likely have been more effective if the establishment of an adequate institutional framework had been given priority. Advice given by neoclassical economists has often led to a strong decline in GDP and may still affect performance of the sector in the future.

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AGRICULTURAL LABOR ADJUSTMENT AND THE IMPACT OF INSTITUTIONS: PANEL DATA ANALYSIS

THOMAS HERZFELD, THOMAS GLAUBEN, LIESBETH DRIES, RAMONA TEUBER

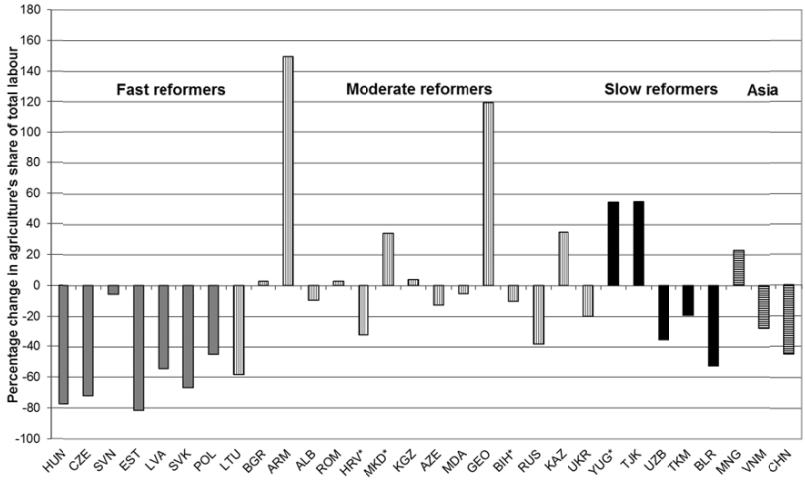
1 INTRODUCTION

Former socialist economies underwent tremendous changes since the start of the economic reforms. Before the break-up of the economic planning system, in most of these countries, agriculture was collectivized and intersectoral movements of labor were more or less restricted. Economic reforms implied decollectivization, privatization of land and assets, adjustment of relative prices and liberalization of labor markets. However, the speed and degree of reform implementation varied tremendously across countries (see, e.g., ROZELLE, SWINNEN, 2004).

A striking observation is the significant divergence in agricultural labor use across countries over the (post-) reform period. Figure 1 presents the relative change in agricultural employment since the beginning of economic reforms up to 2008. Countries are ranked according to the World Bank index of agricultural liberalization developed by CSAKI and NASH (1998) and published for Central Eastern Europe (CEEC) and the Commonwealth of Independent States (CIS). The steepest decrease in agriculture's share in total employment is observed in the so-called group of fast reformers. Similarly, China and Vietnam, which are examples of countries with very early decollectivization, experienced a comparable decrease of agricultural employment, albeit over a 10-year longer period. On the contrary, in several moderately and slowly reforming countries agriculture's share in employment increased. In Armenia, Georgia, and Tajikistan agriculture's share even increased by more than 50 %.

The adjustment of agricultural labor use to new economic conditions seems to take different paths and to proceed at different speeds. Thus, the primary goal of this chapter is to examine the major reasons behind this almost unprecedented and diverse change in agricultural labor use in an econometric framework. Referring to the theory of migration, potential determinants of occupational migration from agriculture to non-agricultural sectors are explored with the help of panel-data approaches. Moreover, we investigate whether historical conditions and the current quality of institutions affect occupational migration.

Figure 1: Change of agriculture's share in total labor since start of reform



Source: Own calculations based on WORLD BANK (2012), ILO (2012), FAO (2012) and national statistics.

Notes: Percentage change between 1989 and 2008, except Bosnia and Herzegovina (1999-2008), China (1978-2008), Croatia (1996-2008), Macedonia (1991-2008), Serbia and Montenegro (1996-2008), Vietnam (1981-2008); FSU countries and Mongolia (1990-2008); ranking according to the cumulated index of agricultural liberalization (CSAKI, ZUSCHLAG, 2003; CSAKI, KRAY, 2005): Fast reformers index ≥ 64, moderate reformers index < 64 and ≥ 45, slow reformers index < 45.

This chapter's contribution to the extant literature is twofold. First, it extends previous studies by including all European and Asian countries in transition. Second, the analysis centers on indicators of the institutional environment as determinants of labor adjustment and the question whether conditional on these variables the impact of other macroeconomic variables is uniform across countries or significant differences exist.

The remainder of this chapter is organized as follows. Section 2 provides a brief overview of the existing literature on labor adjustment and the important role of institutions. Section 3 introduces the applied methodology and the data used. The first part of section 4 presents the evolution of labor adjustment over time and the second sub-section presents the results of the econometric analysis. The last section concludes.

2 Review of literature

Previous empirical evidence points out that the agricultural sector has played and still plays two different roles in labor markets of transition countries. On the one hand, after the removal of subsidies, central planning and mobility restrictions, an outflow of surplus agricultural labor took place. Hidden unemployment in agriculture during the period of central planning has been observed in almost all countries. Brada (1989) and Jackman (1994), for instance, underline this finding with comparatively high figures of hidden unemployment in Poland and Czechoslovakia. On the other hand, several studies also highlight the buffer role of agriculture, e.g., in the form of subsistence farms, in periods of high unemployment and economic uncertainty (Sorm, Terrell, 2000). This buffer role implies a reduced outflow of labor from agriculture or even an inflow into this sector. For instance, Seeth et al. (1998) describe how emerging private subsistence agriculture serves as an insurance against poverty and hunger using the example of Russia. Similar evidence is reported by Bernabè and Stampini (2009) for rural Georgia, where inflow of labor into agriculture increased after the Russian economic crisis of 1998. The authors conclude that farming acts as a social buffer in bad times, especially for unemployed and retired people.

Micro-economic empirical analyses of determinants of agricultural labor adjustment center mainly on farm household decisions and use either cross-sectional or panel micro-level data (Bojnec, Dries, 2005; Chaplin et al., 2004; Buchenrieder et al., 2002 for CEEC; Glauben et al., 2008; Zhang et al., 2004; De Brauw et al., 2002; Brosig et al., 2007 for China).[1] Important determinants of agricultural labor adjustment identified in these studies are the education level of the household members, household composition and regional characteristics. However, studies at the micro-level are of limited use in deriving nation-wide policy conclusions. Especially the impact of macroeconomic reforms and institutional change can only be quantified partially.

Determinants of intersectoral labor adjustment from a macro-economic perspective are extensively discussed and summarized by Larson and Mundlak (1997). In line with traditional theories of migration, such as Todaro's (1969) seminal work, they highlight the differences in (expected future) incomes as the driving force of intersectoral labor flows. A number of empirical findings support this hypothesis. For example, Butzer et al. (2002, 2003) provide empirical evidence for Venezuela and several South East Asian countries that the income ratio

[1] Additionally, interregional migration in China forms a widely discussed topic in the literature. Migrants move from rural to urban regions or from poor Western to rich Eastern Chinese provinces (Taylor et al., 2003). For recent and extended surveys on the general subject of migration see Massey et al. (1993), as well as Taylor and Martin (2001).

between agricultural and non-agricultural sectors, the growth of non-agricultural employment, and the unutilized capacity in non-agriculture are the main determinants of labor flows out of agriculture.

While focusing more strongly on factors within the agricultural sector SWINNEN et al. (2005) show that important drivers of labor outflow from agriculture are decreasing agricultural prices and any development which will increase the reservation wage of agricultural workers. Furthermore, the authors find a significantly negative impact of the development of relative agricultural wages on agricultural employment. DRIES and SWINNEN (2002) observe a significant reduction in agriculture's share in employment in relatively more developed Polish regions. This effect is even stronger in regions with a better infrastructure as well as in younger and better educated farm populations.

Although the importance of institutions, such as property rights on land, hard budget constraints, the framework for contract enforcement and access to capital, is widely acknowledged in the theoretical literature, its quantitative assessment in econometric studies is still limited. Overarching and effective land property rights are seen as necessary requirement to raise efficiency of agricultural production (LERMAN et al., 2004; SWINNEN, 1999). Applying a more formalized theoretical framework, SWINNEN et al. (2005) work out that an effecttive privatization with a shift from corporate farms to profit-maximizing individual farms induces several effects, some of which will reduce and some increase the employed labor in agriculture. Hence, the total effect can either be a net outflow or a net inflow of labor.

Looking at the empirical evidence, SWINNEN et al. (2005) identify three patterns of agricultural labor adjustment based on the organizational transformation of agriculture. In Estonia, Hungary and the Czech Republic, we observe a fast decline in the share of agriculture in total employment together with a moderate increase in the share of individual farms in total agricultural land. On the other hand, agricultural employment decreased less rapidly or even increased in Poland, Romania, Lithuania, Latvia and Slovenia, all countries with a significantly higher prevalence of individual farms. Finally, individual farming in Russia and Ukraine still exhibits only a minor share in total landholdings and the change in agricultural employment is at the same time limited. Moreover, DRIES and SWINNEN (2002) as well as SWINNEN et al. (2005) find agricultural employment to be reduced significantly faster with an increasing share of privatized land, which captures the effect of the introduction of hard budget constraints and decreased workers' bargaining power. In contrast, the share of agricultural land used by individual farms has a significant positive effect on agricultural employment. The latter effect is more pronounced in low-income transition countries, where farming is used to secure food supply.

Previous studies did not account for the different ways of land privatization and institutional quality as potential determinants of labor adjustment. However, they are important for two reasons. First, tenure security on land is expected to facilitate land market development and farms' specialization. Functioning land markets ease farmers' exit from agriculture. Second, a low quality of the institutional environment might hamper the general economic development and farmers might stick to agricultural production to assure the household's food supply. Consequently, the present study includes measures for nominal land ownership status at the beginning of economic reforms and current institutionnal quality.

3 METHODOLOGY AND DESCRIPTION OF THE DATA

3.1 Measuring labor adjustment

Based on the theoretical framework introduced by MUNDLAK (1978) and developed further by BARKLEY (1990), sectoral labor adjustments can be analyzed within a framework of occupational choice. Each individual is assumed to maximize an indirect utility function depending on personal characteristics, realized income or expected income in any other occupation, prices of consumption goods and costs of migration. The remaining lifetime utility of any individual can be derived by discounting the stream of utility for each occupation up to retirement age. Usually expected earnings and switching costs enter the maximization as most important determinants of lifetime utility (MUNDLAK, 2000). In case of a positive difference between the discounted indirect utility in any other occupation and the discounted indirect utility in agricultural employment a shift of occupation is expected to take place.

Assuming an economy with two sectors, agriculture and non-agriculture, and a mutually exclusive character of occupations, aggregated shifts between sectors are defined as sectoral labor adjustment.[2] We quantify this movement by the difference of growth rates in total and agricultural employment and use this measure as dependent variable in our econometric analysis. More specifically, the labor adjustment rate (*m*) is calculated as the difference between

[2] Any aggregated approach neglects part-time farming, which forms a non-negligible part of agricultural households' activities also in transition countries (e.g., CHAPLIN et al., 2004; BUCHENRIEDER, 2005). The measure applied in this chapter will therefore understate the "true" sectoral labor allocation as long as off-farm occupations are not recorded as an individual's main economic activity in official statistics and overstate labor adjustment whenever households continue to engage on household plots besides any registered main non-agricultural employment. However, lack of individual employment data which are consistently comparable over all transition countries limits the use of other concepts.

growth rates of total labor (L) and agricultural labor (L_A). The adjustment rate can be interpreted as relative to the size of the agricultural sector:

$$(1) \qquad m = \frac{L_t - L_{t-1}}{L_{t-1}} - \frac{L_{At} - L_{At-1}}{L_{At-1}} = n - n_A$$

where n is the growth rate of total labor and n_A designates the growth rate of agricultural labor. In the absence of migration, the natural growth rates of agricultural labor and total employment are assumed to be equal. This measure has been suggested first by MUNDLAK (1978) and has been used in econometric analyses by BUTZER et al. (2002, 2003) focusing on Venezuela and Southeast Asian countries, respectively. The measure suffers from one limitation that has to be kept in mind. Due to the assumption of equal growth rates of agricultural and total employment, a drop in total employment leads by definition to a hypothetical migration into agriculture as long as $|n| > |n_A|$. As almost every transition country has been characterized by over-industrialization under central planning (RAISER et al., 2004), (virtual) immigration into agriculture will be caused by the downsizing of the industrial sector. However, we assume that results will be potentially affected in the same way across all countries.

In previous studies, labor market transformation is usually assessed using shares of sectoral employment. Based on the theory of structural change and economic development and the related empirical work by CHENERY and TAYLOR (1968) and RAISER et al. (2004) compare sectoral change in employment shares for 22 transition countries. The simulations by RAISER et al. (2004) reproduce the observation of over-industrialization during central planning. Interestingly, employment in agriculture at the beginning of the transition was clearly lower than predicted by the benchmark. However, the authors do not undertake any further econometric analysis of changes in the distortion index[3] and its determinants. DRIES and SWINNEN (2002) as well as SWINNEN et al. (2005) focus on the development of agricultural labor's share, more specifically on the annual percentage change of labor employed in agriculture since the beginning of economic reforms. As the measure is of cumulative nature it might create inconsistencies in a panel of countries with a different length of reform period. The annual measure of occupational migration employed here allows differentiating a slowly progressing structural change over a long period from a short-run high labor outflow.

[3] The distortion index is a measure of the overall distance of an economy from a market economy with the same per capita income. An index of zero indicates a situation of no distortions.

3.2 Determinants of agricultural labor adjustment

Previous literature provides a range of determinants that possibly impact occupational choice at an aggregated level. Starting from the theoretical framework proposed by LARSON and MUNDLAK (1997), labor flows are a function of the ratio of incomes in non-agriculture to that in agriculture, the size of the originating sector and the rate of population growth. The relevance of the income ratio is supported by earlier theoretical models of migration, such as TODARO's seminal work (TODARO, 1969; HARRIS, TODARO, 1970; ZAREMBKA, 1970), where rural-urban migration is understood as a mechanism to equalize expected marginal earnings in agriculture (rural) and non-agricultural (urban) sectors. Institutions that limit intersectoral mobility may restrict this equalization. A prominent example is the hukou household-registration system in China which restricted people's movement from rural areas to cities at the end of the 1970s, despite the dominance of agricultural production in rural regions.

Lack of individual and internationally comparable wage rates, as well as the high relevance of unpaid family work in agriculture requires us to approximate wages by an average productivity measure. Thus, the ratio of value-added per worker in non-agricultural sectors to value-added per worker in agriculture is expected to be one of the main determinants of occupational migration in our empirical analysis. Relatively high earnings in non-agricultural sectors will foster labor outflow from agriculture.

Furthermore, following the theoretical literature one should expect migration to increase with the relative magnitude of agricultural labor, which constitutes the source of supply (HARRIS, TODARO, 1970; ZAREMBKA, 1970). A higher share of agricultural employment constitutes a larger pool of potential labor moving to other sectors. Unemployment forms another key determinant. On the one hand, a high unemployment rate might slow down structural change by lowering expectations with respect to potential earnings in non-agricultural sectors. On the other hand, high unemployment imposes a threat to new entrants into employment, thus lowering the growth of total employment. TODARO's model stresses the combination of wage differences and the probability of finding employment in urban areas. The impact of the intersectoral ratio of value-added per worker will thus decrease as the unemployment rate increases.

The main interest of this chapter, however, is to investigate the impact of a country's institutional environment on labor flows. It is widely acknowledged that laws, regulations, and the structure of contracts constrain agents' daily behavior and decision making. Obviously, the choice and timing of certain reforms influences the emerging new institutional environment. For instance, the establishment of full private property rights through privatization is expected to stimulate interest of the new owners in securing their property rights

(KOESTER, BRÜMMER, 2006). Full ownership of land as a production factor is characterized by the right to use it for production purposes, to offer it is collateral and to sell it. Hence, KOESTER and BRÜMMER (2006) interpret the strong persistence of cooperatives and collective farms and the widespread existence of household plots in Belarus, Russia and Ukraine as an indication of an incomplete transfer of property rights. However, the choice of land privatization strategies and the speed of reforms are influenced by historical conditions. SWINNEN (1999) postulates that land ownership status under central planning ("post-collectivization ownership" in what follows), the time under communist legacy and ethnic issues determined the path of decollectivization as well as privatization of state owned land. MUKAND and RODRIK (2005) argue that governments and their electorates aim at imitating the policy of a successful neighbor. In our case, their model predicts that countries closer to the European Union are more likely to implement a market economy and allow functioning land markets than countries further away. Summing up, the countries in our sample share some common historical and geographical characteristics. Those characteristics probably cause endogeneity in the econometric analysis. The sample is therefore divided into two subsamples, based on the nominal post-collectivization land ownership status, as suggested by SWINNEN (1999).

At the same time, the implementation of reforms and the improvement of markets is expected to lower the transaction costs of exchanges (NORTH, 1991). Subsequently, lower transaction costs are expected to result in a higher employment of capital relative to labor and/or a higher prevalence of long-term agreements if, for instance, property rights are clearly defined and effective. This hypothesis is backed up by a variety of empirical studies highlighting the economic growth and investment promoting effect of a high-quality institutional environment.[4] Measures of reforms and institutional quality might change from one year to the next. Therefore, such indicators have to be included in the model as explanatory variables. Summing up, faster reforms and a high institutional quality are expected to foster occupational change.

Political intervention into agriculture before the introduction of the first economic reforms varied substantially across the previously centrally planned countries ranging from implicit taxation of agricultural production in East Asia to implicit subsidization in CEEC and CIS. Additionally, liberalization of prices proceeded very differently in the respective countries (ROZELLE, SWINNEN, 2004). As discussed above, relative competitiveness of agriculture depends on price relations. Therefore, we control for the impact of relative prices' adjustment. Obviously, a more favorable development of agricultural prices should limit the outflow of labor.

[4] See ARON (2000) for a detailed critical survey.

3.3 Econometric framework: Data and specification

3.3.1 Data

To calculate the measures of occupational migration, annual sectoral labor data are taken from WORLD BANK (2012), FAO (2012), ILO (2012), and UNECE (2012) and are completed with information from national statistical yearbooks. Data are available for 30 transition countries in Europe and Asia.[5] Employment in agriculture refers to people who have their principal activity within agriculture, hunting, forestry and fishing.[6] Starting in 1989, most transition countries linked their national classification to international standards. The ten new EU member states within the group of transition countries implemented EU regulations and aligned their national statistical systems during the 1990s. In general, possible measurement errors due to problems with the statistical system are expected to become minimal over time.[7] Moreover, BUTZER et al. (2002: 246) show that measurement errors in agricultural employment have only very limited impact on the estimated migration series.

Our econometric analysis starts from a base specification in which we control for intersectoral income differences, the relative size of agricultural labor force, unemployment, development of relative prices, and a country's level of economic development. This base specification relies on previous empirical analyses not specifically focusing on transition countries (e.g., MUNDLAK, 1978; BARKLEY, 1990; BUTZER et al., 2002, 2003). As noted above, the base specification is estimated for two subsamples. The first subsample includes all countries with nominal post-collectivization private ownership on land. The second subsample covers all countries with no formal private ownership status on land under central planning. A complete list of countries is provided in footnote 5.

Testing for the impact of time-varying variables will be done in subsequent stepwise extensions of the base specification. Much of the debate in the literature focuses on the speed of economic reforms, contrasting gradualism (e.g., China)

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[5] The included countries in the first subsample (nominal private post-collectivization ownership) are Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, then Serbia and Montenegro, Slovakia, and Slovenia. The second subsample (no private post-collectivization ownership) includes Albania, Armenia, Azerbaijan, Belarus, China, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and Vietnam.

[6] The categories correspond to the major divisions A and B in the third revised version of the International Standard Industrial Classification (ISIC) and major division 1 in the second revision of the ISIC. Processing of agricultural products beyond levels required for primary markets, marketing through cooperatives and field preparation involving construction work like terracing are excluded from agricultural activities in the ISIC nomenclature.

[7] For a more detailed description of changes in national statistics and reliability of data the interested reader is referred to WORLD BANK (1996) and UNECE (2000).

with shock therapy (e.g., Estonia). The EBRD transition indicator (*EBRD*) is used to control for the impact of the speed of general economic reforms.[8] An increasing occupational migration due to faster economic reforms would support the "restructuring hypothesis". The general level of institutional quality is approximated by two measures: an indicator of contract-intensive money (*CIM*) first proposed by CLAGUE et al. (1999) and a composite indicator of good governance (*WGI*) first assembled by KAUFMANN et al. (1999) and continuously updated by the WORLD BANK. *CIM* is defined as the ratio of non-currency money to the total money supply and reflects the ability of firms to raise capital and the reliance on third-party enforcement. The composite governance indicator *WGI* pools subjective indices for six dimensions of governance: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and corruption from various sources.

With respect to intersectoral income differences, most authors use average sectoral income per worker instead of marginal income due to data limitations. Wages are thought to be less informative due to the existence of other additional pecuniary and non-pecuniary income components. On the other hand, the use of sectoral income may suffer from politically induced price differences between agriculture and non-agriculture. Another source of measurement error may be a differing informal sector's share in both agriculture and non-agriculture. Finally, SCHMITT (1989) points to a measurement error of sectoral labor productivity due to non-agricultural output produced by workers officially recorded as agricultural labor. Unfortunately, sufficient means of correction are lacking. However, it is assumed that especially the latter mentioned source of measurement error will vanish with the progress of decollectivization and restructuring of old-type cooperatives. Hence, the income ratio between non-agricultural sectors and agriculture (*IR*) is calculated as the ratio of respective sectoral value-added per worker and is expected to have a positive impact on annual migration. The ratio of agricultural to non-agricultural labor force (*LR*) controls for the impact of the labor pool in agriculture as the sending sector. To approximate for a change of relative prices the ratio between the GDP deflators for agriculture and for the aggregated non-agricultural sector is interpreted as Terms of Trade (*TOT*).

To reflect the uncertainty with respect to finding a new employment outside agriculture, the unemployment rate (*Unemp*) is introduced as an explanatory variable. Officially registered unemployment figures are thought unreliable for the early transition period. Therefore, we use an approximation of the

[8] Unfortunately, the two Asian countries China and Vietnam had to be excluded from specifications comprising the EBRD index due to data unavailability.

unofficial unemployment rate here. The variable is calculated as the ratio of the employment-to-population ratio and the labor force participation rate.

CHENERY and TAYLOR (1968) as well as RAISER et al. (2004) show that economic wealth of a country is a significant determinant of structural change. Therefore, GDP per capita is included as an explanatory variable (*GDPpc*): higher GDP per capita is expected to lead to higher migration out of agriculture. Furthermore, this variable is thought to cover remaining unobserved characteristics that might affect labor adjustment.

Sources for all the explanatory variables and descriptive statistics are presented in Table 1 for the two subsamples (nominal private land ownership and no private land ownership).

Table 1: Definitions, sources and descriptive statistics of the variables

Variable	Code	Mean (Standard Deviation)		Source
		Private ownership	No private ownership	
Migration rate (Eq. (1))	*m*	1.020 (0.083)	1.008 (0.079)	ILO, WORLD BANK, FAO, UNECE, national statistics
Ratio between non-agricultural and agricultural GDP per worker	*IR*	1.785 (0.898)	2.278 (1.720)	UN (2012)
Ratio between agricultural and non-agricultural labor force	*LR*	0.204 (0.154)	0.772 (0.630)	ILO, WORLD BANK, national statistics
Ration between agricultural and non-agricultural GDP deflator (Terms of trade)	*TOT*	0.819 (0.344)	0.735 (0.491)	UN (2012)
Ratio of employment-to-population ratio and labor force participation rate	*Unemp*	0.149 (0.100)	0.118 (0.075)	ILO
GDP per capita (logged)	*GDPpc*	3.930 (2.709)	1.219 (1.185)	WORLD BANK (2012)
EBRD transition indicator [1 – planned economy, 10 – market economy]	*EBRD*	6.945 (1.843)	5.572 (1.795)	EBRD (2012)
Contract-intensive money [percentage points]	*CIM*	0.855 (0.063)	0.682 (0.147)	IMF
World Governance Indicator [1 – low quality, 10 – high quality]	*WGI*	5.474 (1.150)	4.010 (1.232)	WORLD BANK (2013)

3.3.2 Specification

A panel data estimator seems to be appropriate for our analysis for mainly two reasons. First, taking simple averages of the annual rate of adjustment will ignore important cross-country differences of this measure's development over time. Second, countries follow different economic and agricultural policies and they may use different technologies. Panel data estimators allow capturing all these difficult to observe characteristics in a country-specific variable. The measure of labor adjustment m_{it} (see Eq. (1)) will be explained by a vector of explanatory variables X_{it}, the unobserved country-specific variable υ_i and an error term ε (Eq. (2)). To take into account a possible delay in individual occupational decisions following changes of macroeconomic conditions, all explanatory variables enter Eq. (2) with their one-year lagged values (X_{it-1}):

$$m_{it} = \beta X_{it-1} + \upsilon_i + \varepsilon_{it} \quad (2)$$

There are two reasons for limiting the econometric analysis to the period after the start of economic reforms. First, measurement errors might have been higher under central planning, for instance pre-transition data might suffer from the inclusion of social services provided by collectives for their employees. Second, political reforms led to the break-up of the Soviet Union, Czechoslovakia and Yugoslavia. Most data concerning the successor states are only available after their emergence. The data covers up to 28 years with most of the countries starting in 1990.

The econometric analysis starts from a base specification. Subsequently, indicators of the speed of economic reforms and the quality of the institutional environment are added.

4 RESULTS OF EMPIRICAL ANALYSIS

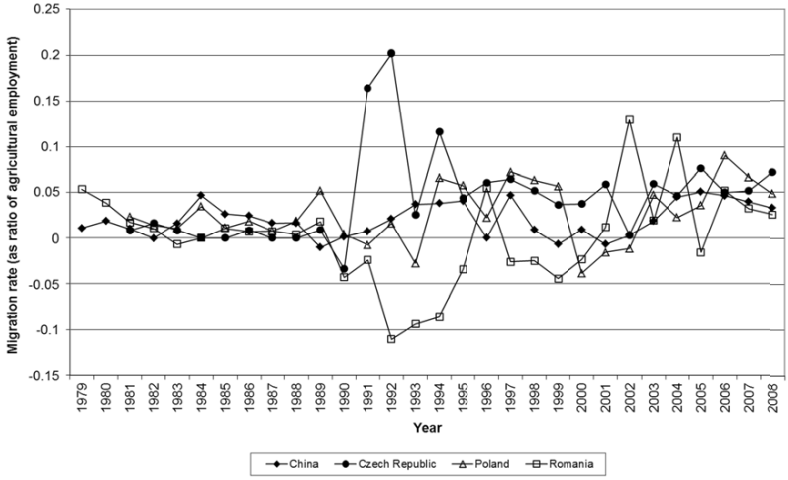
4.1 Descriptive analysis

Figure 1 above presents cumulative changes in labor. A closer look reveals that the average rate masks significant intertemporal differences between and within countries. Four countries – Czech Republic, Romania, Poland and China – are depicted as typical examples and their annual migration rates are plotted in Figure 2. The average annual adjustment rate of four per cent in the Czech Republic is highly influenced by the development shortly after 1990 when up to 20 per cent of agriculture's labor force left the sector in only one year. The pre-reform period (1981-1988) is characterized by an adjustment rate close to zero. Similar examples of a high labor outflow after the beginning of economic reforms are Estonia and Hungary. Figures for Estonia peak at 28 percent of agricultural labor force in 1995 and figures for Hungary reach even 36 percent in 1992. In the global context, annual adjustment rates higher than five percent

of agricultural employment are quite uncommon: this follows from the averages obtained by MUNDLAK (2000) for a large cross-country sample over the second half of the twentieth century.

On the contrary, Romanian data indicate a flow from non-agricultural occupation to agriculture after 1989 of up to 10 per cent of agricultural employment in one year (1992). A sustained period of migration from agriculture to non-agriculture emerged only after 2001. Yet the labor flows into agriculture as observed in Armenia (31 percent in 1992), Georgia (21 percent in 1992) and Moldova (18 percent in 1993) are even more exceptional at an international scale.

Figure 2: Annual agricultural labor adjustment for selected transition countries (1979-2008): China, Czech Republic, Poland, and Romania



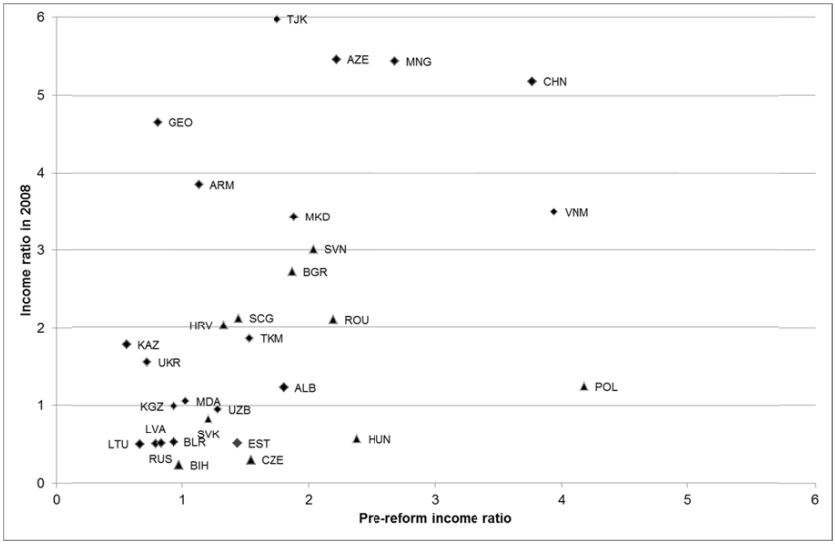
Source: Own calculations based on WORLD BANK (2012), ILO (2012), FAO (2012) and national statistics.

Poland, as a third example, experienced an increasing labor flow out of agriculture but not such a sharp shift in the adjustment rate in the early half of the 1990s. Rates higher than 5 per cent of sector's labor force occur for Poland only in the years 1994 to 1999. One possible explanation may be the largely different production structures. In Poland, private farm households had already dominated agriculture before the break-up of the planned economic system, whereas agriculture in Czechoslovakia and Romania was characterized by large cooperatives. Therefore, in Poland there was no immediate and large scale release of labor from collective farms as could be observed in the Czech Republic (or in East Germany).

Finally, China experienced a large decrease of agriculture's share in total employment since 1978 (Figure 1), whereas the annual adjustment rates were mostly positive (Figure 2), though comparatively low (2 % of agricultural labor force). This may also have been influenced by restrictions on regional movements, which were quite pervasive in China.

Summarizing, the occupational change might be driven by two different general developments. First, it encompasses the actual change of occupation of previous workers. Rapid restructuring of agricultural cooperatives or state enterprises and the imposition of hard budget constraints resulted in high dismissals of agricultural workers, which characterizes the situation in the Czech Republic in 1990-93. On the other hand, the collapse of the non-agricultural sector and the increased access to agricultural land led to a high inflow of labor into agriculture in Romania over the first half of the 1990s. Second, the fact that new young entrants into the labor market prefer the non-agricultural sectors over agriculture results in a more continuous sectoral change in employment. This is more likely to describe the developments in Poland and China, where sectoral change has been driven to a large extent by demographic developments (PANG et al., 2004).

Figure 3: Development of intersectoral income ratio over time



Source: Own calculations based on WORLD BANK (2012), ILO (2012), FAO (2012), UN (2012) and national statistics.

Notes: Pre-reform year is 1989, except for Bosnia and Herzegovina (1990), China (1978), Croatia (1992), Macedonia (1991), Serbia and Montenegro (1990), Slovenia (1990), Vietnam (1981); FSU countries and Mongolia (1990). Most recent available year is 2004 for Turkmenistan and 2005 for Uzbekistan.

The calculated income ratios, non-agricultural GDP over agricultural GDP per worker, vary within a broad range from 0.5 to 7.2. Whereas the CIS countries exhibit income ratios below two in 1990 and 1991, they increased significantly over the sample period and reached relatively high levels above three in Tajikistan, Georgia and Turkmenistan. Non-CIS countries show a higher variation of income ratios already at the beginning of the sample period. Within CEEC, the income ratios are below two over the last decade except for Poland, Bulgaria, Romania, Macedonia, Slovenia and Croatia. These countries, plus Albania, exhibit still the highest share of agricultural employment in CEEC. Whereas they already started from a rather high level, Asian transition countries experienced increasing income ratios. Output per worker in non-agricultural sectors in monetary terms is more than five times the agricultural GDP per worker in China and Mongolia over the last decade. These results are comparable with estimates for developing countries in Asia and Latin America (LARSON, MUNDLAK, 1997). Only African countries show higher income differentials between the non-agricultural sector and agriculture. A comparison of the income ratio at the beginning of economic reforms and the last available year is presented in Figure 3.

4.2 Results of the econometric analysis

A base specification is estimated first, and the institutional variables are subsequently included stepwise in the specifications to quantify their impact. The relatively high correlation between some of the explanatory variables reduces their usefulness in one single specification. Results of all specifications are reported in Table 2.

The Hausman test leads to a rejection of the random-effects model. Therefore, in all specifications unobserved characteristics exist which are highly correlated with the labor adjustment rate. Time dummies would account for common shocks and thus reduce the bias due to cross-section dependence. However, time-fixed effects turn out not to be jointly statistically significant at conventional levels in all specifications.

Whereas the estimated coefficient of the income ratio (*IR*) points to a positive and statistically significant effect on labor adjustment for the first subsample, the estimated coefficient is much smaller and statistically not different from zero in the second subsample. Although the estimated coefficient of the labor ratio (*LR*) is larger in the first subsample, it is not statistically significant. For countries with no private ownership under central planning, the estimated coefficient points to a higher intersectoral migration in countries with relatively more people employed in agriculture. However, the effect is not linear as shown by the interaction effect between both variables. For the second subsample the estimated coefficient suggests a decreasing influence of *LR* given a constant intersectoral income difference and vice versa.

Higher unemployment (*Unemp*) reduces the labor adjustment process for countries in the second subsample but has no effect on occupational migration in the first subsample. These results are partially in line with findings by MUNDLAK et al. (1989) as well as MUNDLAK and COEYMANS (1993) who find a depressing effect of unemployment on migration for Argentina and Chile. However, our estimates suggest that agriculture's role as labor shading sector in times of high unemployment is only relevant for a subset of countries. It seems plausible that countries of the FSU and Asia are characterized by less developed social security systems. Consequently, the buffer role of agriculture becomes much more relevant compared to the Central European countries. The interaction effect of unemployment and income ratio is not statistically significant. Whereas the development of relative prices (*TOT*) seems to have no effect on occupationnal migration in the first subsample, it turns out that improving agricultural terms of trade slow down occupational migration in the second subsample. The result partly contradicts findings by SWINNEN et al. (2005) who obtain an adjustment accelerating effect of decreasing agricultural terms of trade for six CEE countries controlling for country fixed effects. Those six countries belong exclusively to this chapter's first subsample.

The indirect effect of post-collectivization ownership status might work via different ways. For instance, most countries with no nominal private ownership introduced a new legal framework governing ownership of land within the first half of the 1990s. In China agricultural land is still state owned. The choice of decollectivization strategies is highly likely to depend on nominal post-collectivization ownership. Restitution of land might allow a faster restructuring of former cooperatives than issuing land shares on paper. Furthermore, the first subsample coincides largely with the group of transition countries which joined the European Union in 2004 and 2007. Therefore, external incentives to implement functioning markets for land, labor, credit and other agricultural inputs have been high. The sample size does not allow disentangling the specific influence of those channels.

The right-hand part of Table 2 (columns 4-9) present results of additional specifications controlling for the impact of time-varying indicators of the institutionnal environment. All but one estimated coefficients turn out to be not significantly different from zero. Only for the second subsample the coefficient of *EBRD* suggests a higher adjustment rate with advances in macroeconomic reforms. However, the quantitative impact appears to be rather small. Estimated coefficients of the base model remain rather stable. Although institutional quality might affect investment decisions and economic growth as shown in various studies (e.g., MÉON, SEKKAT, 2005), our results don't support evidence of a direct relationship with labor adjustment.

Table 2: Determinants of labor adjustment

Independent variables	Base model		Impact of time-varying institutions					
	Private ownership	No private ownership	Private ownership	No private ownership	Private ownership	No private ownership	Private ownership	No private ownership
Constant	0.916***	1.078***	0.883***	0.990***	0.835***	1.019***	0.881***	1.080***
IR_{t-1}	0.085**	0.020	0.095**	0.039*	0.094**	0.005	0.052	0.035*
LR_{t-1}	0.415	0.123**	0.442	0.188***	0.605	0.132**	0.132	0.221***
$IR_{t-1}*LR_{t-1}$	-0.101	-0.019*	-0.108	-0.031**	-0.156	-0.013	-0.046	-0.030**
TOT_{t-1}	-0.083	-0.066**	-0.074	-0.061*	-0.076	-0.035	-0.049	-0.026
$Unemp_{t-1}$	-0.127	-1.105***	0.079	-0.923***	-0.097	-1.094**	-0.412	-1.192***
$IR_{t-1}*Unemp_{t-1}$	0.051	0.058	-0.019	0.030	0.027	0.045	0.143	0.127
$GDPpc_{t-1}$	-0.003	0.007	0.005	0.013	-0.008	-0.0003	-0.00002	-0.041
CIM			-0.041	0.007				
EBRD					0.008	0.013*		
WGI							0.018	-0.032
R^2	0.20	0.21	0.20	0.23	0.21	0.23	0.13	0.26
N/Countries	156/10	315/19	150/10	274/18	154/10	282/17	124/10	239/19

Note: Coefficients significant at the 1 %, 5 %, and 10 % level of significance are indicated with ***, **, and *, respectively. The displayed R^2 (within) measures only the contribution of the explanatory variables without the unobserved country-specific effects. Employment-to-population ratio data are missing for Serbia-Montenegro. EBRD transition indicator not available for China and Vietnam. CIM index not available for Uzbekistan.

5 Conclusion

Transition countries of Central and Eastern Europe, the former Soviet Union as well as East Asia have chosen different ways to transform their agricultural sectors from a planned to a market economy. The adjustment of agricultural labor force partly reflects these different approaches with increasing labor use in some countries and a sharply declining employment in agriculture in others. In this chapter, a labor adjustment rate is calculated for a panel of 30 transition countries over the last two decades. Very high annual rates of labor flow out of agriculture, as in Hungary, Estonia or Czech Republic, as well as significant flow of labor into agriculture, as in Armenia, Georgia and Tajikistan, are quite unique on a global scale. Potential determinants of the labor adjustment rate are estimated in an econometric panel data framework, which, in addition to economic determinants, also includes the indirect impact of historical conditions and the influence of the current institutional environment.

Results of fixed-effects estimations reveal that determinants of occupational migration differ significantly between countries that had nominal post-collectivization private ownership on land and countries with no private ownership. More specifically, economic drivers like income differences between agriculture and non-agriculture seem to facilitate outflow of labor from agriculture in a subsample of countries with nominal private ownership of land under central planning. Unemployment acts as a determinant that keeps or even attracts labor into agriculture in CIS and Asian transition countries. Additionally, the existence of statistically significant country specific unobserved effects justifies the choice of panel data approaches. Surprisingly, current institutional quality or speed of economic reforms seem to have no direct effect on occupational migration.

The finding of significant differences between subsamples does not indicate a direct impact of post-collectivization ownership status. Such a historical characteristic affects several aspects ranging from the legal framework to mental models of private farming, which might lead to different adjustment paths.

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B. COUNTRY TRANSITION EXPERIENCES

AFTER 20 YEARS OF TRANSITION IN UKRAINE, WILL THE MARKET FIND A WAY?

WILLIAM H. MEYERS, KATERYNA GOYCHUK

1 INTRODUCTION

For those who have studied the ups and downs of the Post-Soviet transition in Ukraine, the last week in October 2012 must have seemed like *déjà vu* all over again. The government announced one week that there would be a ban on wheat exports because of the 2012 drought. A week later, a government spokesperson essentially said "never mind" (APK-INFORM, 2013). It is just another indication that trust in the market is still at a relatively low level compared to a number of other countries that emerged from central planning about the same time. Although Ukraine's grain yields are well below potential, given their agronomic conditions, Ukraine has become a significant exporter and clearly has potential to enlarge that role. Ukraine was exporting about 7.9 percent of total world grain, 8 percent of wheat, 32.8 percent of barley and 5.9 percent of corn total exports in the two years before the 2010 drought, and in the 2012/13 crop year is expected to be back up to 8 percent of total grains and 15 percent of corn exports (USDA, 2013). Also recent research has shown that Black Sea prices closely follow EU wheat prices (GOYCHUK, MEYERS, 2013a), so it is clear that Ukraine is becoming more integrated with world grain markets and is heavily influenced by them. Major constraints to the growth and development of agriculture have been the moratorium on the sale of agricultural land and the persistent government intervention in export markets. Despite these and other impediments to agricultural development, there has been remarkable growth in production and trade. So, there is some hope for realizing Ukraine's great potential for agricultural growth and trade, but the progress often seems painstakingly slow and uneven.

This chapter will examine the Ukraine transition during 20 years and use the studies of ZVI LERMAN and others to understand those developments in Ukrainian agriculture and their implications for the future. Many such studies have already done similar analysis and provided evidence of successes and failures as well as guidance for improving the policy for and economic performance of the sector. Yet despite the progress that has been achieved in the sector, there is still the

expectation that agriculture in Ukraine could achieve much more if well-functioning markets could be realized.

We begin with a discussion of land, land use and farm structure developments, then the transition in grains, livestock and poultry sectors, and finally we analyze a contrast of policy intervention vs. market integration. We conclude with guiding principles for giving the market a greater role in Ukraine's future.

2 LAND POLICY, LAND USE AND FARM STRUCTURE

Ukraine was one of the post-Soviet countries that did not have a family farming heritage within the lifetime of those living at the time the transition to market economy began. Therefore, once the Soviet Union collapsed, land and assets were privatized to farm workers, most of who had little interest or experience in private farming (Table 1). While many continued to produce on small household plots for themselves and even for the market, most were not interested in farming as a business. While these approximately 4.3 million household farms produce a significant value of meat, milk, fruits and vegetables products, they mostly lease to other, larger farm enterprises the additional land distributed to them in the post-Soviet land reform. A moratorium on the sale of this land has been extended every year[1] and in 2012 it was extended for another three years. So among the East European countries Ukraine has the weakest land market performance with the exception of Belarus, which has hardly reformed at all. This has strongly influenced the development of farm structure, which could be generally characterized by two major categories of farms – agricultural enterprises and smaller individual farms that primarily consist of the household plots mentioned above.

Agricultural enterprises in the country differ in their organizational, legal and ownership origins and include state-owned enterprises, private enterprises, economic partnerships, production cooperatives and others. Agricultural enterprises account for 63 percent of agricultural land use and individuals use the remainning 27 percent (MEYERS, GOYCHUK, 2012). Over the past decade, Ukraine has seen a rapid increase in the number and size of the agricultural enterprises with 3,000 ha and more (Table 2) and an emergence of mega farms, known as agriholdings. These are the large farms (sometimes larger than 100,000 ha) that are often vertically integrated with processors and/or exporters. Legally, such farms can be registered as either a business enterprise that are joint-stock or limited liability companies owned by a group of stakeholders, or a private enterprise, owned by a private individual (VAN LEEUWEN et al., 2012).

[1] In the beginning of 2005, a few land purchases were made in a very short period due to a delay in extending the moratorium.

Table 1: Differences in land reform implementation in the Eastern European countries

Country	Small farms dominated before the USSR	Land restitution to former owners	Land distribution to farm workers	Land market functioning as of 2005	Land market restrictions as of 2005
Albania	yes	no	yes	yes	moderate
Belarus	no	no	no	no	substantial
Bosnia and Herzegovina	no	yes	no	yes	moderate
Bulgaria	yes	yes	no	yes	minimal
Croatia	no	yes	no	yes	minimal
Czech Republic	no	yes	no	yes	minimal
Estonia	yes	yes	no	yes	minimal
FYROM	no	yes	no	yes	moderate
Hungary	no	yes	yes	yes	minimal
Latvia	yes	yes	no	yes	minimal
Lithuania	yes	yes	no	yes	minimal
Moldova	no	no	yes	yes	moderate
Montenegro	no	yes	no	yes	moderate
Poland	no	yes	no	yes	minimal
Romania	no	yes	yes	yes	minimal
Russia	no	no	yes	yes	moderate
Serbia	yes	yes	no	yes	moderate
Slovak Republic	no	yes	no	yes	minimal
Slovenia	no	yes	no	yes	minimal
Ukraine	**no**	**no**	**yes**	**no**	**significant**

Source: Compiled by the authors from WEGREN (1998), LERMAN et al. (2004), MATHIJS, SWINNEN (2000), and GERBER, GIOVARELLI (2005).

Such a rapidly changing structure of farms in Ukraine with agriholdings playing a more important role in agricultural production is truly remarkable. It is quite normal in a dynamic market economy for farm consolidation to take place, where the number of farms declines and the average size increases. This results in fewer small and larger farms as consolidation occurs. But it is still amazing that from 2005 to 2011 there was a 35 percent increase in the number of farms over 3000 ha and a 59 percent increase in the sown area of these farms (Table 2). The share of sown area used by farms over 3000 ha increased from 25 percent to 38 percent, and most of this change occurred from 2005 to 2008. Much of this shift came from declines in numbers and area in farms of 500 to 2000 hectares. In fact, in all three periods, about 85 percent of the sown land was in farms of 500 ha or more, so nearly all the shifts seem to have occurred among these groups.

Table 2: Distribution by agricultural producers by size (in hectares)

	Number of enterprises				Sown area			
	Number 2011	**%, 2011**	**% change from 2008**	**% change from 2005**	**'000 ha 2011**	**%, 2011**	**% change from 2008**	**% change from 2005**
Total	44,919	100.0	-6.43	-11.03	19,493.5	100.0	0.17	5.85
Area < 50 ha	24,464	54.5	-8.49	-14.56	536.9	2.8	0.39	-3.57
50–100	4,236	9.4	1.46	7.68	309.7	1.6	0.98	6.61
100–250	4,582	10.2	-6.42	-5.78	749.3	3.8	-6.65	-6.36
250–500	3,199	7.1	-6.97	-10.92	1153.9	5.9	-6.58	-10.96
500–1000	2,901	6.5	-5.69	**-20.54**	2091.9	10.7	-5.67	**-20.51**
1000–2000	2,777	6.2	-6.81	**-18.28**	3976.9	20.4	-6.04	**-17.99**
2000–3000	1,322	2.9	-3.86	-2.29	3215.9	16.5	-4.26	-2.36
> 3000	1,438	3.2	3.20	**35.02**	7459.0	38.3	10.15	**58.78**

Source: STATE STATISTICS SERVICE OF UKRAINE (2011).

Another way to look at this data is in absolute area added in each of these categories. The period from 2005 to 2008 was one of expanding sown area, when much of the more productive cropland abandoned during the farm privatization and restructuring was brought back into use. One million hectares was added to sown area in these three years, mostly in farms over 3000 ha, and another one million hectares shifted from farms of 500 to 2000 ha to farms of over 3000 ha. In the 2008 to 2011 period, another 700,000 ha shifted from smaller size categories to farms of over 3000 ha.

Unfortunately, there are no official statistics on the number of agriholdings in Ukraine or the amount of land in their use. A growing number of the studies, however, provide a useful approximation. Thus, according to Ukrainian Agribusiness Club, in 2011 there were 79 agriholdings in Ukraine with the total land use of 5 million hectares (GAGALYUK, 2011). This accounted for more than 25 percent of country's total sown area and based on Table 2 would suggest that two-thirds of the sown area in farms over 3000 ha is actually used by agriholdings.

The reasons for the investors' interest in the agriholdings are quite numerous. Among the economic ones are vast availability of relatively cheap fertile land, a sufficient level of infrastructure development, world market access, productive and relatively cheap labor, and finally, increasing commodity prices as a promise of higher profits. However, a number of experts who study the emergence and development of such formations point out that there are also reasons for the agriholdings to be a post-USSR (rather than a Western) phenomenon. Among

those are underdeveloped institutional conditions and political-economic forces pertaining to the transition economies that allow for such large capital accumulation (DEMYANENKO, 2008; EPSHTEIN et al., 2013). For example, a moratorium on the sale of agricultural land in Ukraine allows the owners of the agriholdings to rent a large amount of very productive land at relatively low rental rates. Moreover, there are cases where land contracts are secured and allowed to remain idle as the agriholding company uses the land holdings to attract investments in exchange markets. This is clearly not in the interests of the nation nor the small land holders and workers in rural areas. The leasing law should prevent this practice from continuing, but routinely such laws are not enforced.

The major benefit of the agriholdings is that they attract a large amount of investment in the agribusiness sector both from domestic and international investors, which is crucial for increasing food production. Additionally, one might expect that the economies of scale of the agriholdings would allow them to decrease the cost and increase the efficiency of production, while the extent of their integration could allow for the fast and smooth product movement from a farm to an exporter or domestic user. However, massive land holdings that are usually widely scattered geographically and not always well managed as farming enterprises are very likely to be more inefficient than smaller holdings in the 10-20,000 hectare scale as shown in research by DEMYANENKO (2008). A recent, very comprehendsive and robust study of farm data in Ukraine from 2001 to 2011 has found that the growth of large farms in Ukraine cannot be attributed to economies of scale (DEININGER et al., 2013). When the authors carefully accounted for differences of location (rayon fixed effects) and differences of management skills (farm fixed effects) the data show constant returns to scale. It indicates that management skill, location, and other factors such as policy, benefits of vertical integration, and access to credit are the more likely reasons for expansion of these very large agricultural enterprises. In addition, a recent study by EPSHTEIN et al. (2013) that focused on the agriholdings in Belgorod region of Russia, suggests that agriholding farms lag behind smaller independent farms in terms of profitability and are exposed to a higher risk of default compared to the smaller ones.

There are also socio-economic and environmental risks associated with the creation of such mega farms. The main one is the disconnect between agriholdings and the rural areas where they operate. First, they displace a significant number of agricultural workers, which reduces employment and incomes in the rural areas. Also, the major headquarters of such holdings are usually located in the larger cities and not in the areas where the production takes place. Therefore, agriholdings pay taxes to the cities, which in turn decreases the stream of financing to the rural territories. This results in lower levels of financing of infrastructure and public goods provision in the rural areas of Ukraine. The environmental

risk is the tendency of agriholdings to engage in monoculture practices that lead to deterioration of land quality and other environmental externalities.

Some experts (VISSER, SPOOR, 2011) fear that the emergence of agriholdings might be an example of "land grabbing" practices, where a big share of land is owned or under long-term lease by foreign or domestic investors. As a result, this might cause even further loss of revenues on the part of the local population. Whether the benefits that agriholdings provide outweigh the risks or vice versa is yet to be determined. However, at this point it is already clear that they are major players in the food and agricultural system of Ukraine.

Given the fact that Ukraine is still experiencing growth of agriholdings more pronounced than growth of other farm structures, there is concern that a *Latifundia* type agriculture will become the norm and that it may add to rural distress while also not achieving the greatest potential that is possible for Ukraine's agriculture. In fact, the agriholdings are much different than landed estates of Latin America, since agriholding structures are often comprised of many large enterprises in different locations but connected by a common corporate home. Still it may be interesting to make a comparison to Brazil, one of those countries often associated with a *Latifundia* type farm structure (Table 3). Though the size categories are not exactly the same, we can see that farms of 1000 ha and above use 45 percent of the sown area in Brazil as compared with 75 percent in Ukraine. At the other end of the spectrum, Brazil's farms of 100 hectare or less cultivate about 21 percent of sown area compared with less than 5 percent in Ukraine. By these measures, Ukraine is already much more heavily dependent on farms over 1000 ha in size than is Brazil, and smaller farms also have a much smaller role in Ukrainian land use.

Table 3: Distribution by agricultural producers by size, Brazil, 2006

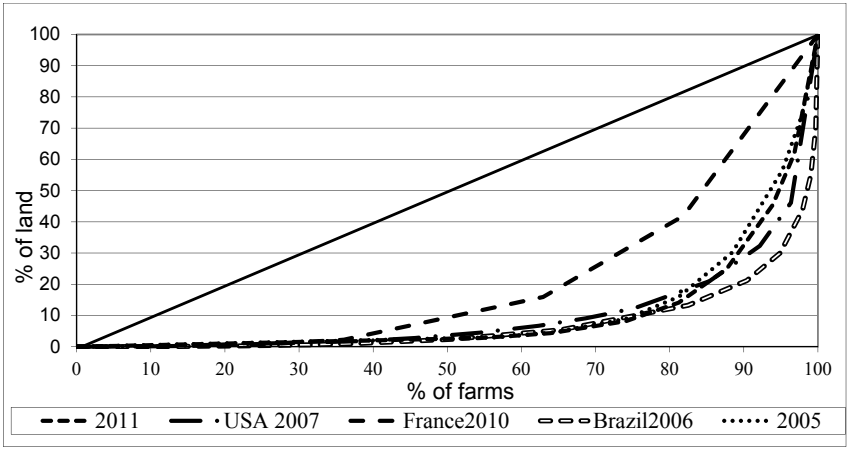
	Number of enterprises	%	Total area sown ('000 ha)	%
Total	4,921	100.0	333,680	100.0
Area < 50 ha	4,058	82.0	44,209	13.2
50–100	390	7.9	26,483	7.9
100–200	219	4.5	29,219	8.8
200–500	151	3.1	46,385	13.9
500–1000	54	1.1	37,240	11.2
1000–2500	32	0.6	48,640	14.6
>2500	15	0.3	101,503	30.4

Source: BENTO (2013).

Another way to compare Ukraine to other countries is to use a Lorenz curve (Figure 1), which was a technique often employed by ZVI LERMAN. In this case we include two periods in Ukraine to show the shift from 2005 to 2011 and compare these to Brazil, US and France. The change from 2005 to 2011 in Ukraine moved it closer to the more extreme Brazil case, where the largest one percent of farms (over 1000 ha) use 45 percent of the land, while in Ukraine the largest three percent of farms (over 3000 ha) use 38 percent of land. In the US, the largest four percent of farms (over 810 ha) use 40 percent of cropland; and the largest contrast is France, where the largest 18 percent of farms (over 100 ha) use 58 percent of the land.

Finally, we can compare the average size of the farms in the top categories of Ukraine and Brazil. The average size of farms over 2500 ha in Brazil is 6,600 ha, while in Ukraine the average size of those over 3,000 ha is 5,187 ha. Similarly, the average size for farms over 1000 ha is also somewhat higher in Brazil, 3,156 ha vs. 2,646 ha in Ukraine. Though the details are not available, it can be expected that the distribution of large farms is quite different in these two countries.

Figure 1: Ukraine farm size distribution in 2011 and 2005 compared with US, France and Brazil



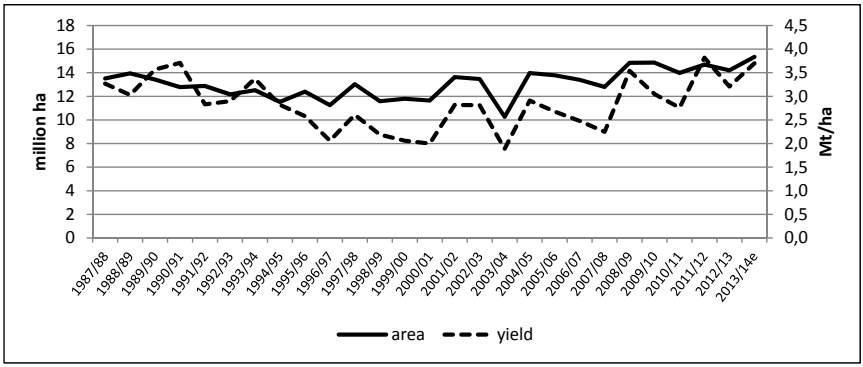
Source: BENTO (2013); EUROSTAT (2010); STATE STATISTICS SERVICE OF UKRAINE (2011); U.S. CENSUS BUREAU (2012).

2 LAND POLICY, LAND USE AND FARM STRUCTURE

Over the two decades since the transition began, there has been a gradual decrease in the land area used for fodder crops due to the decline in the livestock numbers (MEYERS, GOYCHUK, 2012). For the same reason there has been a decline in the use of the major crops for domestic feed. After the collapse of the Soviet

Union, only corn feed has returned to its 1990 level. The amount of wheat used for feed in 2008-2010 was 20 percent of the 1990 level and for barley it decreased to 50 percent of its 1990 level. Also grain production declined about 50 percent from 1987 to 2000 but then more than doubled during the next decade. The secular decline in production up to about 2000 was both due to losses in area and yield (Figure 2) during the privatization and restructuring process and, of course, weather fluctuations added volatility to these outcomes. However, area and yield both responded to improved market conditions and the growing agricultural investment that was mentioned in the previous section.

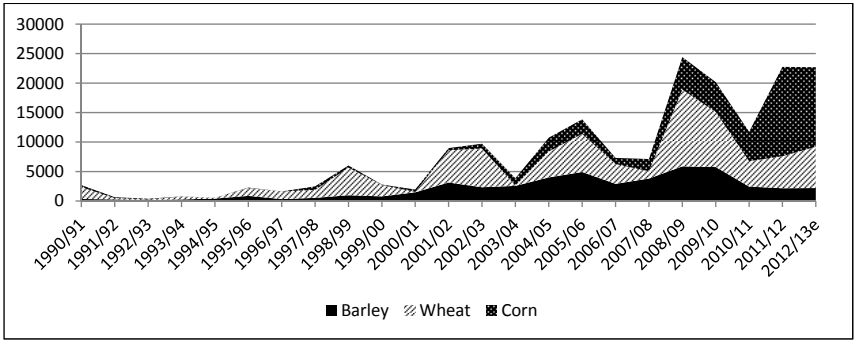
Figure 2: Ukrainian grain area and yield per hectare



Source: USDA, PSD view database.

As production has recovered from the post-Soviet collapse and domestic feed use declined, there has been an increase in the exports of all major Ukrainian grains starting from mid-1990s (Figure 3). Wheat and corn have seen the largest increases. Starting from 2008 Ukraine was exporting on average 7.8 million mt of wheat per year, compared to 1.2 million mt per year during the 1990s. Ukrainian corn exports increased from almost zero in the early 1990s to 8.8 million mt per year in 2008-2012 period. Barley exports increased from 350 thousand mt in 1990 to a 6.4 million mt record in 2008 then began to decline as farmers shifted to more profitable crops, or perhaps were discouraged by increased government trade intervention.

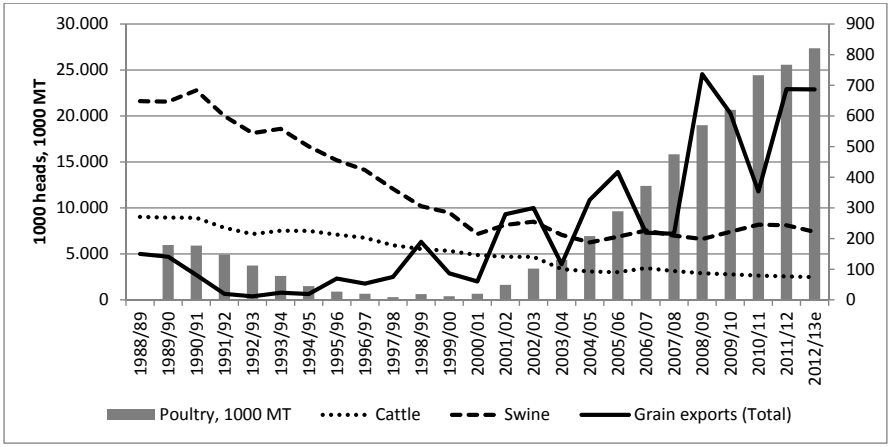
Figure 3: Dynamics of Ukrainian barley, wheat and corn exports, '000 metric tons



Source: USDA, PSD view database.

So the story of Ukraine's grain export success has combined the growth in yields and production with the significant decline in the livestock and dairy industries that drastically reduced domestic grain use for feed (Figure 4). So far, only the poultry industry has shown a rapid resurgence, but there are emerging signs that pigmeat production and possibly dairy also may see substantial growth in the next decade. If there is strong growth in livestock and/or dairy production, this might result in slowing export growth as grain use shifts from exports to domestic feed use and even a possible shift of cropland to the production of fodder crops.

Figure 4: Evolution of grain exports (crop year t/t+1), animal numbers and poultry (calendar year t)



Source: USDA, PSD view database.

Yield statistics also suggest that there is a big potential for increased production of barley, corn and wheat if Ukrainian yields even partially close the gap with the averages of the EU and the U.S. (Table 4). For example, average barley yields in Ukraine are about two-thirds the level of yields in the U.S. and are about half the level of average EU yields. The situation with wheat and corn yields in<-dicates even more potential for improvement. Ukrainian corn yields are about 60 percent of those in the EU-27, and less than half the yields of U.S. farmers. A similar situation exists with the wheat yields. While Ukrainian and U.S. wheat yields do not differ much on average, EU-27 wheat yields are twice as high as those that are seen in Ukraine.

It cannot be expected that Ukrainian farmers will have the levels of government policy support that exist in the EU and the US, but given the relatively strong world prices that are projected to remain well above the pre-2005 levels (FAPRI, 2013), the economic incentive for improved inputs and management practices will continue to be strong. Such yields are already achieved on some farms, but they are still a small portion of total cropland. Just the adoption of improved management practices and seed stock could improve yields significantly as well as reduce yield variance. As can be seen from Table 4, yields of Ukraine's major crops are much more volatile than those from EU-27 and the U.S., and this is an important factor that will continue to keep Ukraine from becoming a reliable supplier to world markets. Another key factor is government policy, which is the topic of the next section.

Table 4: Major grains yield comparisons of Ukraine with EU-27 and USA, mt/ha

Commodity	Barley			Corn			Wheat		
Country	Ukrain	EU27	U.S.	Ukrain	EU27	U.S.	Ukrain	EU27	U.S.
1999/2000	1.85	4.02	3.2	2.52	6.43	8.4	2.29	4.97	2.87
2000/2001	1.86	4.26	3.29	3.01	5.62	8.59	1.98	4.98	2.82
2001/2002	2.6	4.17	3.13	3.24	6.14	8.67	3.1	4.76	2.7
2002/2003	2.5	4.16	2.96	3.52	6.41	8.12	3.05	5.02	2.36
2003/2004	1.49	3.97	3.17	3.46	5.24	8.92	1.47	4.55	2.97
2004/2005	2.45	4.67	3.74	3.86	6.87	10.06	3.17	5.65	2.9
2005/2006	2.06	3.97	3.49	4.32	6.62	9.29	2.85	5.12	2.82
2006/2007	2.17	4.06	3.29	3.74	6.34	9.36	2.53	5.1	2.6
2007/2008	1.46	4.17	3.23	3.9	5.63	9.46	2.34	4.86	2.7
2008/2009	3.03	4.52	3.42	4.69	7.09	9.66	3.67	5.67	3.02
2009/2010	2.37	4.46	3.93	5.02	6.87	10.34	3.09	5.38	2.99
2010/2011	1.97	4.25	3.93	4.5	6.99	9.59	2.68	5.23	3.12
2011/2012	2.43	4.25	3.73	6.0	7.03	9.3	3.28	5.3	2.95
Average	2.17	4.22	3.42	3.98	6.41	9.21	2.73	5.12	2.83
St. Dev.	0.45	0.21	0.32	0.92	0.60	0.65	0.60	0.33	0.20

Source: USDA, PSD view database.

3 POLICY INTERVENTION VS. MARKET INTEGRATION

We have seen that Ukraine has emerged as one of the largest world grain exporters. In the 2012/13 marketing year, according to USDA (2013) Ukraine was among the top ten global suppliers of corn (13.5 mln tons), wheat (7 mln. tons), and barley (2.2 mln tons). The conquest of the world markets, however, did not come with a similar openness in the approach of the Ukrainian government to policy implementation. Until recently it has still been rather dominated by frequent and rather ad hoc policy interventions into Ukrainian grain markets and especially export markets. Table 5 provides the chronology of officially implemented export restrictions in the Ukrainian wheat, barley and corn markets.

Table 5: Chronology of grain export restrictions starting from 2006, thousands metric tons

Decision date	Period	Wheat	Barley	Corn
10/11/2006	10/17/2006-12/31/2006	400	600	600
12/08/2006	12/14/2006-06/30/2007	3	600	500
02/13/2007	02/15/2007-06/30/2007	3	606	30
02/22/2007	02/26/2007-06/07/2007	3	Quotas cancelled	Quotas cancelled
05/22/2007	05/22/2007	Quotas cancelled	-	-
06/20/2007	07/01/2007-10/31/2007	3	3	3
09/26/2007	01/01/2008-03/31/2008	200	400	600
03/28/2008	04/01/2008-04/30/2008	200	400	Automatic licensing
04/23/2008	04/2008-07/01/2008	1,200	900	Automatic licensing
05/21/2008	05/21/2008	Quotas and licenses are cancelled		
10/06/2010	10/20/2010-12/2010	500	200	2,000
12/08/2010	12/2010-02/2011	1,000	200	3,000
03/30/2011	04/04/2011-07/01/2011	1,000	200	5,000
05/2011	05/2011	Quotas are cancelled		
05/2011	05/2011-01/2012	Tariffs are introduced		
10/2011	10/2011	Tariffs cancelled, except for barley (01/01/2012)		

Source: UKRAGROCONSULT (2013), KOBUTA et al. (2012), FAO-EBRD (2010).

Being disruptive to the markets by themselves, these trade policy intervenetions were also accompanied by a dramatic increase in market uncertainty due to a number of factors. First, the export quotas were implemented on short notice or in some cases once announced were not implemented at all. Second, the size of the quotas was readjusted multiple times during a year, and, third, as anecdotal evidence suggests, quota distribution came along with quite an increase of the exporters' rent-seeking behavior.

To give just a few examples: According to the Ukrainian analytical agency UkrAgroConsult (2013), on December 6, 2006 both President Yushchenko and Prime-Minister Yanukovich informed Bloomberg News Agency that till the end of December "Ukraine will remove restrictions for grain export introduced in October". The next week, however, a new Government resolution #1701 was announced that decreased amount of wheat export quota to a prohibitive 3,000 tons from the previous 400 thousand tons. In February 2007, the Ukrainian government announced an increase in wheat export quota to 228 thousand tons, however it was never implemented and stayed at 3,000 tons till May 2007. As can be seen from Table 1, in June 2007, the Ukrainian government cancelled the export quota for wheat, but already in July it was reintroduced, again at the 3,000 ton level. In August 2010 even though the wheat export quota was not officially implemented, the ships that had been already loaded with wheat and ready for departure could not leave the harbor, being blocked by the Ukrainian Customs Service (APK-Inform, 2013).

Apart from the inconsistency in announcement and actual implementation of the quotas, the decision to grant the license to export was not done in a transparent way. For example, in October 2006 43 traders applied for such a license to export barley. At the end, five companies (Serna, Suntrade, Reider-Trade, Louis Dreyfus Ukraine and Barge) were granted permission to export more than two thirds of all barley exports (UkrAgroConsult, 2013).

The growing role of Ukraine in the international grain markets combined with the frequent nature of the Ukrainian government restrictions on its grain exports triggered research on Ukrainian grain markets' efficiency. For example, several recent studies (Goychuk, Meyers, 2013a; Goychuk, Meyers, 2013b; Gotz et al., 2013) investigated the speed and magnitude of the world price transmission[2] into the Ukrainian export and domestic grain markets. In the case of wheat, the research showed that while the Ukrainian wheat export prices were linked the to the world prices between 2004 and 2010, the price transmission was negatively

[2] Competitive market equilibrium or market efficiency is a price-based indicator that holds on the condition of spatial arbitrage, and is often tested with the help of price transmission models.

affected during the periods of the wheat export restrictions imposed by the Ukrainian government (GOYCHUK, MEYERS, 2013a).

When it comes to Ukrainian barley exports, the research shows not only that Ukraine was linked to the world barley market from 2004 till 2010, but that it also served as a price leader in its relationship with other major barley exporters, such as France and Australia (GOYCHUK, MEYERS, 2013b). Interestingly enough, however, starting in 2009 the area allocated to barley production has been decreasing in favor of corn. And, as anecdotal evidence suggests, more restrictive export policies with regard to barley were one of the causes for such production dynamics.

Whenever export restrictions are implemented, they are justified by the Ukrainian government as necessary instruments for protecting domestic grain market from high and volatile prices. A recent study by GOTZ et al. (2013), however, put this justification to test with the analysis of the price volatility development in the Ukrainian wheat market from 2005-2011. The findings suggest that the multiple and unpredictable interference of the Ukrainian government in the wheat export market did not protect its domestic market players from volatility transmission from the world markets. On the contrary, the intervention has coincided with substantially increased market uncertainty which led to pronounced additional price volatility in the domestic market that was even higher than the one observed in the world market price.

One common conclusion that can be made from all these studies is that while the market still finds its way to connect to the world market, short-sighted policies implemented by Ukrainian policy makers seem to be a major obstacle and an important factor in decreasing market efficiency and increasing welfare losses to both consumers and producers. There is, however, a hope that things are slowly improving. One of such signs of improvement is Ukrainian transition from export quotas to less restrictive export tariffs in May 2011 (GERASYMCHUK et al., 2011).

Additionally, in 2011, after the number of complaints about the unpredictability of the government policies that affect investment restrictions, the Ukrainian government and major grain exporters signed a "Memorandum of Understanding". The latter establishes voluntary restrictions on the export of grain for each marketing year in which it is signed. For example, in 2011/12 such a memorandum allowed for 24.8 million tons of grain exports permitted to leave the country, while the actual export amount totaled to 23.2 million tons according to USDA (2013). Even though an improvement over the ad-hoc approach to the export interventions, this Memorandum is far from ideal, since, as anecdotal evidence again suggests, the decisions on who exports what amounts of grain is

still subject to decisions that are not transparent, just as it was in case of export quota distribution.

So, on one hand Ukraine is increasingly integrated with the world market and gains benefits from increased food and agricultural export revenues, but on the other hand the visible hand of the government is standing in the way of completing the transition to a market economy. This reluctance to let the markets work and the continuing inclination to intervene and "guide" market behavior is essentially limiting the incentives of farmers and agribusiness to invest and innovate and generate more growth in the food and agricultural sector.

4 CAN THE MARKET FIND A WAY?

The Ukrainian agriculture sector has clearly been progressing with the turnaround in production, the export expansion and the joining of WTO in 2008. However, there remains much unrealized potential that is both a challenge and an opportunity. Ukraine has been plagued by erratic and often unfavorable government policies. It is hard to know if the policy uncertainty or the actual policies are more damaging to the industry, but both of them have the effect of increasing producer risk and reducing incentives to invest and improve management and inputs in agricultural production. It is not only the periodic imposition of export quotas or the on and off export duties of 2011, but the generally poor marketing infrastructure and costly transportation systems that hamper progress in the industry. The farm to port costs in Ukraine are estimated to be substantially higher than in comparable EU and US markets. And there is too little attention to research and development in the agriculture research system.

The future for Ukraine agriculture can be really bright if market forces are given a chance to operate without undue government interference and even more so if the government can provide more pubic goods in the form of improved marketing infrastructure, information systems and extension services. In the past, farmers have done remarkably well considering the unfavorable policy and market conditions, so the entrepreneurial talent and the natural resources are not the constraint but rather the policy and business environment are the limitation.

Think of a market as water flowing down a stream or through a field. When it reaches an obstacle, it flows around it or over it. The larger the obstacle, the more it diverts or slows the flow of water, but sooner or later, faster or slower, the water finds its way downstream to its destination, whether that be a river or sea or ocean.

In a mature and well-functioning market, goods flow smoothly and efficiently from the source to the destination (farm to port, farm to fork, etc.). But in

Ukraine and to varying degrees in many transition countries, the market economy is barely 20 years old and is not yet a well-oiled machine, so there are relatively more obstacles and inefficiencies in the marketing channels. Some of these are due to lack of experience of market agents (farmers, traders, etc.), some to poorly developed or lacking market institutions, some to lack of infrastructure, some to poor government policies.

Here are a few examples of how the market in Ukraine finds a way around obstacles and deficiencies. The first and obvious example is that an inefficient market raises the cost of obtaining farm inputs and reduces the prices farmer receive for products at the farm gate. The best example is the gap between the farm price and the export price, which is essentially transport and handling costs. The gap is higher if market infrastructure is bad, if inspections, grades and standards are poorly developed or administered, or if the government introduces excessive fees or barriers (such as export quotas, duties or bans). Secondly, if the farm credit market is not well developed or if it serves only a favored group of farmers, then it impedes production growth and sometimes leads to credit provided by input suppliers, produce buyers or others.

Finally, when land sales are not permitted, leasing becomes more important as a means to adjust land use patterns and farm operating units. The rise of agroholdings in Ukraine is itself an example of market agents developing farming systems that would rarely, if ever, be seen in a well-functioning market. The emergence of these mega-farm operations can be seen as a way to overcome the deficiencies in land, credit, and commodity market institutions in Ukraine and other countries, and their rapid growth may also reflect lack of transparency and poor enforcement of existing laws. At least it is clear from recent research that this cannot be explained by economies of scale (DEININGER et al., 2013).

Whether market inefficiencies are due to government action or inaction, lack of functioning institutions or to the "learning by doing" of market agents, improved institutions and government policy are the means to improving market performance. Improving market efficiency is one of the most effective and low-cost means to increase farm productivity, production and income and stimulate more investment in agriculture. In some cases, improving market efficiency means the government doing less and in some cases it means doing more.

It is likely that the future will see a continuation of the kind of price and market volatility that has characterized recent years. Risks associated with yield and price variability can be mitigated with good risk management tools such as yield, price and/or revenue insurance, market information systems and contract facilitation. Government can provide assistance to the private sector in developing and offering such tools and use prudent incentive measures to encourage adoption.

But by interfering in export markets, the government increases rather than reduces risk to farmers and the agribusiness sector more generally.

Finally, there is also an overall principle we may call the "Swinnen principle" (SWINNEN, VAN HERCK, 2010) to suggest in setting policy priorities. This guiding principle is to *give priority to policies that contribute to long-term development goals and avoid policies that conflict with long-term development*. So many of Ukraine's polices in the past, such as export bans and quotas and price interventions, are very short term in perspective and clearly conflict with the agricultural development goals of Ukraine. Smarter policies combined with greater confidence in the market to price and allocate goods and resources would greatly benefit the Ukrainian food and agriculture industry and enhance its role as a reliable supplier to world markets.

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PROPERTY RIGHTS IN TRANSITION: EVIDENCE FROM THE 1999 REFORM IN UKRAINE[1]

LEONID A. KRASNOZHON

1 INTRODUCTION

Ukraine as a post-socialist economy has gone through many institutional changes since 1991, including privatization and land reform. Between December 1999 and April 2000, the Ukraine government reorganized several thousand collective farms. The new arrangement of property rights created two main forms of farm organization: sole proprietorship (SP) and employee-owned corporation (EOC). The Ukraine government justified its 1999 agricultural reform because the agricultural sector lagged in development compared to the rest of Ukraine's economy. This chapter studies the effect of property rights on farm efficiency, using a rich and original dataset from Ukraine's agricultural sector.

The 1999 reform produced controversial results. After the reform, the sole proprietorships farms achieved higher levels of economic efficiency while the employee-owned corporate farms showed signs of troubled restructuring, such as lower levels of productivity and higher rates of farm bankruptcy. My hypothesis is that the sole proprietorship has higher efficiency because its system of property rights generates more efficient governance compared with that in the employee-owned corporation (KLEIN, FOSS, 2002; SHLEIFER, 1998; GROSSMAN, HART, 1986). A properly defined and enforced system of property rights is expected to have effects on the use and allocation of factor resources (MEGGINSON, NETTER, 2001; BARZEL, 1997; BLEWETT, 1995; BESLEY, 1995; OSTROM, 1990; WILLIAMSON, 1991, 1985; DEMSETZ, 1967; COASE, 1937, 1960).

To test this hypothesis, I examine a wide range of diverse outcomes in a rich and original dataset. Several important studies have already shown for Ukraine that

[1] I thank Terry Anderson, Peter Boettke, Daniel Benjamin, Peter J. Hill, Donald Leal, Zvi Lerman, Peter Leeson, Karen Maguire, Robert McCormick, Roger Meiners, Randy Rucker, Frederic Sautet, Kurt Schnier, Walter Thurman, Michael Ward, Reed Watson, Mahmut Yasar, and seminar participants at the Property Environment and Research Center, Bozeman, MT. I am also grateful to the Mercatus Center and the Property and Environment Research Center for financial support. I am very thankful to Zvi Lerman for invaluable help with designing the questionnaires.

economic organization of the farm affects efficiency (LERMAN et al., 2007; KURKALOVA, CARRIQUIRY, 2003). Our data also show that sole proprietorship generate 50 % more revenue per worker than employee-owned corporate farms. By controlling for endogeneity, I further show that sole proprietorships outperform employee-owned corporate farms by as much as 50 % in output. The ownership arrangement has profound effects on agricultural production in Ukraine. This chapter contributes to the strand of economic research that studies agricultural transition in Eastern Europe and former Soviet states (see LERMAN et al., 2007; LERMAN, 1999).

This chapter proceeds as follows. Section 2 discusses the transition of the agricultural sector in Ukraine. Section 3 describes the data samples I use and provides descriptive statistics. Section 4 presents the estimating framework and the empirical findings. Section 5 contains concluding remarks.

2 AGRICULTURAL TRANSITION IN UKRAINE

To begin, it is worth noting the history of the changes of farm organization in Ukraine, beginning with the state-owned farms that dominated the landscape prior to 1991. In Ukraine, the Soviet government created the state-owned farms through nationalization and collectivization of individual farms that started in 1921 (SUBTELNY, 2000; CONQUEST, 1986). The state-owned farms had the same de facto organization although they existed in two different legal forms: "collective farm" (*kolkhoz*) and "Soviet farm" (*sovkhoz*). The state hired farm workers at a fixed-wage rate and guaranteed job security. The state had control over farm assets and delegated the execution of the central planning commands to the farm management chaired by the farm director (usually a bureaucrat). In 1991, with the dissolution of the Soviet Union, the collective agricultural enterprise (CAE) replaced the state-owned farm and became the dominant form of farm organization in Ukraine until the 1999 reform. During the 1999 reform, the state ordered the reorganization of the CAEs into sole proprietorships (SP) or employee-owned corporate farms (EOC). Table 1 presents the main characteristics of the various organizational forms.

Table 1: Legal characteristics of major forms of farm organization in Ukraine

	SP	**EOC**	**CAE**	**State-owned**
Method of creation	Created by a single owner – former CAE employee	Created by shareholders – former CAE employees	Created by former workers of state-owned farm	Created by the state
Entity status	Not separate from owner	Separate from owners	Separate from owners	Not separate from the state
Liability for debts and contracts	Unlimited	Limited to the amount invested in the farm	Limited to the amount invested in the farm	Absent
Duration	Same as owner if debts are paid off	Terminated by a decision of shareholders if debts are paid off	Terminated by a decision of owners if debts are paid off	Terminated by a decision of the state
Transferability of interest	May be sold at any time	May be sold at any time	Absent	Absent
Control	By owner	By assembly of shareholders; majority rule	By assembly of shareholders; majority rule	By the state
Management	By owner	By an elected manager and board of directors	By a former director of state-owned farm	By an appointed director-bureaucrat
Capital	Limited to what owner raises	Limited to what shareholders raise	Limited to what owners raise	Limited to what government raises
Taxation	Fixed	Fixed	Fixed	Fixed
Wage contract	Fixed	Fixed	Fixed	Fixed
Lease contract	Fixed	Fixed	Absent	Absent
Exit barriers	File for dissolution if debts are paid off	Receive an approval of the general assembly	Receive an approval of the general assembly	By decision of the state
Entry barriers	No entry of new members	Must invest capital and land shares in the farm; must be in-rayon resident	No entry of new members	By decision of the state
Land ownership	Private	Common	Common	Public
Capital ownership	Private	Common	Common	Public
Asset ownership	Private	Common	Common	Public

2.1 Agricultural transition: 1991-1999

The CAE emerged in Ukraine's agriculture in the early 1990s, in the midst of the "shock therapy" market reforms, and it dominated the agricultural sector until the 1999 reform (LERMAN, CSAKI, 2000). In December 1991 the government began a divestiture of public farm assets, including buildings, equipment, and farmland. The divestiture was part of a larger reform that involved agricultural privatization. Privatization relied on two methods: primary, by the mechanism of voucher privatization, and, secondary, by management-employee buyout.[2] The state limited the right of participation in divestiture to farm workers (24 % of the labor force) and retirees who had been employed by the farms not more than ten years ago. The beneficiaries of the divestiture process constituted 6.9 million people or 14 % of the population.

The agricultural privatization divested the land and assets of state-owned farms by the following process. The state partitioned a farm's land into land shares and its non-land assets into asset or property shares, depending on farm size and the number of farm workers. The state treated farm managers, employees, and retirees equally. Then the government issued vouchers and distributed them to the beneficiaries on the farm. The beneficiaries had to claim their vouchers and exchange the vouchers for so-called certificates. Only voucher holders had a legal right to a certificate. The certificates had an expiration date that the state set as the deadline for the divestiture process (December 31, 1996). A certificate gave its holder legal rights (temporary titles to land or property) to a 1/Nth share of land or assets of a state-owned farm where they were employed or recently employed at the time of the divestiture process.

The share certificates were only temporary titles to land and property because the certificate holders had to exchange them for permanent deeds issued by the state. The temporary legal rights in principle permitted free transfer of land and asset shares as alienable private property by lease, bequest, sale, and so forth.

In 1992 the state prohibited the sale of farmland by imposing a moratorium. The state still allowed renting (leasing) of land, but a rental contract required information about the land parcel, including its geophysical location, soil quality, and other attributes, which the certificate, as a temporary title to the property, did not contain. Unlike a certificate, a deed presented the formal rights of ownership of the land share as a tangible asset with all known attributes. The asset share certificates were also titles to property of *de facto* inalienable and intangible assets. Without a deed, the beneficiary could not rent or sell his shares

[2] See MEGGINSON and NETTER (2001) for a literature review on the methods of privatization.

in land and assets. As a result, the share certificates passed titles to private proerty that, in practice, was inalienable (other than by bequest).[3]

The CAE resembled an employee-owned corporation. It operated as a corporation based on a common, undivided, ownership of land and assets where the shareholders were only farm workers and retirees. The assignment of ownership claims made the beneficiaries residual claimants who held the farm assets in common property.[4] A general assembly of shareholders, including employees and retirees, became the governing body of the CAE with equal voting rights. The assembly held elections and the shareholders usually elected the former chairman of the state-owned farm as the manager of the CAE. Ordinarily, there was no change of managers upon reorganization (ALLINA-PISANO, 2008: 70). The assembly also delegated limited control and absolute cash flow rights to the farm manager. The new assignment of property rights changed the management-employee relationships from a command-and-control approach emanating from the central government (as used in state-owned farms) to a "democratic" rule of joint welfare maximization.

The new common ownership form, however, had no effect on the scale of production, the efficiency, and the socioeconomic role of the large-scale farms. The CAE continued to operate at the inefficient production scale of the former state-owned farm, employing, on average, 800 workers and 8,000 acres of farmland. The farms used fixed-wage contracts for labor compensation because the state-defined CAE bylaws excluded the option of profit sharing. The retirees, who constituted between 20 % and 30 % of the shareholders, received in-kind dividend payments annually (MINISTRY OF AGRICULTURE, 2010). The CAE shareholders often represented a large portion of the population in a village where the farm was located, while their families constituted the rest of the village population. Some families had several shareholders because several family members worked or used to work on the state-owned farm. Thus, social welfare in rural areas was highly dependent on the local CAE.

Total agricultural output dropped by 50 % from its 1991 level (STATE COMMITTEE OF STATISTICS, 2010). Despite the reorganization of the agricultural sector, capital investments and production restructuring lagged because the turmoil and uncertainty of the property regime affected investors' confidence and created an attenuated system of property rights. Many expected the state to reform the

[3] The share certificates gave their owners the formal usufruct rights similar to those for Mexican farmers and Indian reservations in North America (ANDERSON and LUECK, 1992; MCCHESNEY, 1990). Both the Indian reservations and the Mexican farmers could own and use land but not freely sell.

[4] Residual claimant is the full-fledged owner of the asset who can affect the income flow and bears full responsibility for their actions (BARZEL, 1997: 8).

agricultural sector again because the state regarded the first divestiture as an intermediate step toward agricultural privatization (LERMAN et al., 2007). Regime uncertainty was a likely cause of the production decline (HIGGS, 1997).[5] The proportion of unprofitable farms increased each year: 85 % in 1997, 93 % in 1998, and 98 % in 1999 (MINISTRY OF AGRICULTURE, 1999). A large-scale farm survey, conducted by the UNITED NATIONS FOOD AND AGRICULTURE ORGANIZATION in Ukraine, found that the share of unprofitable farms was 92 % in 1998 (LERMAN et al., 2007: 19). The state, however, subsidized and provided cheap credit to the CAEs. In 1998, the CAEs reported $1.23 billion in losses (4 billion hryvnia) and 95 % of the farms could not keep up loan repayments. In the same year, "Ukraina", the state-owned agricultural bank and the largest bank in Ukraine, filed for bankruptcy. The state had to stop bailing out farms and allowed farms to default on their outstanding debts (MEYERS, 2005).

On December 3, 1999, Ukraine's President Kuchma issued a decree instructing all local authorities to begin the reorganization of the CAEs (PRESIDENTIAL DECREE #1529). The divestiture required the termination of the CAE and the creation of a legal form of farm organization based on individual or joint ownership of asset shares and land shares (SP and EOC). The decree set a deadline of April 30, 2000 for farm reorganization and simplified the farm reorganization procedure. The state, however, created several covenants that again restricted the formal rights of land ownership. The state prohibited farmers to enter into a tenancy contract that exceeded 50 years. The state also regulated the rental market by imposing a price floor of 1 % over the fixed normative price of farmland. The state used a uniform approach to pricing farmland by fixing a normative price of one hectare of farmland at 10,000 hryvnia (i.e. $980 per acre).[6] The state also renewed the 1992 moratorium on land sales until the enactment of a new Land Market Law.

The CAEs had been dissolved by the prescribed deadline. In December 1999, there were 8,102 CAEs in Ukraine (LERMAN et al., 2007:21). By April 2000, there were no CAEs listed in Ukraine's business registry. The change of legal form demanded that farm workers file for an individual or a joint-venture business license. An individual license required an application from a single employee and a joint-venture license required an application from at least nine employees. An individual-license holder created a new form of business organization, a

[5] There could be other reasons for the agricultural production collapse. Peter Sabluk, the former Minister of Agriculture, argued that the farms were unprofitable because they kept the unprofitable livestock sector (SABLUK, 1999). The soft budget constraints in the CAE could be another reason because the state regularly bailed out the bankrupt farms (KORNAI, 1980).

[6] The average exchange rate of hryvnia against the U.S. dollar in 1999 was 1 USD = 4.13 UAH (NATIONAL BANK OF UKRAINE, 2011).

"private agricultural enterprise" (SP in our terminology). The joint-license holders created a different form of business organization, an "agricultural production cooperative" (EOC in our terminology). There were 7,389 (70.9 %) SPs and 3,041 (29.1 %) EOCs among the newly registered farms in April 2000.[7] The SPs were legally based solely on individual ownership of land and assets, while the EOCs were legally based on joint ownership of private land and assets.

Sometimes the reorganization of the CAEs was obstructed by hold-outs. In some instances, a former CAE employee refused to join the reorganized farm or lease his land and asset shares. Farms applied various methods to overcome the hold-out problem. Some farms used economic incentives, offering higher returns on land or asset shares or better employee benefits. Since the social welfare of rural residents was highly dependent on the CAE, farms could use socioeconomic levers and make credible threats to "persuade" the hold-outs. Thus, some farms threatened to strip the former CAE employee and his family of the privileges of community services, such as emergency healthcare and transportation. In the worst case, the farms threatened to reduce the supply of utilities to his house or increase social sanctions and other types of discrimination against him and his family (ALLINA-PISSANO, 2008: 156). The speed of the CAE reorganization suggests that the farms managed to overcome the hold-outs.

The presidential decree that transformed Ukraine's agriculture from a sector dominated by common ownership to a sector dominated by private ownership is generally called the 1999 reform.[8] The order also required authorities to complete an exchange of land and asset share certificates for deeds of private ownership by 2002 when the government planned to enact a new version of the Land Code. The 1999 reform had been enacted by the deadline, but the replacement of share certificates with deeds lagged behind the legislation: 76 % had been issued through 2005, 87.6 % through 2006, and 94 % through 2009 (STATE COMMITTEE ON LAND RESOURCES, 2010).[9]

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[7] Author's calculations are based on data from Table 2.1 "Changes in the number of farm enterprises, 1990-2004" in LERMAN et al. (2007: 21).

[8] Lawyers in Ukraine continue to argue about the legitimacy of the 1999 reform. Some lawyers argue that the presidential decree violated the constitutional rights of the farm workers by forcing them to reorganize their farms. See the references for the legislation that regulated the 1999 reform.

[9] International observers, including USAID and UNDP, point out that there is a significant difference between the rate of deed issuance and the rate of deed-certificate exchange. The state reports that 6.5 million or 94% of deeds have already been issued, while USAID or UNDP farm surveys show that only 70%-80% of certificates have been exchanged for deeds (LERMAN et al., 2007).

2.2 After the 1999 reform: SP and EOC

The SP farm has a single owner who is the residual claimant with unlimited liability for debts and contracts.[10] The farmer uses equipment, buildings, and farmland of the former CAE by leasing the asset and land shares from the former CAE workers at a fixed rent. As a rule, the farmer often hires the former CAE workers because of their skills and experience. Thus, the SP farm presents a set of economic incentives where a tenant not only hires people who happen to be part-owners of the land being farmed but also leases the landowners' share of farm equipment and buildings. The farm employees receive fixed wages and fixed rents, while the farm owner receives the residual income.

The EOC farm has a governance structure that resembles not only an employee-owned corporation but also the CAE. When the CAEs were dissolved, the farm workers received a joint license to create an EOC and invested their share certificates in the EOC to become its shareholders. Their land and assets, including equipment, buildings, and farmland, are in joint ownership and the group of shareholders is the residual claimant. The shareholders, however, bear limited liability for debts and contracts. They are liable only for the amount that they invest in the farm's equity capital. The shareholders have several rights that they are able to exercise. They can terminate (sell) the farm by a majority decision if the farm has no outstanding debt. Individual shareholders can opt out and sell their shares at any time to anyone. A membership in the EOC farm is voluntary and members can choose if they want to invest their asset and land shares in the farm's equity capital or not.

A comparison of the governance system of the EOC farm to the CAE shows that most features are similar. The governing body of the EOC is the general assembly of shareholders. The assembly elects the board of directors and the chairman annually. The former CAE chairman, who typically had been the chairman of the state-owned farm, often remained in the same position in the EOC because of his reputation and experience. The assembly delegates management power to the chairman and the board of directors, while the shareholders have absolute control and equal voting rights (one member – one vote). The general assembly holds meetings on a regular basis. The meetings usually last longer than a full working day. These meetings cover not only production issues but also current affairs, including politics, community service, etc. In fact, the general assembly may ignore production issues altogether and focus on personal issues such as planning a wedding for a farm employee or reprimanding farm employees for

[10] The SP represents two legal forms of business organization: sole proprietorship and partnership. The COMMERCIAL CODE (2003) permits a partnership to operate with a single general partner thus equating it to a sole proprietorship.

mischief.[11] The EOC general assembly meetings are reminiscent of similar meetings instituted by the Soviet state-owned farms and continued by the CAEs.

The EOC has unique contractual arrangements that significantly differ from those in the CAE. The farmland is legally in joint ownership. Instead of using the joint ownership of assets to save on contracting costs, the EOC replicates the contractual arrangement of the SP farm (HART, MOORE, 1990; GROSSMAN, HART, 1986). Unlike the CAE, the EOC leases land from the shareholders at a fixed-rent rate. The lease term is usually between five and ten years.[12] The farm makes lease payments to the shareholders annually.

The EOC uses the above-described contractual arrangement as a mechanism to enforce good conduct, prevent exits, and increase the likelihood of survival. Though it is illegal to sell farmland, the shareholders can transfer land share certificates because of legislative uncertainty surrounding the land market.[13] Shareholders use the contracts to make a credible commitment to their farm and discourage each other from opting out. Defectors can be blacklisted from social events, emergency healthcare, and other community services (ALLINA-PISANO, 2008). Since private enforcement of good conduct works effectively when parties experience repeated interaction or post rewards, the EOC farms provide community services and sponsor festivities in their communities on a regular basis (ELLICKSON, 1991; LIN, 1990; GREIF, 1989).

3 DATA AND DESCRIPTIVE STATISTICS

I use farm-level data from Ukraine's State Committee of Statistics (henceforth, UKRSTAT) and Ukraine's State Registry of Enterprises and Organizations (henceforth, EDRPOU) to create a representative sample of Ukraine's agricultural sector in Kharkiv province in Eastern Ukraine. I also use qualitative data from a field study that I conducted in Ukraine in the summer of 2008. The fieldwork dataset consists of 48 interviews with major stakeholders in agriculture.

3.1 Data sources

The UKRSTAT dataset includes a variety of farm-level economic variables, ranging from land sizes to total revenues, and other annual farm-level economic data for 2004-2009. Each farm is identified by its taxpayer identification number,

[11] As a part of a field study in Ukraine, the author personally participated in several meetings of the general assembly of EOC farms in Kharkiv province.

[12] According to the STATE COMMITTEE ON LAND RESOURCES (2010), 18% of farmland is leased for a 3-year period, 60% of land is leased between 3- and 5-year periods, 15% of land is leased between 6- and 9-year periods, and 7% of land is under a 10-year lease. Overall, 65% of farmland is under a tenancy contract in Ukraine.

[13] Almost 20% of land parcels changed ownership after the second round of divestiture (STATE COMMITTEE ON LAND RESOURCES, 2010).

which remains constant over time. The data for analysis are obtained from UKRSTAT's annual random sample in Kharkiv province. As a result, the number of farms varies over the years.

The EDRPOU data set provides the date of business registration, business location, type of business license, initial amount of equity capital, and other farm-specific information from the national business registry. The Tax Administration updates the EDPROU data annually (we used the dataset updated to 2009). The taxpayer identification number has been used to combine the UKRSTAT and EDPROU datasets.

The sample farms were selected from the Kharkiv province in Eastern Ukraine, providing a representative sample of its 27 rayons (districts, administrative units within a province). The number of the farms in the sample represents 3 % of the total number of farms in Ukraine. Between 2004 and 2009, the sample farms employed around 15,000 workers in Kharkiv province. They operated 1.1 million hectares of agricultural land or 3 % of the national total. In 2006, the total net worth of the sample farms was estimated at 1.4 billion hryvnia ($285 million) and their total revenue from grain sales was 539 million hryvnia ($108 million). On average, the EOC farms represent 10 % of the sample.

In addition to the two quantitative datasets, I use qualitative data from the fieldwork conducted in Kharkiv and several other provinces in Ukraine in the summer of 2008. The fieldwork data consist of two random samples, including 48 semi-structured verbal interviews. During the interview, I asked each respondent to fill a detailed questionnaire and make additional comments to explain their answers.

3.2 Descriptive statistics

The data sample is an unbalanced panel with 1,280 farm-level observations for six years between 2004 and 2009. Table 2 presents summary statistics of the main variables for selected years. The number of sampled farms decreased by 26 % during the period: the number of EOC farms in the sample dropped by 37 %, while the number of SP farms decreased by 25 %. At the provincial level, the share of EOC farms shrunk from 10 % to 8 % of the total number of farms between 2004 and 2009. At the rayon level, the share of EOC farms varied from 30 % in Borovsky rayon to zero in several other rayons.

Table 2: Summary statistics: Means for different organizational forms

	2004		2007		2009	
	SP	**EOC**	**SP**	**EOC**	**SP**	**EOC**
Revenue ('000 UAH)***	2527.9	1900.5	3432.2	2181.7	3056.4	2316.2
Capital cost ('000 UAH)***	1678.1	1907.4	1981.4	1332.0	1776.1	1122.3
Cost-based capital intensity***	4.42	4.84	6.36	4.52	5.89	3.83
Capital lease payments ('000 UAH)***	31.6	53.3	14.9	20.8	8.1	14.0
Land, total (ha)*	2791.7	2872.7	2872.0	2470.2	2725.5	2327.1
Labor costs ('000 UAH)	379.5	393.8	311.6	294.6	301.2	292.5
Land lease payments ('000 UAH)	368.38	389.82	264.98	251.21	345.95	414.84
Number of employees	72.5	88.0	56.4	52.2	48.3	49.6
Revenue per hectare (UAH)***	889.5	662	1228.4	903.2	1248.7	1048.9
Revenue per worker ('000 UAH)***	37.3	24.8	75.7	43.9	74.3	52.6
Subsidy ('000 UAH)	159.2	124.6	288.2	255.8	168.4	179.5
Year.month of registration	2001.1	2000.5	2001.1	2000.4	2001.1	2000.4
Number of observations	239	24	182	19	179	15

Note: (1) 1 hectare = 2.47 acres; UAH – Ukrainian hrivnya in constant prices (2005 = 100).
(2) The difference in the means is statistically significant at the 1 % level (***), the 5 % level (**), and the 10 % level (*).

Table 2 shows that the SP farms are more efficient producers than the EOC farms. The former have higher levels of productive efficiency by the two partial productivity measures. Labor productivity measured as revenue per employee is higher in the SP farms than in the EOC farms. On average, the SP farms have 50 % higher revenue per employee compared to EOC farms. Land productivity, another measure of partial productive efficiency, is also higher for the SP farms than for the EOC farms. On average, the SP farms generate 27 % more revenue per hectare than the EOC farms. To detect a difference in factor use between the two types of farms, I apply a cost-based measure of capital intensity, where capital costs include expenditures on utilities, fuel, fertilizers, seeds, maintenance of machinery and production facilities, and other materials (excluding capital lease payments). The capital cost-to-labor ratio in the SP farms is 40 % higher than in the EOC farms. The farms also demonstrated differences in use of the land input. The SP farms use 8 % more farmland than the EOC farms, while the use of labor is not statistically different between farms of different types.

4 EMPIRICAL FRAMEWORK AND PRELIMINARY FINDINGS

To estimate the effect of farm organization on efficiency, I begin with a Cobb-Douglas production function. To control for endogeneity and selection bias, I use instrumental variables such as the year of farm registration and the share of EOC farms from the total number of farms in each rayon.

4.1 Effect of farm organization

The conventional logarithmic specification of the Cobb-Douglas production function is shown in Eq. (1):

$$(1)\ O_{it} = \beta_0 + \beta_k K_{it} + \beta_l L_{it} + \beta_n N_{it} + \beta_b EOC_{it} + \delta_c rayon_{it} + \delta_y year_i + \varepsilon_{it}$$

It uses logged values of production output and factor inputs (i = farm's taxpayer ID, t = year, 2004-2009). All monetary values are in 2005 constant prices.

The logged revenue from the UKRSTAT database is used as the measure of the crop production output, O. The revenue does not include government subsidies. The capital input variable, K, is taken from production costs and it includes logged expenditures on utilities, fuel, fertilizers, seeds, maintenance of machinery and production facilities, and other materials. These capital costs do not include lease payments for land and capital. The labor input variable L is measured by the logged number of employees (NEMPLOYEES) or by the logged cost of wages (LABOR) in two alternative specifications of the production function (reported in the corresponding pairs of columns in Table 4). Logged value of arable land measures the land input, N. Table 3 summarizes the variables used in Eq. (1) (and in subsequent regressions).

In Eq. (1), β_K, β_L, and β_N are the output elasticities of the corresponding inputs. The coefficient of interest for our analysis is β_b, the effect of farm organization on the agricultural output measured as logged revenue. The farm-organization dummy variable EOC indicates whether the farm is an EOC farm (EOC=1) or an SP farm (EOC=0).

Two techniques are used to estimate Eq. (1): a pooled ordinary least squares (OLS) with year and rayon fixed effects and a random-effects (RE) regression. The estimation results are presented in columns 1-4 in Table 4, each pair of columns corresponding to two different specifications of the labor variable (see above). All coefficients are statistically significant and different from zero at conventional levels. In all regressions, the coefficient of the farm organizational type is negative, suggesting lower performance for EOC (EOC=1) compared to SP (EOC=0).

Table 3: Main variables

Cobb-Douglas production function variables:	
EOC	=1 if employee-owned corporate farm; 0 if sole proprietorship
CAPITAL	Log capital costs ('000 UAH)
NEMPLOYEES	Log number of farm employees
LABOR	Log labor costs ('000 UAH)
LAND	Log area of arable land ('000. hectares)
RAYON	Rayon of farm location (27 rayons)
YEAR	Year, 2004-2009
Instrumental variables:	
DATE	Year of farm registration
SHARE	Share of EOC farms from the total number of farms in each rayon
Robustness check variables:	
CASHCROP	=1 if farm produces cash crops; 0 otherwise
LEGUME	=1 if farm produces legume crops; 0 otherwise
MANURE	=1 if farm produces manure crops; 0 otherwise
SURVIVOR	=1 if farm survived for all years in the sample; 0 if otherwise
SUBSIDY	=1 if farm receives government subsidies; 0 if otherwise

Notes: (1) 1 hectare = 2.47 acres; UAH – Ukrainian hrivnya in constant prices (2005 = 100).

The economic literature demonstrates that the more efficient firm is more likely to be chosen for private ownership rather than common property (MEGGINSON, NETTER, 2001). Furthermore, the more efficient firm is likely to be privatized earlier than the less efficient one if information about efficiency is available before privatization (DJANKOV, 1999). Asymmetric information can also explain the selection of farm organization. Someone can have better information about a particular farm than others. Because of these considerations, the estimation of the farm organization coefficient β_b in Eq. (1) is prone to selection bias.

To overcome the selection bias, I use two instrumental variables for farm organization: the year of farm registration (DATE) and the share of EOC farms from the total number of farms in a rayon (SHARE), as indicated in Eq. (2). I assume that both variables are exogenous to a particular farm and should have no direct effect on farm productivity. At the same time, both the share of EOC farms in the rayon and the registration year could indirectly affect productivity by influencing the decision to choose the type of farm organization.

I use an instrumental variable two-stage least squares (IV-2SLS) procedure to estimate the model. In the first stage (Eq. (2)), I use the two instruments for the choice of a farm organization:[14]

$$(2)\ \mathrm{EOC_{it}} = \delta_0 + \delta_k \mathrm{K_{it}} + \delta_l \mathrm{L_{it}} + \delta_n \mathrm{N_{it}} + \delta_c \mathrm{SHARE_{it}} + \delta_d \mathrm{DATE_{it}} + \mathrm{u_{it}}$$

Eq. (1) is then applied as the second-stage regression that estimates the effect of farm organization on output. The estimation results are presented in columns 5-6 in Table 4. All coefficients are statistically significant and different from zero at conventional levels. The Hausman test rejects equality between OLS and IV-2SLS estimates.

The estimation results in Table 4 show that agricultural production is capital-intensive: the capital input has a larger share in total production than the other inputs (labor and land).

Table 4: The effect of farm organization

Variables	Pooled OLS		Random Effects		IV-2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
EOC	-0.152***	-0.159***	-0.181***	-0.186***	-0.890***	-0.695***
	(0.0435)	(0.0437)	(0.0679)	(0.0710)	(0.288)	(0.269)
LABOR	0.160***		0.136***		0.176***	
	(0.0190)		(0.0221)		(0.0217)	
CAPITAL	0.555***	0.563***	0.482***	0.482***	0.522***	0.537***
	(0.0254)	(0.0249)	(0.0272)	(0.0265)	(0.0307)	(0.0291)
LAND	0.243***	0.263***	0.304***	0.327***	0.262***	0.278***
	(0.0289)	(0.0285)	(0.0332)	(0.0325)	(0.0325)	(0.0306)
NEMPLOYEES		0.200***		0.177***		0.221***
		(0.0237)		(0.0274)		(0.0267)
RAYON	Yes	Yes	Yes	Yes	Yes	Yes
YEAR	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,272	1,272	1,272	1,272	1,272	1,272
R-squared	0.828	0.828	0.826	0.825	0.788	0.807
Sargan statistic (P-value)					0.167	0.382
F-statistic of instruments (P-value)					0.000	0.000

Note: Dependent variable is logged revenue from crop production. Each column presents coefficients (standard errors) from a separate regression. Odd and even columns correspond to alternative specifications of the labor variable. Base category is the sole proprietorship farm (EOC=0). Standard errors are in parentheses.
*** Significant at 1 % level. ** Significant at 5 % level. * Significant at 10 % level.

[14] F-tests based on the first-stage regression show that these instruments are sufficiently correlated with EOC to be valid instruments The Sargan test of overidentifying restrictions does not reject the null hypothesis that the instruments and the error terms are independent (P=0.167 and P=0.382, see bottom of Table 4). The instruments are also individually significant in the first stage. The use of both instruments is thus justified.

The organizational-form coefficient is negative, as in the OLS and RE regressions, indicating lower performance of EOC farms than SP farms. However, the OLS and RE results underestimate the effect of farm organization on total factor productivity: the OLS and RE estimates are smaller in absolute value than the IV-2SLS estimates. The OLS regression results show that the output of SP farms (EOC=0) is 14 %-15 % higher than the output of EOC farms (EOC=1). The IV-2SLS regression results, on the other hand, show that the output of SP farms is 59 % or 50 % higher than the output of EOC farms (depending on labor specification).[15] Thus, controlling for the cost-based measure of the labor input (wages) compared with its physical measure (number of employees) increases the gap between EOC farms and SP farms by nine percentage points. This difference suggests that the EOC farms are even more inefficient in their wage policies. Employee-owned firms have higher wage levels than private firms because the former maximize the average earnings per worker instead of maximizing profit (BEN-NER et al., 2000; EARLE, ESTRIN, 1996).

Overall, the IV-2SLS estimates increase the effect of farm organization on output. This finding indicates that there are unobservable factors that are negatively correlated with the choice of farm organization and output. For instance, adverse selection can be a case in point. As a result, an OLS regression underestimates the effect of farm organization on efficiency.

4.2 Evidence from the qualitative field study

Asymmetric information about de jure forms of farm organization and the process of divestiture can explain the adverse selection. Respondents chose the EOC farm because they viewed its governance system as resembling the CAE and wanted to preserve the old system. Several respondents used identical statements to explain their preference for the EOC farm: "there is no difference between the cooperative (EOC) and the collective farm (CAE)" and "it was easier to become an EOC because it was the same as the CAE" (ORAL TESTIMONY #3, #7, and #11). ALLINA-PISANO (2008: 69) finds similar oral testimonies in her field study conducted in rural Ukraine and Russia between 1997 and 2006: "[the CAE] was a collective farm before, and [the EOC] remains a collective farm" and "[the EOC] was the closest to a collective farm."

Moreover, respondents who work for the EOC farm explain their choice of farm organization as an egalitarian and socially optimal arrangement of property rights. The following excerpt from an interview with an EOC manager shows his strong preference for social justice (ORAL TESTIMONY #3):

[15] For OLS regression, from columns 1 and 2, exp(−0.152) −1 = 0.141 and exp(−0.159) −1 = 0.147; for IV-2SLS regression, from columns 5 and 6, exp(−0.890) − 1 = 0.589 and exp(−0.695) − 1 = 0.501.

> I did not want to own what did not belong to me. The farm belonged to our village. I would not dare to look into people's eyes if I became the only owner of everything.

Respondents who own a SP farm explain their choice of farm organization by their desire to make decisions on their own and circumvent "the Soviet method of collective decision-making and collective meetings" (ORAL TESTIMONY #11).

A former agricultural policy adviser to the president of Ukraine argues that asymmetric information about the process of divestiture is to blame for a negative perception of SP farms among some of the rural population (ORAL TESTIMONY #31):

> The private farm was viewed as an unjust transfer of farm assets into the hands of one person, because nobody really understood the process of divestiture.

Moreover, informal local politics created asymmetric information about the 1999 reform. According to several studies, some local government officials lobbied for their decisions among the farmers community (ALLINA-PISSANO, 2008; LERMAN et al., 2007; MEYERS, 2005). Government officials actively participated in the 1999 reform by making public appearances before the CAE general assembly and using administrative resources to reorganize the CAE into specific organizational forms (LERMAN et al., 2007: 35). ALLINA-PISANO (2008: 58) writes that some local officials who were former farmers had personal views on the 1999 reform and regarded it as potential destruction of rural social institutions. Those government officials did not execute all formal requirements of the reform. The agricultural collectives (the CAEs) were not only the main producers of food but also social linchpins: institutions that provided a set of social goods and services in rural areas and helped to maintain social order and stability (ALLINA-PISANO, 2008: 60).

4.3 Robustness checks

It is important to consider whether other farm characteristics affect the estimation results. Among other characteristics missing from regressions (1) and (2), we consider survival during the entire observation period (2004-2009), government subsidies, and crop mix.

The dataset constituted an unbalanced panel because some farms did not survive between 2004 and 2009 and some farms started their operations later than 2004 (new entrants). On average, 70 % of farms in the sample are survivors. Since survivors may have higher levels of productivity than non-survivors or new entrants, I use another dummy variable SURVIVOR (see Table 3) to control for survival bias. A farm is a survivor if it is observed in each year between 2004 and 2009 (SURVIVOR=1); otherwise, it is not a survivor (SURVIVOR=0).

On average, 72 % of the sample farms received subsidies. To examine the effect of government subsidies on crop production, I use a corresponding dummy variable SUBSIDY (see Table 3) that indicates whether a farm receives a subsidy (SUBSIDY=1) or not (SUBSIDY=0).

Finally, farms may produce a different mix of crops due to different crop rotation practices or management considerations. I divide the crops into three groups: legumes, green manure, and cash crops. Cash crops such as corn and sunflower usually exhaust the soil nutrients but they are more likely to increase short-term sales revenue than green manure or legumes. Peas are legumes that are often alternated with cereals in order to maintain soil fertility. Buckwheat and oats are green manure crops that improve soil fertility and prevent soil erosion, but these crops do not generate as much revenue as cash crops do. Dummy variables are introduced to control for the crop rotation effect of the three groups of crops (see Table 3): cash crops (CASHCROP=1; otherwise, 0); legume crops (LEGUME=1; otherwise, 0); the green manure crops are the base category.

Table 5: Robustness check of the effect of farm organization

Variables	Pooled OLS		Random Effects		IV-2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
EOC	-0.147***	-0.155***	-0.160**	-0.165**	-0.894***	-0.709***
	(0.0433)	(0.0432)	(0.0655)	(0.0667)	(0.281)	(0.260)
LABOR	0.146***		0.121***		0.166***	
	(0.0192)		(0.0220)		(0.0223)	
CAPITAL	0.553***	0.555***	0.478***	0.478***	0.525***	0.532***
	(0.0260)	(0.0254)	(0.0275)	(0.0266)	(0.0304)	(0.0287)
LAND	0.224***	0.229***	0.276***	0.279***	0.239***	0.241***
	(0.0294)	(0.0291)	(0.0335)	(0.0331)	(0.0326)	(0.0309)
NEMPLOYEES		0.199***		0.178***		0.222***
		(0.0235)		(0.0270)		(0.0269)
SURVIVOR	0.0695**	0.0844***	0.153***	0.164***	0.0275	0.0558
	(0.0308)	(0.0304)	(0.0427)	(0.0431)	(0.0372)	(0.0345)
SUBSIDY	0.0220	0.0248	0.0250	0.0208	0.0458	0.0421
	(0.0478)	(0.0475)	(0.0433)	(0.0429)	(0.0532)	(0.0504)
CASHCROP	0.755***	1.047***	0.668***	0.888***	0.798***	1.092***
	(0.178)	(0.195)	(0.168)	(0.184)	(0.196)	(0.205)
LEGUME	0.0303	0.0360	0.0315	0.0327	0.0316	0.0385
	(0.0272)	(0.0270)	(0.0275)	(0.0274)	(0.0298)	(0.0283)
RAYON	Yes	Yes	Yes	Yes	Yes	Yes
YEAR	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,272	1,272	1,272	1,272	1,272	1,272
R-squared	0.831	0.833	0.828	0.830	0.791	0.811
Sargan statistic (P-value)					0.139	0.265
F-statistic of instruments (P-value)					0.000	0.000

Note: See Table 4.

The estimation results from the supplementary analysis are presented in Table 5. The survivor effect is statistically significant and positive in OLS and RE regressions (for the IV-2SLS estimation, it is positive but not statistically significant). Cash crops also have a statistically significant positive effect on farm efficiency. Subsidy and legume crops do not have a statistically significant effect. The effect of farm organization remains statistically significant at the 1 % level with these variables included. Overall, the supplementary analysis confirms the robustness of the main empirical results.

6 CONCLUDING REMARKS

This study emphasizes the importance of the property rights regime that underlies the governance system of farms in Ukraine. Between December 1999 and April 2000, the Ukrainian government reorganized thousands of collective farms (then called "collective agricultural enterprises", or CAE) into two forms of economic organization: sole proprietorship (SP) and employee-owned corporation (EOC). The new organizational forms where characterized by different governance systems and property rights regimes. The sole proprietorship farms achieved higher levels of economic efficiency after the 1999 reform, while the employee-owned corporate farms showed signs of troubled restructuring, such as lower levels of productivity and higher bankruptcy rates. By exploring an original farm-level dataset, this study demonstrates that the sole proprietorship is about 50 % more productive than the employee-owned corporation. By controlling for endogeneity, we conclude that the sole proprietorships produce larger farm output.

In addition, we find that the sole proprietorship farms have higher values of partial productivity than the employee-owned corporate farms. The sole proprietorship farms have, on average, 50 % higher revenue per employee compared to the employee-owned corporate farms. The sole proprietorship farms also generate, on average, 27 % more revenue per hectare than the employee-owned corporate farms. Previous studies show that agricultural production is capital-intensive in Ukraine (LERMAN et al., 2007; KURKALOVA, CARRIQUIRY, 2003, LERMAN, CSAKI, 2000). We confirm these previous empirical findings. Moreover, a cost-based measure of capital intensity in the sole proprietorship farms is 40 % higher, on average, than in the employee-owned farms. The sole proprietorship farms also use 8 % more farmland than the employee-owned farms. Regarding the patterns of agricultural production, we find that cash crops have a statistically significant positive effect on farm revenues, while the effect of subsidy or legume crops on farm output is not statistically significant. Overall, farm organization emerges as a statistically significant determinant of agricultural productivity in several different specifications of the production model. The arrangement of property rights has profound effects on agricultural production in Ukraine.

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COMPETITION FOR LAND AND LABOR AMONG INDIVIDUAL FARMS AND AGRICULTURAL ENTERPRISES: EVIDENCE FROM KAZAKHSTAN'S GRAIN REGION[1]

MARTIN PETRICK

1 INTRODUCTION

Until recently, there existed a widespread consensus among agricultural economists concerning the desirable model of farming organization. The two hypotheses of this "family farm theory" were that (1) technological scale economies are typically exhausted before farm size exceeds the labor capacity of a family and that (2) further growth of the labor force is inhibited by rising supervision costs (see EASTWOOD et al. (2010) for a recent review). These hypotheses imply the existence of a surplus maximizing, optimal farm size. They were supported by a large body of empirical literature from developed and developing countries, which showed that smaller farms were not less efficient than bigger ones (HALLAM, 1991) or that land productivity was actually higher on smaller farms (a stylized fact called the "inverse relationship" (IR); see BERRY, CLINE (1979)). Although many deviations from this model were observed in reality, they were attributed to political influence and asymmetric power relations in favor of those benefiting from estate farming operations and the concessionary policies protecting them from fair competition with other farm types (BINSWANGER et al., 1995). The model thus served as a justification for land reforms in developing countries (LIPTON, 2009) and protective agricultural policies in the developed world (SCHMITT, 1984; GARDNER, 2002). Still in the late 1990s, it represented a cornerstone in the WORLD BANK's land policy documents (DEININGER, BINSWANGER, 1999).

It is no surprise that policy advisors to the governments in Central and Eastern Europe and the Former Soviet Union (FSU) also strongly endorsed this family farm model. Radical restructuring and downsizing of collective farms was supposed to be an essential precondition for a post-socialist "farmer's road" to agricultural development (see SARRIS et al. (1999) and LERMAN (2010) for articulations

[1] The author is grateful to Nora Dudwick and Karin Fock for making available the 2003 World Bank survey data and to Nodir Djanibekov and Zvi Lerman for providing helpful comments on an earlier draft of the manuscript. Research assistance by Katharina Vantomme is acknowledged.

of this view and LERMAN (1998) discussing it in the light of insufficient progress of reform). The following quote illustrates the vision behind this reform strategy (LERMAN et al. (2004), p. 50):

> [I]t is progress on the sectoral microlevel … that had the potential for a significant impact on the agrarian rural population. As theory suggests, individual responsibility and direct accountability would cure free riding, shirking, and moral hazard that make collective organizations generally inefficient. Smaller farm sizes would be more manageable and less wasteful, reducing the level of monitoring and other transaction costs between managers and workers that are typically high in large organizations. Property rights associated with private ownership of land (or with secure tenure) would induce farmers to put a greater effort into production. Finally, transferability of use rights would facilitate the flow of land from less efficient to more efficient producers … .

By the late 1990s, actual reform progress was at best mixed, despite some formal advances in asset redistribution. The supposed reform beneficiaries in the land-rich countries of the FSU displayed a persistent disinclination to break up the former collective production structures. This disappointing outcome was noted by the Western observers as follows (LERMAN et al. (2004), p. 123):

> The new land owners are not particularly willing to leave the supportive umbrella of the collective structure and risk everything in independent farming. The overwhelming majority of farm workers in Russia, Ukraine, and Moldova prefer to keep their land and asset shares in the former collective, which in the meantime has reregistered as a corporate farm with a new market-sounding name. They waive their right of exit, at least for the time being, and pool their resources to create a corporate structure.

Ten years on, the global boom in food prices, a generally improved macroeconomic environment for agriculture that has emerged in the RUK countries (Russia, Ukraine, Kazakhstan) despite the turmoil of the financial crisis, and slow but perceptible changes in farm organization call for an update of this bleak assessment. Based on recently collected farm-level data, the present chapter engages in such an update for the major grain-producing region in northern Kazakhstan. Its aim is to evaluate the recent evolution of farm structure in that region against the reform objectives of the 1990s and the family farm theory that underpinned the latter.

At the outset of reforms, in the early 1990s, the situation of the farming sector in Kazakhstan's grain region was an extreme version of the typical Soviet model. In the late 1950s, in a quasi-overnight campaign, almost 500 sovkhozy (state farms) had been established in an attempt to make the "Virgin Lands" of the Kazakh steppe amenable to grain production. Each sovkhoz controlled tens of thousands of hectares. Given this legacy, reform implementation in the late 1990s led to the downsizing of former state farms, which were reorganized as agricultural enterprises (*sel'skokhoziaistvennye predpriiatiia*). Furthermore, a

significant layer of individual farms emerged in the process (called "peasant farms" in Kazakh terminology, *krest'ianskie (fermerskie) khoziaistva*). More recently, some of the former state farms were taken over by outside investors and put under the umbrella of horizontally and vertically integrated holding structures, so-called agroholdings (this is not an officially recognized legal form, see PETRICK et al. (2011, 2013) for details). Today, the typical agroholding encompasses several agricultural enterprises and cultivates up to 100,000 hectares of cropland, sometimes even more. What makes the case of Kazakhstan particularly interesting is that nowadays super-large agroholdings, large-scale enterprises and smaller individual farms co-exist side-by-side and compete for resources in a homogenous production environment. If there is indeed a level playing field, the economically optimal type of organization should emerge and drive out the inferior competitors in an evolutionary process. Kazakhstan is hence a potentially fertile study object not only for an assessment of the transition progress but for deeper issues concerning the desirable model of farm organization worldwide.

With the adoption of the new land code in 2003, Kazakhstan introduced the legal basis for fully private ownership of agricultural land and market-based land transactions. We thus ask whether a land market has actually emerged and whether land transactions help to shift land to the more efficient user. We evaluate and compare the economic performance of agroholdings, agricultural enterprises and individual farms, highlighting a number of key characteristics of farm types that dominate grain production. Next to land, we focus on labor as a second important production factor. Due to massive rural outmigration (primarily of Russians and other ethnic minorities) during the 1990s, labor has become a scarce factor in rural areas of northern Kazakhstan. The use of labor also sheds light on the social structure of the different farm types. Its analysis helps to assess how "family-based" the individual farms actually are and how relevant supervision problems in labor management are likely to be. This in turn will possibly shed a new light on the validity of the established family farm theory, at least under the conditions of post-socialist agriculture.

2 DATA SOURCES

The data for this analysis come from two farm surveys conducted in 2003 by the WORLD BANK and in 2012 by IAMO. The data were collected in Akmola (in 2003 and 2012) and Pavlodar (only in 2003) provinces (oblasts), both part of the Virgin Lands region in northern Kazakhstan. Many identical questions were included in both surveys. Furthermore, in Akmola province, both surveys were carried out in the same districts (rayons) and in mostly the same villages. In Akmola, 50 % of the observed farms were located in Ereymentausky district, and 44.5 % in Esilsky district. Both surveys were administered by the same data

collection firm BISAM with headquarters in Almaty, Kazakhstan. However, the identification of specific farms across the two surveys was not possible due to anonymity restrictions. In each of the provinces, the administrators of the 2003 survey had pre-selected two districts, one close to and one distant from the provincial capital, which were visited again in 2012 (in Akmola province). Within the given districts, farms were selected randomly from company registers provided by the local government administration in each of the two survey years. Enumerators then arranged standardized face-to-face interviews with the farm managers. The 2012 survey targeted principally those villages that had already been surveyed in 2003 and otherwise proceeded in the same fashion. In 2012, data collection was carried out during summer and fall, often before the crop was fully harvested and marketed. In this round, all economic performance indicators therefore refer to the cropping year 2011. Results of the 2003 survey were published separately by DUDWICK et al. (2007).

The data include information about the legal status of the farms (see PETRICK et al. (2011) on relevant background legislation in Kazakhstan). In 2012, there was a quota set that at least 50 entities registered as an agricultural enterprise were to be included in the sample. Furthermore, the 2012 survey instrument asked whether the enterprise belonged to a parent organization such as an agroholding. In this way, it was possible to distinguish the three farm types mentioned before, with agroholdings observed only in 2012. In the following, the category "agroholding" denotes a single agricultural enterprise identified as a member of a larger parent organization, not the entire holding company. Agroholding companies are sometimes active in several provinces or even countries, so that their member-enterprises are often geographically scattered (PETRICK et al., 2013).

Table 1 displays the descriptive statistics of variables important for the following analysis, by farm type and year. The bottom row shows the sizes of the five subsamples. Two groups are very small, agricultural enterprises in 2003 (N=9) and agroholdings in 2011 (N=8), which should be kept in mind when generalizing from the following analysis. The raw data on labor input, wages, and real revenue turned out to be particularly noisy so that extreme data points within the first (third) quartiles minus (plus) 1.5 times the interquartile range (IQR) were excluded from further analysis. Moreover, the grain yields given in the table for 2011 should be interpreted with caution. While 2011 was an exceptionally good wheat year, some of the per hectare yields reported in the survey data were still incredibly high. An arbitrary outlier cut-off was therefore applied at 50 dt/ha. Yield data beyond this cut-off were discarded.

Table 1: Descriptive statistics by farm type for 2003 and 2011

	Individual farms						Agricultural enterprises						Agroholdings		
	2003			2011			2003			2011			2011		
	Mean	*Min*	*Max*	*Mean*	*Min*	*Max*	*Mean*	*Min*	*Max*	*Mean*	*Min*	*Max*	*Mean*	*Min*	*Max*
Utilized area (thousand ha)	**0.514**	0.003	5.600	**1.369**	0.010	10.968	**9.396**	0.040	41.105	**15.577**	1.123	80.0	**25.388**	11.112	40.454
Labor input (FTE) [a]	**17.1**	2.1	248.9	**4.0**	0.5	32.9	**89.5**	8.4	282.6	**51.2**	2.5	540.5	**95.9**	18.4	234.7
Working capital (mln. 2011 KZT) [a]	**2.1**	0.0	12.7	**4.9**	0.0	135.7	**25.0**	0.0	209.7	**17.4**	0.4	138.0	**78.7**	23.2	223.0
Education of farm manager (1..8) [b]	**6.3**	3	8	**6.4**	4	8	**7.6**	6	8	**7.4**	6	8	**7.8**	6	8
Farm revenue (mln. 2011 KZT) [a]	**5.4**	0.1	32.7	**5.6**	0.0	42.3	**126.6**	1.0	895.4	**126.7**	0.0	1142.0	**277.5**	56.9	938.2
Grain yield (dt/ha) [a]	**5.1**	0.1	9.0	**7.7**	0.0	40	**2.6**	0.1	8.0	**7.7**	0.0	50	**7.1**	3.3	21.0
No. of observations		91			100			9			42			8	

Notes: FTE = Full Time Equivalent based on 242 working days per year. [a] Statistics based on non-missing values. [b] Index based on 1=no formal education, 2=primary school, 3=incomplete secondary school, 4=secondary general, 5=vocational school, 6=college, 7=incomplete higher education, 8=university degree. Working capital for 2003 inflated by the purchase price index of productive and technical inputs (2011/2003=2.54), farm revenue inflated by grain price index (2011/2003=1.57), based on indices published by the Kazakh Statistical Agency. Data covers Akmola and Pavlodar provinces in 2003 and Akmola province in 2011. 200 Kazakh tenge (KZT) are approximately equal to 1 EUR.Source: Author based on WORLD BANK and IAMO farm surveys.

As this overview shows, the levels of both input use and output generation differ by order of magnitude between the three farm types. In terms of land and labor use, very roughly speaking, the ratio is about 1:10:20 for individual farms vs. enterprises vs. agroholdings in 2011. On the revenue side, the ratio is approximately 1:25:50, i.e., much less favorable for individual farms. At the same time, there is tremendous variation in the farm-specific levels, ranging from a 3 ha individual farm in 2003 to an 80,000 ha enterprise in 2011. Comparing the sample means in 2003 and 2011, we also see that both individual farms and enterprises increased their land endowment but considerably downsized in terms of labor use. Neither the managers' educational level nor the recorded grain yields per hectare follow a clear trend.

3 COMPETITION FOR LAND

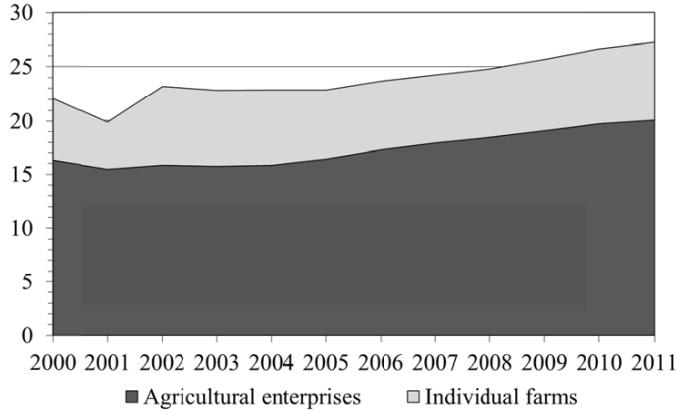
To understand the current situation on the land market, it is useful to review briefly the legal conditions for land transactions in Kazakhstan. Since national independence, land legislation in Kazakhstan has been subject to on-going reform and it underwent a major paradigm shift in the early 2000s (for details see PETRICK et al. (2011), pp. 13-20). In the 1990s, the paradigm was that all land remained in state ownership. Nevertheless, major private property rights were introduced – the right to temporary or permanent use of land leased from the government, the right to extract benefit from leased state land, and the right to transfer land via sublease. So-called "conditional land shares" in the form of paper certificates of entitlement were distributed among rural citizens. However, no specific, physical land plot was assigned to the share, so that the holders of the certificates knew neither the location nor the shape of the land to which they had rights. For most beneficiaries of land share redistribution, renting their land to agricultural enterprises was the only way to make productive use of their land shares. Even so, the creation of individual farms also accelerated, so that among the registered farms a significant number of both corporate and individual farms began to co-exist.

Towards the turn of the millennium, the paradigm shifted to the recognition of full private ownership of farmland. A new land code was adopted in 2003 and came into force in 2005, allowing private ownership of agricultural land with all property rights, including free sale and purchase of land plots. Yet, at the same time, subleasing of land shares or demarcated land plots received under previous privatization steps was outlawed. Subleased land shares and physical land plots could be invested as a share in the capital stock ("equity") of an agricultural enterprise, they could be used to form an individual farm, or they could be purchased from the government into full private ownership.

3.1 Land markets and farm growth

While land purchases have been increasing recently, the vast majority of land is still rented from the government at a normatively set low price – it is given practically for free. Data published by the Ministry of Agriculture show that, in 2010, only one percent of all agricultural land was in full private ownership, while 15 percent was cultivated by the state. The remaining 84 percent was in private use, based on long-term lease from the state (ISSAYEVA, 2012; see also OECD (2013), p. 108). As secondary rentals of land leased from the state are prohibited, short- and medium-term adjustments in land use outside the land sales market are difficult. Interviews with farmers and local experts (PETRICK et al., 2011) revealed that they mostly occur when existing farms change ownership, due to liquidations or mergers, and the land shares are transferred to the new owner. Land transactions are largely controlled by local land commissions, in which directors of existing farms and local officials are represented. Agricultural enterprises benefited from the new legislation more than individual farms, as the latter could not acquire land shares from rural residents.

Figure 1: Land use by agricultural enterprises and individual farms in Kazakhstan's grain region (million ha)



Sources: Author's calculations based on Agricultural Statistical Yearbooks for Kazakhstan.
Notes: Figure includes the provinces of Akmola, Kostanay and North Kazakhstan.

Figure 1 shows the total land resources used by agricultural enterprises and individual farms, the two categories of farm businesses listed in the official statistics.[1] The figure includes the three provinces of Akmola, Kostanay and

[1] A third category of producers listed in official statistics is the rural household plots (*khoziaistva naseleniia*). They are very important in fruits and vegetables production as well

North Kazakhstan. These are regarded as the grain region of Kazakhstan today and contribute about 80 % of the country's total grain production. In official documents, Pavlodar is no longer considered as part of the grain region, as its grain output is actually small. Total agricultural land (re-)expanded markedly after 2000, and of the 27 million hectare used in 2011, 27 % were cultivated by individual farms. In 2003, the land share of individual farms had been 31 %.

Of the total land covered by the farms in the survey sample, the share in individual farms was 36 % in 2003 and 18 % in 2011. So in terms of land use, peasant farms are slightly overrepresented in the 2003 sample, while they are underrepresented in 2011.

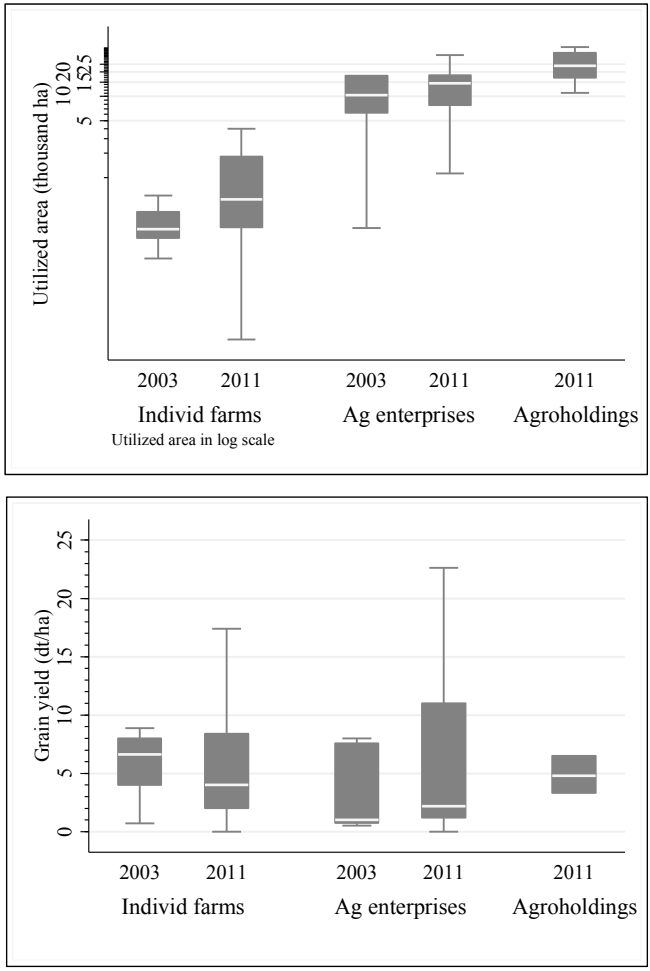
The distribution of farm sizes in terms of utilized area and the distribution of grain yields per hectare across farm types are illustrated for Akmola province in Figure 2. In the box plots, the line dividing the box represents the median, whereas the lower and upper limits of the box represent the first and third quartiles of the distribution. Lower and upper whiskers delimit the most extreme data point within first (third) quartiles minus (plus) 1.5 times the interquartile range. Such extreme "outside values" are not displayed. The figure thus gives a more differentiated picture than the mean values in Table 1. While the overall tendency of a generally increasing land endowment over time is supported, the enormous variation in farm sizes is now clearly visualized (log scale is used for farm size on the vertical axis in the top chart). It is interesting to note that the total number of individual farms active in Akmola province went up from 2,780 in 2003 to 3,719 in 2011. Likewise, the number of agricultural enterprises increased from 481 in 2003 to 768 in 2011 (based on data in the Agricultural Statistical Yearbooks). Therefore mass liquidation of operating farms followed by merger of farmland is unlikely to be an explanation for the growth in average farm sizes, even if some of these farms only exist on paper. It must rather have come from the re-activation of land that had been laying fallow, which is consistent with Figure 1. No polarization is observed in the data for individual farms indicating a separation into few very large and many very small individual farms.

The bottom chart showing grain yields suggests no clear trend, except perhaps that yields on agricultural enterprises are typically lower than on individual farms and agroholdings. At the same time, their variation is larger. Recall that yield data points higher than 50 dt/ha were discarded from the calculation of the figure (see section 2). The grain yields are low by international standards:

as livestock and contribute a considerable share to gross agricultural output (PETRICK et al., 2011). However, they are typically run as a side business to wage employment and their utilization of land, compared to the other two types of producers, is minimal. We therefore concentrate on the other categories in the following.

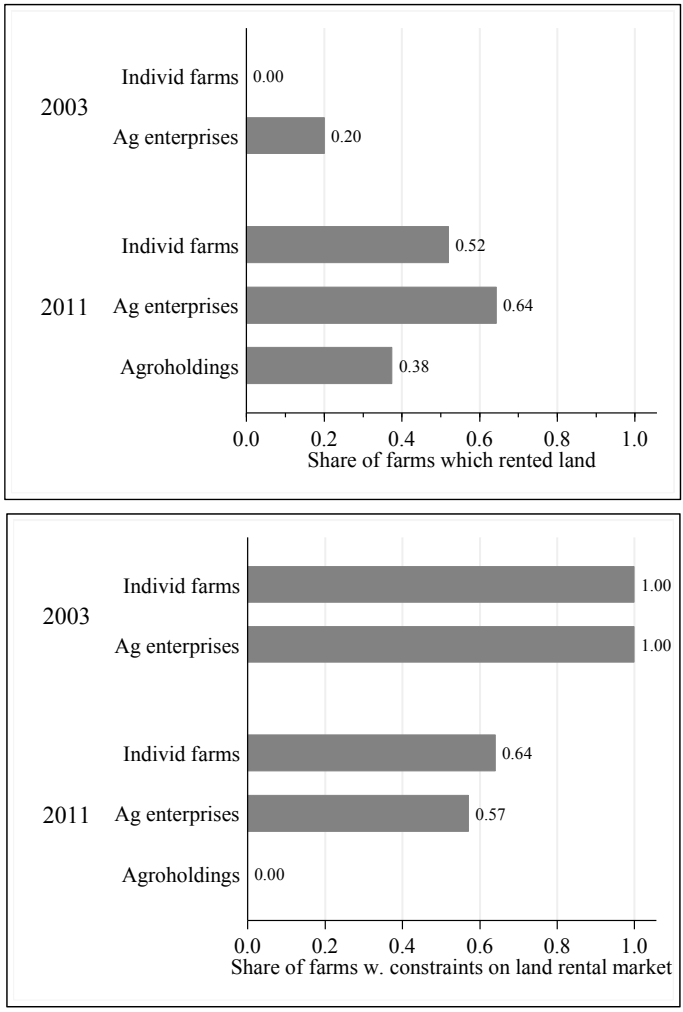
in 2011, wheat yields were 65 dt/ha in France, 70 dt/ha in Germany, 23 dt/ha in the Russian Federation, and 29 dt/ha in the United States (based on FAOSTAT data). Yet they are not untypical for the very low-intensity production system prevailing in the Kazakh steppe: in the bumper crop year 2011, the officially published average grain yield in Akmola province was 15.6 dt/ha, while in the Ereymentausky district in Akmola province (where most sample farms are located) the official grain yield was only 5.5 dt/ha.

Figure 2: Farm size and land productivity (Akmola province)



Source: Author based on WORLD BANK and IAMO farm surveys.

Figure 3: Land rentals and perceived constraints on land access, 2003-2011 (Akmola province)



Source: Author based on WORLD BANK and IAMO farm surveys.

Notes: Only rentals from outsiders (non-shareholders) or the government considered.

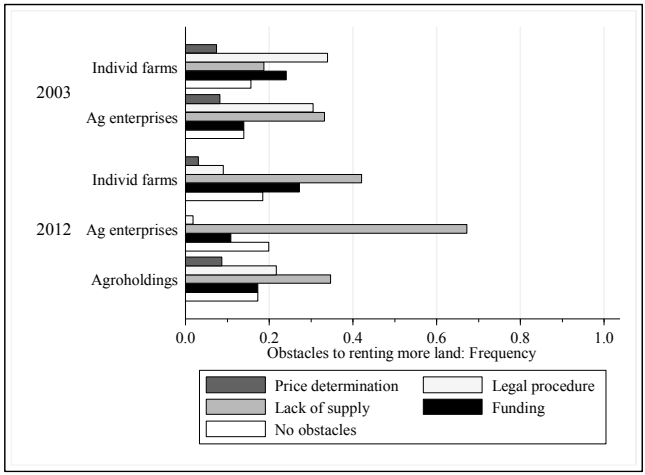
The survey data confirm that land purchases are a very recent and infrequent phenomenon. There were no reports of land purchases by any of the farm entities surveyed in 2003. This is of course not surprising, given that it was not legally possible to purchase land at that time. But also the 2011 survey round documents only four land purchases among all individual farms surveyed, and one among the enterprises. As Figure 3 (top chart) shows, there was more activity on the land rental market, and it has been increasing considerably. We consider only rentals from non-shareholders or from the government that occurred after the legal constitution of the farm or enterprise. While none of the individual farms rented land in 2003, 20 % of enterprises did so at that time. By 2011, however, 52 % of individual farms rented extra land, as did 64 % of the enterprises and three out of the eight agroholdings.

Figure 3 (bottom chart) counts the negative responses to the question whether the farm could rent in (more) land if it wanted. It thus measures the perceived constraints on the land rental market. Not a single farmer or manager said he/she could rent in more land in 2003. Consistently with the top chart in Figure 3, this pessimistic assessment was much less frequent in 2011, when it was held by only 64 % of the farmers and 57 % of the enterprise managers. It is remarkable that none of the agroholding managers regarded the land rental market as being supply constrained.

Both survey rounds also contained questions about the nature of the constraints on the land rental market (Figure 4). It is instructive to note how the relative importance shifted over time and among farm types. In 2003, problems with the legal procedure of land renting and funding difficulties (second and fourth bars in each cluster in Figure 4) were prominent among individual farms. The legal procedure (second bar) was also an obstacle for many enterprises, although lack of supply (third bar) was the most frequently noted difficulty among agricultural enterprises. Both farm types also reported price determination (first bar), i.e., how to find an appropriate price, as a relevant problem. In 2011, the constraints were clearly shifting to the supply side. Lack of supply (third bar) was by far the most frequent response in 2011. From the survey data, we know that the overwhelming majority of existing rentals (98 %) were from the government. So apparently most available land from the government is now rented out. Problems with price determination (first bar) no longer played a role in 2011. An increasing number of managers stated that they did not see any obstacles to land access, most frequently among the agroholdings (last, fifth bar). So it seems fair to conclude that the land rental market has become much more active over time, but that it is mostly limited to transactions in which the government is the lessor of the land. As the land rental price is fixed at a low

level by law, it is not particular surprising that there is now an excess demand and widely perceived rationing on the supply side.

Figure 4: Obstacles to land access, 2003-2011 (Akmola province)



Source: Author's calculations.

Notes: Multiple answers possible, total number of responses 270.

3.2 Shadow prices of production factors

To obtain a deeper insight into the willingness to pay for land and other production factors among different farm types, we estimated a production function that allows calculating the shadow prices of the factors in the presence of input rationing (see CARTER, WIEBE (1990) for an earlier application). If π is the profit, x an input level to be chosen by the farmer, p the given output price, f a given production technology, and w the input price, the simple profit maximizing calculus of the farmer under an input constraint $\bar{x}$ is given by:

$$\max_x \pi = pf(x) - wx \text{ s.t. } \bar{x} - x \geq 0. \quad (1)$$

If f is concave in x, the unique solution for the input x under supply rationing is defined by:

$$p\frac{\partial f}{\partial x} = w + \lambda \equiv w^*, \quad (2)$$

with λ the marginal value of the rationing constraint in the optimization calculus and w^* the shadow price of the input. It holds that $w^* \geq w$.

In the following, we estimated f for the pooled sample of all farms and enterprises including agroholdings in Akmola and Pavlodar provinces, assuming that, given their variation in input levels, they operate under the same production technology. Knowing f, the first term of Eq. (2) allows us to compute the farm-

individual values of the shadow price for all inputs included in the estimation, and hence a measure of the severity of the rationing constraint. We assumed a Cobb-Douglas specification for the production technology and included the utilized area, the number of workers, working capital, and the education of the manager as regressors (see Table 1 and Table 2 for descriptive statistics). Furthermore, dummy variables for the year 2003 as well as for the main two districts covered were added. Total farm revenue was used as the dependent variable. 12 observations with a revenue of zero were excluded from the sample. Closer inspection showed that these were all on the verge of bankruptcy. Farms with a capital input of zero were treated as if this was equal to one thousand KZT, so as to allow the log transformation. The results from an ordinary least squares (OLS) regression are presented in Table 2. [2]

Table 2: Cobb-Douglas production function estimates

Variable	Coefficient	p-value	Sample mean	Sample min	Sample max
Utilized area (thou. ha)	0.326 *	0.001	4.712	0.010	80.000
Workers (FTE)	0.551 *	<0.001	5.94	0.12	130.80
Working capital (mln. 2011 KZT)	0.190 *	<0.001	8.27	0.001	223.00
Education (1..8)	0.315	0.287	6.62	3	8
Year 2003 (0/1)	-0.381	0.163	0.38	0	1
Esilsky district (0/1) [a]	1.215 *	<0.001	0.31	0	1
Ereymentausky district (0/1) [a]	0.309	0.139	0.44	0	1
Constant	0.276	0.654			
			Elasticity of scale 95 % confidence interval		
Elasticity of scale	1.067 *	<0.001	0.946	1.188	
F(7, 199)	101.61 *	<0.001			
R^2	0.681				
N	207				

Notes: Dependent variable is log farm revenue. Utilized area, workers, working capital and education are logged. [a] farms outside the two districts form the base group. * significant at the 1 % level. *p*-values based on robust standard errors. Sample mean (min, max) of farm revenue: 41.670 (0.037; 1142.0) million 2011 KZT.

[2] The analysis is based on the assumption that the data identifies the coefficients of interest. Given the widespread supply rationing on input markets discussed in this chapter, this assumption is possibly not too far from the truth.

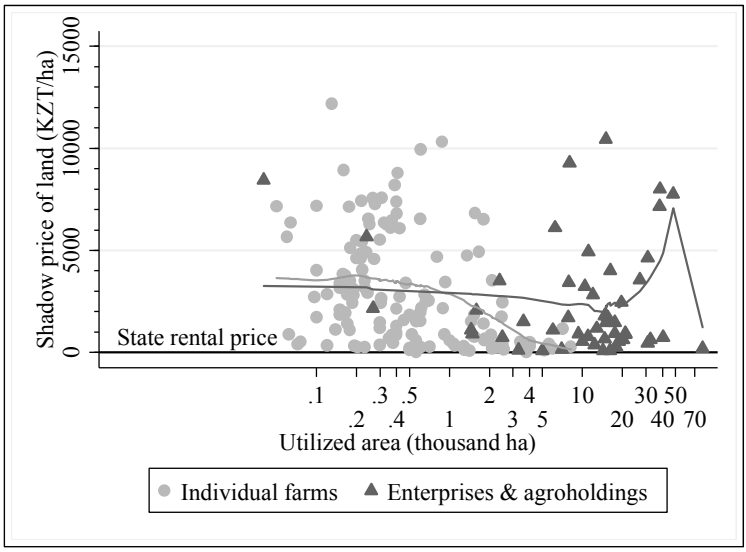
All coefficients (and hence production elasticities) of the three material factors are significantly positive and of a plausible order of magnitude. Educational attainment varies relatively little in the sample and has no significant influence on revenue. The negative year dummy appears reasonable as well, since climatic conditions in 2011 were exceptionally good for wheat production. Furthermore, the dummy has probably captured some technical progress. One of the district dummies is also significant: this is the district distant from any urban center. The estimated elasticity of scale is slightly above one, but a constant elasticity of scale cannot be rejected statistically.

In a further step, we use these estimates to calculate farm-specific shadow prices. Given the Cobb-Douglas specification, this can be done by multiplying the estimated coefficients with the inverse of the farm-specific average factor productivity. The distribution of the shadow prices of land along the farm size continuum is shown in Figure 5. The shadow price is given in KZT/ha, separately for individual farms and enterprises/agroholdings. LOWESS smoothers were added to illustrate the general tendency in the distribution. The chart indicates that shadow prices (and hence the annual willingness to pay) are highest for individual farms in a size range of 100 hectares to 500 hectares, as well as for enterprises of about 50,000 hectares in size. Note that the horizontal axis is on a logarithmic scale, so that the bigger farm sizes are squeezed together. In any case, it is remarkable that bigger individual farms and smaller enterprises tend to display lower shadow prices. To compare the estimated shadow prices with actual rental rates observed, we added a horizontal line indicating the order of magnitude of the fixed state rental price. In Kazakhstan, land use payment for state land and land tax are typically lumped together in a single payment. This varies across regions in a range between 0.50 KZT/ha and 200 KZT/ha (0.0025 EUR/ha to 1 EUR/ha), depending on soil fertility (OECD, 2013, pp. 151-54). Under a special regime of tax concessions, most enterprises and farms pay even 205 EUR/ha) in 2011. In Figure 5 thus makes quite clear that, in good years like 2011, the majority of both individual farms and enterprises could afford higher rental prices, at least up to a level of 3,000 KZT/ha (15 EUR/ha) for individual farms and up to 5,000 KZT/ha (25 EUR/ha) for enterprises.

We conclude that the land market in Kazakhstan's grain region was freed from legal constraints recently and that farmers have learned how to deal with land market transactions. In response, activity on the land rental market has increased significantly, although there are still very few sales transactions. As a consequence of little sales market development and government ownership as the default situation, rental transactions are almost exclusively with the government, i.e., rentals of state and municipality land. In 2011, every second farm entity in our sample rented outside land in addition to the land it had obtained during the

share redistribution, irrespective of its organizational type. This led to a signifycant growth in average farm sizes between 2003 and 2011: the median individual farm in our Akmola sample doubled its land resources, while the median enterprise grew by one half. Given a normatively set land rental price close to zero and limited state land resources, there is now widely perceived supply rationing in the land market. Our shadow price estimates reveal that the majority of individual farms and agricultural enterprises could afford to pay higher rental rates. The willingness to pay for land is thus highest among individual farms in the size range of 100 hectares to 500 hectares. It is even higher for agricultural enterprises or agroholdings of around 50,000 hectares.

Figure 5: Willingness to pay for land according to farm size



Source: Author's calculations.

Note: Based on Cobb-Douglas production function estimates for Akmola and Pavlodar provinces reported in Table 2. Curved lines represent LOWESS smoothers based on the two farm type subsamples. Figure excludes outside values for shadow price of land. Utilized area on logarithmic scale.

4 COMPETITION FOR LABOR

Figures 6 and 7 display total labor input by farm type and year, per farm and per 100 hectares. Data on labor use were recorded in days for both permanent and seasonal workers and then transformed into Full Time Equivalents (FTE), using the ratio of 242 days/FTE. This was the most common ratio stated by the surveyed managers.

Figure 6: Labor force, 2003-2011 (Akmola province)

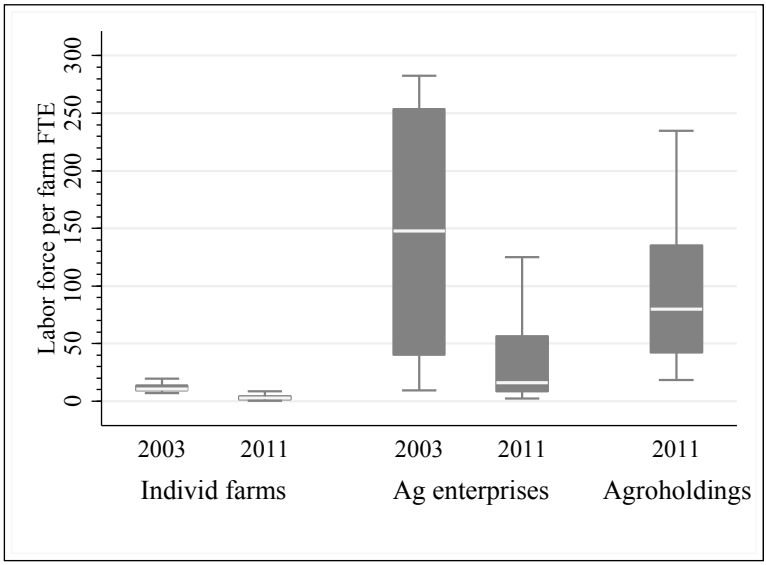
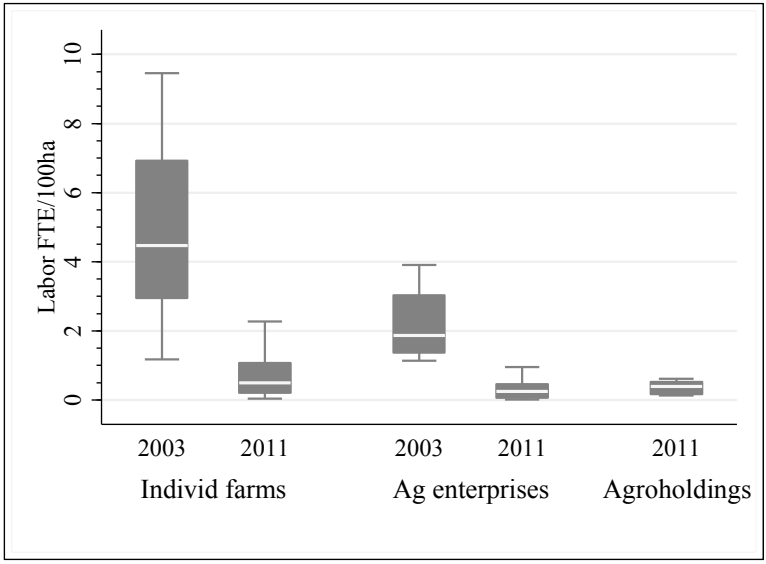


Figure 7: Labor intensity, 2003-2011 (Akmola province)



Source: Author based on WORLD BANK and IAMO farm surveys.

Notes: In Figures 6 and 7, FTE = Full Time Equivalent based on 242 working days per year.

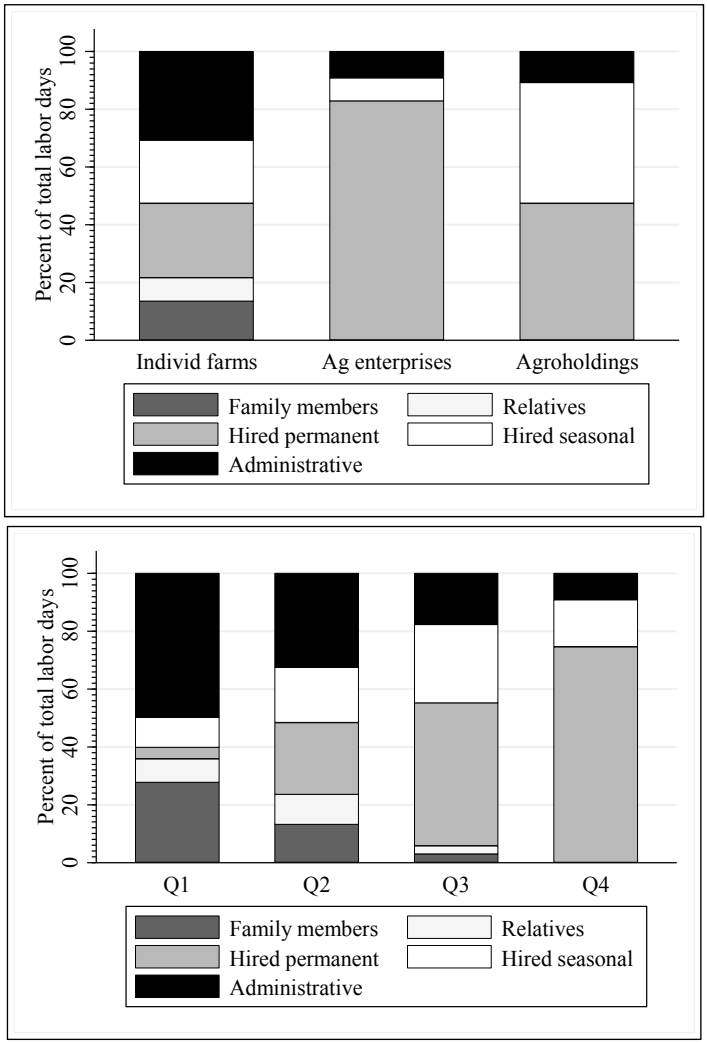
Interestingly, the trends in labor use are quite different from those in land use. Both individual farms and agricultural enterprises used much less labor in 2011 than in 2003. The downsizing of the labor force is particularly evident for enterprises. While this type of farm typically employed 150 and more workers in 2003, the figure is now lower than 50 in most agricultural enterprises. The median enterprise had a labor input of 16 FTE in 2011. In the same year, the median individual farm employed approximately 3 FTE. As all farm types commonly expanded their land resources, labor intensity went down considerably between 2003 and 2011. It is now at 0.5 FTE/100 ha on individual farms, 0.3 FTE/100 ha for enterprises and 0.4 FTE/100 ha for agroholdings.

In the 2011 survey, labor days were recorded separately for the five groups of workers listed in Figures 8. The top chart displays the relative composition of the total labor force according to farm type. The bottom chart pools all farm types and gives the composition according to farm size quartiles. The figures show that family labor plays a certain role in smaller and individual farms, whereas enterprises and bigger farms mostly rely on hired labor. Note that the farm manager is counted as administrative staff. On individual farms, the manager is typically the owner and thus the residual claimant. In 2011, only 10 % of the individual farms reported a hired manager. Other family members and relatives are commonly employed in practical tasks related to crop or livestock production.

The average composition of the labor force for individual farms in Figure 8 (top chart) is somewhat misleading. It suggests that the typical farm using 3 FTE employs approximately one permanently hired worker in addition to the manager, plus a mix of seasonal and family workers. In reality, two different models prevail. Either the individual farm is mostly run by family members alone (manager plus relatives) or by the owner-manager with permanently hired workers who are not family members (their number is sometimes larger than the number of family members). Having said this, it is typically the case under both regimes that farmers hire additional seasonal workers during the peak season. On agroholdings, typically half the work is done by seasonal workers, the highest share among all farm types. Fully 98 % of seasonal workers are recruited locally from the area; there are no reported cases of seasonal labor immigration from abroad.

Given the growth in land use in Kazakhstan's grain region (Figure 1) and the fact that the region lost almost one third of its population due to emigration during the 1990s, rural labor is now becoming a scarce factor (PETRICK et al., 2013). In the 2012 data collection round, 66 % of individual farm managers said it is "very problematic" or "problematic" to find skilled workers. The same was true for 40 % of the agricultural enterprises and 75 % of the agroholdings.

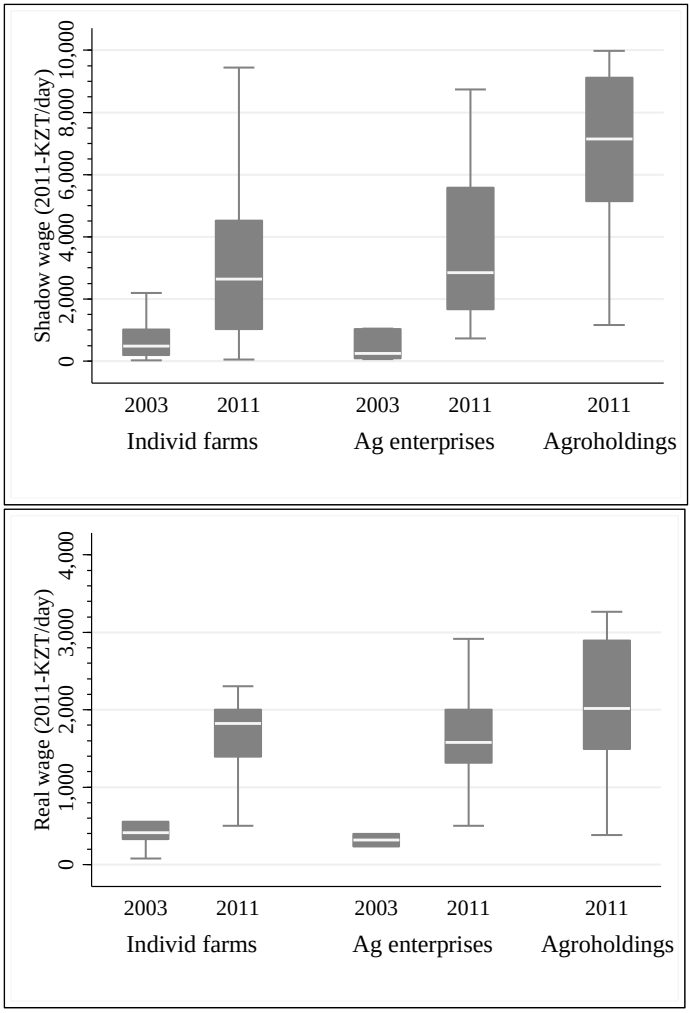
Figure 8: Labor composition by farm type and by size quartiles, 2011 (Akmola province)



Source: Author's calculations.

Notes: "Administrative" group includes the farm manager as well as other administrative personnel such as accountants and human resource managers (where applicable). Size quartiles in bottom chart are defined as follows (all farm types): Q1=up to 364 ha; Q2=364 ha to 1,514 ha; Q3=1,514 ha to 9,350 ha; Q4=more than 9,350 ha.

Figure 9: Real wage and shadow wage level, 2003-2011 (Akmola province)



Source: Author's calculations.

These findings are in contrast with rural unemployed who were left behind by the harsh transition process. It is, however, consistent with a significant rise in real rural wages, as shown in the top chart of Figure 9. According to these figures, the median wage for hired workers on individual farms in 2011 prices went up from 470 KZT/day to 1820 KZT/day (2.35 EUR/day to 9.10 EUR/day). This

measure represents an average of permanent and hired workers. Wages on agricultural enterprises were somewhat lower, but increased in a similar order of magnitude. Agroholdings pay the highest wages, namely 2000 KZT/day (10 EUR/day) and more.

Using the production elasticities estimated in Table 2, we also calculated the shadow wage or marginal value product of labor (Figure 9, bottom chart). Not only did the shadow wage rise over time, in 2011 it was also typically higher than the real wage paid. Individual farms and agricultural enterprises could afford to pay 2500 KZT/day and more in 2011, agroholdings as high as 7000 KZT/day.

Compared to land, labor is a mobile factor and the labor market is less regulated than the land market. It is true that there was significant labor shedding on agricultural enterprises between 2003 and 2011, so that rising wages could simply be the result of a change in the labor force composition. Even so, it has become difficult for agricultural operators to find skilled workers more recently and competition on agricultural labor markets has increased. While a considerable share of labor on individual farms is supplied by family members, agricultural enterprises and agroholdings have to rely entirely on hired workers. Among the latter two groups, enterprises belonging to an agroholding use less labor per hectare, display a higher marginal labor productivity and pay higher wages. Agroholdings thus tend to be the most competitive bidders on the rural labor market. At the same time, their managers expressed the most vigorous concern about finding good workers.

5 Conclusions

More than twenty years after the beginning of transition reforms, large and super-large corporate farms in Kazakhstan's grain region appear alive and well. They emerged from the liquidation of the former collective farms, but with less fundamental restructuring than was initially expected. Based overwhelmingly on rented state land and hired labor, they represent an extreme countermodel to the family farm in the West. Our farm-level analysis shows that the biggest among them, the enterprises belonging to an agroholding parent organization, have been those with the highest factor productivity and the strongest competitiveness on land and labor markets recently.

But this is only half the story. What makes Kazakhstan so interesting is that individual farms emerged in parallel and now cultivate a little more than one quarter of the agricultural land in the grain region. Individual farms also have access to state land, so that the median farm size in our sample doubled between 2003 and 2011. They are much closer to the Western family farm model, as many of them rely mostly on family labor. Their factor productivity is comparable to that in most agricultural enterprises. Furthermore, our results show that technical

returns are approximately constant. In other words, there is no technical advantage for a bigger scale of operation.

The cause-effect direction between agroholding membership and factor productivity is not clear. Enterprises chosen to be incorporated into agroholding structures could have been those that displayed the best performance in the first place. On the other hand, there is casual evidence that agroholdings tended to take over enterprises when they were illiquid, because these were the only ones available for sale.

It is possible that the higher share of agricultural enterprises in total land use reflects political preferences for this type of farm organization. During most reform steps of the previous two decades, large corporate farm enterprises were the explicit or implicit template endorsed by the political administration (PETRICK et al., 2013). Yet given the growth record of individual farms, the resulting handicap was unlikely to be severe.

There is still very little empirical knowledge about the relevance of supervision costs in hierarchical farming organizations. Neither do we know whether there are systematic differences between enterprises and individual farms at all (e.g., as suggested by CARTER, ZIMMERMAN (2000)), nor is it evident how different farm types try to curb the problems associated with labor shirking (e.g., by performance pay or satellite-based control systems). Fortunately, there is more information available on this topic from the survey data that have yet to be analyzed. Further analysis is also required on the causes of productivity differences across farm types and sizes. Surely, different management capabilities and access to outside funding will be among the factors that are central to such an analysis.

It is thus too early to conclude that large corporate farms are economically superior to individual (family) farms. The shadow prices for land in our Kazakhstan data tend to predict a polarized farm structure for the future, with smaller family farms and bigger enterprises or agroholdings being the most competetive farm entities (in their respective groups). Given the depletion of state land resources and the government plans to raise the normative land rent, competition for land will further increase in the future. However, the present analysis clearly calls into question that family farms per se are a desirable or even the only viable way of organizing agricultural production. This in turn suggests that a revision of the accepted family farm theory may be needed.

One of the implications of such a revised theory may be that policymakers should avoid favoring specific farm types or forms of agricultural organizations. On the grounds of productive factor use and competitive labor remuneration, the case of Kazakhstan provides no arguments that help to denounce large-scale agroinvestments as "land grabbing" on the back of the rural population.

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REVEALING THE ROLE OF AGRICULTURAL CONTRACTS IN RURAL LIVELIHOODS IN UZBEKISTAN[1]

UTKUR DJANIBEKOV, KRISTOF VAN ASSCHE, DAAN BOEZEMAN, GRACE VILLAMOR, NODIR DJANIBEKOV

1 INTRODUCTION

Economic performance of relatively large commercial farms is an important issue in rural development, as they are the main agricultural producers and land users. At the same time, in developing countries, rural population mainly consists of semi-subsistence rural households or smallholders that derive the largest share of their income from agricultural production and employment off the family plot. Agricultural production is thus organized into a dual system of symbiotic relationships between commercial farms and rural households. Agricultural policies for rural development are commonly oriented toward one of these two groups of agricultural actors (BINSWANGER, DEININGER, 1997). In many post-Soviet countries, including those in Central Asia, large-scale commercial farms dominate the use of arable land. As the commercial farms are the main producers of strategic export-oriented crops, e.g., cotton in Uzbekistan and Turkmenistan or wheat in Kazakhstan, the agricultural policies attempt to improve output and productivity of these farms (DEININGER, BYERLEE, 2012; POMFRET, 2012). In countries where agriculture consists predominantly of small family farms, e.g., South Asia and China, the agricultural policies are designed to support smallholders (BINSWANGER, DEININGER, 1997). Yet, despite their advantages in access to markets, infrastructure, and technology, large-scale commercial farms often do not operate their entire farmland on their own (LAFFONT, MATOUSSI, 1995), relying on hired labor from neighborring rural families. Such interdependency of land-abundant commercial farms and labor-abundant rural households forms a bimodal agricultural or farming system. In the bimodal agricultural system, the economy of rural households is closely connected to the economic performance of commercial farms and to the shifts in the external policy environment that determine commercial-farm perfor-

[1] The authors gratefully acknowledge the support of the Robert Bosch Foundation, and the ZEF/UNESCO program (www.zef.de) funded by the Federal Ministry of Education and Research (BMBF) in Uzbekistan. The first author thanks the International Postgraduate Studies in Water Technologies (IPSWaT) for the financial support to conduct the doctoral research and the Dr. Herman Eiselen Doctoral Program of the Foundation fiat panis for the financial support to participate in conferences.

mance. In Uzbekistan, for instance, commercial farms (*fermers* in Uzbek) interact with rural households (*dehqans* in Uzbek) through various forms of contractual agreements (DJANIBEKOV et al., 2013b). This case of farm-smallholder interlinkage and its possible contribution to rural economy is partly discussed by VELDWISCH and BOCK (2011). Yet, such interrelationship varies depending on the attributes of farmers and their workers (smallholders), production technologies, input and output prices, and agricultural policies (MURREL, 1983; ROUMASSET, 1995). The role that in-farm labor relationships in a bimodal agricultural system play in rural livelihoods has often been overlooked in the literature on post-Soviet countries.

Agricultural contracts are formed through mutual agreement between landlord and tenant (ROUMASSET, 1995). We abstract from the classical landlord-tenant definition and adjust it to match the transitional post-Soviet environment with its bimodal agricultural system. In our case, the landlord is a commercial farm that has accumulated abundant land through the process of farm consolidation, and the tenant is a land-scarce semi-subsistence rural household (DJANIBEKOV et al., 2012a). The land-abundant commercial farm suffers from shortage of labor and supervision skills, which are in abundance in rural households. In addition to land and labor, commercial farms and smallholders possess other inputs (in different proportions and quality), which they draw upon for deciding the form of contractual arrangements. Despite their importance in food security and poverty alleviation, smallholders have insufficient capital and land for agricultural production. In this respect, the economic performance of commercial farms is essential in providing rural employment and securing welfare (SLESNICK, 1996; IRZ, 2001). Consideration of the agrarian actors and institutional arrangements between them can allow for a broader and clearer understanding of the organization of agricultural production in transition countries.

We use the case of Khorezm region and the southern districts of Karakalpakstan (Beruniy, Ellikkala, and Turtkul) in Uzbekistan as an example representing the symbiotic bimodal agricultural system in irrigated areas of the post-Soviet Central Asia. The predominant crops in the study area are cotton and wheat, as well as other food crops such as rice and vegetables. Agriculture in Uzbekistan has a recent history of collective farming based on intensive input use, employment of trained farm managers, and engineers operating within a specially designed infrastructure of irrigation canals and roads. Agricultural reforms over the last years created two main actors – commercial farms and rural households, which are interdependent through agricultural contracts. The objective of our study is to investigate the present interrelationship via agricultural contracts between commercial farms and semi-subsistence smallholders and its effect on rural livelihoods.

To analyze rural interdependencies, a multi-topic survey of rural households was conducted to collect information on aspects of rural economy and agriculture that could influence decisions regarding contractual arrangements. The survey attempted to identify determinants of rural living standards with a focus on agricultural interrelationships of commercial farms and rural households. For achieving this aim, a rural household The survey was carried out between June 2010 and March 2011, covering 400 rural households that had been randomly selected from all administrative districts in the study area. The details of the survey are presented in DJANIBEKOV et al. (2013a). In this chapter, we first describe the general setting for the bimodal agricultural system in Uzbekistan, as well as the present forms of contractual arrangements that are common in the study region. We also discuss the external factors that influence the formation of these contractual arrangements, deviations from the agreements, and the available enforcement mechanisms. We use principal component analysis and cluster analysis to classify rural households into distinct clusters and show how different groups of rural households depend on employment at commercial farms and on agricultural contracts.

2 BIMODAL AGRICULTURAL SYSTEM

Following the declaration of Uzbekistan's independence in 1991, various reforms have been implemented in agriculture, the most significant of which was the process of farm restructuring (LERMAN, 2008b, 2008a; VELDWISCH, SPOOR, 2008; DJANIBEKOV et al., 2012a). Farm restructuring led to the creation of the bimodal agricultural system with two main types of agricultural producers – commercial farms and semi-subsistence smallholders (rural household plots), which can be distinguished according to their specialization, size, employment, and other factors (Table 1). Commercial farms are private agricultural enterprises managed under long-term land lease contracts from the state; they employ labor under contract agreements with the workers and trade in agricultural commodities subject to government procurement policies.

The share of land used by commercial farms in the study area increased from about 3 % to 88 % between 1997 and 2010. There are about 7,200 commercial farms in the study area that produce about one-third of the regional gross agricultural product and operate about 350,000 hectares of arable land (STATE STATISTICAL COMMITTEE, 2012). Rural households produce the rest of the regional gross agricultural product. The average size of a commercial private farm in Uzbekistan was about 60 hectares in 2010 (Figure 1); the average commercial farm in the study area was somewhat smaller, about 53 hectares (DJANIBEKOV et al., 2012a; STATE STATISTICAL COMMITTEE, 2012). The dominant type of commercial farm is the cotton-grain farm with average size of 100 hectares (MAWR, 2010). These farms produce all the cotton and the major share of wheat in the region.

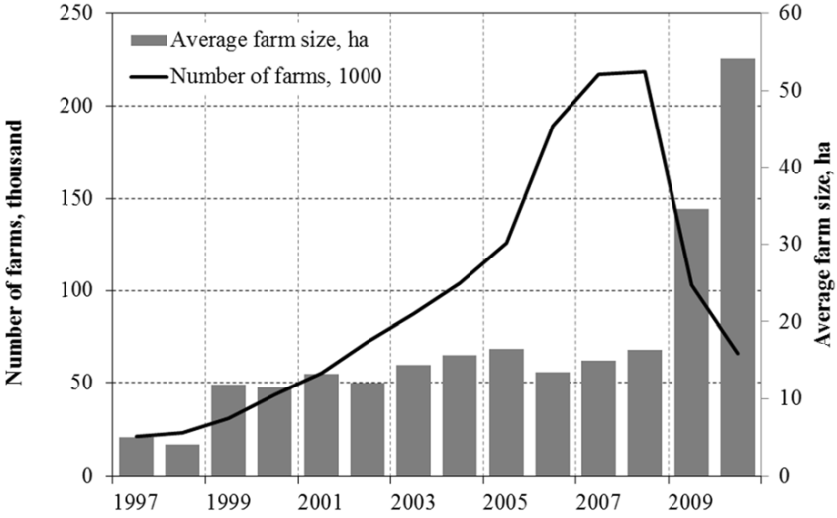
Less than 1 % of land is in state agricultural enterprises and the remainder is in rural household plots. Rural households are the smallest agricultural producers in Uzbekistan; they rely on family labor and produce vegetables, fruits, and animal products on own plots that are given in lifetime inheritable possession (DJANIBEKOV et al., 2012b). Rural households have an abundance of labor, lack of storage and transportation facilities, and insufficient buffer wealth, which forces them to sell their output soon after harvest, when the prices are lowest. Although over the past ten years, the total area of the rural household plots increased by about 7 % and the total area of arable land currently cultivated by rural households is about 60,000 hectares (STATE STATISTICAL COMMITTEE, 2012), they still have insufficient land to meet own household consumption demand. Rural households operate an attached plot of 0.08 hectares on average and an additional remote plot of 0.12 hectares, making up a total arable area of 0.20 hectares per household. These household plots serve to complement family income and contribute to the family's food security. Rural households are exempt from the state procurement policy.

Table 1: Characteristics of commercial farms and rural households in the study area

	Commercial farms	**Rural households**
Production specialization	Cotton-grain, livestock, horticulture, and others	Vegetables, fruits, wheat, livestock (consume largest share of own products)
State policies	Cotton and winter wheat subject to state procurement	No state procurement
Form of land tenure	Long-term lease contract from the state (30-50 years)	Lifetime inheritable possession from the state
Form of labor	Family workers and hired labor	Family workers
Employment	At own farm	At commercial farm and in non-agricultural activities

Source: Based on DJANIBEKOV (2012b); VELDWISCH, BOCK (2011).

Figure 1: Number and average size of commercial farms in Uzbekistan 1997-2010



Source: STATE STATISTICAL COMMITTEE (2012).

3 AGRICULTURAL POLICIES

After gaining independence, Uzbekistan launched a program of agricultural reforms aimed mainly at improving agricultural production on commercial farms. These agricultural reforms focused on generating additional revenues for the state through exports of cotton from commercial farms. The cotton procurement policy in Uzbekistan prescribes allocation of a certain area of farmland in commercial farms to cotton and requires production of a specified quantity of cotton on this land. The entire target quantity of cotton is purchased by the state at prices lower than the potential border prices. In 2010, cotton occupied about 50 % of sown area in commercial farms. The fulfillment of cotton targets is enforced by the threat that the state may cancel the land lease of a cotton-growing farm if the production target is not met. To minimize the risks of low cotton yields, the state coordinates farmers' field operations and prioritizes input supply for cotton growers (VELDWISCH, SPOOR, 2008).

In the next stage of reform, the commercial farms were restructured with the objective of increasing agricultural production. The first steps of commercial farm restructuring, 1992-2002, created thousands of small farms and did not promote the idea of a commercial farm as a single production unit cultivating a contiguous land area. As farm fragmentation increased, the availability of farm-service infrastructure began to fall short of the demands of the multitude of newly

established small farms. The original design of the rural infrastructure (roads, irrigation canals, drainage systems) had been intended to serve a relatively small number of large-scale farms; the infrastructure could not meet the needs of the large number of small commercial farms, which accordingly suffered from insecure access to key resources endangering the sustainability of agricultural production. The existing infrastructure was costly to maintain, and yet its adaptation to fit the new smaller water users was technically and financially infeasible.

A farm consolidation program was thus launched in 2008 with the declared aim of "optimization" of commercial farm sizes by merging smaller commercial farms into larger units. However, the potential benefits of farm consolidation, in the sense of creating a single farm unit with contiguous fields and a better fit to the existing infrastructure, rarely materialized. The farm consolidation program implemented in response to these difficulties did not solve the problem, as in most cases farm size augmentation did not entail proper consolidation into a single contiguous parcel, supposedly fitting the old Soviet irrigation infrastructure designed to serve large farms: there are still many relatively small commercial farms, the fields in these farms are widely scattered, and the goals of improved water distribution have not been addressed.

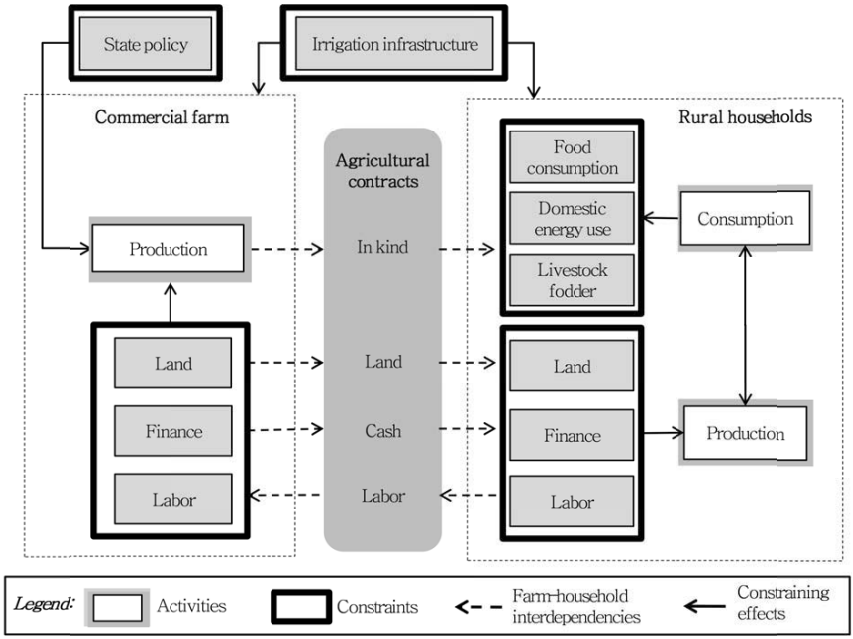
Given the policy of production targets, the commercial farmers' land lease rights (from 30 to 50 years) are limited to non-transferable usufruct rights. The users are prohibited to sell, mortgage or exchange the land leased from the state (LERMAN, 2008a; DJANIBEKOV et al., 2012a). The state is the exclusive landowner and it can expropriate land from farmers if this is deemed necessary, as often occurred in the process of farm consolidation. This makes private farming in Uzbekistan only quasi-private (LERMAN, 2008a). On the other hand, rural households are given land in lifetime inheritable possession and are not subject to the land consolidation policy (nor are they subject to the state's cotton procurement policy). The process of farm consolidation has sent wrong signals to the new commercial farmers, because the state turned around and took away the land that had been granted to private farms only a short time before. It seems clear that not so much inadequate property rights as an unstable and unpredictable tenure arrangements discourages investment and efficiency gains. Commercial farms cannot change their land use from cotton production to other crops that may better suit the preferences of their members and produce higher returns.

4 INTERLINKAGES BETWEEN COMMERCIAL FARMS AND RURAL HOUSEHOLDS

The implementation of various agricultural reforms in Uzbekistan since its independence resulted in the formation of an interdependent bimodal agricultural system that comprises commercial farms and rural households. In our example, a commercial farm is represented by a cotton-grain growing farm that relies

heavily on labor from rural households. Figure 2 presents the organization of a bimodal farming system highlighting the key elements that affect the formation of agricultural contracts between commercial farms and rural households. These elements have to be taken into account when studying the organization of agriculture in Uzbekistan.

Figure 2: Organization of a bimodal agricultural system



Commercial cotton-grain growers are subject to state orders in the production of the two strategic crops. As part of the state order system, these farmers have better access to technology and market information, which includes information on available and new crop varieties, expectation of water availability, and market prices; they also receive better information about agricultural policies. The superiority of commercial farms over rural households in access to this information is reflected in their greater wealth, status, networking options, and interactions with traders and financial institutions. Commercial farms have managerial capacity to make production decisions on the choice of crops, proper land and water management, selection and negotiation of timely availability of inputs, as well as procurement of machinery services.

Due to their higher opportunity income from non-agricultural sectors, commercial farm owners are often physically distant from the agricultural and rural scene. Commercial farmers also may have higher costs of day-to-day monitoring

of activities on their land. Commercial farmers thus hire nearby rural households to manage their agricultural production. In the contractual arrangements, a commercial farmer may be considered as an absentee landlord, whereas the rural households bring their human capital in the form of crop cultivation skills and the ability to mobilize extra hands from among their family members during labor intensive seasons (DJANIBEKOV et al., 2013b; VELDWISCH, SPOOR, 2008). Rural households do not have machinery operating skills, mechanical equipment, or irrigation (pump) services to contribute to the production process; they mainly specialize in the provision of labor services to the commercial farm.

4.1 Forms of agricultural contracts

Commercial farmers cannot directly observe the agricultural productivity characteristics of their workers, who bring different skills to the farm. Commercial farmers accordingly offer their workers a menu of contracts, and rural households in turn select from this menu contractual forms that fit best their characteristics and needs (DJANIBEKOV et al., 2013a). Depending on the commercial farm's land size and availability of cash, as well as the characteristics of the rural households, contractual arrangements between these two actors are distinguished as fixed wage, fixed rent, and flexible.

Under the fixed-wage contract, commercial farmers employ rural households and keep the entire harvest, paying in cash or in kind (the main crop or various crop byproducts) for labor services provided by the rural households. The commercial farmer bears all production costs and risks, personally supervising the labor force. Fixed-wage contracts are typically arranged for a specific task and are mainly practiced in cotton cultivation.

The next widely practiced form of contractual arrangement is the fixed-rent contract. According to ROUMASSET (1995), when material determinants are such that production is prone to labor shirking, the fixed-rent contract is preferable for both actors. Although renting out of land is prohibited by Uzbekistan's land law, the commercial farm informally rents out part of its land to a rural household in return for a certain cash payment received prior to the sowing season. The rural household bears all production costs and risks, providing both management and supervision, and keeps the entire harvest. In the study area, this contractual arrangement is preferred by commercial farmers who live far from their farm, as for these absentee farmers the monitoring and supervision of contractual agreements is a costly task. The land is typically rented for one crop season for about $450-$900 per hectare depending on soil quality and access to irrigation water. The fixed-rent contract is usually applied for the cultivation of cash crops such as vegetables or rice (DJANIBEKOV et al., 2013b).

The next type of contractual arrangement between commercial farmers and rural households is the flexible contract, i.e., sharecropping. According to STIGLITZ (1974), sharecropping can produce higher returns to the farmer than wage contracts. In our case, the commercial farmer bears most of the production costs while the rural household provides labor; the actors share the harvest according to their contribution to the production costs. Sharecropping provides commercial farmers and rural households an opportunity for specialization in skills and resources according to their relative advantage. In this sense, sharecropping emerges as the decision of the actors to pool their skills and resources and thus achieve an output that they would not be able to achieve individually. This arrangement is commonly used in the cultivation of wheat and crops with high market value, such as rice and vegetables. In such contract both farmers and rural households share the production costs, where farmers mainly cover the fertilizer and machinery costs, and ensure the delivery of irrigation during the season, whereas rural households conduct management activities, and the harvest is divided based on the efforts of both actors. Commercial farms and rural households often use simple fractions of crop output for distribution (e.g., buckets of harvested grain in the case of wheat production) to minimize measurement costs.

CHEUNG (1969) argues that sharecropping may emerge as the dominant contractual arrangement in the presence of both agricultural risks and transaction costs. The structure of agricultural contracts in our study differs in certain respects from the contracts in other countries as described in the literature. In Uzbekistan, all three types of contracts – fixed wage, fixed rent, and flexible – have one feature in common: the remuneration for land and labor comes both in cash and in kind. The sharecropping contract resembles fixed-rent contracts when it is agreed that the rural household bears all production costs and leaves a share of the output to the commercial farmer, calculated taking into account the rent value of the land provided by the commercial farmer less production costs and the value of labor services provided by the rural household. The sharecropping contract resembles fixed-wage contracts when it is agreed that the commercial farmer bears all the production costs and then allocates a share of the output in kind to the rural household taking into account his production costs and the value of land rented to the household. In our study region we actually observed that commercial farmers use a part of their cropland as payment to rural households for labor in each of the three forms of contracts.

These types of contracts may not always reflect the actual behavior of the actors (LAFFONT, MATOUSSI, 1995). For example, in case of fixed-wage contracts, the commercial farmer may exploit the workers and provide insufficient remuneration for their labor after the harvest. Such behavior can be prevented when the

commercial farmer and the rural household are located near each other, and the farmer cares about his reputation in the local community. The farmer's reputation acts as an enforcement of the original agreement. In fixed-rent contracts, rural households that do not have lifetime land tenure may over-apply chemical fertilizers and pesticides to increase short-term crop yields at the expense of future soil productivity. To prevent this, the commercial farmer guided by long-run considerations of maintaining soil productivity monitors labor activities or hires managers to monitor on his behalf. In addition, similarly to fixed-wage contracts, it is in the interest of the rural household to maintain a good relationship and use the rented land in a sustainable way. In sharecropping, both commercial farmer and rural household can deviate from the initial contractual agreement. Since the farmer is not constantly present in the field, rural households may tend to apply less than the quantity of inputs provided under the sharecropping contract and divert part of the inputs to the own plot, thus profiting at the expense of the commercial farmer.

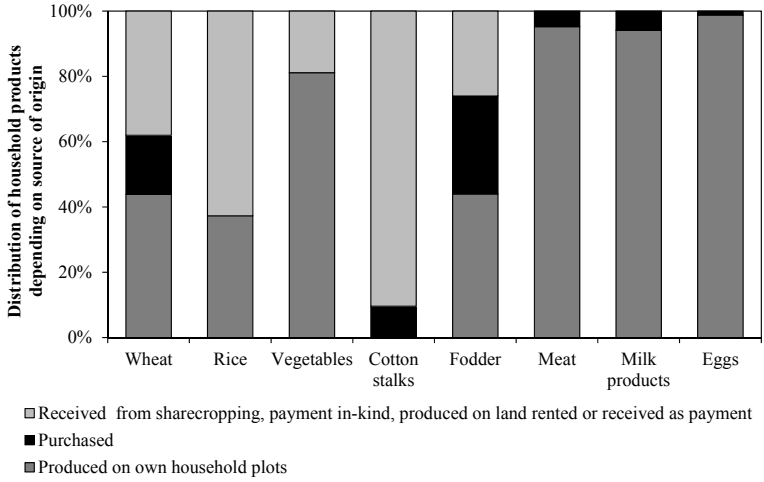
Another issue is the underreporting of expected or actual quantity and quality of harvest by the rural household to the commercial farmer. The commercial farmer may also deviate from the agreement by supplying his sharecropping partner (i.e., rural household) with lower crop shares or crops of worse quality. As the commercial farm size grows through consolidation, the so-called patron-client relationship between farmer and rural households will become more established, penalizing the incidents of moral hazards by among tenants. In such patron-client relations, a patron (the commercial farmer) uses his power and resources to provide benefits to loyal rural households that he employs (VELDWISCH, BOCK, 2011). The loss of patron's trust and confidence will be costly for the smallholder: he will lose all access to credit markets and, perhaps more importantly, also lose his reputation as a reliable worker. At the same time, as the commercial farm becomes larger, the farmer will have to spend more resources to supervise hired work, which can be avoided only if there is trust between the actors. Hence, contract fulfillment plays an important role in the economy of both commercial farms and rural households.

4.2 Dependency of rural livelihoods on agricultural contracts

Most rural households produce insufficient quantity of wheat to cover their annual consumption needs, despite wheat being the second major crop in the study area (VELDWISCH, BOCK, 2011). Only rice, vegetables, and milk products are produced in sufficient quantity to generate a marketable surplus. The demand for wheat and other "deficit" products is satisfied from alternative sources, e.g., from employment on a commercial farm, from production on rented farmland, and from buying in the market (Figure 3). Rural households that satisfy their own needs from production on the household plot still obtain some food products,

such as rice and vegetables, through employment on a commercial farm or production on rented farmland, thus accumulating a marketable surplus. Rural households also receive cotton stalks as payment in kind from commercial farms; cotton stalks are used as a source of energy for cooking and heating, mitigating the frequent interruptions in central gas supply in rural areas.

Figure 3: Sources of main agricultural products in rural households in the study area



Classifying rural households will provide clues about the main factors that characterize the different types and reduce the aggregation bias when studying their dependency on commercial farms. Principal component analysis (PCA) and cluster analysis (CA) have been applied to identify representative rural households from the survey of 400 rural households and to analyze their reliance on agricultural and non-agricultural activities. For further information about estimation procedures for PCA and CA, see HAIR et al., (1998) and VILLAMOR (2012).

PCA is performed to condense information from a large number of original variables describing rural households into a smaller number of new composite components with minimum information loss[2]. Our survey data produced five principal components (Table 2). These were characterized according to their

[2] Principal component analysis uses only variables with a Kaiser-Meyer-Olkin measure of sampling adequacy higher than 0.5 (the unacceptable threshold). This selection avoids the situation the variables are correlated and their properties are overvalued in the clustering process. In the principal component analysis based on our survey, the Kaiser-Meyer-Olkin measure showed a satisfactory sampling adequacy of 0.617. Afterwards the principal components for categorizing rural households were constructed using the rotated component matrix. The derived principal components interpret the original variables with loadings.

leading constituent variables (bold loadings in Table 2) as "Non-agricultural activity", "Commercial farmland", "Cash and crops from employment on a commercial farm", "Food commodity purchase expenditure", and "Own plot and livestock". The five principal components explained 74 % of the total variance of 12 independent variables with highest loadings representing household characteristics (number of household members, employment on a commercial farm, employment in non-agricultural activities, land area, livestock headcount, as well as variables characterizing household expenditure and income structure).

The non-agricultural activities as the principal component 1 account for 19.1 % of the total variance of the original dataset (Table 2). The non-agricultural activeties of rural households are mainly employment (loading 0.83) and income in the non-agricultural sector (loading 0.87), such as government, as well as remittances from migrants working in Russia and Kazakhstan, and social payments, such as pensions. Other expenditures (transportation, health care, education, construction, and purchases not related to agricultural production) are also important in explaining dependencies on non-agricultural activities (loading 0.87). Rural households are also highly dependent on commercial farmland, mainly through agricultural contracts – land received as payment in kind, sharecropping, and land rent. Commercial farmland as the principal component 2 is composed of variables such as the number of rural household members employed on a commercial farm, the area of land in contracts, income from farmland, and expenditure on agricultural production. This component accounts for 17.5 % of the total variance of the original dataset. Principal component 3 includes payments in cash and in crops in return for employment on the commercial farm from among factors describing rural household characteristics (it accounts for 14.1 % of total variance explained). Since rural households produce insufficient wheat and other food products on their own plot, the household size and food purchases characterize principal component 4 as "Food commodity purchase expenditure" accounting for 12.9 % of total variance explained of the original dataset. Livestock numbers (loading 0.79) and income from selling crops and animal products produced on the own household plot (loading 0.73) also contribute to rural livelihoods as principal component 5.

Table 2: Principal components of rural households characterized by dependence on various activities

Independent variables	Principal components				
	(1) Non-agricultural activity	(2) Commercial farmland	(3) Cash and crops from employment at farm	(4) Food commodity purchase expenditure	(5) Own plot and live-stock
Explained variance	19.1%	17.5%	14.1%	12.9%	10.4%
Number of rural household members	0.44	0.02	0.16	**0.72**	0.16
Number of rural household members working on a commercial farm	-0.21	**0.60**	**0.70**	0.39	0.11
Number of household members engaged in non-agricultural activities	**0.83**	-0.06	-0.11	0.14	0.08
Area of land rented, received as payment in kind, or used in sharecropping with commercial farm	-0.10	**0.90**	-0.10	0.14	0.09
Livestock headcount	0.24	0.04	0.14	-0.20	**0.79**
Food commodity purchase expenditure	0.37	0.03	0.10	**0.78**	-0.07
Agricultural production expenditure	0.18	**0.66**	0.48	-0.22	0.13
Other expenditures	**0.58**	-0.02	0.01	0.18	0.04
Income from marketing livestock and crops from own plot	-0.21	0.09	-0.07	0.32	**0.73**
Income from crops and cash payments from farm employment	-0.06	0.02	**0.90**	0.03	-0.02
Income from land rented, received as payment in kind, or obtained as sharecropping from commercial farm	-0.07	**0.91**	-0.03	-0.02	-0.01
Income from non-agricultural activities	**0.87**	-0.03	-0.10	0.12	-0.10

Note: Bold numbers are high loadings identifying the most important of the original variables that are included in the principal components using the rotated component matrix by Varimax with Kaiser Normalization. Bold numbers are the variables selected for household categorization.

Cluster analysis (CA) was performed using the 12 variables with highest loadings (Table 2)[1]. Using the five principal components produced by PCA, three clusters (or groups 1, 2, 3) were identified (Table 3).

Table 3: Characteristics of rural household groups, in average values

	Variable	Rural household group		
		1	2	3
1	Number of rural household members	6	7	9
2	Number of rural household members working on a commercial farm	3	2	5
3	Number of rural household members engaged in non-agricultural activities	2	3	2
4	Area of land rented, received as payment in kind, or used in sharecropping with commercial farm, ha	0.4	0.2	0.8
5	Livestock headcount	3.6	2.3	3.8
6	Share of food commodity purchase expenditure, %	34	36	33
7	Share of agricultural production expenditure, %	29	16	30
8	Share of other expenditures, %	37	48	37
9	Share of income from marketing livestock and crops from own plot, %	27	20	26
10	Share of income from crops and cash payments from farm employment, %	14	8	16
11	Share of income from land rented, received as payment in kind, or obtained as sharecropping from commercial farm, %	21	12	24
12	Share of income from non-agricultural activities, %	39	60	34

Of the total 400 rural households surveyed, 200 are in group 1, 112 in group 2, and 88 in group 3. Table 3 summarizes the main characteristics of the three groups. The largest group, i.e., group 1, has the smallest household size (6 people) and the lowest share of other expenditures (construction, transportation, purchasing clothes, and others). Group 2 consists of rural households whose main income and expenditure sources are related to non-agricultural activities. Group 3 has the smallest number of households from our survey, but the largest average household size. The distinguishing characteristic of these relatively large households is that the main source of income stems from agricultural activities: their income share from non-agricultural activities is the lowest (variable 12 in Table 3). Overall, we observe from Table 3 that employment of rural household members on a commercial farm (variable 2), and

[1] The *K*-mean method was applied to minimize the heterogeneity of each cluster by moving cases between clusters. This approach classifies the observations into several clusters, with each observation assigned to the cluster with the nearest mean value.

especially agricultural contracts (variables 9 and 10) play an important role in the livelihoods of rural households.

Different payment arrangements are agreed between rural households and commercial farms depending on household characteristics. Table 4 presents the different contractual forms practiced by rural households of different groups. The most frequently observed arrangement for all rural groups is payment in kind in the form of crops and crop byproducts. This is consistent with other studies, which report that a substantial amount of redistribution in rural areas occurs in kind – an arrangement vital for the subsistence of the rural population (GAHVARI, 1994). In our study, the largest number of respondents with fixed-wage payments is in rural household group 3, which largely relies on income from agricultural activity (see Table 3). This may be so because for rural households where food security and access to land are an issue, agricultural work may be more attractive than non-agricultural work if agricultural wages are paid in commodities (DJANIBEKOV et al., 2013b).

Table 4: Annual pattern of agricultural contracts in rural households (number of observations)

	Fixed wage			Fixed rent			Flexible		
	Rural household group			Rural household group			Rural household group		
	1	2	3	1	2	3	1	2	3
Contractual arrangements	100	75	121	71	55	60	80	55	103
Average area of land contract, ha	0.1	0.1	0.1	0.7	0.3	0.7	0.3	0.2	0.3
Payment mode									
Main crop products	100	60	115	n.a.	n.a.	n.a.	80	55	103
Crop byproducts	95	68	74	n.a.	n.a.	n.a.	80	55	103
Cash	54	33	58	71	55	60	38	28	50
Land	55	36	60	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Note n.a. – Not applicable payment mode in given contract type. In the fixed rent contractual arrangement, the rural households rent land from farmers and hence payment of cash is from rural households to farmers.

In the study area, flexible arrangements (sharecropping) are mainly in the form of main crop harvest and its byproducts, and sometimes with payments in cash. Similar to fixed-wage contracts, sharecropping is mainly observed in rural household group 3, due to high dependency of these rural household members on employment on a commercial farm. Sharecropping, can be attractive for both commercial farmers and rural households: these contracts

allow them to share production risks and help households who lack sufficient capital for crop production (CHEUNG, 1969). The fixed-rent contract also plays an important role in the economy of rural households, which is mainly observed in group 1. The fixed-rent contract is also relevant when rural households suffer from scarcity of land whereas commercial farmers have insufficient capital (MURREL, 1983). The rural households that are less dependent on agricultural activities and whose main income sources is from non-agricultural activities, i.e., group 2 households, have the lowest observed number of agricultural arrangements with the commercial farmer. The rural household can have several contractual forms at the same time, e.g., receive a bucket of wheat as payment in kind and land as sharecropping, and rent land.

5 CONCLUSIONS

Our case study of the Khorezm region and the southern districts of Karakalpakstan in Uzbekistan revealed existing interdependencies between commercial farms which are the agricultural producers possessing most of the arable land and rural households or smallholders in Central Asia. The Uzbek setting is specific in several respects: first, the state exercises persistent involvement in agricultural decision-making through commercial farm restructuring and imposition of production targets; second, the inherited system of irrigation networks does not meet the needs of the new farming structure and the uncertain irrigation water supply creates additional risks for producers. The lack of stability in farm restructuring, incomplete autonomy of the farmers due to the imposition of cotton production plans, as well as the uncertainty of land tenure and water supply may have adverse effects on rural welfare through the organization of contractual arrangements between commercial farms and rural households. Hence, to be able to fully capture the effects of production changes in commercial farms on rural livelihoods it is important to understand the dependency of rural people on contracts with commercial farms.

By classifying the rural households into three clusters, we were able to identify the rural population groups that are the most dependent on agricultural or non-agricultural activities, more specifically on employment at a commercial farm and on the type of agricultural contracts. All the three groups relied to some degree on employment at commercial farms and all had various contractual arrangements with commercial farmers. Different contract types may be practiced in one smallholder family, e.g., a smallholder can have both a fixed-wage and a sharecropping contract, having agreed with a commercial farmer on both a fixed payment in wheat and a share of yield from the managed land. It was interesting to observe in our case is that the more dependent rural household group, i.e., group 3, has a larger number of observations in fixed-wage and flexible contracts than the other groups (see Table 4). This is due to

the fact that payment in crop products (under fixed-wage contracts) substantially contributes to the household's food security, while the households do not have enough cash to rent land and thus rely on sharecropping. In contrast, smallholders that are more dependent on non-agricultural activities (i.e., group 2) such as entrepreneurship, employment abroad, and social payments, accordingly have the least number of agricultural payments in all three types of contracts, i.e., fixed wage, fixed rent and flexible.

Our results show that payments from commercial farms play an important role in rural livelihoods. Hence, developing policies oriented towards commercial farm production and restructuring should be based on a broader understanding of the interdependency between commercial farms and rural households, as these policies are likely to have spillover effects on rural livelihoods.

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TAJIKISTAN'S VULNERABILITY TO CLIMATE CHANGE: AN AGRICULTURAL POLICY APPROACH[1]

ZVI LERMAN

1 INTRODUCTION

Tajikistan is a mountainous country, with 93 % of its surface area taken up by Tien-Shan and Pamir ranges. Almost half the country is at altitudes of more than 3,000 m. Despite the inhospitable terrain, Tajikistan is a highly agrarian country with agriculture accounting for 65 % of employment and 25 % of GDP (TAJSTAT, 2010a). As is typical of agrarian economies, Tajikistan has low income per capita (WDI, 2010), which is the lowest in the Commonwealth of Independent States (CIS). Tajikistan also has high rural poverty: 43 % of the rural population live below $2.15 per day, compared with 30 % for the urban population (TAJSTAT, 2010b).

Because of its profile – mountainous terrain, high dependence on agriculture, low incomes, and high poverty – Tajikistan is vulnerable to risks, including climate change risks and food insecurity risks. By some vulnerability assessments, it is the most vulnerable among the 28 countries in the World Bank's Europe and Central Asia (ECA) region (WORLD BANK, 2009). This chapter examines how Tajikistan's vulnerability can be mitigated by a set of land use policies and practices. Vulnerability and resilience are treated within the conceptual framework of the Intergovernmental Panel on Climate Change (IPCC, 2007).

The chapter is organized in five sections. Section 1 reviews the current state of land resources and the outcomes of land reform in Tajikistan. Section 2 introduces the three dimensions of vulnerability – exposure, sensitivity, and adaptive capacity – and identifies the characteristics that are responsible for Tajikistan's high sensitivity and low adaptive capacity. In Section 3, policy measures for increasing the resilience of land use in Tajikistan are elaborated, drawing on national statistics and farm surveys for supporting evidence. Section 4 presents examples from local initiatives on how to implement the proposed policy measures in practice. Section 5 concludes.

[1] This chapter is based on research carried out as part of the Pilot Program for Climate Resilience (PPCR) in Tajikistan, Phase 1, Component A5, Agriculture and Sustainable Land Management (SLM), February-August 2011.

2 LAND RESOURCES AND OUTCOMES OF LAND REFORM

Less than 30 % of Tajikistan's territory is agricultural land (4.0 million ha in 2009). Pastures are the dominant component – 75 % of agricultural land. Cultivable area covers 25 % of agricultural land – 22 % arable land and 3 % land under orchards and vineyards. Despite the dominant share of pastures in land resources, livestock accounts for only 30 % of Gross Agricultural Output (GAO). Tajikistan's agriculture is 70 % cultivated crops, produced on 25 % of agricultural land. Crop agriculture is substantially more productive than livestock (LERMAN, SEDIK, 2008).

The climate in Tajikistan is semi-arid and arable agriculture is heavily dependent on irrigation, drawing water from the huge glaciers in the high mountains. However, the plentiful water does not always reach the fields because of the poor technical condition of the Soviet-era irrigation infrastructure. The deterioration of the irrigation system since independence is attributable to inadequate institutions for water sector management (STRATEGY, 2006).

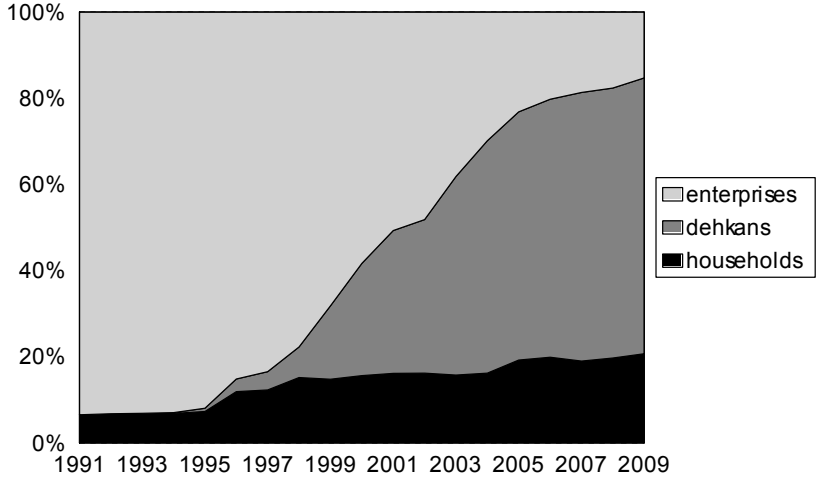
Tajikistan's land resources are inherently limited, while its population, especially the rural population, is growing rapidly. The area of arable land has remained fairly constant at around 850,000 ha since 1980, while the rural population more than doubled from 2.6 million to 5.5 million (TAJSTAT, 2011). Rural population density was 6.3 persons per ha of arable land in 2009. This is comparable to that in Kyrgyzstan, Turkmenistan, and Uzbekistan, but an order of magnitude higher than in Kazakhstan, Russia, and Ukraine.

It is usually claimed that unsustainable land management in Tajikistan has led to large-scale land degradation. Unfortunately there are no systematic statistics on soil quality and land degradation. Available estimates indicate that 89 % of agricultural land in Tajikistan suffers high and medium level of erosion and that erosion affects 60 % of the irrigated land (UNECE 2004); degradation due to overgrazing involves approximately 3 million ha, or 85 % of pastureland (NAPCD, 2000). These fragmentary estimates indeed suggest that erosion and other types of soil degradation are important problems in Tajikistan, adversely affecting production and farmers' incomes. The problem has been addressed by many small initiatives and projects over the last 15 years. A recently conducted inventory of sustainable land management (SLM) practices in Tajikistan documented the experiences of 14 different governmental and non-governmental organizations, producing 70 case studies that cover an estimated 9,000 ha of land (WORLD BANK, 2011).

Land in Tajikistan is exclusively owned by the state and it is given to farmers and households in use rights (legally conferred by a land use certificate). Instead of land privatization, Tajikistan has undergone individualization of

agriculture – a shift to individual and family farming on state-owned land (LERMAN, SEDIK, 2008). Prior to 1992, 95 % of cultivable land was controlled by agricultural enterprises (collective and state farms) and 5 % was in household plots – the smallholder family agriculture that persisted all through the Soviet era (Figure 1). The land reform that began in 1992 reduced the share of agricultural enterprises to just 25 % of cultivable land by 2009, while the share of household plots increased dramatically to 20 % (through land distribution from the state reserve in 1995 and 1997) and another 65 % shifted to dehkan (or peasant) farms, a new organizational form that began to emerge after 1992. Dehkan farms and household plots combined accounted for 85 % of cultivable land in 2009, up from just 5 % in 1991. Most dehkan farms today are individual and family farms, as the number of originally created partnership (or collective) dehkan farms is rapidly shrinking due to the government's program reallocating land to individual farm members. The use of cultivable land in Tajikistan has been effectively individualized since 1991.

Figure 1: Structure of land use by farm type, 1991-2009

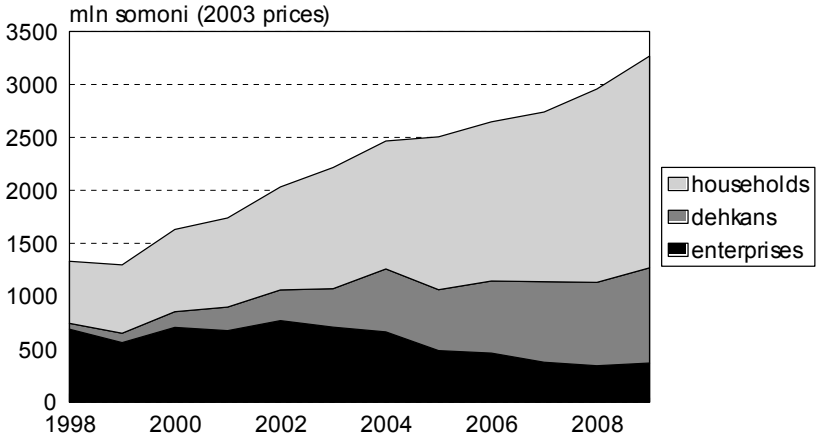


Source: LERMAN, SEDIK (2008), updated from TAJSTAT (2010a).

The allocation pattern for pastures is somewhat different: household plots do not have any pastures (only cultivable land); dehkan farms control about two-thirds of all pastures (roughly 2 million ha) and the remaining one-third is still held by agricultural enterprises (TAJSTAT, 2010a). It is impossible to say how much of the 2 million ha of pastures in dehkan farms has been transferred to individual and family use and how much remains in collective use.

Despite substantial expansion, household plots remain very small, averaging 0.3 ha (compared with about 5 ha on average for individual and family dehkan farms and 100-200 ha for partnership dehkan farms). There are 750,000 household plots in Tajikistan (UNICEF, 2009) and only 50,000 dehkan farms (TAJSTAT, 2010a). The increase of land resources in household plots has inevitably led to an increase of their share in agricultural production. While the share of agricultural enterprises in GAO dropped from 65 % in 1995 to less than 10 % in 2009, the share of household plots soared from 35 % to 65 % (Figure 2**)**. The remaining 25 % comes from dehkan farms – the second component of the individual farm sector that started to contribute after 1997. Agricultural production, like land use, is now fully individualized in Tajikistan. Since household plots produce 65 % of agricultural output on 20 % of cultivable land, they are obviously much more productive than other farm types. Due to their high productivity, household plots are the engine of agricultural growth: they are responsible for the recovery of Tajikistan's agriculture, with GAO more than doubling between 1998 and 2009, despite the sharp decline in the output of agricultural enterprises (Figure 2). These achievements may be attributed to the well-known advantages of family farms with their strong internal cohesion and accountability.

Figure 2: GAO by farm type (million somoni in constant prices)



Source: LERMAN, SEDIK (2008), updated from TAJSTAT (2010a).

3 DIMENSIONS OF VULNERABILITY: EXPOSURE, SENSITIVITY, ADAPTIVE CAPACITY

An individual or a household is *vulnerable to risks* (among them also risks associated with climate change) if these risks may result in a loss of well-being to a level below some threshold. The opposite of vulnerability is resilience. Vulnerability assessments usually rely on different combinations of geo-climatic and socio-economic variables, which are always matched to the three defining dimensions of vulnerability: exposure, sensitivity, and adaptive capacity (Table 1). Exposure and sensitivity both act to increase vulnerability, while higher adaptive capacity mitigates vulnerability.

Climate change is one of the elements that contribute to increased variability and risk, exacerbating already existing vulnerabilities (OXFAM, 2011). Tajikistan is judged to have only moderate exposure to climate change risks in the sense of likelihood to experience the greatest increases in climate extremes by the end of the 21st century, but overall it is the most vulnerable to climate change risk among the 28 ECA countries due to the combination of its high sensitivity and negligible adaptive capacity (WORLD BANK 2009).

Table 1: The defining dimensions of vulnerability

• *Exposure to risks:* the chance that assets and livelihoods will be impacted by risk
• *Sensitivity to risks:* the susceptibility of assets and livelihoods exposed to risk
• *Adaptive capacity*: the ability to deploy social risk management strategies (i.e., adjustments in assets, livelihoods, behaviors, technologies, or policies) for reduction of risk and human vulnerability; adaptive capacity signifies ability to recover from, to prevent, or to mitigate the effects of risk.

Source: HELTBERG, BONCH-OSMOLOVSKIY (2011).

Table 2 lists the socio-economic determinants of vulnerability that generally occur in various combinations in the literature. Family well-being is the main defining factor for vulnerability due to its dominant effect on adaptive capacity. Well-being in turn is primarily determined by family income – both the level of income and the stability of income over time. A complementary view of family well-being is provided by poverty data, such as poverty headcounts and indirectly also infant mortality, child undernourishment, or food insecurity.

Statistical data from Tajikistan (WDI, 2010; TAJSTAT, 2010a; TAJSTAT, 2011; SOFI, 2010) provide evidence of positive trends in all well-being indicators in recent years (GDP per capita, per capita household incomes, rural poverty rates, infant mortality rates, and the proportion of undernourished). These developments improve adaptive capacity and thus mitigate vulnerability, but absolute levels of vulnerability remain high. Furthermore, rural population appears to

be more vulnerable than urban population due to lower per capita incomes, higher poverty rates, and higher infant mortality.

Table 2: The effect of main socio-economic variables on vulnerability

Indicators	Effect on vulnerability	Situation in Tajikistan
• Income and well-being	–	Low but increasing
• Poverty (also infant mortality, undernourishment, food insecurity)	+	High but decreasing
• Debt and financial insecurity	+	Not critical
• Agricultural land	–	Small holdings, land not transferable
• Livestock	–	Small number of animals in each household, headcount increasing
• Commercialization (share of production sold)	–	Low, underdeveloped
• Population density: stress on land and water resources	+	Increasing (fast population growth)
• Irrigation: stress on water resources	+	Poorly maintained, inefficient system
• Water availability	–	Ample, from glaciers
• Diversification of income and farm production	–	Underdeveloped

3.1 Sensitivity of rural livelihoods in mountainous Tajikistan

Reviewing the discussion of land and water resources and farm structure through the lens of vulnerability, we can identify the following characteristics that are responsible for Tajikistan's high sensitivity:

- High population density (high stress on both land and water resources)
- Small farm sizes and cultivation of small plots on mountain slopes (low income potential)
- Acute dependence on irrigation combined with degraded irrigation infrastructure (high stress on water resources, sensitivity to climate change due to glacier melting)
- High soil degradation, unproductive lands (adverse effect on production and income)
- Difficult access to markets due to a combination of physical (mountainous terrain) and institutional (underdeveloped sales channels) factors (adverse effect on income)

3.2 Adaptive capacity of mountain rural population

We proceed to discuss measures that can be used to improve the adaptive capacity of Tajikistan's large rural population. We primarily focus on measures that increase family incomes and thus make the rural population more resilient to risks. Families with high and stable income are less sensitive to risk and are able to apply a wider range of coping strategies (i.e., have high adaptive capacity). Poor families are more sensitive to risk and have no resources to cope with adversity.

Rural families largely depend on agriculture and their income is primarily generated by land and livestock (plus family labor). Productive farming also requires access to machinery, purchased inputs (such as fertilizers and quality seeds), veterinary services, and extension information. Cash income is augmented through sale of part of farm output, and this requires marketing channels. Adequate resources and farm services make it possible to maintain income generation at satisfactory levels and thus act to reduce vulnerability.

Income from agriculture – especially in mountain regions – is highly variable due to its dependence on weather and other natural conditions. This variability is likely to increase in the future due to climate change. Diversification of income sources is a standard technique for reducing the variability of income streams and thus mitigating vulnerability.

Individualization of cultivable land in the process of land reform has led to recovery of agricultural growth and increased productivity (LERMAN, SEDIK, 2008). Family farms (including household plots) have proved substantially more productive than farms of other types, which underscores their high adaptive capacity. Thus, supporting family dehkan farms and household plots is an effective policy to increase the adaptive capacity of rural livelihoods in Tajikistan.

4 FROM VULNERABILITY TO RESILIENCE: AN AGRICULTURAL ECONOMICS PERSPECTIVE

The conceptual framework developed above suggests three policy directions for improving the adaptive capacity of Tajikistan's rural population:

- Improve income generating capacity through attention to the resource base: increase the land endowment of the rural population, increase land use efficiency and sustainability
- Improve income generating efficiency through better access to farm services: increase farm commercialization and livestock productivity
- Encourage diversification into additional crops and new income sources

Below we explore these directions as opportunities for the rural population to become more climate resilient.

4.1 Land and commercialization increase family well-being

Evidence from all CIS countries conclusively shows that per capita family incomes and family well-being increase with the increase of the land allotment in family farms. Furthermore, families with more land demonstrate a greater readiness to sell their farm output and thus increase their available income with cash revenue from sales.

Table 3: Farm size and share of farm sales in family income for different levels of well-being

Well-being level	Irrigated land, ha	Share of farm sales in family income, %
High: comfortable consumption regime (n=60)	6.0	42
Low: able to purchase food and daily needs only (n=46)	3.5	30

Source: PPCR farm survey, May 2011 (WORLD BANK, 2011, Appendix 2).

New survey evidence for Tajikistan (WORLD BANK, 2011, Appendix 2) demonstrates that larger family farms attain a higher level of well-being (Table 3, first column) and that greater commercial orientation is associated with higher levels of well-being (Table 3, second column). Respondents who fall in the "high" well-being category have more land than those in the "low" well-being category (6.0 ha compared with 3.5 ha) and earn a higher share of their family income from farm sales (42 % compared with 30 %).

4.2 Expansion of land holdings

A clear policy prescription for reducing vulnerability is to expand the land allotments of the highly productive rural households and family dehkan farms. This can be accomplished in several ways.

4.2.1 Distribution of inefficiently used land

The state land reserve in Tajikistan is less than 1 % of arable land (land balance data for January 2010), which rules out another wave of land distribution for expansion of the small farms. However, 15 % of cultivable land (nearly 130,000 ha) is still managed by agricultural enterprises (Figure 1), which achieve relatively low productivity levels. In addition, a substantial area of cultivable land is held in collective dehkan farms, which are not more productive than the former *kolkhozes* that they succeeded. Land in agricultural enterprises and collective dehkan farms is a large hidden reserve that may be as high as 30 % of Tajikistan's 1.1 million ha of cultivable land (LERMAN, SEDIK, 2008). Making at least part of this land available

for distribution to small family-based farms could further increase the productivity of the agricultural sector and reduce vulnerability of the rural population. Government initiatives promoting transformation of partnership dehkan farms into family farms since 2007 have already produced noticeable increases in the average size of small farms (TAJSTAT, 2010a). These and similar efforts for expansion of small farms should be broadened and intensified.

4.2.2 Development of land markets

Since the options for additional land distribution are inherently limited, it would be important to enable farmers to adjust the size of their holdings through land market transactions. Land markets allow land to flow from less efficient or inactive users to more efficient and productive ones, and the development of land markets will allow enterprising farmers to increase the size of their farms and achieve higher incomes. Given that all agricultural land in Tajikistan is owned by the state and thus cannot be bought or sold, the only feasible way for land markets to develop today is by allowing transferability of land use certificates – either temporarily (through leasing) or permanently (through selling). This option is included as one of the proposed amendments in the new Land Code currently under discussion. Safeguards ensuring that distressed smallholders cannot be pressured into giving up their land to more powerful land users will have to be introduced as land markets develop. These safeguards may restrict transactions in agricultural land to bona fide farmers, thus precluding land accumulation in the hands of rich investors; they may ensure that no household remains landless through bankruptcy or forced sales by allowing distressed families to keep at least their household plots.

4.2.3 Return of unused land to cultivation

Another option involves identification of currently unproductive or unused lands that have a potential for being upgraded to productive use. To implement this option, unproductive and unused lands should be fully inventorized at the village level and earmarked for distribution to small farmers for productive cultivation. Such practices have already been implemented in Tajikistan: examples are listed in Table 5 below (the agroforestry category).

The process may require overcoming certain legal obstacles, such as permissions to convert pastures into orchards. Farmers willing to invest in rehabilitating degraded land should benefit from incentives, such as tax credits, exemption from the higher tax applicable to orchards, and access to low-interest microloans or grants for investment in conversion.

4.3 Improving livestock productivity

In Tajikistan, the livestock herd is concentrated almost totally in rural households, each with 1-2 animals (Table 4). Livestock is an important source of both

food and income for the rural households. There is a ready cash market for live animals, while milk is easily sold to dairies or directly to consumers. Livestock sales represent 56 % of total sales revenue from household plots, most of it (36 %) from sale of live animals and the rest mainly from milk sales (WORLD BANK, 2011, Appendix 2). Milk yields in Tajikistan are the lowest among all CIS countries, averaging 800 kg per cow per year. Higher livestock productivity will increase the production volumes per household, increasing their incomes and in effect taking them out of the "smallness trap".

Table 4: Livestock in rural households 2009

	Headcount in rural households	% of national headcount	Average per household*
Cattle	1,676.3	92	2.2
Cows	909.7	96	1.2
Sheep and goats	3456.9	82	4.6

Source: TAJSTAT (2010a).

Note: * Based on 757,608 rural households (UNICEF, 2009).

Poor animal genetics, inadequate supply of cultivated feed, and degraded pastures are among the main reasons for low livestock performance. While the animal headcount increases over time, the area sown to feed crops declined precipitously after 1990 and the quantity of feed harvested also fell sharply (in 2007 it was merely 15 %-30 % of the harvest in 1990). This contraction of cultivated feed crops is largely the outcome of government policies that until recently imposed production targets for wheat and cotton and in effect discouraged or even prohibited allocation of land for feed crops. In principle, decrease in feed crops should be compensated by increased grazing, but according to statistics the area of pastures has decreased by 300,000 ha (about 10 %) since 1997. This was another outcome of government policies, which ignored efficient pasture management, contributing to unsustainable use and degradation of pastures. Climate change also contributes increasingly to low pasture productivity. Recent years have seen warmer winters and the decreasing snow cover adversely affects the availability of soil moisture on pastures in the spring.

Measures for improving livestock productivity may include the following:

- greater attention to feed sufficiency, including development of high-yield varieties of feed crops and rehabilitation of pastures (re-seeding, fencing, adoption of pasture rotation schemes, gully rehabilitation);
- provision of more watering points for animals in grazing areas;
- attention to animal health through modernization of veterinary services;

- improvement of animal breeds through artificial insemination, including breed selection for both higher yields and greater tolerance to local climate.

4.4 Increasing commercialization through improvement of farm services

Small farmers will sell their products more readily if they have good access to marketing channels. Improvements in other farm services – input supply, machinery (rental and maintenance), extension, credit – will lead to more efficient production and generate higher incomes.

Best-practice world experience suggests that farmers' service cooperatives provide the most effective way of improving the access of small farmers to market services and enabling them to meet higher quality standards. Service cooperatives do not rule out private initiative: private trade intermediaries, integrators, and service providers should be allowed to co-exist with service cooperatives and continue their currently developing operations. Government officials and decision makers have to acknowledge the contribution of small farms and focus on policies that ensure a supportive market environment for the small-farm sector (including household plots).

4.5 Diversification of income and farm production

More land, improved livestock productivity, and greater commercialization allow farmers to achieve higher incomes. Yet income flows are prone to variability and therefore risky. Diversification is a standard risk-reducing tool in economic practice, and it can be effectively used to reduce vulnerability.

Diversification should be increased on two levels: (a) diversification of income sources to reduce income risks and (b) diversification of the agricultural product mix to reduce production risks. Family incomes today are strongly dependent on a single source, with 50 %-70 % deriving from agriculture (WORLD BANK, 2011, Appendix 2). Diversification of income sources is usually achieved by accepting wage employment outside agriculture and by expanding entrepreneurial activeties. Wage employment (including remittances for family members working abroad as migrants) constitutes already now a significant component of family income. Income from entrepreneurial activities, however, is so far negligible. Policy measures should be put in place to encourage development of off-farm activities in rural areas, including small-scale processing, cottage industries, and small business initiatives (transport, trade, intermediation, tourism). Encouragement of off-farm activities requires an intelligent public awareness and education campaign; it may also require micro-financing with loans or grants, establishment of alternative credit mechanisms (e.g., credit unions as an alternative to commercial banks), and innovative tax measures to provide additional incentives.

In terms of product diversification, Tajikistan's agriculture is 70 % crops and only 30 % livestock (TAJSTAT, 2010a). Only one-quarter of small dehkan farms engage in both crop and livestock production (WORLD BANK, 2011, Appendix 2); the rest produce crops, but no livestock. Tajikistan's agriculture thus bears an unbalanced risk due to the dominance of crop enterprises with their exposure to weather and climate change risks. Measures to improve livestock productivity (see above) will inevitably result in higher output and increase the share of livestock production, leading to a more balanced and less vulnerable product mix.

Crop production is characterized by concentration in just two crops – cotton and wheat, which have traditionally occupied in varying proportions up to 70 %-80 % of total sown area (TAJSTAT, 2010a). The remainder was split between feed crops and horticulture (potatoes, vegetables, melons, fruits, and grapes). Here, as with the crop/livestock mix, we witness basic diversification of crop production, but the diversification is not very pronounced: cotton and wheat dominate the cultivated area.

The specialization in cotton and wheat is an inherited feature of the government policies that prevailed until 2008. During most of the period since independence authorities dictated the allocation of land to "strategic" crops and set production targets for cotton and wheat. To encourage further diversification of dehkan farms away from cotton and wheat, the government should ensure strict compliance – at all levels – with the full intent of the "freedom to farm" provisions adopted in several rounds since 2007. These provisions release farms from production targets on cotton and wheat, eliminate administrative intervention in production and land allocation decisions, and allow farmers to decide where and how to sell their output (WORLD BANK, 2011). Implementation of the "freedom to farm" principles should enable small farms to maximize their relative advantage by specializing to a greater extent in labor intensive horticultural crops, which are ideally suited for small farms with their abundance of relatively cheap labor. Relaxation of production constraints should also lead to allocation of more land to feed crops, ensuring that livestock is supplied with enough feed to maintain reasonable milk yields.

5 IMPLEMENTATION OF POLICY MEASURES: UPSCALING OF EXISTING SLM PRACTICES

Many examples of existing SLM practices in Tajikistan implement various aspects of the policy measures proposed for reducing the vulnerability of the rural population. These examples have been documented in the WOCAT online database (www.wocat.net).

Table 5 lists 14 practices grouped by the main policy measures: expansion of land holdings, diversification of farm production, improvement of livestock

productivity, and improvement of farm services. These practices were introduced by innovative individual farmers, by non-governmental organizations, or through programs in collaboration with the government. So far these are basically local initiatives, but they hold considerable potential for national roll-out.

Table 5: Examples of WOCAT sustainable land management practices in Tajikistan in the context of proposed policy measures

Policy measures	Practice category	Case title	WOCAT code*
Expansion of land holdings and diversification	Agroforestry**	Orchard-based agroforestry	WT TAJ003
		Rehabilitation of poor soils through agroforestry	WT TAJ113
		Conversion of grazing land to fruit and fodder plots	WT TAJ004
		Development of stony slopes for establishment of irrigated apricot orchard	WT TAJ365
		Integrated Technologies for Household Plots	WT TAJ370
	Financial support (startup capital for SML initiatives)	SLM small grant allocation mechanisms	WA TAJ044
Increasing livestock productivity	Improved grazing land	Rotational grazing supported by additional water points	WT TAJ100
		Growing of fodder grass on steep slope	WT TAJ103
		Pasture improvement through Izen plantation	WT TAJ368
		Perennial herbaceous fodder plants for intact canopy cover	WT TAJ009
Commercialization to increase family well-being	User associations	Income generation activities of poor women in Muminabad	WA TAJ036
Improving farm services	User associations	Creation of a seed association	WA TAJ024
	Knowledge transfer	Technical advisory groups	WA TAJ024
		Farmer field schools	WA TAJ108

Notes: * WT – WOCAT Technology; WA – WOCAT Approach.
** Agroforestry involves combined cultivation of trees and annual crops.

6 CONCLUSIONS

Tajikistan is characterized by limited availability of cultivable land and prevalence of smallholders – a situation representative of other mountain regions. The rural population is judged to be highly vulnerable to risk, including climate

change and food insecurity risks, and policy frameworks are needed to build resilience, especially in mountain rural areas. Empirical evidence demonstrates that land and commercialization increase family well-being and thus reduce vulnerability. This evidence suggests four policy recommendations for increasing family income and reducing vulnerability: (1) expansion of smallholder farms, (2) improvement of livestock productivity, (3) increase of commercialization through improvement of farm services, and (4) greater diversification of both income sources and farm production.

SLM case studies in Tajikistan demonstrate the existence of good practices implementing these policy recommendations, but their scope is limited to small areas. The information about successful experiences should by widely disseminated, e.g., by uploading standardized knowledge documentation to an online database (such as WOCAT). Knowledge dissemination will lead to wider adoption of the relevant practices by stakeholders.

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LAND REFORM AND ITS DISTRIBUTIONAL IMPLICATIONS: THE CASE OF GEORGIA[1]

AYAL KIMHI

1 INTRODUCTION AND MOTIVATION

The purpose of this research is to extend the knowledge about distributional implications of land reforms in transition countries. The main objective of land reforms in general is to distribute land to rural families in an equitable way, based on the belief that land productivity is highest on small farms where family labor is abundant (DEININGER, FEDER, 2001). However, land reforms often create, in addition, mechanisms for land transactions through permanent sales or temporary leases. This allows more productive farmers to obtain land from less productive ones, so that over time the land allocation becomes more efficient (VRANKEN, SWINNEN, 2006; DEININGER, JIN, 2008). These mechanisms may lead to concentration of land in the hands of large and wealthy farmers, because small farmers may not be able to reach their productivity potential due to incompleteness or inexistence of other markets, for example the credit market (LERMAN et al., 2004a). If this is the case, the final outcome of the land reform may be a more unequal allocation of land, as opposed to its original purpose (ROZELLE, SWINNEN, 2004). This could lead to higher rural inequality and poverty.

This research will focus on the changes in the distribution of landholdings in Georgia following the land reform of the 1990s. Land individualization started in Georgia as early as 1992, not long after independence, with the establishment of a "privatization reserve" of 850,000 hectares (roughly 25 % of all agricultural land, and 70 % of all arable land and perennials), including 200,000 hectares already used by private farm families at that time and an additional 650,000 hectares from collective and state farms.[2] This land was intended for allocation among

[1] This chapter was written while the author was a Visiting Fellow at LICOS – Centre for Institutions and Economic Performance at the Katholieke Universiteit Leuven. Financial support was provided by Erasmus Mundus Action II – Lot 3A and by the Center for Agricultural Economic Research. Many thanks to Johan Swinnen, Liesbet Vranken and Kristine Van Herke for helpful comments and suggestions.

[2] The process was initiated by the so-called "land privatization decree" (Government Resolution 48 of January 1992), but we use the term "individualization" as all agricultural land remained state-owned land and was given to individuals in inheritable lifetime use.

existing and new family farms.[3] By 1996, land held by private households grew by roughly 200 % to a total of 628,000 hectares (LERMAN, 1996). However, although Georgia was among the leading former Soviet countries in the land reform process (SWINNEN, HEINEGG, 2002), the progress of the reform was hampered by institutional barriers and high transaction costs (LERMAN, 1997), and therefore the implementation of the reform has been rather slow (LERMAN, 1999). The *Law on Agricultural Landownership* enabling buying and selling of land and the *Law on Land Registration* were passed in 1996 (SALUKVADZE, 1999; LERMAN et al., 2004b), but the administrative burden of land transactions remained relatively high and often preventative (CSAKI, LERMAN, 1997; FIDAS, MCNICHOLAS, 2007).[4] Also legislated in 1996 and implemented since 1998 was the leasing of state land to private farmers or other legal entities (TSOMAIA et al., 2003). By 1997, the amount of land leased to producers was almost equal to the amount held privately (SHUKER, 2000).

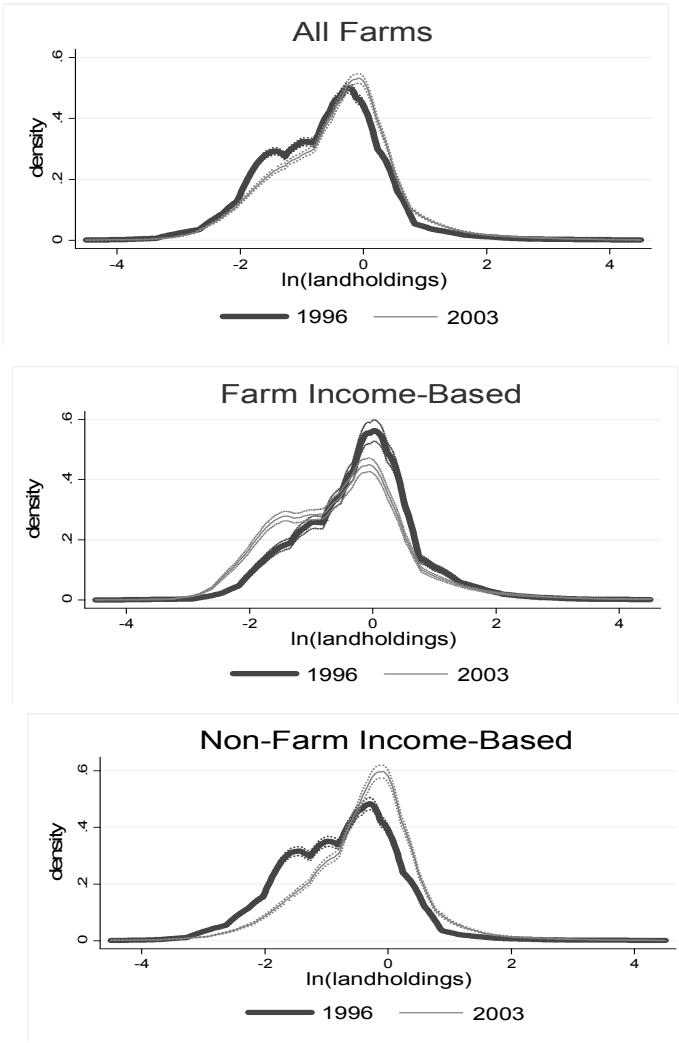
We use farm-household data obtained through two comparable surveys conducted in 1996 and 2003. Previous research (GOGODZE et al., 2005) has shown that most land transactions between 1996 and 2003 were in the form of leasing rather than buying. This could be due to the transaction costs involved in land registration, or to the reluctance of the relatively new land owners to give up their land permanently. In any case, this has led to an increase in the average agricultural landholdings from 0.90 hectare to 1.59 hectares from 1996 to 2003 (GOGODZE et al., 2005).

The notion of land privatization reflected the intention to transfer the distributed land eventually to private ownership. See LERMAN (1996).

[3] Citizens who were directly involved in farming had the right to receive up to 1.25 ha per family. People who lived in rural areas but were not involved in farming (e.g., working in public services) were entitled to 0.75 ha; and people from urban areas could obtain 0.25 ha. Land already owned by individuals prior to this land distribution was included in the 1.25 ha and so the land parcels that were distributed were often smaller than the fixed amount. In total, 1 million families became owners of small land parcels, with an average of 0.9 ha per household (ECONOMIC COMMISSION FOR EUROPE, 2003).

[4] The distribution of both privatized and leased land was at the hands of the sakrebulo (representative body of local government). A land transfer is only complete once the state issues a transfer certificate called a "giving and receiving act," and these certificates were slow to be issued. Moreover, land sales between private farmers within a sakrebulo were allowed only after all agricultural land in the sakrebulo is systematically registered (SHUKER, 2000). It should be noted that another reform was initiated in 2006, with the legislation of "The Law of Registration of Rights over Real Property," which has moved the responsibility of land registration from a government agency to an independent non-governmental agency (BIZCLIR, 2006).

Figure 1: Changes in landholding distributions between 1996 and 2003



(dotted lines -- boundaries of a 5 % confidence interval)

The top panel in Figure 1 shows that the size distribution of log-landholdings has shifted to the right between 1996 and 2003, although the shift does not seem to be too extreme. GOGODZE et al. (2008) showed that those leasing land tended to be farming on a much larger scale and also enjoyed higher non-farm income. Non-farm income might be what enabled these farmers to lease land.

The survey data show that from 1996 to 2003, the value of farm output has decreased by about a quarter on average, but at the same time the share of farm income in total household income increased. It could be that the non-farm labor market opportunities have worsened during that period even more severely than the decline in the value of farm output.[5]

In any case, we hypothesize that the extent of reliance on farm income is an important determinant of landholding transactions. Theoretically, the sign of this effect is ambiguous. On one hand, higher reliance on farm income may indicate that the household has a comparative advantage in farming and would like to acquire more land if the opportunity comes. On the other hand, higher reliance on farm income may be associated with poor off-farm earning potential and lack of financial resources that could lead to leasing out land rather than leasing in.[6] This last effect could be especially important if there is a positive correlation between ability to be a good farmer and labor market ability (see for example AHITUV, KIMHI, 2006). Therefore, we will examine the role of the reliance on farm income in the change in the landholdings distribution.

Our data indicate that such role does exist. We compare two subgroups of farm households: those who derive at least 50 % of household income from the farm (farm income-based) and those who derive less than 50 % of household income from the farm (non-farm income-based). In 1996, the median landholdings of farm income-based farms was quite higher than that of non-farm income-based farms (0.8 hectare versus 0.5 hectare), but this difference has reversed in 2003 (0.65 hectare for the former versus 0.75 hectare for the latter).[7] The bottom two panels of Figure 1 compare the changes of the entire log-landholdings distributions of the two subgroups of farms, and tell a similar story. One can observe that the landholding distribution of farm income-based households has shifted to the left and became more dispersed, while the landholding distribution of non-farm income-based households has shifted to the right and became more concentrated. This supports the claim that non-farm income-based households either have better qualifications as entrepreneurs that enable them to take

[5] Unfortunately, the 1996 survey did not include questions about non-farm income.

[6] LEHMANN, MURAVYEV (2011) showed that employment has declined in Georgia over the years despite fast liberalization of the labor market. The findings of HOYMAN, KIMHI (2009) imply that the off-farm labor market in rural Georgia is at the early stages of development. They also indicate that the effect of landholdings on off-farm labor decisions is quantitatively small.

[7] It should be noted that a comparison of the means rather than the medians tells exactly the opposite story. This is because the landholdings distribution is highly skewed, and a small number of farm income-based farms that leased large plots of land have a large influence on the means of the distributions. This is why we chose to analyze the distribution of log-landholdings.

advantage of the opportunities in the land market, or have more financial resources that enable them to utilize these opportunities.

However, the composition of the two subgroups of households has changes as well, with 43 % of them in the farm income-based subgroup in 2003 compared to only 31 % in 1996. If those changing from non-farm income-based to farm income-based are relatively small landholders, this could have led to the outcomes shown in Figure 1 even in the absence of any changes in landholdings. Hence, the first task of our empirical analysis will be to decompose the overall change in the landholding distribution into between-groups and within-groups components.

In addition, Figure 1 indicates that the changes in the landholdings distribution involved both changes in means and changes in variances, and possibly changes in higher moments in the distribution as well. As we are concerned with inequality implications of the land reform, we will further decompose the changes in the landholdings distribution of each subgroup into changes in mean, changes in variance, and residual changes. For this we will use the decomposition methodology suggested by JENKINS, VAN KERM (2005).

The next section provides a brief review of the literature on farm size distributional trends. The following section describes the decomposition methodology. After that we present the application of this methodology to the case of landholdings in Georgia. The final section concludes with some policy implications.

2 LITERATURE REVIEW

Much of the literature on farm size distributional changes has focused on the increase in average farm size (see for example HUFFMAN, EVENSON, 2001; AHEARN et al., 2005; KEY, ROBERTS, 2007; SHAPIRO et al., 1987; UPTON, HAWORTH, 1987; WEISS, 1999; BREMMER et al., 2002; RIZOV, MATHIJS, 2003; BAKUCS, FERTŐ, 2009; JUVANČIČ, 2005; AHITUV, KIMHI, 2006; DOLEV, KIMHI, 2010). In many cases, various regression specifications were used to estimate the determinants of average farm size or its rate of growth. Some of the applications allowed farm growth to depend on initial farm size, thereby allowing for differential growth rates for farms of different sizes. The results show trends of increased concentration of farm sizes in several cases and trends of increased dispersion of farm sizes in other cases, while in some other cases no significant effect of farm size on farm growth was found.

The limitation of this line of literature is the reliance on a parametric regression model that allows for a limited class of distributional changes. Two alternatives have been proposed in the literature. CHAVAS, MAGAND (1988) and ZEPEDA (1995) used a Markov analysis to estimate transition probabilities between size classes. Alternatively, KOSTOV et al. (2005) and BAKUCS, FERTŐ (2009) estimated the

farm growth equation by quantile regression, thereby allowing for different growth rates in different parts of the size distribution. These methods allow for more flexible changes in farm growth rates across the farm size distribution. Still, they do not capture the entire change in the farm size distribution over time.

WOLF, SUMNER (2001) examined the changes in the farm size distribution using kernel density estimates, but did not go further than a visual inspection of the density plots. JENKINS, VAN KERM (2005) took this approach several steps further, by decomposing the change in the density function into changes in subgroup shares and changes in subgroup densities, after dividing the farm population into subgroups according to some key characteristics. The importance of looking at differential distributional changes by subgroups of farms has been demonstrated in several cases, e.g., UPTON, HAWORTH (1987), WEISS (1999), and AHITUV, KIMHI (2006). The changes in subgroup densities are then decomposed further into changes in the location (mean), spread (variance), and higher moments of the distribution. This enables the identification of types of farms that contribute to the changes in the farm size distribution in specific ways.

This approach is nonparametric in nature, and is superior to regression-based parametric approaches, such as the one proposed by MILJKOVIC (2005), who used a regression framework to analyze the determinants of an index of farm size inequality. Several semiparametric alternatives have been proposed in the literature. For example, MELLY (2005) uses a quantile regression in order to decompose inequality into the share of covariates, the share of coefficients and the share of residuals. This allows for a richer set of covariates than the JENKINS, VAN KERM (2005) procedure, but it relies on a parametric assumption about the dependence of conditional quantiles on the covariates.

3 METHODOLOGY

Suppose that the farm population can be divided into K different subgroups indexed 1…*K*.[8] The density function of the farm size distribution can be written as:

$$(1) \qquad f(x) = \sum_{k=1}^{K} v^k \cdot f^k(x),$$

where $f(x)$ is the density function of farm size (x) over the entire farm population, v^k is the population share of subgroup *k*, and $f^k(x)$ is the density function of farm size within subgroup *k*. In addition, the change in the density function between time period 0 and time period 1 can be written as:

$$(2) \qquad \Delta f(x) = \sum_{k=1}^{K} w^k \Delta f^k(x) + \sum_{k=1}^{K} z^k(x) \Delta v^k = c_D(x) + c_S(x),$$

[8] This section draws heavily on JENKINS, VAN KERM (2005).

where $c_D(x)$ is the contribution of the changes in subgroup densities, $c_S(x)$ is the contribution of the changes in the subgroup shares, and the weights w^k and $z^k(x)$ are defined as:

(3) $$w^k = \pi \cdot v_0^k + (1-\pi) \cdot v_1^k$$

(4) $$z^k(x) = (1-\pi) \cdot f_0^k(x) + \pi \cdot f_1^k(x)$$

where $0 \leq \pi \leq 1$ can be chosen arbitrarily. In our application, we use various values of π in order to check the robustness of the results to this parameter.

Following JENKINS, VAN KERM (2005), we now move to further decompose the change in subgroup densities $c_D(x)$ into three components: sliding, stretching and squashing. Sliding reflects a horizontal shift of the entire density function. Stretching reflects an increase in the spread of the density without changing the mean. Squashing reflects all other changes in the density function, holding the mean and the spread constant. We begin by assuming the existence of a subgroup-specific function (g_k) that describes end-period farm size (x_1) as a function of beginning-period farm size (x_0): $x_1 = g_k(x_0)$. Using the inverse of g_k, we can express the end-period density as:

(5) $$f_1^k(x) = \left| \frac{d(g_k^{-1}(x)}{dx} \right| f_0^k(g_k^{-1}(x)).$$

By using specific functional forms for g_k, we can construct specific approximations of the changes in the farm size density. For example, suppose that we choose a linear function:

(6) $$x_1 = \alpha_k + \beta_k x_0.$$

Under the linearily assumption, our approximation for the farm size density is:

(7) $$\varsigma^k(x) = \left| \frac{1}{\beta_k} \right| f_0^k\left(\frac{x-\alpha_k}{\beta_k}\right).$$

Now suppose that we impose the constraint $\beta_k = 1$. The linear transformation g_k now reflects an additive increase of a constant number of units, α_k, in the size of all farms in subgroup k. In terms of the density function, this is reflected in a horizontal shift of the entire function, which is denoted as sliding. Calibrating to the increase in average farm size, we obtain $\alpha_k = E(f_1^k) - E(f_0^k)$. Using these parameters, the counterfactual distribution (7) is now denoted $\varsigma_1^k(x; \mu_1^k, \sigma_0^k)$, where the subscript "0" of the standard deviation means that we maintain the standard deviation of the initial period, and the subscript "1" of the mean of the distribution means that the counterfactual distribution has the same mean as the actual distribution in the final period.

We now move to an alternative parameterization of (6). If we set $\beta_k = s$ and $\alpha_k = (1-s)E(f_0^k)$, it is easy to verify that the mean of farm size does not change, and that the standard deviation increases by a factor of s. Hence, the calibration to the final-period standard deviation requires setting $s = \sqrt{Var(f_1^k)/Var(f_0^k)}$. Using these parameters, (7) is now denoted $\varsigma_1^k(x;\mu_0^k,\sigma_1^k)$, where the subscript "0" of the mean of the distribution means that we maintain the mean of the counterfactual distribution equal to that of the initial period, and the subscript "1" of the standard deviation means that the counterfactual distribution has the same standard deviation as the actual distribution in the final period.

We can also merge these two transformations into a single transformation that allows changes in both mean and standard deviation. Calibration to final-period mean and standard deviation requires setting $\beta_k = s = \sqrt{Var(f_1^k)/Var(f_0^k)}$ and $\alpha_k = E(f_1^k) - E(f_0^k)$. The resulting counterfactual density based on (7) is denoted as $\varsigma_1^k(x;\mu_1^k,\sigma_1^k)$. We are now in the position to decompose the change in the subgroup density function of farm size into the three components: sliding, stretching and squashing. Note that both sliding and stretching can be obtained in two ways. Sliding, for example, is the change in the mean, but it can be conditioned on the standard deviation of either the initial period or the final period. Similarly, stretching is the change in the standard deviation, but it can be conditioned on the mean of the initial period or the final period. We solve this problem by weighting each of these possibilities in a way that leaves squashing as a residual. The resulting decomposition is:

$$
\begin{aligned}
\Delta f^k(x) = {} & \eta(\varsigma_1^k(x;\mu_1^k,\sigma_0^k) - f_0^k(x)) + (1-\eta)(\varsigma_1^k(x;\mu_1^k,\sigma_1^k) - \varsigma_1^k(x;\mu_0^k,\sigma_1^k)) \\
& \qquad [\text{Subgroup mean effect (sliding)}] \\
& + \eta(\varsigma_1^k(x;\mu_1^k,\sigma_1^k) - \varsigma(x;\mu_1^k,\sigma_0^k)) + (1-\eta)(\varsigma_1^k(x;\mu_0^k,\sigma_1^k) - f_0^k(x)) \\
& \qquad [\text{Subgroup variance effect (streching)}] \\
& + f_1^k(x) - \varsigma_1^k(x;\mu_1^k,\sigma_1^k) \\
& [\text{Subgroup residual effect (squashing)}]
\end{aligned} \tag{8}
$$

The weight η is set at 0.5 in the empirical application below, but we also check the robustness of the results to this choice. Once computed, (8) can be plugged into (2) to obtain the overall decomposition.

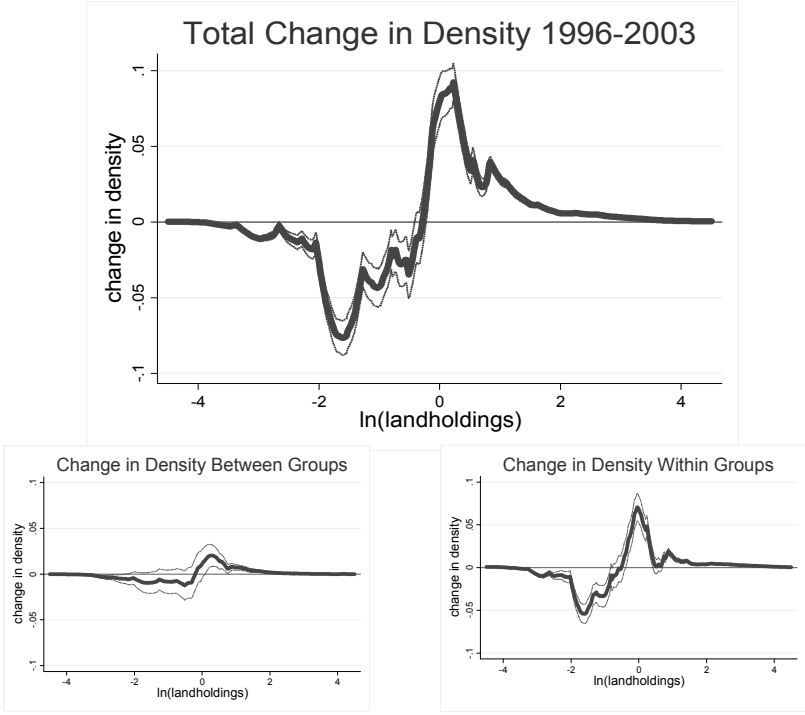
4 EMPIRICAL APPLICATION

We use two comparable data sets obtained through farm-household surveys conducted in 1996 and 2003 in four districts around the capital city of Tbilisi. The 1996 and 2003 surveys included a total of 1,914 and 2,520 individual farms, respectively. The survey questionnaires were designed to collect information about the demographic profile of the household, land resources and other farm

assets, farming activities and related activities. Landholding expansion between the two periods has been mostly a result of leasing-in land. While only 40 farmers in the sample were cultivating leased land in 1996, more than 200 farmers did that in 2003 (GOGODZE et al., 2008). Farmers who leased land in 2003 cultivated more than 7 hectares on average, while those who did not lease land cultivated less than 1 hectare. Despite that, we do not distinguish between leased land and owned land in our empirical application.[9]

Figure 2 shows the change from 1996 to 2003 of the landholdings density. Portions of the curve that lie above zero indicate levels of landholdings with higher probability masses in 2003 than in 1996, while the opposite is true for portions that lie below zero. It is easy to see that relatively low levels of landholdings lost probability masses while relatively high levels gained probability masses, indicating that there has been a general shift of the landholdings distribution to the right.

Figure 2: Changes in landholding densities between and within groups, π=0.25 (dotted lines -- boundaries of a 5 % confidence interval)



[9] The small number of farmers who leased land in 1996 prevents such distinction from being viable.

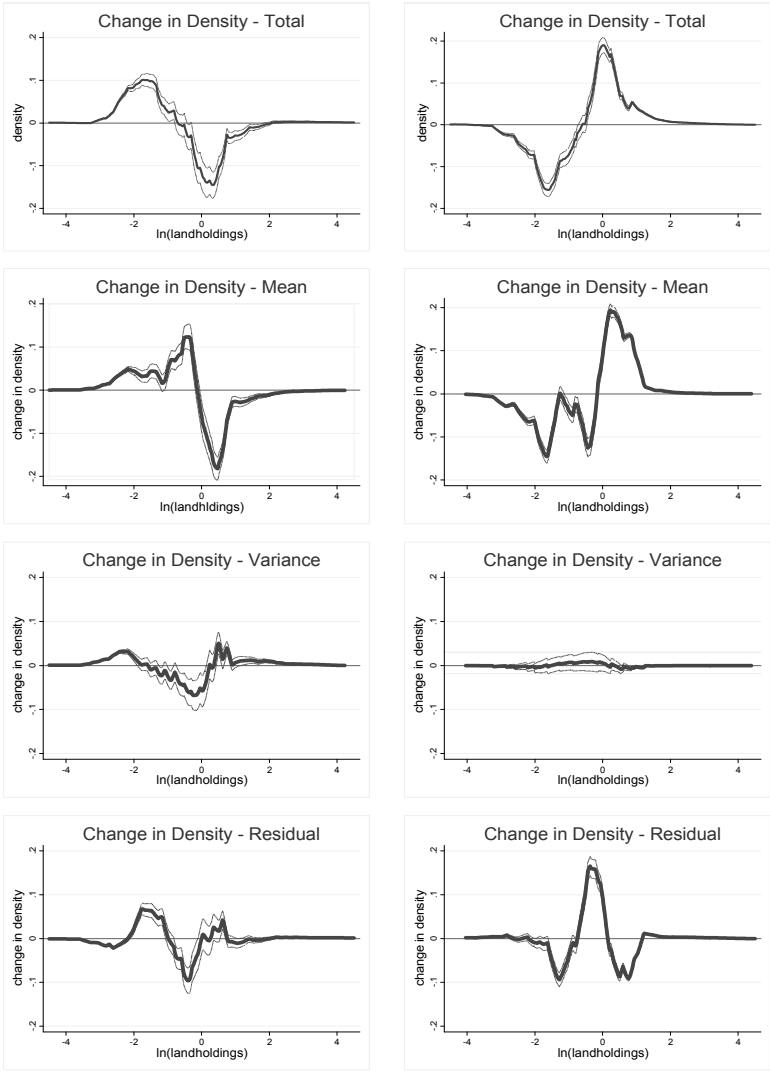
The total change in the density of landholdings was decomposed using Eq. (2) into between-group and within-group components. for different values of the weighting parameter π. The components are qualitatively not very different for different values of π. The between-group component is much smaller in magnitude than the within-group component. In fact, the entire between-group component of the change in landholdings density is within less than one standard deviation from zero, with the exception of a small segment in the case of π=0.25. We conclude that the increase in the size of the farm income-based subgroup did not have a substantial impact on the distribution of landholdings.

We now move to analyze the subgroup-specific distributional changes. The top panel of Figure 3 shows that, while the landholding density of non-farm income-based farms has shifted to the right as in the entire sample, the density of farm income-based farms has shifted to the left. This is what we observed in Figure 1, but here it is much easier to see. In other words, farm income-based farms lost land, on average, between 1996 and 2003, while non-farm income-based farms increased their landholdings on average.

Next, we decompose these subgroup distributional changes into sliding (mean), stretching (variance) and squashing (residual) components (Eq. (8)). The results are in the lower panels of Figure 3.[10] Beginning with the farm income-based farms (on the left), we find that the dominant component is the sliding component, that is, the shift of the distribution to the left when higher moments of the distribution are held constant. The change in density due to the increase in variance is relatively small but somewhat significant, while higher moments also contribute to the shift of the distribution to the left, and their contribution is more important than the contribution of the variance but less important than the contribution of the mean. In the case of non-farm income-based farms, the dominant contribution to the shift of the distribution to the right is again the mean, while in this case the contribution of the variance is both quantitatively and statistically insignificant. Higher moments of the distribution also have an important contribution, and their effect leads to a higher concentration of landholdings. Again, this is compatible with our analysis of Figure 1.

[10] The results are presented for η=0.5. No meaningful differences are observed in corresponding results for η=0.25 and for η=0.75 (not shown).

Figure 3: Decomposition of changes in landholdings within groups for η=0.5 (dotted lines -- boundaries of a 5 % confidence interval)



Farm Income-Based **Non-Farm Income-Based**

It is interesting to try to understand the reasons for the substantial differences between the changes in the landholdings distributions of the two subgroups. It turns out that the changes in the relative size of the two subgroups as well

as the changes in landholdings vary considerably by district. Figure 4 shows that the distribution of farms across the two subgroups was relatively homogeneous in 1996, with Mtskheta standing out with only 25 % of the farms in the farm income-based subgroup compared to 33 %-36 % in the other districts. By 2003, the fraction of farm income-based farms had not changed significantly in Mtskheta and Sagaredjo, while it increased from 36 % to 48 % in Dusheti and from 33 % to 61 % in Gardabani.

Figure 4: Changes in subgroup composition between 1996 and 2003, by region

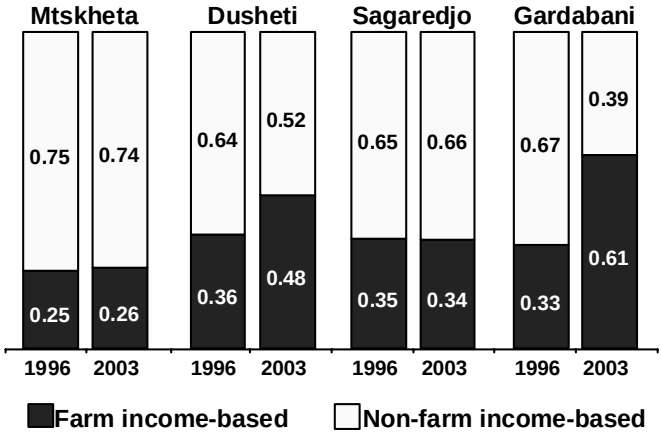


Figure 5: Changes in median landholdings between 1996 and 2003, by region

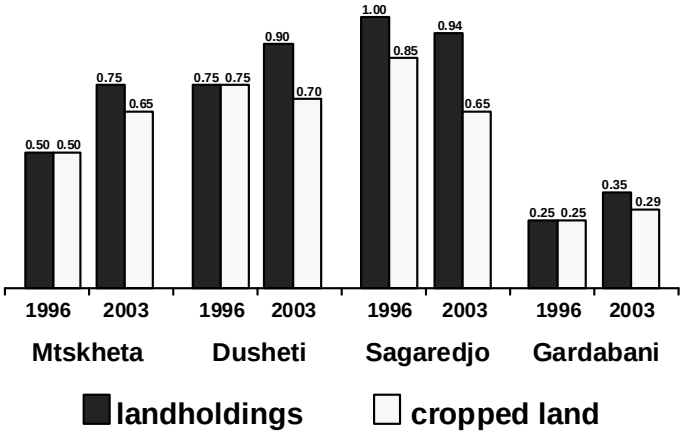
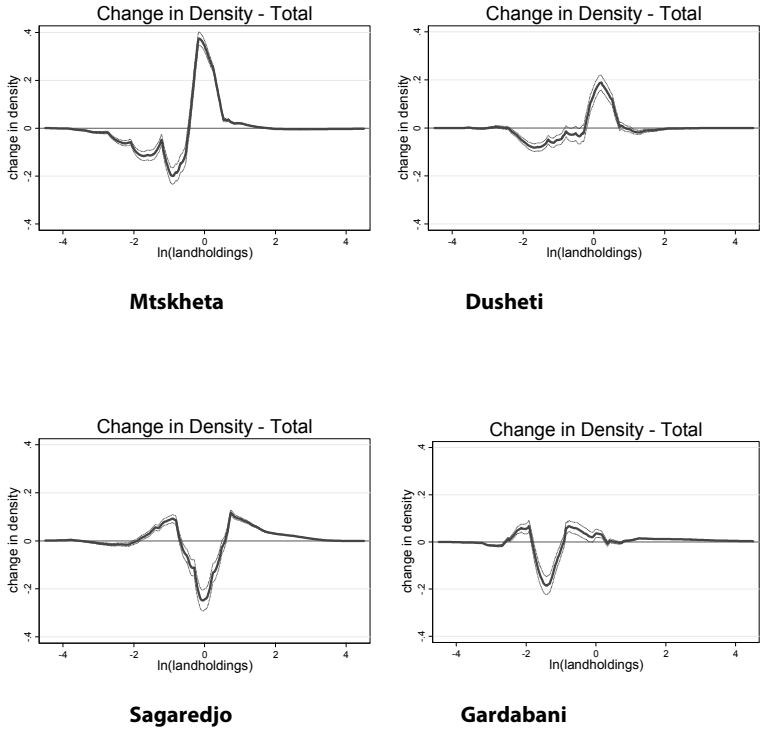


Figure 5 shows the changes in the median landholdings in each of the districts between 1996 and 2003. It can be seen that median landholdings varied considerably across districts in 1996, but the differences narrowed by 2003. In particular, median landholdings increased the most in Mtskheta and Gardabani, the districts with the lowest median landholdings in 1996, and decreased slightly in Sagaredjo, the district with the highest median landholdings in 1996. Comparing to Figure 4, there is no clear relation across districts between the increase in the share of farm income-based farms and median landholdings. There are several possible reasons for that. First, not all land held by farmers is actually cultivated, either due to lack of inputs or because the land has initially been obtained for speculative reasons (FAO, 1999). As Figure 5 shows, the difference across districts in cropped land are smaller than the differences in landholdings. In particular, cropped land increased between 1996 and 2003 only in Mtskheta and Gardabani (the districts with the smallest median landholdings but with the largest increases in landholdings). Second, districts differ by crops, agro-ecological conditions, infrastructure, access to markets, etc. For example, the fraction of farmers reporting difficulties in transporting products to markets ranged from 4 % in Mtskheta to 35 % in Gardabani, in 2003. For these two reasons and perhaps other reasons as well, there is no clear association between landholdings and farm income. Moreover, non-farm earning opportunities may vary across regions as well, which also reduces the association between reliance on farm income and median landholdings at the district level.

Still, Figure 5 indicates that it might be informative to examine the changes in the landholdings distribution by district. This is done in Figure 6. Indeed, the results vary considerably by district. While there has been a shift of the landholdings distribution to the right in Mtskheta and Dusheti, the change in the landholdings distribution in Sagaredjo and Gardabani was dominated by an increase in spread. Apparently, the former two districts are those with fewer farmers reporting transportation difficulties, and this hints on one direction to explain the inter-district differences observed in Figure 6. However, there does not seem to be a clear association between the patterns observed in Figures 4-6. This leads to the conclusion that whatever the reason for the inter-district differences in the changes in landholdings distributions, these differences do not explain the opposite patterns of distributional changes of the two subgroups of farms defined according to their dependence on farm income.

Figure 6: Changes in landholdings distribution between 1996 and 2003, by region (dotted lines -- boundaries of a 5 % confidence interval)



SUMMARY AND CONCLUSION

This chapter examined the evolution of the landholdings distribution in Georgia during the land reform and in particular its relation to the extent of reliance on farm income. Using two comparable data sets collected in 1996 and 2003, we divided each sample into farm income-based farms and non-farm income-based farms. We then decomposed the change in the landholdings distribution between 1996 and 2003 into between-group and within-group components. We found that the between-group component is much smaller in magnitude and hardly significant. We then decomposed each within-group component further into a change in the mean of the distribution (sliding), a change in the variance (stretching) and a change in higher moments (squashing). The dominant component in both subgroups has been the change in the mean, but its direction differed across subgroups. While the mean component shifted the landholdings

distribution to the right among non-farm income-based farms, the opposite was true in the case of farm income-based farms. This result has two interpretations. First, it could be that non-farm income-based farmers are more able entrepreneurs and this ability is an advantage both in farming and in alternative income-generating activities. Initially, they were land constrained and hence devoted more effort to non-farm activities, but when it became possible to obtain more land they found it beneficial to do so. Second, even if the two subgroups of landowners are equally able as farmers, because of their higher access to financial resources due to their reliance on non-farm income, they are able to take advantage of the opportunity to obtain more land, whereas farm income-dependent farmers may be more credit constrained.

The main policy conclusion that is drawn from these findings is that in order for the land reform to equally benefit all land recipients, it has to be accompanied by measures that enable farmers to take advantage of their newly allocated land. Such measures include first and foremost making credit available for small farmers in order to purchase production inputs, and progressing rapidly with land titling and registration that will enable farmers to obtain credit in the commercial market. This conclusion is not necessarily specific to Georgia, but our results indicate that financial resources may have been the major reason for the fact that some Georgian farmers could take advantage of the new opportunities in the land market while others could not.

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C. Trade

THE IMPACT OF THE SOVIET LEGACY ON AGRI-FOOD TRADE IN THE FORMER SOVIET UNION

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1 INTRODUCTION

Towards the end of the Eastern bloc in the 1980s, the centrally planned and administered economies still traded largely among themselves. The share of trade within the Council for Mutual Economic Assistance (COMECON) made up about 50 % of their foreign trade portfolio. This pattern of trade was driven by two intertwined forces: (1) trade in the Soviet bloc was strongly inward oriented, and (2) the economic system incentivized firms to avoid international competetion, producing first and foremost for markets in fraternal communist countries (WINIECKI, 2002). These products were usually of lower quality than their Western counterparts and their production was largely inefficient due to high fixed costs and upward-sloping variable costs as well as obsolete technology. The distorted trade pattern are believed to be a major reason for the economic challenges that accompanied the Soviet collapse (TARR, 1993).

All countries of the Eastern bloc experienced a steep decline in agri-food trade at the start of transition. The decline can be attributed to both supply-side and demand-side factors. WINIECKI (2002) argues that oversized input inventories and excessive investments were major causes of output decline. The input inventtories in centrally planned economies were usually 2-2.5 times larger than in the West and twice as much capital was required to generate 1 % economic growth. Moreover, statistics on production and trade were often doctored. Because incentives to falsify accounts disappeared with the shift to a market-based economy, a sharp decline in output was recorded. On the other hand, domestic and foreign demand-side factors have to be considered as drivers behind the decline in foreign trade. The systemic change prompted firms to reassess their commercial relationships and allowed consumers to shift from low quality products, supplied by domestic or COMECON producers, to their Western counterparts, which were associated with higher quality. The new economic freedom facilitated the correction of distortions inherent to the centrally planned economic system, resulting in a rapid reorientation of trade towards the West and in a sharp initial decline in trade between the former COMECON countries. This pattern was observed at the nation level but also at the sub-nation level.

Particularly the Soviet successor states were strongly pounded by the aftermaths of the breakup.

We agree with the literature that political disintegration is the major cause of economic disintegration (DJANKOV, FREUND, 2002; FIDRMUC, FIDRMUC, 2003; HEINEMEYER, 2007). In the countries of the former Soviet Union (FSU), the correction of distortions inherent to the centrally planned economic system took place immediately after the breakup, resulting in swift adjustments of agri-food trade relations (WINIECKI, 2002). DJANKOV, FREUND (2002) study the trade adjustment process in the Russian Federation. They show that the short-run effects of the Soviet breakup were immense, causing a trade decline by 60 % between the Russian regions and other Soviet successor states. Although the FSU countries adjusted their agri-food trade relations after the breakup, they still trade largely among themselves. For instance, 67.1 % of agri-food exports directed to Kyrgyzstan originate from other FSU countries (averaged for 1995-2012). With the exception of Ukraine and the Russian Federation, this share is well above 50 % in all the other successor states. But why is it that they prefer to trade among themselves? In order to answer this question, we argue that a Soviet legacy effect exists, which is driving long-run demand and supply for food products among the Soviet successors.

For many years, non-Soviet food products were simply not available for the majority of the population and the basket of buyable food products was fairly similar across the republics. Moreover, the Soviet Union was strongly integrated, both from a cultural and from a social standpoint. This led to the development of a common taste culture, which finds expression in shared preferences. WRIGHT et al. (2001) argue that food taste preferences are determined by a consumer's social and cultural origin but also driven by social ambitions and innovation. Hence, we claim that the inherited taste for Soviet-style food products is an important driver of agri-food trade among the successor states. This is what we understand under the Soviet legacy effect. Arguably, the Soviet legacy effect may gradually deteriorate over the years due to innovation and the accompanying adjustment of preferences.

On the other hand, the Soviet legacy may also affect food producers and processsors down to the present day. The food sector was highly integrated during Soviet times and, although food producers had to go through painful adjustments in the early transition years, there exist economic rationales for a Soviet legacy effect on the producer side: (1) similar technology in food production and processing across the republics, and (2) similar consumption patterns facilitated by preferential market access. Before the breakup, the technology level was equal across the republics when it comes to the production and processing of food. Upgrading the technology level is linked to a cost that needs to be compensated by gains in productivity. It was unfeasible for producers in the Soviet

Union to comply with the higher Western food quality and safety standards, making it impossible for most of them to capture market shares in the West. Hence, incentives to upgrade production processes and develop new products remained low after the breakup. However, with amplifying international competition, changing consumption patterns in the successor states and increasing foreign direct investments, modernization and innovation have been progresssing and slowly reshaping the food industry in recent years. Another rationale for a Soviet legacy effect on the producer side is the above-mentioned similarity of consumption patterns facilitated by preferential markets access. Operating in a not properly functioning market of nearly 300 million customers reduces the incentives for innovation, driven by rent seeking opportunities. We argue that, despite the changes, food production in the successor countries is still fairly integrated due to the Soviet legacy.

This study is concerned principally with developing a better understanding of the long-run effects of the Soviet legacy for agri-food trade among the successor states. We offer three contributions. First, we document the changes in intra-FSU agri-food trade and investigate existing dependencies by examining agri-food trade among the 15 successor states of the Soviet Union. Our benchmark covers bilateral trade flows (HS codes 1-24) of 152 countries for 1995-2012. The countries are listed in in the Appendix. Second, we estimate a gravity type equation to determine the partial trade effect of the Soviet legacy on bilateral agri-food trade flows among the successor states. We rely on the structural gravity equation, allowing for zero trade flows and heteroskedasticity. Our analysis is concerned with the intensive and extensive trade margins. The estimates show that agri-food trade among the Soviet successors is driven by the Soviet legacy, for both the intensive and extensive trade margins. Third, we study the dynamics of the Soviet legacy effect. Our results indicate that the Soviet legacy effect is positively correlated with the economic recovery and negatively with the time since the breakup, and thus they support the argumentation we have outlined earlier. Over the years, the Soviet legacy effect has been gradually diminishing due to innovation and the accompanying adjustment of preferences at the consumer side, and innovation as well as modernization at the producer side.

The remainder of this study is organized as follows. After the introduction, a detailed background to food dependences caused by the Soviet legacy is presented. Section 3 explains our identification strategy. We introduce the structural gravity equation, define our empirical specification, and describe the dataset as well as our econometric approach. The results alongside with a discussion are presented in Section 4, followed by conclusions that summarize our study and point towards open questions for further research.

2 AGRI-FOOD TRADE DEPENDENCIES IN THE FSU

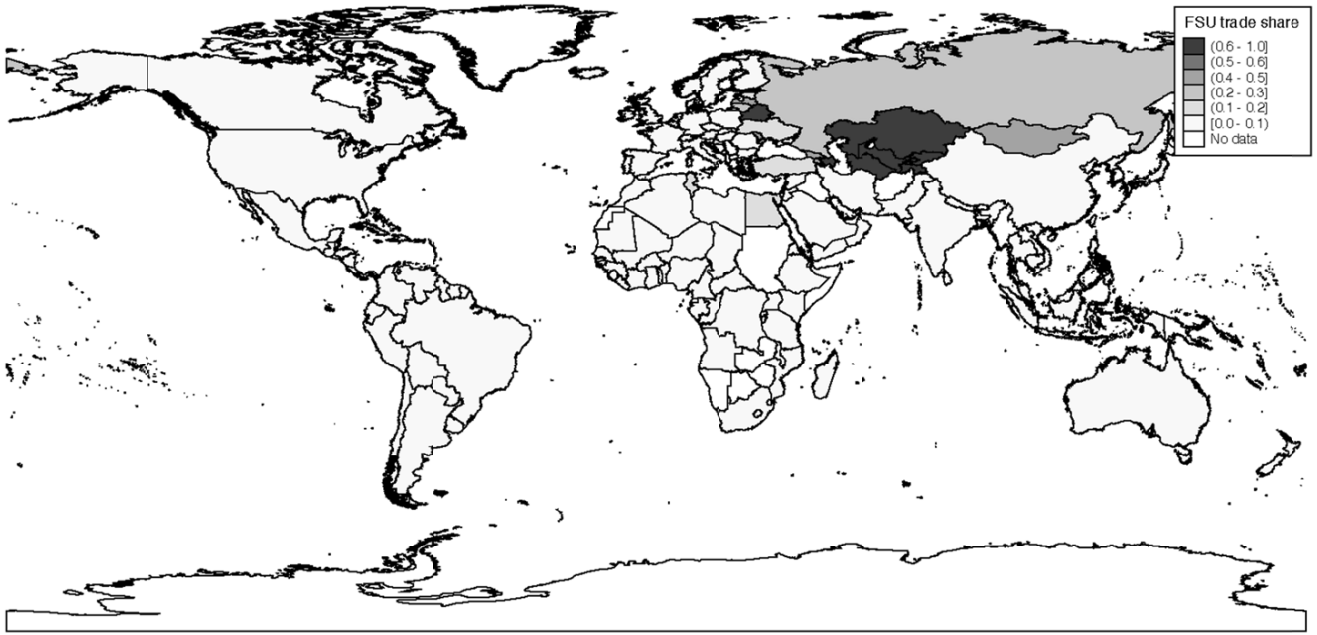
The Soviet successor states increased their food exports substantially in recent years. Although world agri-food trade grew by impressive 297.7 % since 1996, surpassing US$ 1,267.3 billion in 2012, FSU exporters outperformed the global average by far, increasing their exports by 1,023.9 %. With exports of US$ 56.8 billion in 2012, they accounted for 4.5 % of the world agri-food trade. Among the Soviet successor states, the Russian Federation is the largest exporter of food products, followed by Ukraine and Lithuania. In recent years, FSU exporters increased their shares in various markets. For instance, the Russian Federation dominates the markets for mediocre quality wheat in low- and middle-income countries (PALL et al., 2014).

The Soviet successors trade largely among themselves. Figure 1 shows the export share of FSU countries in 152 food markets, averaged for 1995-2012. Particularly the countries in Central Asia and in the Caucasus depend on intra-FSU trade. More than 60 % of exports directed to these countries originate from other successor states. On the other hand, the Russian Federation and Ukraine depend far less on such exports, receiving only 20 % of their imports from other FSU countries. The ratios did change over time, showing a decreasing trend. Still, the shares remain very high, implying a special trade relation among the successsor states.

Various explanations for a high level of economic integration exist. Among these factors, a shared border is often argued to be a driver of trade integration, because countries that are neighbors often have common cultural roots, share tastes, and are integrated at the industry level. Studies have shown that countries with a shared border trade intensely with each other (DJANKOV, FREUND, 2002; BUCH et al., 2004; LIU et al., 2010; YOTOV, 2012). Although such type of trade creation can be an important driver of agri-food trade, we think that it is insufficient to explain the observed trade pattern. We argue that it is the Soviet legacy that drives trade between the successor states.

The question whether the Soviet legacy drives nu export trade was first addressed in STEINBACH (2012) and STEINBACH and RYBAK (2012). They show that the degree of economic integration among the Soviet republics caused large trade dependencies. The authors argue that such dependencies did not vanish overnight as the Soviet Union fell apart. After the breakup, some commodities proved to be unsalable on the international markets because of relatively low quality or inadequate infrastructure. An example is citrus fruits from Georgia. The country had been a major supplier of citrus during Soviet times, but dramatically reduced production and trade after 1991. For other commodities, such as wheat, the transition of trade relations was smoother and the corresponding markets rapidly integrated in the world economy.

Figure 1: Market share of food exports of FSU countries in 152 countries, averaged for 1995-2012

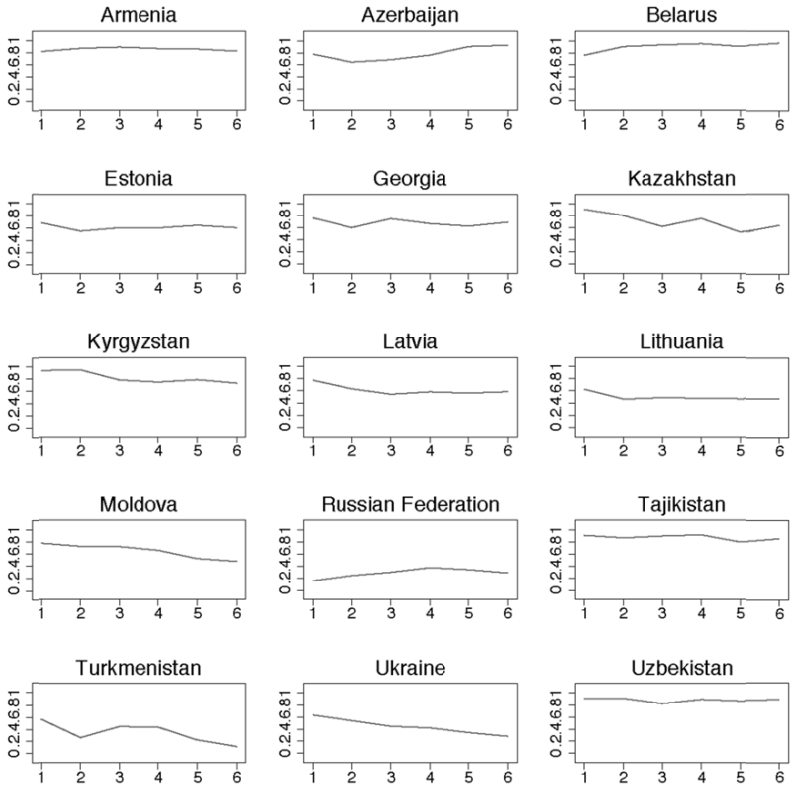


Source: Analysis based on data from the BACI trade database (CEPII, 2014).

Note: The analysis is limited to 152 countries because trade data for the other countries are not available for 1995-2012. The share of these missing countries in agri-food trade is small because of their size (mostly small island nations).

Figure 2 shows the dependence of the Soviet successors on agri-food trade with other FSU countries. We define the export trade dependence ratio as share of food exports directed to FSU countries in total food exports of a country. The index is bounded between zero and one. A ratio of zero would indicate no dependence on FSU markets, whereas a ratio of one would show that a country trades exclusively with Soviet successors. To provide a better understanding of the market trends, we calculated tri-annual averages.

Figure 2: Export trade dependence ratio for 15 successor states, triennial averages for 1995-2012



Source: Based on data from the BACI trade database (CEPII, 2014).

Most successors depend on their FSU trading partners. Averaged over the whole period, only the Baltic countries (Latvia, Lithuania and Estonia), the Russian Federation, Ukraine and Turkmenistan show a level of dependence below 0.5.

After the breakup, the Baltic countries oriented their agri-food trade relations towards Western Europe, which explains their low share of intra-FSU trade. On the other hand, the Russian Federation and Ukraine are major bulk food exporters. These products are not well differentiated. Hence, consumers can substitute one product for another, regardless of its origin. The same holds for an exporting country. Whether a bulk carrier transports its cargo from Odessa (Ukraine) to Poti (Georgia) or to Istanbul (Turkey) does not add much to transport costs, but can lead to a substantial increase in profit margins.

Agri-food trade dependences in the other successor states are large, reaching almost unity for Azerbaijan, Belarus und Uzbekistan. In the case of Azerbaijan, its geographic position and special trade relations with Georgia and the Russian Federation explain the high share of trade with FSU countries. The country is a major supplier of horticultural products and exports them to Georgia and the southern part of the Russian Federation. For Belarus, neglected reforms, an authoritarian government and an investment gap in agriculture affect its agri-food trade. This is the reason why the country strongly depends on trade with other successor states. In most FSU countries, a decreasing trend is observable, implying that the countries depend less and less on trade within the FSU space.

To reveal the Soviet legacy effect, it is important to separate this effect from other factors that may affect trade between two countries. Not only that one needs to control for production capacities and consumption abilities in the trading economies, rather one also has to account for other factors driving bilateral trade. Such factors include in particular trade agreements and transport costs. In the next section, we outline our method to account for these factors. We present the structural gravity equation that allows us to separate the Soviet legacy effect from country-specific and country-pair-specific factors.

3 IDENTIFICATION STRATEGY

3.1 Structural gravity and estimable equation

The gravity equation has been used to analyze the determinants of bilateral trade flows since TINBERGEN (1962). It is one of the most successful empirical models in international economics and its accuracy of fit for bilateral trade flows has long been recognized. The gravity equation has been shown to hold under various theories, including perfect competition, Bertrand competition, monopolistic competition with homogenous firms, and monopolistic competetion with heterogeneous firms (see HEAD, MAYER (2015) for an excellent review). Gravity will arise whenever preferences are represented by a constant elasticity of substitution (CES) utility function, trade costs are of the iceberg form, and the decision to consume/produce a good is separable from the decision

about where to buy/sell it (ANDERSON, VAN WINCOOP, 2004). Studies appearing before ANDERSON and VAN WINCOOP (2003) almost universally explain bilateral trade flows by bilateral trade barriers and do not consider trade barriers across all trading partners. The so-called "multilateral resistance" (MR) terms have been largely neglected but they are important determinants of bilateral trade flows in a general equilibrium setting. Assuming that goods are differentiated by country of origin (Armington differentiation) and consumers have identical and homothetic preferences over these products, ANDERSON and VAN WINCOOP (2003) derive the following set of equations. For each exporting country *i* and destination market *n*, trade flows X_{ni} have to satisfy

$$X_{ni} = \frac{Y_i}{\Pi_i^{-\theta}} \tau_{ni}^{-\theta} \frac{E_n}{\mathrm{P}_n^{-\theta}} \tag{1}$$

where Y_i refers to total output of producers in country *i* and E_n to total expenditures of consumers in market *n*. The bilateral market accessibility is captured by $\tau_{ni}^{-\theta}$, combining trade cost τ_{ni} with their respective elasticity θ to measure the overall impact on bilateral trade flows. We account for the multilateral resistance terms with $\Pi_i^{-\theta}$, which is the outward multilateral resistance, and $\mathrm{P}_n^{-\theta}$, which is the inward the inward resistance. These terms reflect the average outward and inward resistance to shipments to all partners and from all origins. The pattern of trade flows X_{ni} is consistent with the "structural gravity" framework if they satisfy equation (1) with the following constraints on the multilateral resistance terms:

$$\Pi_i^{-\theta} = \sum_l \frac{E_l}{\mathrm{P}_l^{-\theta}} \tau_{li}^{-\theta} \qquad \text{and} \qquad \mathrm{P}_n^{-\theta} = \sum_l \frac{Y_l}{\Pi_l^{-\theta}} \tau_{nl}^{-\theta}$$

The structural gravity equation can be estimated at the aggregated level or the industry level (ANDERSON, YOTOV, 2010). We define the equation at the aggregated level for agri-food exports (HS codes 1-24), assuming that Y_i measures the output of agri-food products in country i and that E_n is the consumption of agri-food products in market *n*, with $n \neq i$.

To estimate Eq. (1), there are broadly two approaches that differ in the treatment of the multilateral resistance terms. Since they are usually not empirically observable, ANDERSON and VAN WINCOOP (2003) developed an approach to approximate them. They assume that trade costs are symmetric and define them in terms of observable variables (such as distance between trading partners, existence of a common border, income shares and others). Using initial values for the resistance terms, they apply a contraction-mapping algorithm to find fixed points for the outward and inward resistances. The disadvantage of the structural method is that it is difficult to implement, particularly when estimating panels. A reduced-form approach is to simply introduce fixed effects to account

for the multilateral resistance terms. This approach ignores the structure proposed by the structural gravity equation, but as FALLY (2013) has shown the fixed effects automatically satisfy the constraints of the structural approach if the Poisson pseudo-maximum-likelihood (Poisson PML) estimator is used. The estimation equation can be expressed as follows:

$$X_{ni}^{s} = \exp(e_i^s - \theta \log \tau_{ni}^{s} + m_n^s) + \varepsilon_{ni}^{s} \quad (2)$$

where e_i^s are exporter fixed effects and m_n^s are importer fixed effects. The trade cost function is denoted by τ_{ni}^{s} and the error term by ε_{ni}^{s}. Because we attempt to study changes in the Soviet legacy effect over time, we introduce the superscript s, which accounts for the time dimension. Estimating a repeated cross-sectional dataset means that the multilateral resistances can differ over time. Hence, we allow the fixed effects e_i^s and m_n^s to be different in each time period s (FEENSTRA, 2004).

3.2 Definition of variables and data

Bilateral agri-food trade can grow at two margins. The intensive trade margin is concerned with the intensity of trade between two countries, whereas the extensive trade margin provides insights into the composition of trade. To capture the effect of the Soviet legacy for the intensive and extensive trade margins, we define bilateral food exports X_{ni}^{s} in terms of total trade and in terms of the number of traded products. Using agri-food exports as the dependent variable allows us to reveal the Soviet legacy effect on the intensive trade margin, whereas using the number of products traded allows us to investigate its effect on the extensive trade margin. The data are derived from the BACI trade database (CEPII, 2014). We define bilateral export trade in millions of current US$ as the sum of bilateral export flows for 672 product categories at the 6-digit level listed in section 1-24 of the HS-92 code system. The number of traded products is defined as the sum of positive trade events between partners in these product categories. The variable is bounded between zero and 672. If two countries do not engage in trade at all, the variable takes the value zero. We calculate triennial averages of the dependent variable. This is because the computational needs of inverting large dummy matrices grow exponentially with the number of dummies, which are a function of the years in our panel. Hence, we need to keep the number of periods small. This approach is dependable because our identification strategy relies on between-country variation in the data (variation between countries in the occurrence of the Soviet legacy effect). Overall, our dataset covers trade between 152 countries for 6 time periods. Summary statistics of the dependent and independent variables are provided in Table 1.

Table 1: Summary statistics, triennial averages for 1995-2012

Variable	Mean	Std. dev.	Min	Max
Bilateral export value	0.301	2.934	0	216.703
Number of products	10.433	25.763	0	222.333
Soviet legacy	0.009	0.095	0	1
Log of distance	8.692	0.790	3.572	9.886
Common border	0.019	0.135	0	1
Language	0.148	0.355	0	1
Ethnicity	0.145	0.352	0	1
Common colonizer	0.096	0.295	0	1
Former colony	0.013	0.112	0	1
WTO membership	0.592	0.491	0	1
EIA membership	0.478	1.078	0	6

We define the trade cost function τ_{ni}^{s} in terms of the following observables.

Soviet legacy:

We believe that trade between the successor states is affected by the shared experience in the Soviet Union. Being part of the same country for an extended period led to the development of a common taste culture. Moreover, the production and processing of food was and still is highly integrated. Thus, we assume that the parameter estimate for the Soviet legacy has a positive sign. The Soviet legacy variable is coded as a dummy, which is one if two countries were part of the Soviet Union and otherwise it is zero. To separate the Soviet legacy effect from other factors that may affect trade between the successor states, we follow the literature and substitute the following additional variables into the trade cost function (ANDERSON, VAN WINCOOP, 2004; MARTINEZ-ZARZOSO et al., 2008).

Distance:

The more remote two trading partners are, the less they trade with each other. Instead of relying on the great-circle distance, which measures the shortest distance between two capitals, we believe that remoteness is better reflected by a measure that considers the multi-core infrastructure of a country. We derive this measure from the GeoDist database (MAYER, ZIGNAGO, 2011). Assuming that with larger distance between trading partners, trade cost increases, we anticipate the trade effect of distance to be negative.

Common border:

A common border between two countries may have a trade diversion effect. This effect occurs due to informal and formal trade barriers. The literature

dealing with the diversion effects of borders is broad but comes to a common conclusion: national borders reduce trade, compared to internal trade (BUCH et al., 2004; LIU et al., 2010; YOTOV, 2012). For instance, ANDERSON and VAN WINCOOP (2003) show that trade between the United States and Canada is reduced by about 44 %, as compared to trade within the countries. On the other hand, in a multi-country setting, a common border may create trade if compared to countries that do not share a border. This is because neighboring countries often have a similar culture and legislative system (Guo, 2004). Thus, we expect the estimate to have a positive sign. The variable takes the value one if two countries share a border and is zero otherwise. We obtained the data from the GeoDist database.

Language and ethnicity:

Countries that share the same language and have the same ethnic background are more likely to establish trade relations and the cost of maintaining these relations is lower. Various studies deal with the effects of language and ethnicity on bilateral trade. For instance, the role of these factors is extensively discussed in MELITZ (2008) and LOHMANN (2011). They show that language and ethnicity have trade creation effects. We derive these measures from the GeoDist database and expect a positive sign for the parameter estimates. The language variable takes the value one if two countries share the same major language and the ethnicity variable takes the value one if two countries have the same major ethnicity, otherwise both variables are zero.

Common colonizer and colony:

We include a dummy for countries that had a common colonizer and a dummy for trade between a former colony and its motherland. The first variable takes the value one if two countries had the same colonizer and the second variable takes the value one for a trade relation between a colonizer and its former colony, otherwise both variables are zero. The variables are derived from the GeoDist database and according to HEAD et al. (2010) we expect the sign of the parameter estimates to be positive.

WTO membership:

Multilateral trade integration has a trade creation effect (SUBRAMANIAN and WEI, 2007; CHANG and LEE, 2011; EICHER and HENN, 2011). We include a dummy variable, which is bound between zero and one, to account for the effect of multilateral trade integration. The variable takes the value one if two countries were members of the World Trade Organization (WTO) in year t, otherwise it is zero. We calculate tri-annual averages of the variable. The variable is derived from data on the WTO webpage.

EIA membership:

Bilateral trade integration can create trade between two countries (ROSE, 2000; BAIER, BERGSTRAND, 2007; ROY, 2010). The variable is derived from the NSF-Kellogg Institute dataset on Economic Integration Agreements (EIA) (WINIECKI, 2002). While most other similar datasets use a binary variable to index the absence or presence of an agreement, this dataset uses a multichotomous index (0-6), where 0 denotes no existing economic integration agreement, 1 a one-way preferential trade agreement, 2 a two-way preferential trade agreement, 3 a free trade agreement, 4 a customs union, 5 a common market, and 6 an economic union. We supplemented information for recently signed EIAs to obtain a set of complete information for 1995-2012. We calculate tri-annual averages of the variable and expect the parameter estimate to have a positive sign.

3.3 Econometric approach

We estimate the gravity equation with the Poisson PML estimator because of its advantages over more traditional estimation strategies. Poisson PML allows for modeling zero trade flows accurately. In general, trade flows include a large portion of zeros. Such trade events are important because they reflect a firm's decision not to sell its products in a foreign market. Hence, excluding zero trade flows would bias the parameter estimates. The Poisson PML estimator allows us to incorporate zeros by estimating the gravity equation in levels instead of logs. If one estimates the gravity equation in levels rather than in logs, heteroskedasticity typically arises due to the large variation in production and consumption across countries. The Poisson PML allows us to handle heteroskedasticity with a robust covariance matrix. Moreover, it is the only consistent and efficient one-stage estimator of the gravity equation when zeros are present in the data (SANTOS SILVA, TENREYRO, 2006). In its general form, the Poisson regression model is defined by its discrete distribution as follows:

$$\Pr\left(X_{ni}^{s} = y \mid \hat{X}_{ni}^{s}\right) = \frac{\exp\left(-\hat{X}_{ni}^{s}\right)}{y!}\exp\left(-\hat{X}_{ni}^{s}\right)^{y}, \quad y = 0,1,2,3,\dots,k \tag{3}$$

As long as the constant is not interpreted, Poisson PML is the proper strategy to estimate the gravity equation (SANTOS SILVA, TENREYRO, 2011). Overdispersion is not an issue with Poisson PML because the variance is estimated with a non-parametric Sandwich estimator that produces cluster-robust standard errors. Another advantage of Poisson PML is that it is the only estimator that solves the "adding up" problem (ARVIS, SHEPHERD, 2013). Adding up implies that total predicted trade exceeds total actual trade, which is a particular problem with OLS and Gamma PML.

4 RESULTS AND DISCUSSION

The Poisson PML estimation results for the intensive and extensive trade margin are reported in Table 2. We estimated the gravity equation without and with treating the multilateral resistance terms properly. The estimates without time-varying fixed effects for exporter and importer are shown in (column 1), whereas we present estimates with these effects in (column 2). We only report parameter estimates for the trade cost variables.

Table 2: Poisson PML parameter estimates for the intensive and extensive trade margins, without MR terms (1) and with MR terms (2)

Variable	Intensive trade margin (Bilateral export value)		Extensive trade margin (Number of products)	
	(1)	(2)	(1)	(2)
Soviet legacy	0.342	1.496***	0.695***	1.606***
	(0.243)	(0.188)	(0.100)	(0.079)
Log of distance	0.125	-0.814***	-0.311***	-0.659***
	(0.084)	(0.034)	(0.019)	(0.018)
Common border	1.691***	0.222**	0.224***	-0.236***
	(0.252)	(0.069)	(0.061)	(0.068)
Language	-0.928***	0.016	-0.335***	0.301***
	(0.271)	(0.116)	(0.075)	(0.050)
Ethnicity	1.138***	0.320*	0.652***	0.243***
	(0.233)	(0.132)	(0.070)	(0.049)
Common colonizer	-2.079***	0.312*	-0.979***	0.146**
	(0.232)	(0.137)	(0.063)	(0.049)
Former colony	0.626**	0.346***	1.045***	0.430***
	(0.217)	(0.101)	(0.075)	(0.052)
WTO membership	1.004***	0.224*	0.673***	0.054
	(0.082)	(0.087)	(0.028)	(0.041)
EIA membership	0.557***	0.141***	0.304***	0.027**
	(0.030)	(0.018)	(0.010)	(0.009)
Observations	137,712	137,712	137,712	137,712
Pseudo R-squared	0.118	0.852	0.246	0.712
MR terms	*No*	*Yes*	*No*	*Yes*

Notes: Country-pair cluster robust standard errors are reported in parenthesis and the significance level is indicated by * p<0.05, ** p<0.01, *** p<0.001.

We report both specifications to illustrate the endogeneity problem that is caused by estimating the gravity equation without the MR terms. The parameter estimates are largely biased and have mostly the wrong sign (see for

instance the log of distance). This shows that a correct treatment of multilateral resistances is necessary to obtain reliable parameter estimates.

The accurately specified gravity equation (column 2) fits the underlying data well as shown by the pseudo R-squared values. All coefficient estimators for the approximated bilateral trade cost have the expected sign. We find that the Soviet legacy effect is positive, both for the intensive and extensive trade margin, which implies that the Soviet successor states prefer to trade with each other. We control for a large portion of variation in the data by including other trade cost variables and the multilateral resistance terms. This reduces the risk of a spurious relationship substantially. However, we cannot make sure that the parameter estimates only account for the Soviet legacy effect. It could be that other factors exist that affect agri-food trade between the successor states, indicated by a correlation between these effects with the Soviet legacy variable. We believe that most of these unobserved variables are strongly linked to the Soviet legacy. It is not only that the common food culture and the integration at the producer side are inherent to the Soviet system, also infrastructure, political and economic relations at the individual level are determined by the shared Soviet experience. Hence, the reported parameter estimates are a plausible approximation of the "true" Soviet legacy effect. They reflect the upper bound of the effect. To obtain partial equilibrium effects for the Soviet legacy variable, we transform the parameter estimates by calculating Euler's number to the power of the Soviet legacy estimate and subtract one. We find for the intensive trade margin that trade between the Soviet successor states is 346.4 % larger than with other countries. The Soviet legacy effect is more pronounced for the extensive trade margin. Our estimates show that the successor states trade 398.3 % more intensively with each other than with other countries. The partial equilibrium effects are large but reliable because we control for endogeneity by including other trade cost variables and the multilateral resistance terms.

We report Poisson PML estimates for the intensive and extensive trade margin in Table 3. We interacted the Soviet legacy variable with the time dimension to illustrate changes in the Soviet legacy effect over time.

Our results show that specifying the gravity equation incorrectly leads to biases of the parameter estimates. Some of the estimates for the trade cost variables have the incorrect sign and the Soviet legacy effect is not identified for the intensive trade margin. We find that the correctly specified gravity equation fits the data well and that the parameter estimates have consistently the expected sign, both for the intensive and extensive trade margin.

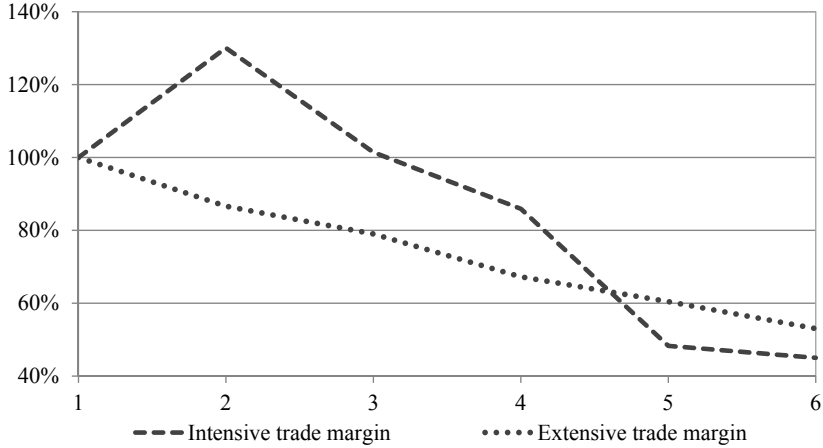
Table 3: Poisson PML estimates for the intensive and extensive trade margins (without and with MR terms), varying Soviet legacy effect

Variable	Intensive trade margin (Bilateral export value)		Extensive trade margin (Number of products)	
	(1)	(2)	(1)	(2)
Soviet legacy (period 1)	0.394	1.912***	1.039***	1.909***
	(0.348)	(0.218)	(0.123)	(0.099)
Soviet legacy (period 2)	0.197	2.140***	0.957***	1.788***
	(0.283)	(0.188)	(0.103)	(0.090)
Soviet legacy (period 3)	-0.116	1.924***	0.633***	1.712***
	(0.251)	(0.177)	(0.097)	(0.085)
Soviet legacy (period 4)	-0.077	1.784***	0.508***	1.582***
	(0.256)	(0.183)	(0.106)	(0.085)
Soviet legacy (period 5)	0.451	1.331***	0.577***	1.498***
	(0.254)	(0.202)	(0.107)	(0.083)
Soviet legacy (period 6)	0.705**	1.280***	0.646***	1.398***
	(0.251)	(0.219)	(0.101)	(0.080)
Log of distance	0.125	-0.813***	-0.310***	-0.658***
	(0.084)	(0.034)	(0.019)	(0.018)
Common border	1.691***	0.222**	0.225***	-0.236***
	(0.252)	(0.069)	(0.061)	(0.068)
Language	-0.927***	0.016	-0.337***	0.301***
	(0.272)	(0.116)	(0.075)	(0.050)
Ethnicity	1.137***	0.320*	0.654***	0.243***
	(0.233)	(0.132)	(0.070)	(0.049)
Common colonizer	-2.081***	0.314*	-0.979***	0.148**
	(0.232)	(0.137)	(0.063)	(0.049)
Former colony	0.626**	0.347***	1.043***	0.429***
	(0.217)	(0.101)	(0.075)	(0.052)
WTO membership	1.003***	0.183*	0.674***	0.026
	(0.082)	(0.093)	(0.028)	(0.044)
EIA membership	0.557***	0.142***	0.305***	0.028**
	(0.030)	(0.018)	(0.010)	(0.009)
Observations	137,712	137,712	137,712	137,712
Pseudo R-squared	0.118	0.853	0.246	0.712
MR terms	*No*	*Yes*	*No*	*Yes*

Note: Country-pair cluster robust standard errors are reported in parenthesis and the significance level is indicated by * p<0.05, ** p<0.01, *** p<0.001.

Figure 3 shows partial equilibrium effects of the Soviet legacy for both trade margins relative to the baseline period 1995-1997. We find that for the intensive trade margin the Soviet legacy effect was more pronounced in period 2 (1998-2000) and period 3 (2001-2003) than in period 1 (1995-1997). This indicates that the Soviet successor states intensified their trade relations with other FSU countries during the economic recovery period. This effect fits well our argumentation. We argue that it was easier for the Soviet successor states to expand trade with countries for which economic and cultural links exist. In recent years, the importance of the Soviet legacy effect has been decreasing. This is because, due to innovation and the accompanying adjustment of preferences at the consumer side as well as innovation and market integration at the producer side, the Soviet legacy effect for the intensive trade margin gradually deteriorates. Still, this effect is strong, equaling 259.7 % for 2010-2012.

Figure 3: Changes in the Soviet legacy effect for the intensive and extensive trade margin, baseline period 1995-1997



We find for the extensive trade margin that the Soviet legacy effect deteriorated almost linearly. The correlation between the partial equilibrium effect and the time trend is -0.994, which means that the marginal change of the Soviet legacy effect is constant. For the last period, we find that the partial equilibrium effect of the Soviet legacy is still large, corresponding to a trade intensity that is 304.7 % higher than with non-FSU countries. The higher trade intensity complies with our argumentation. Assuming that a common food culture exists between the Soviet successors states, lower cost occur for exporters when they want to establish new products and remain present with existing products in FSU

markets. Agri-food processing is strongly integrated, both vertically and horizontally, which implies that the intensity of food trade, measured by the number of trade products, should be larger among them.

These results confirm our hypothesis that the Soviet legacy positively affects agri-food trade between FSU countries. Although our findings are largely in line with DJANKOV and FREUND (2002), FIDRMUC and FIDRMUC (2003), and HEINEMEYER (2007), who claim that political disintegration leads to economic disintegration, we are able to extend the discussion and show that economic disintegration is happening gradually. Still, the Soviet legacy effect is large, implying a number of implications, some of which are discussed below.

5 CONCLUSION

In this study, we investigate the role of the Soviet legacy for agri-food trade between FSU countries. Our background analysis shows that the Soviet successors trade largely among themselves. With the exception of the Baltic countries, the Russian Federation, Ukraine and Turkmenistan, all successor states direct more than 50 % of their agri-food exports to other FSU countries. We argue that the shared Soviet legacy is responsible for the intense trade relations. To separate this effect from other factors that may affect trade between the successor states, we estimate a structural gravity equation, studying the intensive and extensive trade margin. Our results show that the Soviet legacy effect exists in both trade margins. It is more pronounced for the extensive than for the intensive trade margin. Studying changes of the Soviet legacy effect, we find a positive correlation between the intensive trade margin and the economic recovery in the early 2000s. Since then, the Soviet legacy effect has been decreasing gradually. On the other hand, we find for the extensive trade margin that the Soviet legacy effect is almost linearly decreasing. These changes can be explained by innovation and the accompanying adjustment of preferences at the consumer side. Moreover, innovation and market integration at the producer side may also affect trade between the Soviet successor states. Hence, it is not surprising that the Soviet legacy effect is slowly deteriorating over time. We find that the Soviet legacy effect is still large, equaling 259.7 % in the intensive margin and 304.7 % in the extensive margin for 2010-2012.

Our findings enhance the understanding of agri-food trade patterns among the Soviet successor states. The positive effect of the Soviet legacy reflects better market access, due to similar preferences and inherited economic links. The discussion about agri-food trade integration in the region has to be reconsidered and the consequences of the common past have to be explicitly taken into account. Trade policy makers should perceive the existent links as a potential to strengthen cross-country cooperation. Good relations with neighboring

countries are vital especially for landlocked states, such as the five Central Asian republics, Armenia, Azerbaijan, Belarus, and Moldova. The Baltic republics, which have strongly reoriented their trade toward the European Union, can also profit from recapturing some of their traditional markets. This is facilitated by the existing similarity of preferences and sentiments toward the past.

These insights suggest some policy recommendations. Having identified and understood the factors that drive agri-food trade among the Soviet successor states, policy makers can implement trade policies that facilitate integration of the agri-food sector. Such measures could not only raise growth rates in the agri-food sector but also provide spillover effects in rural areas. The common Soviet legacy – from language to similar consumer preferences – strengthens the already significant dependencies and can catalyze further development in the agri-food sector.

Further research could be concerned with the product-level effects of the Soviet legacy on agri-food trade among the Soviet successor states. Due to differences in the product characteristics, these effects could arguably vary substantially. Moreover, it would be advisable to consider general equilibrium effects of the Soviet legacy and compute welfare effects. They can largely differ from the partial equilibrium effects, particularly during growth periods.

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APPENDIX: LIST OF COUNTRIES IN ALPHABETIC ORDER

Albania	France	Nigeria
Algeria	Gabon	North Korea
Angola	Gambia	Norway
Antigua and Barbuda	Georgia	Oman
Argentina	Germany	Pakistan
Armenia	Ghana	Palestine
Australia	Greece	Paraguay
Austria	Grenada	Peru
Azerbaijan	Guatemala	Philippines
Bahamas	Guinea	Poland
Bahrain	Guinea-Bissau	Portugal
Bangladesh	Guyana	Romania
Barbados	Haiti	Russia
Belarus	Honduras	Rwanda
Belize	Hong Kong	Saint Lucia
Benin	Hungary	Saint Vincent and the Grenadines
Bolivia	Iceland	Samoa
Bosnia and Herzegovina	India	Saudi Arabia
Brazil	Indonesia	Senegal
Bulgaria	Iran	Seychelles
Burkina Faso	Ireland	Sierra Leone
Cote d'Ivoire	Israel	Singapore
Cambodia	Italy	Slovakia
Cameroon	Japan	Slovenia
Canada	Jordan	South Africa
Cape Verde	Kazakhstan	Spain
Central African Republic	Kenya	Sri Lanka
Chad	Kuwait	Suriname
Chile	Kyrgyzstan	Sweden
China	Latvia	Switzerland
Colombia	Lebanon	Syria
Comoros	Liberia	Tajikistan
Congo	Libya	Tanzania
Congo (Democratic Republic)	Lithuania	Thailand
Costa Rica	Madagascar	Togo
Croatia	Malawi	Tonga
Cyprus	Malaysia	Trinidad and Tobago
Czech Republic	Mali	Tunisia
Denmark	Malta	Turkey
Djibouti	Mauritania	Turkmenistan
Dominica	Mauritius	Uganda

Dominican Republic	Mexico	Ukraine
Ecuador	Moldova	United Arab Emirates
Egypt	Mongolia	United Kingdom
El Salvador	Morocco	United States
Equatorial Guinea	Mozambique	Uruguay
Eritrea	Nepal	Uzbekistan
Estonia	Netherlands	Venezuela
Ethiopia	New Zealand	Vietnam
Fiji	Nicaragua	Yemen
Finland	Niger	

AGRICULTURAL POLICY IN RUSSIA AND WTO ACCESSION[1]

DAVID SEDIK, ZVI LERMAN, VASILII UZUN

1 INTRODUCTION

On 16 December 2011, the Ministerial Council of the World Trade Organization (WTO) approved the accession package containing reforms to Russia's trade regime and the commitments that Russia undertook to implement as part of its WTO accession. On 10 July 2012, the Russian State Duma ratified the agreement into law. Russia officially joined the WTO 30 days after it informed that body of the ratification.

Before the terms of the agreement became known a number of articles appeared that assessed the effects of WTO accession on Russian agriculture. The WORLD BANK work under the leadership of DAVID TARR, former WORLD BANK Lead Economist, covered the anticipated effects of accession on the economy as a whole, with breakdowns by sector. This work focused mainly on the sizeable benefits that would accrue to Russian consumers as a result of liberalization of the financial sector, but also on the overall growth implications of accession (TARR, 2010; JENSEN, RUTHERFORD, TARR, 2004).

As the terms of accession were becoming known, a string of publications designned to assess the implications of accession appeared in Russia and abroad. KISELEV, ROMASHKIN (2012) published work on the terms of accession with background material on agricultural trade and production. KRYLATYKH (2012) highlighted the projected production implications of accession, while ELDIEVA (2012) assessed the lessons of accession of other transition economies. VOLCHKOVA, TURDYEVA (2012) published the results of CEFIR's production projections based on the accession terms using a general equilibrium model of the Russian economy. Meanwhile, DAVID TARR and his colleagues (SHEPOTYLO, TARR, 2012 and TARR, 2012) continued to publish results of their work, branching out into issues connected with the Eurasian Customs Union. WEGREN (2012) noted that the effects of WTO accession on Russian agriculture would be mixed, but was not specific as to whether Russian agricultural policies would be substantially changed. Finally, BRINK, ORDEN, DATZ

[1] The views expressed in this chapter reflect the opinions of the authors and should not be attributed to their respective organizations. The authors would like to thank Lars Brink and William Liefert for thorough reviews of previous drafts of this chapter, as well as the participants of the international workshop in Rehovot for useful comments.

(2013) provided the most complete account yet of the implications of Russian WTO accession on domestic support.

The current chapter is an attempt to analyze the implications of Russia WTO accession for agricultural policy. This chapter is divided into three sections: In the first section we characterize Russian agricultural policies using the OECD (2012) data on producer support. The structure of support in Russia is compared with that in a number of other countries, in order to ascertain the character of Russian policies. We use the United States the European Union, as well as Canada, China and Ukraine, as comparator countries, primarily because the Russians themselves tend to compare themselves to those WTO members, particularly the US and EU. The conclusion of this section is that Russian agricultural policies can be characterized by two traits: (1) reliance on tariffs to generate 2/3 of producer support and (2) budget support that is linked explicitly to production. Both of these elements are trade and production distorting.

The second part of the chapter outlines the terms of Russian WTO accession in the area of agriculture. The fundamental purpose of the WTO Agreement on Agriculture is to constrain policies that lead to economic distortions in production and trade. Thus, particular attention is paid to disciplines introduced on Russian policies through the market access and domestic support commitments.

The third section of the chapter seeks to answer the question of how and to what extent the WTO disciplines introduced by accession will in fact constrain or even roll back the distortionary policies described in the first section. This is the most difficult section of the chapter for a number of reasons. First, while both the OECD and WTO systems address the same questions – how much support do individual countries provide to their agricultural sectors and what forms does that support take – they were created for quite different purposes, and thus the conceptual categories are not compatible (though they may even have the same name). We can address this problem only by paying close attention to the categories we use and by being careful in how our results are characterized. Second, the WTO disciplines on agricultural support are phased in over a period of 6 years through 2018, while those on market access are implemented completely only in 2020. Thus, we must assess the structure of agriculture support, including the effects of WTO accession, in 2020. We use the OECD-FAO projections of Russian domestic prices, production, use and international prices in the OECD-FAO (2012) commodity projections to 2021 for these projections, assuming that they characterize the best efforts of these two organizations to take into account the effect of WTO disciplines on Russian agriculture to 2021. Third, in order to gauge the effect of the Russian domestic support commitment on agricultural policies we require an estimate of both WTO Aggregate Measurement of Support (AMS)-type and OECD Producer Support Estimate (PSE)-type

expenditures in 2020.[2] The first estimate is used to determine in which year and to what extent the WTO domestic support commitment will begin to bind. The second estimate is used to characterize Russian agricultural policies in 2020. We can develop only naïve and rough estimates of these two indicators, both based on planned expenditures in the Russian State Program for 2013-2020.

Our conclusions from this exercise are that the Russian structure of support identified in the OECD data for 2008-2010 is certainly consistent with the commitments Russia has made as part of WTO accession. According to our projecttions, the structure of OECD-type producer support in 2020 will be very similar to its current state. Market price support will continue to dominate the PSE. On domestic support, State Program funding projections pursued as business as usual indicate that the commitment on production-distorting support under WTO rules will begin to bind only in 2017.[3] In that year some of the measures currently planned for budgetary support of agriculture may need to be adjusted to fit the requirements of the WTO commitment on support, and for 2020 the Russian government may need to adjust some measures such that distortionary support can be accommodated with the WTO commitment and its associated rules for classifying and measuring support. This could take the form of changing some policy measures to make it possible to classify them as meeting the criteria for exemption from the WTO commitment (green box and blue box measures). At any rate, four years (2013-2017) seems to be ample time to replace some distortionary measures with others that qualify for exemption.

For the above reasons, we conclude that although WTO accession offers opportunities for important changes in Russian sanitary, phytosanitary, food safety, trade and tariff policies, membership is not a guarantee of systemic change. In fact, a serious look at Russian WTO commitments makes a minimum change scenario quite possible and even likely.

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[2] AMS and PSE are WTO and OECD measurements of producer support.

[3] The WTO Agreement on Agriculture makes a distinction between four types of support measures. Some measures (known as the "green box") are required to have "no, or at most minimal, trade-distorting effects or effects on production." A second category of policy measures (the "blue box") comprises payments made under production-limiting programs (e.g., set aside- or conservation reserve program-type measures). This second category of measures is believed to have only small production and trade distorting effects, as it can be argued that constraining supply dampens their trade-distorting effect. Certain investment and input subsidies fall into a third category, applicable only in developing countries. Any remaining domestic support measures compose a residual category that is subject to WTO domestic support limitations ("amber box" measures). Only support in the last category is included in the WTO AMS measurement.

2 RUSSIAN AGRICULTURAL AND TRADE POLICY

We can distinguish three important pillars of Russian agricultural policies in the post-Soviet period. *Transition policies* characterized the initial three years of post-Soviet Russia, from 1992 to 1994. These policies laid the basis for changing the allocation of resources and the nature of agricultural institutions in Russia (LERMAN, SEDIK, 2013). Price liberalization, tighter fiscal and monetary policies, and a more liberal trade regime were the principal factors that changed the allocation of resources in Russian agriculture away from the model established in the Soviet past. These policies came from outside the sector, but had a large impact on agriculture. Institutional reforms – the source of productivity increases and therefore sustainable growth – came from inside the sector, were slower in coming and were much less effective in transforming the structure of Russian farming to one resembling structures in market economies. The primary institutional reforms in Russian agriculture were land reforms, as well as farm privatization and restructuring.

The second set of policies related to agriculture is *state budget policies to subsidize agriculture*. The main document outlining state agricultural support policies in Russia was the State Program for Development of Agriculture for 2008-2012. The State Program was aimed at increasing production and halting the social decline of rural areas. In the area of production, emphasis was placed on a policy of import substitution for meat products through border protection and investment support (OECD, 2011, p. 238). The State Program for Development of Agriculture for 2013-20 succeeded the State Program for 2008-2012. The purposes of this program are (1) to ensure food independence according to the measures defined in the Doctrine on Food Security (see below), (2) to improve the competitiveness of Russian agricultural production on domestic and international markets in the context of Russian accession to the WTO, (3) to raise the financial sustainability of agricultural companies, (4) to promote sustainable rural development, and (5) to raise the effectiveness of resource use in agriculture and to encourage production according to ecologically sound principles.

The third important area for agriculture is trade, or more narrowly, *border policies*. After the initial years of market liberalization, Russia agricultural trade policies became gradually more protectionist. After the 2007-08 rise in food prices the policy of agricultural protection in Russia found its programmatic statement in the Doctrine on Food Security, issued in 2010 (DOKTRINA, 2010). The Doctrine set the main criterion for evaluating and ensuring food security in Russia, the domestic production ratio (the share of domestic production to total availability, by commodity). According to the Doctrine, the guiding principle for developing agricultural strategies and programs at the regional level should be the domestic production ratios listed in the document which range between 80 to 95 percent

for the following products: grains, sugar, vegetable oil, meat and meat products, milk and dairy products, fish and fish products and salt. Domestic production ratios of this magnitude imply near complete self-sufficiency in the above agricultural commodities. The Doctrine on Food Security was a statement of policy without an established mechanism for implementation until the publication of the State Program for Development of Agriculture for 2013-20 that specifically places the targets of the Doctrine as one of its goals (MINISTRY OF AGRICULTURE OF RUSSIA, 2012).

The primary concern of this chapter is the second two pillars of Russian agricultural policies, direct budget support and border policies. The reason is that, with WTO accession, these two sets of policies become the subject of WTO disciplines. In the first section, therefore, we analyze these two pillars of Russian agricultural policy in order to define a starting point for the policy changes that can be anticipated as Russia implements the commitments it made in its WTO accession. The analysis in this section is comparative, because it is only possible to understand the specific character of Russian policies through comparing those policies with those of other countries. In the second part of the chapter we define the Russian terms of accession. The third part of the chapter outlines our projections of the changes that can be anticipated in Russian agricultural policies as a result of fulfillment of WTO accession commitments.

2.1 Analysis of Russian agricultural policy: Agricultural support and trade measures

The established source of analysis on agricultural support and trade policies are the *Agricultural Policy Monitoring and Evaluation* publications of the Organization for Economic Cooperation and Development (OECD). OECD (2012) has developped a set of producer support estimate and related indicators designed to monitor and analyze the level and composition of support provided to agriculture deriving from border and budget policies. The entire set of indicators used in this chapter is listed and defined in Appendix 1. While initially calculated only for OECD countries, the analysis has been expanded to cover a number of non-OECD countries, such as Russia, Ukraine, Kazakhstan (in 2013), Brazil, China and South Africa. The standardized methodology of the OECD indicators allows for the comparison of agricultural policies across countries and over time. At the same time, however, the OECD methodology differs in many important ways from the classification and measurement of support in the WTO context, and extreme care must be taken when interpreting either set of support indicators outside its own particular context.[4]

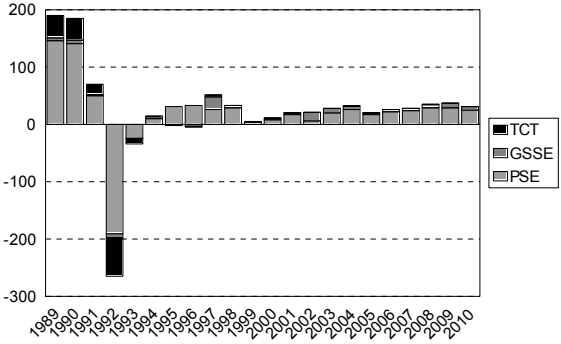
[4] For an authoritative summary of the differences between the OECD and WTO measurements of agricultural support see EFFLAND (2011).

The comparison of levels of support in Russia and other similar countries starts with the widest definition of support, total support to agriculture. This includes support (1) targeted to producers, (2) intended to benefit the sector as a whole and (3) to consumers. It then narrows the analysis to consider only support to individual agricultural producers, since producers are by far the most significant recipients of support in Russia. The specific character of Russian support policies is defined through comparison with other country support policies.

2.1.1 Russian total support to agriculture in comparative perspective

Total support to agriculture (TSE) in OECD parlance is composed of support to producers (PSE – Producer support estimate), support to the sector through funding services, such as extension, research, sanitary and phyto-sanitary inspection, and other services (GSSE – General services support estimate) and budget support to consumers, such as food stamps, school milk and other child nutrition programs, as well as others (TCT – Budget transfers to consumers). Figure 1 shows that total support to agriculture in Russia has ranged from nearly 200 percent of value added in the Soviet period, plunging to nearly – 300 percent in 1992, and after 1998 has risen from a low of 5 percent in 1999 to a level between 30 and 40 percent between 2008-10.[5] Since 2000, support to producers (PSE) has accounted for 70-80 percent of total support. Thus, today the overwhelming portion of Russian support to agriculture is directed to producers.

Figure 1: Total support to agriculture in Russia as a percent of agricultural value added, 1989-2010



Source: OECD (2012).

[5] The OECD total support and producer support calculations for the Soviet period should be interpreted with great care, because OECD used the official (and overvalued) ruble-dollar exchange rate of 0.6 rubles per US dollar to calculate them. Using estimated market exchange rates for the Soviet years, COOK, LIEFERT, KOOPMAN (1991) calculated PSEs of approximately one-third the size of the OECD PSEs. For this reason, we excluded the Soviet period PSE figures from the tables that follow.

Table 1 shows that the level of total support as a portion of the value added of agriculture in Russia in 2010 is quite typical for other middle income countries, such as China and Ukraine, as well as for Canada. The level of support in the high-income countries (where agriculture makes up a far smaller portion of GDP) is higher – nearly 50 percent of total support in the European Union and nearly 70 percent in the US. Apparently the degree of distortion caused by agricultural policies increases as the sector shrinks as a portion of GDP and incomes increase.

Table 1 further illustrates that in 2010 the *burden* on the economy imposed by agricultural support, as indicated by total support as a percent of GDP, was higher in the middle-income countries. China, Russia and Ukraine all supported agriculture at levels quite a bit higher than the high income countries, the US, the EU and Canada.

Table 1: Total support to agriculture, 2010

Country	Total support as % of agricultural value added	Total support as % of GDP	Agriculture as % of GDP (2010)
Russia	30.4	1.23	4.0
EU	48.4	0.71	1.5
US	77.8	0.92	1.2
China	29.6	2.99	10.1
Canada	29.0	0.67	1.9*
Ukraine	22.7	1.86	8.2

Source: OECD (2012); IMF (2012).

Note: * 2008.

In sum, the issue of which countries have "higher" support for agriculture is not as straightforward as it is sometimes portrayed. Certainly, support for agriculture in the US and EU is higher as a portion of value added. In other words, the distortions introduced to agriculture by agricultural policies in these countries are presumably higher. However, the burden of agricultural support on the economy as a whole is clearly higher in the middle-income countries of China, Russia and Ukraine.

A comparison of the structure of total support to agriculture in 2008-10 (Table 2) shows that agricultural support in most countries, including Russia, means predominantly support to producers. Between 2/3 and 90 percent of total support is directed to producers in all countries with the single exception of the US. In the US producers received the smallest portion of support (25 %), while expenditures on general services (research, development, public services, inspection services, marketing and promotion) covered nearly half of all support, and consumers (primarily food stamps, school milk programs and child nutrition programs) received 28 % of payments.

Table 2: Structure of total agricultural support, by recipient, 2008-2010 (%)

Country	Support to producers (PSE)		General services support (GSSE)		Consumer budget subsidies (TCT)	
	1986-88	2008-10	1986-88	2008-10	1986-88	2008-10
Russia		81		19		0
Ukraine		66		34		0
US	60	25	23	47	17	28
EU	87	87	8	12	4	0
Canada	80	69	20	31	0	0
China		71		29		0

Source: OECD (2012).

General services support for agriculture make up the second largest category of support in all countries, with the exception of the US. General services support covers a range of public goods provided by the state that benefit the sector as a whole. Generally speaking, investment in general services is encouraged by those who view these services as public goods vital to the development of agriculture and the food safety system. In the richer countries, such as the EU, US and Canada, with professional farmers many of these services have been operating since the nineteenth century. In the ex-socialist countries, Russia, China and Ukraine, public services were formerly provided to agriculture primarily in large state and collective farms. With the change to a smallholder structure of farming in these countries the portion of support to general services would need to be higher, in order to establish a new set of public services aimed at smallholders. This can be observed to some extent in Russia and Ukraine, but general services support in Russia still lags far behind that of the US, Canada, China and even Ukraine. Only in the EU, with its mixed private-public system of agricultural advisory services, is public general services support smaller.

Table 3: Structure of total agricultural support, by source, 1986-88 and 2008-10 (%)

Country	Transfers from consumers (TSES)		Budget expenditures (TSET+TSEU)	
	1986-88	2008-10	1986-88	2008-10
Russia		77		23
Ukraine		51		49
Canada	41	42	59	58
China		28		72
EU	76	20	24	80
US	23	3	77	97

Source: OECD (2012).

Table 1 showed that the burden of agricultural support in the middle-income countries is considerably higher than in the high-income countries. As a matter of equity, it is also important to understand which group in society bears that burden. Total support to agriculture can be calculated by source (Table 3) as well as by recipient (Table 2). OECD distinguishes two sources of support to the sector: transfers from consumers (extra payments made by consumers to producers as a result of the price wedge between domestic and international prices) and budget expenditures. Table 3 indicates that 77 percent of Russian agricultural support in 2008-10 was financed by consumers. This is the highest level of such support of all the countries considered here and hints at why food prices in Russia (and Ukraine) seem to be higher than in the high-income countries of the EU and North America. The policy of funding agricultural support through import tariffs places the predominant burden (which is quite high in Russia at 1.23 % of GDP) of support on food consumers. Since the portion of expenditures on food is highest in the budgets of poor consumers, the poor actually pay a higher share of their total income on this "food tax", making it highly regressive.

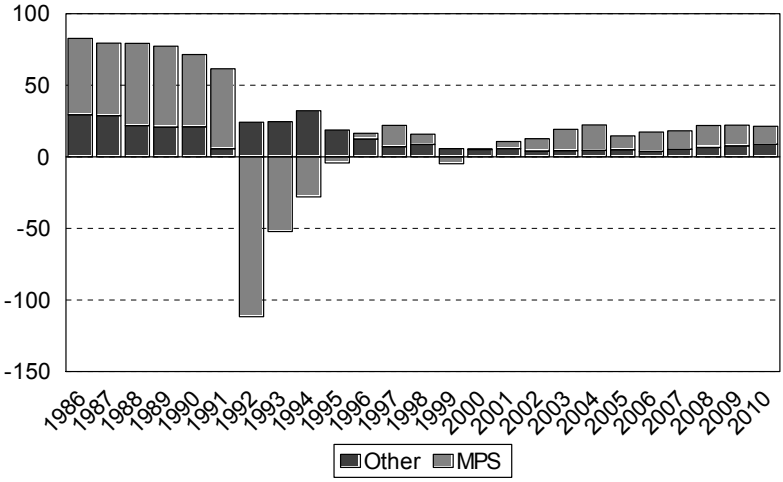
Table 3 also shows, for the US and the EU, a major shift of the source of support to agriculture between 1986-88 and 2008-10 from consumers (through border measures) to budget expenditures, which may have been associated with the 1986-94 Uruguay Round of GATT negotiations and subsequent implementation of commitments of the Agreement on Agriculture. Contrariwise, in Russia and Ukraine it is still very high. China funds agricultural support predominantly though budget expenditures, while Canada is peculiar in that the structure of support has not changed over time.

2.1.2 Russian support to agricultural producers in comparative perspective

Russian producer support has followed the same pattern over time as total support to agriculture, with quite high levels in the Soviet period, followed by a steep decline to highly negative levels in 1992-94, followed by recovery since 2000 (Figure 2). Through most of these years the main source of support has been Market Price Support (MPS). Market price support describes the revenue transferred from consumers of food to producers as a result of a difference between domestic and international prices (measured appropriately). A major, though not only, source of this difference is import tariffs. An import tariff creates a difference between the world market price for an imported good at the border and the border price for that good including the import tariff. The difference in price of the imported good multiplied by the amount imported is a transfer from consumers to the state budget known as tariff revenues. This amount is not included in market price support, since it is transferred to the state budget. However, a tariff also raises the price of domestically produced goods that compete with imported goods. Consumers pay an amount over what they would

have paid in the non-tariff situation to domestic producers. Market price support to producers is primarily composed of this payment caused by a tariff.[6]

Figure 2: Russian producer support (PSE) as a portion of gross farm receipts, 1986-2010



Source: OECD (2012).

Table 4: Agricultural producer support estimate, 1986-88, 1995-97 and 2008-10 (% of gross farm receipts)

Country	1986-88	1995-97	2008-10
Russia		18	22
Ukraine		-9	7
Canada	36	16	16
China		3	11
EU	39	34	22
US	22	12	9

Source: OECD (2012).

The level of agricultural producer support estimated for Russia as a portion of gross farm receipts (the %PSE) in 2008-10 is rather high compared to the other countries considered here (Table 4). At 22 percent, it is, along with the %PSE of the EU, the highest among the six countries. Table 4 also shows contradictory trends in the Uruguay Round countries vis-à-vis the new WTO entrants – in the Uruguay Round countries producer support has fallen significantly as a portion of gross farm receipts. However, for the new WTO members support to producers

[6] The MPS also includes adjustments to net out transfers to producers from taxpayers, price levies and excess feed costs (OECD, 2010).

as a portion of gross farm receipts has actually risen since 1995-97. Russia and the EU have the highest level of support of all six countries, though over the past 13 years support to producers has risen in Russia and fallen in the EU.

The structure of producer support can be analyzed by source, just as total agricultural support was analyzed in Table 3. Table 5 shows the portion of producer support derived from market price support (row 1) and from various forms of direct budget subsidies in 2008-2010: budget payments based on production (rows 2 and 3), budget payments not based on production (line 4) and other payments (line 5).

Table 5: Percent of producer support in 2008-2010, by type and country (%)

Producer support components	Russia	Ukraine	Canada	China	EU	US
Producer support (PSE), total	100	100	100	100	100	100
Of which						
(1) Market price support (MPS)	65	21	55	43	23	10
(2) Payments based on output (PO)	2	17	0	0	1	3
(3) Payments based on input use (PI)	30	54	7	24	13	31
(4) Payments based on area, animal numbers, etc. (PC, PHR, PHNR)	1	8	36	26	60	48
(5) Other payments (PN, PM)	2	0	2	7	3	8
Subtotal: Highly production and trade distorting support (% of producer support in (1), (2) and (3))	97	92	62	67	38	44

Source: OECD (2012).

There are very significant differences between countries on market price support (line 1). Today most support to producers in the EU and US is not in the form of market price support, but budget transfers (lines 2-5), while in Russia and Canada the overwhelming majority of support is in the form of market price support – support gained as a result of import tariffs or administered prices (in Canada).[7] This illustrates the extent to which Russian producer support

[7] The US and EU have decreased the portion of producer support deriving from higher than market prices significantly since 1986-88 and 1995-97, while Russia and China have

depends on the "food tax" noted in the discussion on Table 3. Certainly, as Russia implements its WTO commitments to decrease tariff levels over time we would expect to witness some decrease in OECD market price support to producers, compared to a base scenario with current tariff levels and identical production and imports.[8] In the case of a falling OECD MPS, overall support to producers should fall, unless the government replaces some of the support currently paid by consumers with payments from the budget. However, the scope for increased budget transfers to Russian producers is also limited by WTO disciplines through the cap on certain support to producers.

OECD support categories (1), (2) and (3) of Table 5 stem from the types of measures (i.e., based on production and inputs) that distort production and trade the most. According to OECD (2001), market price support, input subsidies and output subsidies are the most production and trade distorting types of subsidies. Area payments and payments based on historical entitlements ("decoupled income support") are less production and trade distorting. While there certainly is no one-to-one mapping of these OECD categories of support to the WTO "amber box", it is still instructive to compare the share of support in categories (1), (2) and (3).[9] A look at the last line in Table 5 shows the portion of producer support for each country that would seem to be most production or trade distorting. The totals seem to divide the countries considered here into three categories based on the level of production and trade distortion of producer support: emphasis on highly distortive (Russia and Ukraine), on medium distortive (China and Canada) and on least distortive (EU and US) policies. Russia has the highest portion of support connected with distortion of production and trade.

Despite its wide use in the literature on agricultural policy measures, there is by no means a consensus on the definition of the term "decoupled income support."[10] We can look further at how line 4 of Table 5 (producer support tied

significantly increased this portion. In 1986-88 the portions of the PSE derived from MPS in the EU and the US were 85 and 36%. The portions of the PSE derived from MPS in Russia and China in 1995-97 were 21 and -8%.

[8] Certainly, this does not mean that as tariff levels in Russia fall the MPS will necessarily decline as well. The OECD MPS depends not only on the wedge between international market prices and domestic prices caused by changes in tariffs, but on (a) changes in other factors affecting the difference between international market prices and domestic prices, (b) changes in levels of production, and (c) changes in imports. Therefore, for instance, small changes in tariff levels will cause a small decline in the MPS, which can be swamped by increases in production, imports and other factors that may increase the MPS.

[9] FAO (2004) provides a concise overview of the issues related to distortive policy measures.

[10] OECD (2001a) lists two definitions; the EUROPEAN COMMISSION (2013) has had its own application of the concept in the Common Agricultural Policy since 2003; and the WTO Agreement on Agriculture (1994) has its own definition of decoupled income support measures

to area, animal numbers, receipts or income) has evolved over time in Table 6. The US and the EU claim that several of the policy measures in this OECD category meet the criteria of the WTO green box. It is probably not incidental, then, that this is the single largest OECD category of support to producers in the US and the EU. Table 6 illustrates that Russian producer support in this category is minuscule, less than 1 percent of total producer support. This example highlights the strategies pursued by the US and the EU for some length of time (or at least temporarily in the case of the US), i.e., the provision of significant amounts of support through policy instruments that meet or come close to meeting the criteria in the WTO green box paragraph for so-called "decoupled income support". As a member of the WTO, Russia may likewise find it advantageous to consider "decoupled income support" as an alternative to support falling in the OECD categories (1), (2) or (3).

Table 6: Producer support tied to area, animal numbers, receipts or income (% of PSE)

Country	1986-88	1995-97	2008-10
Russia		0	1
Ukraine		-19	8
Canada	23	33	36
China		16	26
EU	4	32	60
US	35	21	48

Source: OECD (2012).

2.2 Russian agricultural border policies in comparative perspective

In the previous section it was noted that tariffs account for at least part of the reason for high Russian MPS support in the OECD PSEs. A direct analysis of Russian import tariffs reveals that they are higher than in most other countries compared here. Table 7 illustrates the differences in import tariff levels for agricultural commodities through three indicators. The first two refer to the share of tariff lines or imports with a tariff level of 0-10 %.

that qualify as "green box." Thus, line 4 of Table 5 can be said to include, not define, "decoupled income support."

Table 7: Comparison of agricultural tariff levels in 2011, by country

	Share of agricultural tariff lines or imports with 10 % or less import tariffs		Average MFN applied duties for agricultural goods, weighted by value of agricultural import commodity groups, 2010
	MFN applied tariffs, 2011	Imports, 2010	
Russia	50.8	38.3	16.9
US	88.3	91.8	7.1
Ukraine	69.4	87.0	10.0
Canada	83.3	84.8	13.5
China	41.0	73.0	13.2
EU27	56.4	71.0	11.5

Source: WTO tariff profiles (2012).

The first column shows that the unweighted share of tariff lines for most favored nation (MFN) applied tariffs in 2011 was about 50 percent in Russia and the EU, while it was quite a bit higher in Ukraine and North America. Only China had a lower share of MFN applied tariffs of 10 percent or less. However, the share of tariff lines is not an indicator of the significance of tariffs for trade flows and revenues. It may be that Russia has high tariffs on goods that are not imported, but low tariffs on imported goods, in which case the tariffs generate few budget revenues. Therefore, a more meaningful indicator for the trade and budget significance of tariffs is the portion of the value of agricultural imports subject to tariff levels at or below 10 %. Here there are clear differences between Russia and the rest of the countries analyzed. The portion of imports subject to minimal tariff levels is quite a bit smaller in Russia than in other countries. The last indicator in Table 7 is the average MFN applied duties weighted by the value of agricultural imports. It is an approximation, because it aggregates not by individual tariff lines, but by the tariff line groups available in the WTO tariff profiles.[11] Nevertheless, this indicator also shows that Russia has the highest level of import tariffs of the group of countries considered here.

A more explicity economic analysis of the effect of border policies is computed by OECD (2012). The Consumer Nominal Protection Coefficient (consumer NPC) is a measure of the distortion on domestic consumer food markets caused by a wedge between the domestic and international consumer prices for agricultural commodities. Typically, this wedge is caused by tariffs on imports, but it may be caused by additional factors such as price controls, significant transaction costs at the border or in domestic markets. The consumer NPC is defined as

[11] Animal products, dairy products, fruits, vegetables and plants, coffee and tea, cereals and preparations, oilseeds, fats and oils, sugars and confectionary, beverages and tobacco, cotton and other agricultural products. The corresponding 4-digit lines from the harmonized system nomenclature can be found in the technical notes to the tariff profiles.

the ratio of the domestic to international price, such that a value larger than unity indicates that domestic prices exceed international prices and vice-versa.

Table 8 shows commodity-specific consumer NPCs for selected countries. In Russia consumer prices of wheat, maize, other grains and sunflowers were less than the world price, while pig meat and poultry prices were quite a bit higher than world prices. This is a deliberate state policy to make feed prices cheap in order to subsidize meat producers, and it also may be a result of the export limitation policies that were practiced in 2010 (GOTZ, GLAUBEN and BRUMMER, 2013). Pig meat and poultry prices were high, probably due partly to high import tariffs. A similar policy is followed in Ukraine.

The last line of Table 8 shows an index computed from the individual commodity consumer nominal protection coefficients. The index includes the following commodities: Wheat (or rice for China), maize, other grains (or barley), refined sugar, sunflower (or soybeans), milk, beef/veal, pig meat, poultry meat, eggs and potatoes (if available). The consumer NPCs were weighted by the shares of the value of production of a specific commodity in the aggregate value of the listed commodities (in local currency units) at the farm gate. This aggregate NPC illustrates the degree to which Russia and Canada stand out as the most protectionist of the six countries. In the case of Canada, the overwhelming majority of protection is for dairy products, while for Russia protection is extended to the three meats, sugar and dairy products.

Table 8: Consumer NPCs in selected countries, by commodity, 2010 (%)

Commodity	Russia	EU	US	China	Canada	Ukraine
Wheat (rice for China)	0.76	1.00	1.00	1.39	1.00	0.92
Maize	0.66	1.00	1.00	1.30	1.00	0.88
Other grains or barley	0.74	1.00	1.00	0.97	1.00	0.95
Refined sugar	1.38	1.00	1.63	1.40	n.a.	1.44
Sunflower, rapeseed or soybeans	0.49	1.00	1.00	1.19	1.00	0.85
Milk	1.32	1.00	1.01	1.33	2.41	0.90
Beef/veal	1.22	1.07	1.00	1.16	1.00	0.91
Pig meat	1.72	1.03	1.00	1.16	1.00	1.99
Poultry	1.70	1.45	1.00	1.04	1.19	1.54
Eggs	1.00	1.01	1.00	1.00	1.40	1.00
Potatoes	1.00	1.10	n.a.	n.a.	1.00	1.00
Index	1.24	1.06	1.01	1.15	1.27	1.06

Source: OECD (2012).

To summarize the main conclusions of this section: Russian agricultural producer support can be characterized by two traits: (1) reliance on market price support (including as a result of tariffs) to generate 2/3 of producer support and (2) budget

support that is linked explicitly to production and inputs. Both of these elements are the most trade- and production-distorting. These conclusions are supported by a direct comparison of the protectionist nature of agricultural border policies: the value of agricultural imports in Russia subject to low (10 % or less) tariff levels seems to be quite limited in comparison with other countries. Finally, a comparison of consumer NPCs in 2010 show that domestic price levels for food in Russia and Canada seem to be higher than in other countries.

3 RUSSIAN ACCESSION TO THE WTO[12]

The fundamental purpose of the Agreement on Agriculture is to constrain policies that lead to economic distortions in agricultural production and trade. The WTO is the successor to the GATT (General Agreement on Tariffs and Trade) agreement signed in 1947 that had the goal of eliminating discrimination in international trade and abolishing arbitrary non-tariff measures. The GATT supported the use of tariffs, as opposed to less-transparent quantitative restrictions on trade, as the preferred means of protecting domestically produced goods. The GATT also encouraged governments to bind tariffs, to increase the number of products covered by bound tariffs and to progressively reduce the level of those tariffs. In the GATT, and now in the WTO, the objective is therefore to avoid discrimination and distortions in international trade and to make trade more open, transparent and more predictable. In the area of agriculture, during the accession prospective members are required to make a number of concrete commitments on market access (converting non-tariff barriers into tariffs, binding tariffs, etc.), domestic support and export measures.

3.1 Russian market access commitments

In the area of market access Russia agreed to lower its tariffs on a wide range of products. Most of the tariffs are bound in *ad valorem* terms. There are also specific rate duties (e.g., sugar and alcohols).[13] In addition, some agricultural products are subject to tariff bindings in terms of mixed (e.g. dairy, cereals, fruit juices) duties.[14] While this may sound encouraging, Table 9 shows that for the main

[12] WTO terms used in this chapter are listed and defined in Appendix 2.

[13] The specific tariff scheduled on raw sugar is peculiar, because the import duty is not determined based on the import price of the consignment but rather depends on the average world sugar price quoted on the New York Mercantile Exchange (NYMEX) (e.g., a tariff of $270 per ton if the average monthly price is below $100 per ton on New York Mercantile Exchange, $140 per ton if the average monthly price exceeds $198.40, etc.). For raw sugar, it was agreed to lower the maximum specific duty from $270 per ton if the average monthly price is not more than $100 per ton on New York Mercantile Exchange to $250 per ton.

[14] An *ad valorem* duty is a charge levied on imports defined in terms of a fixed percentage of value. A specific rate duty is a tariff levied on imports, defined in terms of a specific amount per unit, such as cents per kilogram. Mixed/combined duties are in the schedule of

products there is very little difference between the 2012 bound rate and the final bound rate for 2020. The major change in this table is for milk and dairy products and, particularly, pig meat.

The consumer NPCs in 2010 in Table 9 also illustrate an interesting fact: There is no discernable correlation between tariff rates and the price wedge that is used to calculate NPCs, presumably because there are additional factors determining the domestic price level in addition to tariffs. For instance, the consumer NPC for milk and dairy products is double the tariff rate, and the pig meat NPC exceeds even the out of quota tariff. OECD (2010) states that the MPS is defined as the value of transfers from consumers and taxpayers to agricultural producers *from policy measures* that support agriculture by creating a gap between domestic market prices and border prices. However, the peculiar inconsistency between the size of tariffs and other border policies compared with the size of the price wedge has led some researchers to argue that for Russia as well as other countries, the calculated MPS is often identifying price gaps caused by more than conventional border and domestic price support policies, or any other identifiable policy. For example, LIEFERT, LIEFERT (2008) and LIEFERT (2008) argue that, in the case of Russia, changes in the MPS have been driven not only by changes in border policies, but also by wide fluctuations in the exchange rate combined with imperfect price pass-through, due to poorly developed market infrastructure and inefficient markets. In the case of Russia, we may add sanitary and phytosanitary import restrictions to the list of policies probably responsible for the price wedges. These researchers therefore argue that the conventionally calculated MPS requires a broad definition to include market imperfections and any other factors that can create wedges between countries' domestic and border prices.

commitments in terms of alternative rates: an *ad valorem* rate and simultaneously a specific rate that serves as a minimum rate of duty (e.g. butter – 15 percent, but not less than €0.22 per kg).

Table 9: Changes in tariffs in Russian WTO Commitments, 2012 and 2020

Consumer NPCs	2012 bound rate	2020 final bound rate	Note: 2010 level of OECD consumer NPC
Wheat	5	5	0.76
Maize	5	5	0.66
Barley	5	5	0.74
Refined sugar	***	***	1.38
Sunflower oil	15	15	0.49
Milk and dairy	16.6	14.9	1.32
Beef/veal	15(55)	15(55)	1.22
Pig meat	0(65)	25	1.72
Poultry	25(80)	25(80)	1.70
Eggs	25	15 (in 2015)	1.00
Potatoes	15	10 (in 2015)	1.00

Source: WTO (2011), tariff commitments table in WT/MIN(11)/2/A1-02; OECD (2012).

Note: *** Indicates the specific tariff regime described earlier, for which the only change was a reduction in the highest rate when raw sugar prices fall below $100 on the NYMEX. TRQs for beef, pig meat and poultry meat are denoted by the in quota tariff rate (out of quota tariff rate).

One of the most important areas of Russian agricultural policy is that of promoting domestic production of meat through both budget subsidies to producers and import tariffs. Relatively high tariff rate quotas (TRQs) are applied to beef, pork and poultry meat (as well as some whey products) (Table 10). Imports entering the market within the quota face lower tariffs while very high duties are applied to products imported outside the quota.

Russia's schedule of WTO commitments slightly reduces border protection for beef and pork through three important provisions. First, a lower tariff rate is established for High Quality Beef (HQB), and the definition of the term is clarified.[15] Tariff commitments on such beef have been scheduled based on country-specific quality definitions (applicable to US, Canada and Argentina). For other members a price threshold has been established as an alternative route to classify beef as HQB. A beef consignment priced at or above €8000 per ton (threshold subject to annual review) would be deemed as HQB and shall be subject to the scheduled tariff for HQB. In addition, Russia has committed to develop a national definition of HQB. Beef from members meeting the national HQB definition would also receive a tariff treatment scheduled for HQB. These

[15] Bound out-of-quota tariff on beef is 55% except on High Quality Beef (HQB), subject to a bound tariff of 15%.

provisions ensure relatively unfettered access to Russian markets for high quality beef. Second, Russia lowered the in-quota tariff to zero in 2012 and committed to end the pig meat tariff rate quota in 2020, replacing it with an *ad valorem* tariff of 25 percent. Third, the tariff for live swine imports was reduced from 40 to 5 percent. The latter change allows for increased import of live swine for slaughter. This provision, combined with the zero-rate tariff on pig meat imports to 400,000 tons, should place downward pressure on pork prices.

Table 10: Tariff rate quotas in Russia, bound rates at date of accession

Products	In quota rate (%)	Out of quota rate (%)	TRQ volume (thousand tons)	TRQ utilization in 2008-10 (%)
Fresh and chilled beef (0201)	15	55	40	42.2
Frozen beef (0202)	15	55	530	78.7
Pork (except 0203 29 550 2, 0203 29 900 2)	0	65	400	
Pork trimming (0203 29 550 2, 0203 29 900 2)	0	65	30	96.6
Poultry meat (0207 14 200, 0207 600)	25	80	250	83.1
Poultry meat (0207 14 100)	25	80	100	
Poultry meat (0207 27)			14	
Whey (0404 10 120, 0404 10 160)	10	15	15	

Source: KISELEV, ROMASHKIN, 2012; WTO (2011), WT/MIN(11)/2/A1-02, table 40.

3.2 Russian commitments on domestic support

On domestic support Russia's Total Aggregate Measurement of Support (AMS) commitment in the schedule is limited at US $9 billion in 2012 and 2013 and it then gradually declines to US $4.4 billion in 2018 (Table 11).

The $9 billion level in the first two years of the commitment schedule corresponds to the average annual support provided to agriculture in 1993-95 and also to the potential level of budgetary support to be provided in 2012 and 2013 under the State Program. The bound level of $ 4.4 billion in 2018 corresponds to Russia's annual average total AMS in 2006-2008. This level of support is less than the level of support provided in 2010 and 2011 (KISELEV, ROMASHKIN, 2012).[16]

[16] Russia has also made a commitment during the transition period from 2012 to 2018 to keep its total product-specific AMS within 30 percent of its non-product specific AMS in every year. This constraint through 2017 is designed to check any potential excessive channeling of trade-distorting support to specific products.

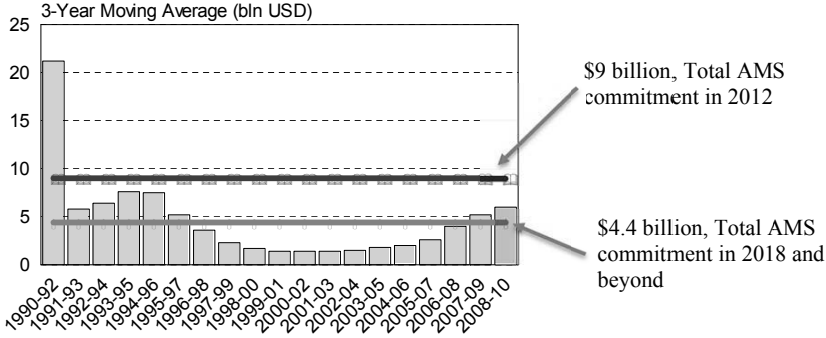
Table 11: Russia's domestic support commitments (total AMS)

Years	2012	2013	2014	2015	2016	2017	2018 and beyond
Billion USD	9.0	9.0	8.1	7.2	6.3	5.4	4.4

Source: WTO (2011), WT/MIN(11)/2/A1-02, schedule of commitments (Part IV – Agricultural products commitments limiting subsidization).

The question is often asked as to whether the Total AMS commitment schedule will inhibit Russian policy making in the years up to and beyond 2020. This question is difficult to answer with certainty, because Russia's Current Total AMS calculations for years other than the base period of 2006-08 are not publicly available.[17] Thus, we must use an approximation of Total AMS to consider even current levels. BRINK, ORDEN, DATZ (2013) used a proxy, the OECD PSE without market price support, to indicate the possibility that budgetary AMS support increased over the periods 2001-03, 2004-06 and 2006-08. Figure 3 shows these calculated budgetary support levels to agriculture for the years 1990-92 to 2008-10 along with the starting and final Total AMS commitments.

Figure 3: Russian calculated budgetary support to agriculture (OECD PSE without market price support)



Source: OECD (2012).

The $9 billion limit in Figure 3 does not appear to present a problem at this point. However, the 2008-10 level of Current Total AMS is already over the 2018 commitment and KISELEV, ROMASHKIN (2012) state that the 2010 and 2011 Current Total AMS calculated according to the WTO methodology is over $4.4 billion. Depending on how Russia chooses to take advantage of the WTO rules for calculating Current Total AMS (such as the *de minimis* provisions), it may need to make efforts to limit trade and production distorting (amber box) budget subsidies to

[17] On the WTO website only the calculations for 2006-08 are available (WT/ACC/SPEC/RUS/39).

producers over the next few years in order to stay within its WTO commitments. Such considerations would also need to include any steps taken to introduce market price support instruments of the kind recognized in the Agreement on Agriculture using administered prices.[18] In contrast to the OECD PSE, market price support under the rules of the WTO Agreement on Agriculture is calculated only if administered prices are applied.

3.3 Export restrictions

Regarding export restrictions, Russia confirmed that upon accession to the WTO, it would only apply quantitative export restrictions in accordance with Article XI of the GATT 1994 and Article 12 of the Agreement on Agriculture. This means that the institution of any new export prohibitions or restrictions on foodstuffs will adhere to the following provisions:

(a) the Member instituting the export prohibition or restriction shall give due consideration to the effects of such prohibition or restriction on importing Members' food security; and

(b) before any Member institutes an export prohibition or restriction, it shall give advance notice in writing to the Committee on Agriculture concerning the nature and the duration of the measure.

4 How will agricultural policies in Russia change as a result of WTO accession?

In this third section we seek to answer the question of how and to what extent the WTO disciplines introduced by accession will in fact constrain or even roll back the distortionary policies described in the first section. The WTO disciplines discussed in the second section of the chapter concern two main issues in Russian agricultural policy – tariffs and domestic support. Though this may seem to be a straightforward task, because the question is so obviously important, in reality the procedure for answering the question is far from simple, and the best we can do is to offer a structured, educated guess.

Our first task is to define what we mean by "to what extent WTO disciplines will change agricultural policies". In Table 5 of the first section of this chapter we showed that Russian agricultural policies are relatively trade and production distorting, because they can be characterized by two traits: (1) reliance predominantly on market price support through border measures and (2) linked to production and inputs for the budget support component. This is a statement about

[18] The WTO Agreement on Agriculture provides for *de minimis* exclusions from the Current Total AMS of product-specific and non-product-specific AMS support that is below threshold values (5 percent of the value of production for developed countries and 10 percent for developing countries).

the structure of PSE support. Thus, if we were to compare the structure of PSE support in 2010 and 2020 we could judge whether WTO disciplines, *ceteris paribus*, have had the expected effect of changing the structure of the PSE to one less distortive.

In order to compare the structure of PSE support in 2010 and 2020 we need to estimate the two PSE elements – MPS and budget support – in 2020. The portion of MPS in the PSE will provide one comparison to assess changes from 2010. In order to construct the MPS element of the PSE for 2020 we use information from the OECD-FAO commodity outlook projections through 2021. We estimate the budget support element of the PSE for 2020 using data from the State Program 2013-20.

We then assess whether the structure of budget support will change toward less distortionary policies based on whether and to what extent the WTO domestic support limit for 2020 will present a constraint on agricultural support. If the domestic support limit seems to present a sizeable constraint, then we can infer that the structure of budget support will change toward less distortionary policies. If not, we assume that support will follow the rule of "business as usual," meaning very little change. In order to determine whether the WTO domestic support limit seems to present a sizeable constraint we project AMS-type support for each year from 2009-2020 using data from the State Programs for 2008-12 and 2013-20. We then compare this AMS-type support with the WTO AMS limit each year to assess whether the constraint is binding.

4.1 Projection of Russian PSEs in 2020

Using the FAO-OECD (2012) commodity and price projections database to 2021 we calculate Russian *market price support* for the commodities in the OECD agricultural support estimate database for the year 2020. Total MPS in Russia will more than double over 10 years. Budget support to agriculture in Table 12 was estimated from the State Program for 2013-2020 by applying the ratio of non-MPS PSE as a portion of average State Program expenditures for the years 2008-10 (58 %) to 2020. The estimate of MPS and budget support are summed to arrive at the PSE figure for 2020.

The main result of Table 12 is that market price support in 2020 continues to be the main source of producer support. In fact, instead of 59 % of PSE deriving from MPS, a whopping 82 % of PSE will derive from MPS in 2020. While this is a naïve and rough estimate, it certainly shows that, under the assumptions made here, the structure of Russian agricultural policies will not become less distortive. If anything, they will become more distortive.

Table 12: Projection of Russian PSE in 2020 (billion rubles)

	2010	2020
PSE	471.4	1,096.6
– Budget support	192.0	192.8
– Market price support	279.4	903.7

Sources: 2010 columns are from OECD (2012). For 2020, the PSE column commodity MPS's are projections based on price, production and consumption forecasts in OECD-FAO (2012). The PSE Market Price Support line is simply the sum of the commodity level MPS. "Budget support" for 2020 is an estimate based on the following ratio: the average non-MPS PSE as a portion of average State Program expenditures for the years 2008-10. This ratio is 58 %. The estimate for 2020 is calculated by applying that ratio to planned State Program expenditures for 2020 (0.58*330.16 billion rub. = 193 billion rub.). PSE is the sum of the MPS estimate (903.7 billion rub.) and the budget support estimate.

4.2 Projection of estimated yearly sum of budgetary AMS-type support to Russian agriculture from the State Program, 2008-2020

Table 13 illustrates the estimation of budgetary AMS-type support to agriculture using expenditure data from the State Programs for 2008-2012 and 2013-2020. We call this estimated sum an "estimated yearly sum of budgetary AMS-type support" in order to emphasize that it is not an estimate of Current Total AMS, and that we do not seek to apply the *de minimis* rules, because we don't have the information required.

The figures in column 2 were estimated by applying the ratio of the notified total AMS (without the *de minimis* exclusion) to total State Program planned expenditures in 2008 (one of only three years for which information on total AMS is available – 2006, 2007 and 2008) to the years 2009 through 2020. These estimates assume that Russia does not introduce administered prices for any basic agricultural product between 2013 and 2020 (administered prices require the calculation of a price-gap based element of a product's AMS, which, although called market price support, differs markedly from OECD MPS). The figures in column 3 were estimated using exchange rates found in the OECD agricultural support estimate database for 2008 and 2009 and the exchange rate of 31 rubles per US dollar for the years 2010-2020.

Table 13 indicates that the WTO cap on support begins to bind only in 2017. This implies that the Russian government will be required to take actions to reduce the Current Total AMS starting in that year. In order to honor WTO commitments, State Program support in 2020 counted in Current Total AMS will need to be limited to $4.4 billion. This implies that Russia will face a need to change some its 2020 support, for which several possibilities exist.

Table 13: Estimated yearly sum of budgetary AMS-type support to Russian agriculture from the State Programs, 2008-2020

Year	Total annual state program support (bln rub) (1)	Estimated AMS-type support (bln rub) (2)	Estimated AMS-type support (bln. USD) (3)	WTO Commitment Cap (bln USD) (4)
2008	263	*152*	*6.1*	
2009	303	175	5.5	
2010	332	192	6.3	
2011	246	142	4.6	
2012	262	152	4.9	9.0
2013	241	139	4.5	9.0
2014	245	142	4.6	8.1
2015	266	154	5.0	7.2
2016	282	163	5.3	6.3
2017	295	171	5.5	5.4
2018	308	178	5.8	4.4
2019	320	185	6.0	4.4
2020	330	191	6.2	4.4

Sources: Column 1: State Programs; column 2: for 2008 this is the notified total AMS of 152,120.7 million rubles without *de minimis* exclusions (source: WTO (2011), WT/ACC/SPEC/RUS/39, Supporting Table DS:4); the ratio of 2008 total AMS to total State Program planned expenditures in 2008 (0.58) was applied to the State Program planned expenditures for the years 2009-2020 to obtain a naïve, rough estimate of total AMS in those years; Column 3: for 2008 this is the notified total AMS of 6,131.41 million US dollars (source: Russian WT/ACC/SPEC/RUS/39, Supporting Table DS:4); for 2009-2020 these are calculated from column 2 using the following exchange rates: 2009 (31.77 rub/USD), 2010 (30.77 rub/USD), 2011-2020 (31 rub/USD); Column 4: WTO (2011), WT/MIN(11)/2/A1-02.

One is to recast $1.8 (=6.2-4.4) billion from the support captured in the Current Total AMS to support meeting the criteria of the green or blue boxes. A second possibility is to reduce the amount of AMS-type support without increasing green or blue box support. A third possibility is to exclude some support from Current Total AMS by taking advantage of the de minimis allowances for product-specific and/or non-product specific AMS support.[19] A fourth possibility is some combination of possibilities one, two, and three. According to Table 13, $1.8 billion is about 30 % of the planned AMS-type State Program support for 2020 in column 2. Whichever route is taken, one effect would be some, even if small, reduction in the production and trade distorting amounts of support to Russia's agricultural producers, compared to a situation without the WTO domestic support commitment.

[19] BRINK, ORDEN, DATZ (2013) discuss the issue of taking better advantage of *de minimis* thresholds in the context of Russia's Bound Total AMS for 2018 and beyond.

5 Conclusion

To summarize, in this chapter we have shown that Russia has a specific structure of agricultural policies. Russian agricultural producer support can be characterized by two traits: (1) reliance on market price support (including, though not exclusively as a result of, tariffs and other border measures) to generate 2/3 of producer support and (2) budget support that is linked explicitly to production and inputs. Both of these elements are trade and production distorting.

Considering that the fundamental purpose of the Agreement on Agriculture is to constrain policies that lead to economic distortions in agricultural production and trade, we then considered the commitments Russia has assumed as part of accession to be phased in gradually by 2020. The main relevant disciplines identified were the decrease in dairy and pig meat tariffs and the agricultural support limitation.

In this third section of the chapter, we sought to answer the question of how and to what extent the WTO disciplines introduced by accession will in fact constrain or even roll back the distortionary policies described in the first section. We used estimates of the PSE and AMS-type budgetary spending based on the State Programs for 2008-2012 and 2013-2020 and on the OECD-FAO commodity projections to 2021 to arrive at the following conclusions: First, contrary to what might be expected, the structure of agricultural policies in 2020 will probably not be much different than in 2010. If anything, the reliance on market price support will be larger. Second, regarding budget support, the discipline imposed by the WTO limit on certain agricultural support will begin to constrain agricultural support only in 2017. It is believed that Russia will be able to make the changes in support policies necessary by that time to keep agricultural support within the limit without great difficulty. These changes include converting some distortionary support into non-distortionary support and/or taking advantage of the *de minimis* provisions of the Agreement on Agriculture without appreciably reducing distortionary support.

To those who may believe that WTO accession will necessarily make a big difference in Russian agricultural policies these estimates may seem surprising. They indicate that WTO accession is more of an opportunity for change than a necessity. Although WTO accession offers opportunities for important changes in Russian sanitary, phytosanitary, food safety, trade and tariff policies, membership is not a guarantee of systemic change. In fact, a serious look at Russian WTO commitments makes a minimum change scenario quite possible and even likely.

It does not have to be this way. Russian policy makers could follow the EU and the US in adjusting agricultural policies away from production- and trade-distorting measures by:

(1) recasting agricultural support away from reliance on tariffs and toward budget subsidies to generate producer support (Table 3). This would decrease the highly regressive "food tax" mentioned earlier;

(2) increase support to the establishment of a well-functioning research and extension system in Russia (classified by OECD under "general service support") at the expense of producer support (Table 2). Many studies have shown that agricultural productivity improvements are closely linked to investments in agricultural research and extension, and the returns to investments in research and extension services have been shown to be high across the developing world (WORLD BANK, 2007);

(3) greater reliance on more decoupled income support at the expense of production and trade-distorting producer support (Tables 5 and 6).

These policy actions would change the nature of agricultural policies in Russia to resemble more those in the US and the EU, as UZUN (2012) has advocated in his work. More importantly, though, they would realign agricultural policies in a way that would make them (1) more pro-poor, (2) more effective in supporting long run agricultural growth and (3) more oriented toward supporting the incomes of the rural population and rural development. These policy changes would mirror those that have taken place in the US and EU in agricultural policies since the Uruguay Round. They would also be more in keeping with the spirit of the WTO Agreement on Agriculture to reduce production- and trade-distorting measures in agriculture.

APPENDIX 1

NAMES AND DEFINITIONS OF SELECTED OECD INDICATORS OF AGRICULTURAL SUPPORT

Indicators of total support to agriculture

Total Support Estimate (TSE): the annual monetary value of all gross transfers from taxpayers and consumers arising from policy measures that support agriculture, net of associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products.

Percentage TSE (%TSE): TSE as a share of GDP.

Indicators of support to producers

Producer Support Estimate (PSE): the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income.

Market price support (MPS): Transfers from consumers and taxpayers to agricultural producers arising from policy measures that create a gap between domestic market prices and border prices of a specific agricultural commodity, measured at the farm gate level.

Indicators of support to general services for agriculture

General Services Support Estimate (GSSE): the annual monetary value of gross transfers to general services provided to agricultural producers collectively (such as research, development, training, inspection, marketing and promotion), arising from policy measures that support agriculture regardless of their nature, objecttives and impacts on farm production, income, or consumption. The GSSE does not include any transfers to individual producers.

Percentage GSSE (%GSSE): GSSE as a share of Total Support Estimate (TSE).

Indicators of support to consumers

Consumer Nominal Protection Coefficient (consumer NPC): the ratio between the average price paid by consumers (at farm gate) and the border price (measured at farm gate).

Transfers to Consumers from Taxpayers (TCT): TCT are budgetary payments to consumers (processors) that are given for the specific purpose of compensating them for the higher prices they pay for agricultural products that result from policies that support producer prices. An example of such transfers is subsidies to the first purchasers of agricultural commodities such as mills, dairies or slaughterhouses.

Source: OECD (2010).

APPENDIX 2

A NOTE ON THE WTO AGREEMENT ON AGRICULTURE

The *Agreement on Agriculture* is an international treaty of the World Trade Organization (WTO), negotiated during the Uruguay Round Trade Negotiations of the General Agreement on Tariffs and Trade (GATT), and entered into force with the establishment of the WTO on January 1, 1995. The objective of the Agreement on Agriculture was to reduce production and trade distorting measures in the sector through new rules and country commitments applied to (1) market access (import restrictions, such as import tariffs, quotas, etc.), (2) domestic support (production- and trade-distorting support to producers) and (3) export subsidies and other methods used to make exports artificially competitive. Commitments were implemented over a six year period (10 years for developing countries), that began in 1995 for those countries that participated in the Uruguay Round trade negotiations. For countries acceding to the WTO after the Uruguay Round, similar commitments were sought.

Market Access Commitments: In the area of market access, non-tariff border measures were replaced by tariffs that provide substantially the same level of protection. Tariffs resulting from this "tariffication" process, as well as other tariffs on agricultural products, were reduced in both developed and developing countries. Reductions were undertaken over six years in the case of developed countries and over ten years in the case of developing countries. Least-developed countries were not required to reduce their tariffs.

Domestic Support Commitments: The domestic support reduction commitments of each member are contained in Part IV of its Schedule of Commitments. Reduction commitments apply to "amber box" measures, i.e., all domestic support measures in favor of agricultural producers with the exception of the domestic measures set out in Article 6 and Annex 2 of the Agreement ("green box", "blue box" measures, and, for developing countries, certain development program measures). "Green box" measures must have no, or at most minimal, trade-distorting effects or effects on production and are exempt from commitment, and "blue box" measures and certain development program measures are exempt from commitment for other reasons.

Aggregate Measurement of Support: The monetary value of "amber box" measures each year is calculated as an annual "Current Total Aggregate Measurement of Support" (CTAMS). The commitments are expressed in terms of "Annual and Final Bound Commitment Levels". A member is in compliance with its domestic support reduction commitments in any year in which its domestic support in favor of agricultural producers expressed in terms of Current Total AMS does not

exceed the corresponding annual or final bound commitment level specified in Part IV of the Member's Schedule.

De minimis exclusion: A developed country WTO member is not required to include in the calculation of its Current Total AMS: (i) product-specific domestic support which would otherwise be required to be included in a member's calculation of its Current AMS where such support does not exceed 5 per cent of the member's total value of production of a basic agricultural product during the relevant year; and (ii) non-product-specific domestic support which would otherwise be required to be included in a member's calculation of its Current AMS where such support does not exceed 5 per cent of the value of that member's total agricultural production. For developing country members, the *de minimis* percentage is 10 per cent.

Source: Adapted from WTO (1994).

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D. NEW STRUCTURES: AGROHOLDINGS AND COOPERATIVES

WHAT DRIVES THE GROWTH OF AGROHOLDINGS? AN ANALYSIS OF RUSSIAN AND UKRAINIAN EXPERIENCES

ALFONS BALMANN, HEINRICH HOCKMANN, KARIN KATARIA, FRANZISKA SCHAFT

1 INTRODUCTION

Over the last decade, large-scale investments in agricultural land have been observed in post-Soviet countries, specifically in Russia and Ukraine. These investments are often driven by a new type of agribusiness, so called agroholdings. The creation of agroholdings began in Russia especially after the financial crisis in August 1998 (WANDEL, 2011). Favorable terms of trade due to the devaluation of the Russian ruble, high import tariffs, and continuing state support for agriculture created numerous profit opportunities for agricultural and food enterprises (HOCKMANN et al., 2009). These economic incentives were complemented by a revival of the central planning coordination mechanism by agricultural economists and the regional governments. In Russia but also Ukraine, some focal enterprises in the value chains as well as individual entrepreneurs mobilized own assets or convinced potential stakeholders to invest heavily at all stages in the value chains (JOLLY, RYLKO, 2005). The hold-up problem was usually solved by creating horizontally, diagonally, and vertically integrated structures (USHACHEV, 2002; SEROVA, 2007). These agroholdings often control tens or hundreds of thousands of hectares and thus constitute major players in agriculture and in rural areas.

Due to their comparably large average size and group affiliation, farms associated with agroholdings can be expected to have greater possibilities for establishing productive and efficient structures compared with independent farms. This conjecture naturally should be tested using empirical data. The present contribution aims to shed further light on these issues by analyzing efficiency, productivity, and risk for agroholding members and for independent farms in Russia and Ukraine. Section 2 will present the findings for Russia (Oryol Oblast) and Section 3 will focus on Ukrainian farms. The chapter ends with concluding remarks in Section 4.

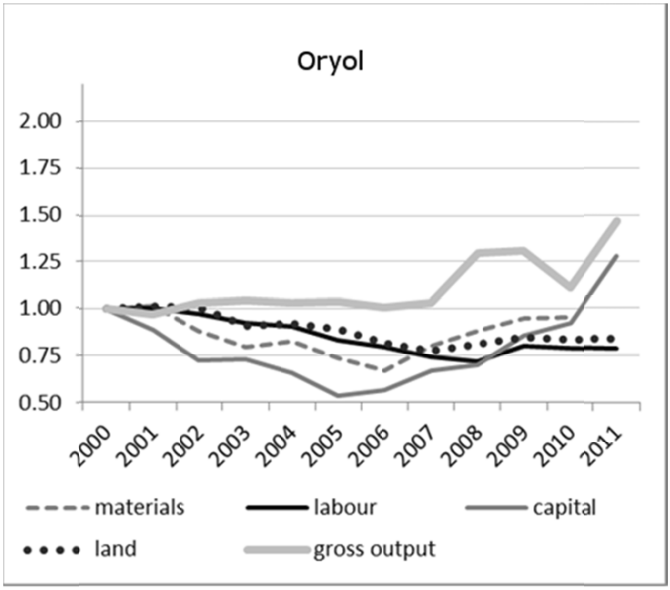
2 Risk, technical efficiency and market transaction costs in different organizational forms: Evidence from Russia (Oryol Oblast)

2.1 Agricultural development in Oryol Oblast

Oryol Oblast is located in the southwest of Central Russia. The region has good weather and soil conditions for crop production (grains, potato, sugar beet) and extensive grassland for livestock.

After 2000, the region experienced strong growth in agricultural production (Figure 1). Between 2000 and 2011, gross agricultural output (GAO) increased by more than 5 % annually. The growth trend started in 2007 and continued through 2011, despite a sharp dip in production in 2010 due to extreme drought.

Figure 1: Development of production and factor use in Oryol Oblast, 2000-2011 (2000 = 1)

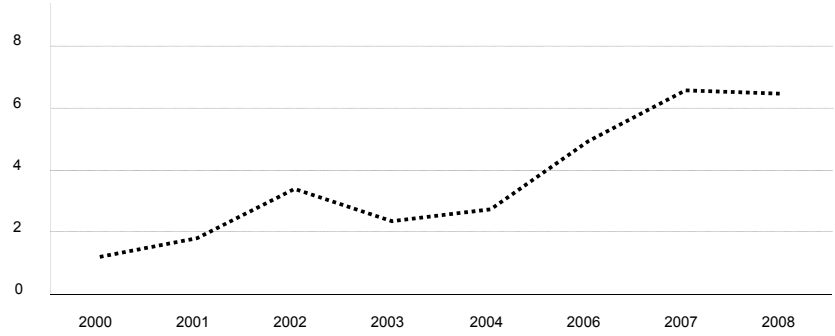


Source: Own calculations based on Rosstat.

Surprisingly, the growth in production was not accompanied by similar growth of input use in agriculture. In fact, except for capital, all inputs are at a lower level in 2011 than in 2000 (Figure 1). Industrial inputs, such as capital and materials, reached the lowest level in the middle of the decade and their use started to recover in recent years. Land and labor inputs also declined until the middle of the decade but after that, both stabilized at a level about 25 % lower than in 2000.

The reasons for these developments and for the differences in the behavior of different inputs are manifold. Detailed explanations would go beyond the scope of this chapter. However, at least two aspects should be mentioned. First, if input use decreases while output remains steady or even grows, we can conclude that technological change plays an important role in agriculture. This issue will be taken up in more detail in Sections 2.3 and 2.4. Second, the agricultural sector may have been the recipient of substantial support from regional and federal government, which encouraged the adoption of new technologies. Precise information on policy interventions of regional and federal government is not available, but still the share of subsidies in the value of production sheds at least some light on the issue. Public support for agriculture went up significantly between 2000 and 2008 (Figure 2). The strongest increase was observed after 2004, which roughly coincides with the period when industrial input use started to increase (see Figure 1).

Figure 2: Share of subsidies in the value of agricultural production in Oryol Oblast, %



Source: ROSSTAT, RUSSIAN MINISTRY OF AGRICULTURE.

Starting back in the late 1990s, the regional government in Oryol Oblast, headed by a Soviet trained agricultural expert, encouraged the creation of agroholdings. Two highly integrated structures with strong vertical, horizontal, and diagonal integration were created, subject to strong control by the regional and local governments. These agroholdings had closed commodity chains, joint production planning, as well as centralized financial management. Their purpose was not only agricultural, but also more generally rural development. Since many agroholdings were highly indebted, they suffered strongly from the economic crisis in 2009. In addition, the regional governor who had supported the creation of agroholdings had left his position in 2009. Due to inadequate efficiency and profitability as well as reduced political support for agroholdings, one of the big companies (Orlovskaya Niva) broke up into several specialized vertically

integrated agroholdings, variously specializing in sugar, grain, poultry and/or pork production and processing (WANDEL, 2011).

2.2 Revenues and quantity and price variation

2.2.1 Data

We use accounting data of agricultural enterprises in Oryol Oblast for the period 2006-2008 (financial statement data from Rosstat provided by VIAPI). This is an unbalanced panel comprising 172 agricultural enterprises with a total of 352 observations. The majority of the farms (148) were independent enterprises, 24 farms belonged to agroholdings. The dataset provided detailed information on production structures, specialization, and factor input. Implicit firm-specific product prices were calculated from the dataset using quantities sold and sales revenues.

2.2.2 Prices and partial productivities

In a first step, we took a closer look at production and product prices of the agricultural enterprises. Our data allowed conducting comparable analyses for grain and milk. To ensure that the comparisons were not biased by farm size, gross production was calculated per unit of input. The input represented the area planted with the corresponding crop for grain production and the number of cows for milk production.

Table 1: Mean prices in rubles per kg and quantities produced per hectare or cow, Oryol Oblast

	Independent farms					
	2006		**2007**		**2008**	
	E(y)	E(p)	E(y)	E(p)	E(y)	E(p)
Grain	17.6	2.8	18.5	4.4	29.9	3.7
Milk	29.0	5.9	27.9	7.2	33.4	8.9
	Agroholding members					
	2006		2007		2008	
	E(y)	E(p)	E(y)	E(p)	E(y)	E(p)
Grain	17.9	2.6	18.9	4.3	31.7	3.4
Milk	24.9	5.9	27.2	7.5	29.8	9.1

Source: Own calculations.

Notes: E(y) denote mean production in 100 kg per hectare or 100 kg per cow. E(p) are mean prices per kg or liter in rubles.

Table 1 provides information about partial productivities E(y) and mean prices E(p) received by farmers. The data show that no marked price differences existed between the two organizational types. The same is true for partial productivities. These results are quite astonishing. Often it is argued that prices received by agroholding members are only transfer prices and are independent of market

prices. The information in Table 1 provides no support for this view, since both groups receive, on average, the same prices. This does not preclude the possibility that agroholdings adopt special price strategies and thus the result presented in Table 1 is accidental. This could be investigated further by comparing prices between different agroholdings, but the required information was not available in the dataset. Although not as informative as agroholding specific prices, price variation between independent farms and agroholding members may help to shed some light on this issue. This is the topic of Section 2.2.3.

2.2.3 Share of revenue variance explained by price and quantity variances

We now discuss the contribution of the variance of prices and quantities to the variance of revenues. To this end, we decompose the revenue variance into price and quantity variances using a first-order Taylor approximation:

$$(1)\quad \operatorname{var}(py) = (Ep)^2 \operatorname{var}(y) + (Ey)^2 \operatorname{var}(p) + c(y,p),$$

$$\text{with } c(y,p) = 2p_0y_0\mathrm{E}(p-p_0)(y-y_0)$$

where p and y represent output prices and quantities respectively and $c(y, p)$ contains the covariance structures between prices and quantities.

Table 2: Contribution of price and quantity variance to revenue variance (in percent), Oryol Oblast

	Independent farms								
	2006			**2007**			**2008**		
	Share explained	Share of prices	Share of quantities	Share explained	Share of prices	Share of quantities	Share explained	Share of prices	Share of quantities
Grain	81.3	12.4	87.6	80.0	14.5	85.5	51.6	37.5	62.5
Milk	75.3	8.5	91.5	68.7	13.1	86.9	70.3	12.5	87.5
	Agroholding members								
	2006			2007			2008		
	Share explained	Share of prices	Share of quantities	Share explained	Share of prices	Share of quantities	Share explained	Share of prices	Share of quantities
Grain	60.8	17.4	82.6	82.5	8.0	92.0	42.0	46.4	53.6
Milk	78.2	4.2	95.8	104.8	14.6	85.4	99.9	9.4	90.6

Source: Own calculations.

Note: Quantities are per unit of input, e.g., crop production per hectare and milk production per cow.

Table 2 shows that price and quantity variances account on average for the major share in the variation of revenues. The share explained is usually less than 1. This shows that the within-period covariance effects are positive, implying a positive correlation between quantities and prices. This suggests that products

are not just sold under prevailing market conditions, but that farms to some extent are able to negotiate better prices when they supply larger quantities.[1]

Calculations show that by far the dominant share of total revenue variance results from quantity variance. The dominance of output variance requires taking a more detailed look at the sources of its variation. In principle, we distinguish between four effects: size, productivity, risk, and technical efficiency. Our main intention is to identify the contribution of risk and technical inefficiency to output variance. The next two sections deal with this problem. First, we introduce the theoretical background. Following that, we discuss the results.

2.3 The sources of quantity variation: Theory

2.3.1 Methodological considerations

In the analysis of the production structures, we apply an extended version of the conventional production function – the risk production function. Compared to the conventional procedure, this model is able to identify consistently the impact of individual inputs on risk and efficiency separately. This concept was originally introduced by JUST and POPE (1978) and extended by KUMBHAKAR (2002):[2]

(2) $y = f(\mathbf{x}, m, t; \boldsymbol{\alpha}) + g(\mathbf{x}, m, \mathbf{d}; \boldsymbol{\gamma})v - q(\mathbf{x}, m; \boldsymbol{\theta})u$

with

$f(\mathbf{x}, m, t; \boldsymbol{\alpha})$	mean production function
$g(\mathbf{x}, m, \mathbf{d}; \boldsymbol{\gamma})$	risk function
$q(\mathbf{x}, m; \boldsymbol{\theta})$	inefficiency function,

y and $\mathbf{x}$ are the (scalar) output and the vector of inputs, respectively; t is time, $\mathbf{d}$ is a vector of year dummy variables, and m denotes the organizational form with $m = 0$ for independent farms and $m = 1$ for agroholding members $\boldsymbol{\alpha}$, $\boldsymbol{\gamma}$, and $\boldsymbol{\theta}$ represent parameter vectors to be estimated.

Thus, output variation is decomposed into three components. First, there is the technology or the mean production function f, which represents the average impacts of the inputs ($\mathbf{x}$) on production. The second component g is assumed to capture the effects of risk on production. Due to poor or favorable weather conditions actual output can be lower or higher than its average level. Thus, it is straightforward to connect the risk function with a two-sided error

[1] SVETLOV (2009) and SVETLOV and HOCKMANN (2007) investigated the role of external transaction cost in agriculture in Moscow Oblast. Using a different approach (Data Envelopment Analysis – DEA), they also found that this cost significantly affects agroholdings.

[2] In the following, bold symbols indicate vectors or matrices; all other variables are scalars. Subscripts will be omitted to improve readability.

component (*v*). The function *q* captures the impact of factor use on the exploitation of the production possibilities or technical efficiency. This function transforms a one-sided error term *u*.

For the empirical analysis, we make the following assumption about the functionnal forms. The natural logarithm of the mean production function is assumed to be in translog form:

(2a) $$\ln f(\mathbf{x}) = a_0 + a_m m + \left(a_t + .5a_t t + a_{tm} m\right)t + \left(\mathrm{a} + \boldsymbol{\alpha}_t t + \boldsymbol{\alpha}_m m\right)'\ln \mathbf{x} + \tfrac{1}{2}\ln \mathbf{x}'\,\mathbf{A}\ln \mathbf{x}$$

In this representation, we assume that the constant and the first-order effects may change over time (*t*) and with organizational structure (*m*). The former is supposed to capture the impact of technical change, while the latter is introduced in order to test whether membership in an agroholding had a significant impact on the production structures.

The risk function is assumed to consist of two parts. First, there is generic risk. This component captures the effects of overall weather conditions and affects all farms similarly. In the empirical analysis we follow BOKUSHEVA and HOCKMANN (2006) and represent this kind of risk by a constant and dummy variables for the years 2006 and 2008 (d_{06}, d_{08}). The second part of *g* is farm-specific or idiosyncratic and depends on the intensity and structure of input use. We assume that the idiosyncratic component can be represented by a Cobb-Douglas functional form. Thus, we have

(2b) $$\ln g(\mathbf{x}) = \gamma_0 + \gamma_{06} d_{06} + \gamma_{08} d_{08} + \gamma' \ln \mathbf{x} + \gamma_m m$$

For the inefficiency function *q* we also assume a Cobb-Douglas functional form:

(2c) $$\ln q(\mathbf{x}) = \boldsymbol{\theta}' \ln \mathbf{x} + \theta_m m$$

2.3.2 Estimation procedure

The econometric model consists of (2) and additional assumptions regarding the error terms *u* and *v*:

(3) $y = f(\mathbf{x}, m, t; \boldsymbol{\alpha}) + g(\mathbf{x}, m, \mathbf{d}; \boldsymbol{\gamma})v - q(\mathbf{x}, m; \boldsymbol{\theta})u$,

with $v \sim N(0,1)$ and $u \sim N^{+}(0, \sigma_u)$.[3]

The risk production function used in this chapter is more flexible than the conventional production function, and yet it can be transformed to fit the requirements of the standard estimation procedure. The model can be estimated by extending the conventional workhorse of efficiency analysis (KUMBHAKAR, 2002).

[3] The assumption $v \sim N(0,1)$, e.g., $\sigma_v = 1$, results from the introduction of the idiosyncratic component into the risk function. Without the assumption of standard normality, the model would not be identified.

The distribution of the compound error term $\varepsilon = (y - f)/g$ is given by a proportional shift of the skewed normal distribution (AZZALINI, 1985)[4]:

$$(4)\quad \mathrm{f}(\varepsilon) = \int_0^{\infty} \mathrm{f}(\varepsilon, u)\,|J|\,du = \left[\frac{2}{\sigma}\phi\left(\frac{\varepsilon}{\sigma}\right)\Phi\left(-\frac{\varepsilon\lambda}{\sigma}\right)\right]\frac{1}{g(x)},$$

$$\text{with } J = \frac{\partial \varepsilon}{\partial y} = \frac{1}{g(x)},^{5}$$

$$\varepsilon = \frac{y - f(\mathbf{x})}{g(\mathbf{x})} = v - h(\mathbf{x})u,\ h(\mathbf{x}) = \frac{q(\mathbf{x})}{g(\mathbf{x})},$$

$$\sigma = \sqrt{1 + h(\mathbf{x})^2 \sigma_u^{\,2}} \quad \text{and} \quad \lambda = h(\mathbf{x})\sigma_u$$

where ϕ and Φ are the standard normal density and cumulative distribution functions. Optimal parameter estimates can be computed by maximizing the log likelihood associated with (4). In a second step, the approach of JONDROW et al. (1982) is applied to estimate the expected value of *u*:

$$(5)\quad E(u \mid \varepsilon) = \frac{\lambda}{\sigma}\left(\frac{\phi(\varepsilon\lambda/\sigma)}{1 - \Phi(\varepsilon\lambda/\sigma)} - \frac{\varepsilon\lambda}{\sigma}\right).$$

In order to ensure that (2) is an appropriate representation of the technology, the regularity conditions, e.g., monotonically increasing and quasi-concave inputs were implemented for a wide range of input variation. In doing so, we consider that irregularities are most likely to occur at the upper or lower end of the input ranges (SAUER et al., 2006).

2.4 The sources of quantity variation: Estimation results and further interpretations for Oryol Oblast

2.4.1 Data

The data derive from the same set that we have used in the analysis of the revenue variances. Inputs comprise land (Lan), labor (Lab), capital (Cap), and materials (Mat). Land and labor are given by the utilized agricultural area (in hectare) and the number of workers, respectively. The capital input was approximated by depreciation. We constructed the variable by adding up the depreciation of capital use in crop and animal production, each deflated by the corresponding regionnal price indices for machinery. Materials comprise all costs for variable

[4] λ is the shape or skewness parameter, and σ represents the variance or scale parameter or variance (AZZALINI, 1985, 1986).

[5] The proportional shift is given by the Jacobian *J*. The Jacobian has to be applied because of the transformation from ε to *y* (DEGROOT, 1989).

inputs. Before adding up the expenses for individual inputs, the time series were deflated by the corresponding regional price indices.

The output variable is the value of gross production in constant prices. This variable was constructed in several steps. First, gross production in current prices was determined by adding up the production values of different products (calculated in turn by multiplying gross production in physical terms and firm-specific product price for each product). We distinguish fourteen categories of products. Crop production includes cereals, sugar beet, sunflower, potatoes, and vegetables. In livestock production, we distinguish beef, pork, mutton, poultry, milk, meat, eggs, wool, and dairy products. Firm-specific product prices were calculated as sales revenue divided by the quantity of product sold. In the second step, we computed firm-specific multi-lateral consistent price indices using the approach developed by CAVES et al. (1982).[6] In doing so, we used firm-specific product prices and firm-specific revenue shares. Finally, in the third step, we deflated gross production in current values by the firm specific output price indices.

Table 3 and Figure 3 show similarities and difference of production structures between the two groups of farms. The data show that agroholding members use less labor but more land (Table 3). However, these differences in input structure are not reflects in partial productivities, as average land and labor productivities are almost the same in the two groups (Figure 3).

Table 3: Output and input use by organizational form, Oryol Oblast

	Independent farms	**Agroholding members**
Output	0.944	1.394
Labor	0.965	1.223
Land	0.943	1.404
Capital	0.929	1.533
Materials	0.946	1.379

Note: All values normalized by their geometric means. The numbers thus represent the percentage difference to the means of outputs and inputs

2.4.2 Estimation results

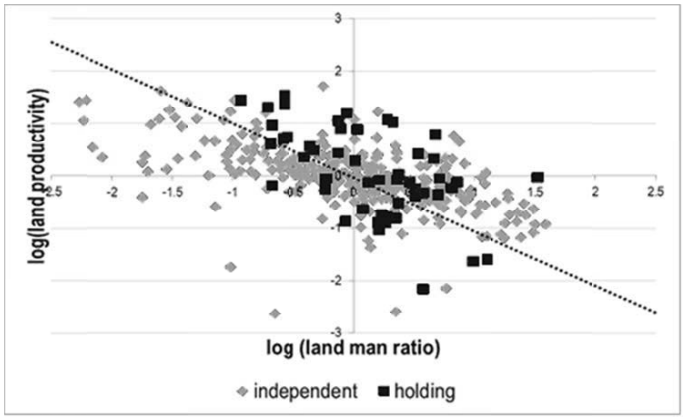
Parameter estimates of the risk production function (3) are given in Table 4. Most parameters in the mean production function as well as the risk and inefficiency functions are highly significant. Thus, it can be concluded that the omission of the risk and inefficiency functions would produce biased estimates for the production function.[7] Moreover, because of the restrictions on monotonicity

[6] Assuming a translog aggregator function, the result is a TÖRNQUIST–THEIL Index. By this approach, each observation is compared to the average in the sample.

[7] We omit a formal Wald test. First, given the significance of the parameters the result of the test is trivial. Second, the logic behind testing a parameter or a group of parameters against the null hypothesis would be to check whether a more restricted model could be used.

and curvature, theoretical consistency holds for more than 90 % of the observations

Figure 3: Land productivity and man-land ratio (mean adjusted), Oryol Oblast



Notes: All variables normalized by their geometric mean. The dashed line represents average labor productivity

Materials (α_4) were the most important input in terms of elasticities. The estimates suggest that about 57 % of revenues were used to pay for variable inputs. This result is consistent with the expectation, given the importance of purchased material inputs for modern agricultural production. The production elasticity for capital (α_3) was about 20 %. This matched well the share of depreciation in revenues in the dataset. For land and labor, no information about revenue shares were available, but the parameters of the four first-order terms (α_1 to α_4) add up to almost 1, implying that the technology is characterized by constant returns to scale. This holds not only for independent farms but for agroholding members as well. Moreover, the estimates reveal no significant differences in terms of elasticities between agroholding members (α_{m1} to α_{m4}) and independent farms. This suggests that both groups of farms use similar production technologies.

Independent farms benefited largely from the impact of technical change (α_t and α_{tt}). This result is consistent with the strong increase of production and the decease of inputs use in the investigated period (Figure 1). Compared to independent farms, agroholding members were not as able to profit from technical change (α_{mt}). It can be assumed that this is one reason for the lack of profitability that led to the restructuring of one of the big agroholdings.

Table 4: Parameter estimates of the risk production function, Oryol Oblast

	Parameter		Estimate	t-Value
mean production function	Constant	α_0	-0.031	-1.033
	Tim[#]	α_τ	0.069	2.942***
	Tim*Tim	$\alpha_{\tau\tau}$	0.204	3.279***
	Lab	α_1	0.121	2.568***
	Lan	α_2	0.093	3.837***
	Cap	α_3	0.195	9.411***
	Mat	α_4	0.569	19.064***
	Lab*Tim	$\alpha_{1\tau}$	0.100	1.782**
	Lan*Tim	$\alpha_{2\tau}$	0.134	3.204***
	Cap*Tim	$\alpha_{3\tau}$	-0.040	-1.588*
	Mat*Tim	$\alpha_{4\tau}$	-0.089	-2.599***
	Lab*Lab	α_{11}	-0.023	-0.209
	Lan*Lan	α_{22}	-0.216	-4.468***
	Cap*Cap	α_{33}	0.028	1.549*
	Mat*Mat	α_{44}	0.120	4.590***
	Lan*Lab	α_{12}	-0.008	-0.129
	Lan*Cap	α_{13}	0.029	0.687
	Lan*Mat	α_{14}	0.001	0.009
	Lab*Cap	α_{23}	0.062	2.862***
	Lab*Mat	α_{24}	0.052	2.536***
	Cap*Mat	α_{34}	-0.082	-3.487***
	Mem	α_μ	-0.077	-1.256
	Tim*Mem	$\alpha_{\mu\tau}$	-0.106	-2.423***
	Lab*Mem	$\alpha_{\mu1}$	0.009	0.055
	Lan*Mem	$\alpha_{\mu2}$	0.115	0.733
	Cap*Mem	$\alpha_{\mu3}$	0.040	0.786
	Mat*Mem	$\alpha_{\mu4}$	0.009	0.170
risk function	Constant	γ_0	-1.307	-21.976***
	Dum06	γ_{06}	-0.005	-0.076
	Dum08	γ_{08}	0.176	1.742**
	Lab	γ_1	0.343	3.059***
	Lan	γ_2	0.038	0.570
	Cap	γ_3	0.296	8.043***
	Mat	γ_4	0.197	2.759***
	Mem	γ_μ	0.207	1.765**
inefficiency function	Lab	θ_1	1.135	1.060
	Lan	θ_2	1.063	0.431
	Cap	θ_3	0.012	0.094
	Mat	θ_4	2.096	1.467*
	Mem	θ_μ	-0.092	-0.047
	Std. Dev.	σ_u	0.020	0.250

Notes: *,**,*** denote significance at the 10 %, 5 % and 1 % level, respectively.
[#] Tim is a trend variable that captures the influence of technical change.

The parameter estimates for inputs in the risk function are positive, implying that no evidence was found for the use of special risk management practices. Moreover, agroholding members appear to have used riskier technologies than independent farms (γ_m). Furthermore, the specific weather conditions in 2008 had a significant risk increasing effect (γ_{08}). However, given that production structures are quite similar between the two groups, this result can only be explained by the differences in farm size between agroholding members and independent farms. Given that the output changes per hectare are the same, larger farms will experience higher variation of total output.

We found little indication that factor input affects inefficiency. Only the increase of material use had a negative impact on efficiency (θ_4). Group membership does not have a significant impact either. HOCKMANN ET AL. (2009) reported that many agroholding members restructured their management and adopted modern management practices for a better monitoring of production and factor input. However, these changes apparently did not lead to higher productivity compared with independent farms. Moreover, inefficiency appeared to be not as relevant as is usually expected, since σ_u is very small and in addition not significant. This does not necessarily imply that all farms operate at the boundary of the production possibility set but rather that the production structures are quite similar, so that only small efficiency differences occurred.

In sum, the estimates indicate that there were no pronounced differences in terms of elasticities in the production structure between the two groups of farms.

Production elasticity is defined as the ratio of marginal and average productivities. Thus, the estimated values can be used to deduce more conclusions regarding differences of marginal productivities, i.e., (shadow) factor prices (Table 5). The table shows that, except for materials, the model gives significantly higher shadow prices of inputs for agroholding members. The result for the shadow price of materials in Table 5 is consistent with the fact that material inputs, such as seed, fertilizer or pesticides, have to be purchased in the input market, and a functioning input market implies that the prices are the same for the two organizational forms. The higher shadow price of land might be explained by the fact that agroholding members use riskier technology (γ_m, Table 4). To compensate for the additional risk, banks and other financial institutions demand a higher interest rate from agroholding members, which is reflected in a higher shadow price for capital. Many agricultural enterprises underwent restructuring after becoming a member on an agroholding (HOCKMANN et al. 2009). These processes usually involved unproductive branches and were accompanied by shedding of labor. Given a downward sloping labor demand function, the reduction of labor input induced a higher shadow price for labor.

Table 5: Marginal productivities (shadow input prices) by organizational form, Oryol Oblast

	Marginal productivities			
	Labor	**Land**	**Capital**	**Materials**
Independent farms	0.161 *(0.191)*	0.206 *(0.371)*	0.222 *(0.174)*	0.591 *(0.244)*
Agroholding members	0.254 *(0.268)*	0.333 *(0.494)*	0.266 *(0.215)*	0.624 *(0.238)*
t-Value	**-3.052*****	**-2.164*****	**-1.644***	-0.912

Notes: Standard deviations in parentheses.
*, **, *** denote significance at the 10 %, 5 %, and 1 % level, respectively.

Given this mechanism, the higher shadow price of land is surprising. The larger size of agroholding members would imply a lower remuneration for this input. However, the land market is malfunctioning and the decrease of land use (see Figure 1) suggests that land is not a scarce factor. This implies that farm owners are able to appropriate the land rent. Since agroholding members are typically larger than independent farms,[8] the enlargement of farms by investors (agroholding owners) can be regarded as a means for extracting the maximum land rent. Even though land income may leave the agricultural sector, it is uncertain whether the existence of agroholdings will hamper or stimulate the development of the agricultural sector or of rural areas in general. One the one hand, the land rent might be reinvested in agricultural production for further development, but on the other hand, the income might be used for pure consumption purposes without creating positive effects on agricultural productivity.

3 AGROHOLDING DEVELOPMENT IN UKRAINE: CURRENT SITUATION AND CHALLENGES

3.1 Agroholdings in Ukraine

According to estimates of the Ukrainian Agribusiness Club (UCAB), some 78 agroholdings in Ukraine cultivated 5.6 million hectares in mid-2012, which equals 25.5 % of all farmland under cultivation by agricultural enterprises of all categories. The largest agroholding is estimated to control around 482,000 hectares of land (see Table 6) and the process of erenlargement continues.

Originally, enlargement processes were realized through acquisition of independent small farms, but nowadays, large agroholdings not only take over smaller corporate farms but also other agroholdings. For instance, in 2011 the "UkrLandFarming" gained about 370,000 hectares through the acquisition of several

[8] This phenomenon can be observed not only in Oryol but in other oblasts as well, e.g., Belgorod and Tatarstan (HAHLBROCK and HOCKMANN 2011a; HAHLBROCK and HOCKMANN, 2011b).

agroholdings (Dakor Agro Holding, Rise, Agro Alpha and Olimpex-Agro). Other cases of rapid expansion could be observed in the agroholding "Kernel", which increased its land bank to more than 330,000 hectares through several acquisitions (UCAB, 2012). Further expansion will depend on the pending land reform, as the moratorium on sales and purchase of agricultural land has been extended to January 2016 (UKRAINIAN WEEK, 2013).

The rest of Section 3 is structured as follows. First, Section 3.2 presents some empirical facts about selected agroholdings in Ukraine. Then, in Section 3.3, we report survey results regarding the drivers for the creation of agroholdings (from the managers' point of view). These results are based on interviews with management board members from eight agroholdings, conducted in 2012 with the aim of gaining insights into the rationale for the development of agroholdings.[9] In Section 3.4, the performance and input use of agroholding members and independent farms in Ukraine are analyzed and compared. This section presents efficiency and productivity measures based on recent data. Finally, in Section 3.5, the strategies, constraints, and risks are discussed, as seen from the managers' perspective.

3.2 Empirical facts for selected Ukrainian agroholdings

Table 6 summarizes some empirical facts for a selection of the largest and publicly most visible agroholdings in Ukraine. A high degree of vertical integration is observed among the enterprises, which embraces at least own production and processing infrastructure and – increasingly – own storage facilities. Production often focuses on the cultivation of cereals and oil crops, although an increase in industrial pig breeding has been observed (UCAB, 2011, 2012). As illustrated in the last column in Table 6, several of these agroholdings are listed on international stock markets.

3.3 What drives the creation of agroholdings? Managers' assessment in Ukraine

The creation of agroholdings in Ukraine can be motivated by two strands of argument. On the one hand, it might be understood as an expression of a changing business environment in the global agrifood sector, which is driven by the globalization of finance, human capital, products, and resources as well as technological change. To take part in this increasingly complex business environment, market participants have to establish or join competitive value chains, in which business structures are shifting from individual producers to vertically and horizontally coordinated or integrated structures that are capable of better managing risks and exploiting size advantages and technological progress.

[9] The authors gratefully acknowledge Iryna Kulyk for conducting the interviews.

Table 6: Empirical facts for selected agroholdings in Ukraine, 2011

Holding	Land* '000 ha	Owner's nationality **	Crop/ livestock mix***	Processing	Storage	Export	Stock market^
NCH Capital	482	USA	97/3	feed, mill, cereal products	+	+	
UkrLand Farming	476	Ukraine	85/15	egg products, sugar, feed	+	+	LSE
Kernel Group	332	Ukraine	92/8	fat and oil products, sugar, feed	+	+	WSE
Mriya	298	Ukraine	99/1	Sugar	+	+	FSE
Ukrainian Agrarian Investments	260	Russia	99/1		+	+	
MHP	254	Ukraine	27/73	meat products, feed, oil and fat products	+	+	LSE
Astarta	238	Ukraine	88/12	sugar, feed	+	+	WSE
HarvEast	217	Ukraine	71/29	mill and cereal products, meat, feed	+		
Agroton	129	Ukraine	77/23		+		WSE
Valars Group	150	Ukraine	97/3	sugar	+	+	FSE

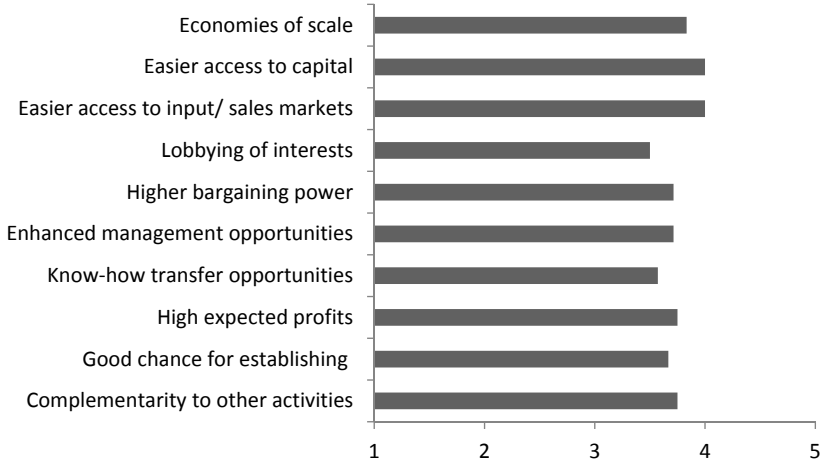
Source: UCAB (2012), own compilation.

Notes: * 2012 UCAB estimate, subject to change .
** Nationality of owner/majority shareholder.
*** Ratios show specific output weights of crop production and livestock production in the total gross output of the companies in 2011.
^ LSE = London stock exchange, FSE = Frankfurt stock exchange; WSE = Warsaw stock exchange.

On the other hand, it can be argued that the creation of agroholdings is a reaction strategy to minimize country-specific transaction costs arising from constraints such as poor institutions and bad governance. For example, access to credits and input factors in Ukraine is often seriously impeded by poor liquidity or high investment risks, such as untapped production efficiencies, volatile

yields, insecure markets or a lack of agricultural insurance schemes. Weak and unreliable market partners as well as poor rural infrastructures limit access to knowhow. Indeed, the interviewed managers of Ukrainian agroholdings perceive access to capital and input markets and also expected size advantages as major drivers for agroholding creation (Figure 4).

Figure 4: Importance of driving forces for establishing agroholdings in Ukraine*



Source: Own survey, 2012.

Notes: * Scale: 1 – Not important at all, 2 – Not so important, 3 – Neutral, 4 – Important, 5 – Very important; average values, N=8.

3.4 Performance and input use of agroholding members and independent farms in Ukraine

3.4.1 Data and descriptive analysis

This section uses accounting data for 2008-2010 that have been made available through UCAB. The analysis focused on crop-specialized farms with 90 % or more of their output (by value) derived from crop production. A balanced panel was achieved by excluding farms that had not been observed during the entire three-year period. The final dataset consisted of 822 farm-year observations, i.e., 274 farms observed in each of the three years. Of these, 73 farms (27 %) are members of an agroholding.

The efficiency and productivity measures presented below involve one output and four inputs. The output is the value of total production (crops and livestock) in thousands UAH; the inputs are material costs in thousands UAH (seeds, feed,

fertilizer, etc.), capital costs (depreciation of assets) in thousands UAH, the number of workers, and total agricultural land in hectares. Table 7 shows descriptive statistics for all farms in the sample as well as separately for farms that are members of agroholdings and independent farms that are not included in any agroholdings. Agroholding members are, on average, substantially larger than the independent farms (8,200 hectares versus 2,229 hectares).

Table 7: Descriptive statistics for sample farms in Ukraine

Variable	Independent farms (N=603)		Agroholding members (N=219)		All farms (N=822)	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Value of total production, '000 UAH	6,800	8,082	32,278	58,072	13,588	32,717
Material costs, '000 UAH	3,462	4,620	19,760	33,879	7,804	19,298
Capital costs, '000 UAH	391	601	930	2,036	534	1,193
Average full-time workers	51	72	150	271	77	159
Total agricultural land, ha	2,229	2,141	8,208	11,534	3,822	6,759

Source: KATARIA et al. (2013).

Figure 5 displays the mean value of production per hectare and the mean use of three inputs per hectare for both groups of farms. Capital costs per hectare are on average lower for agroholding members. Figure 6, illustrating capital costs for various size groups in 2010, indicates that the difference in capital costs between agroholding members and independent farms cannot be explained by differences in farm size since the same pattern (lower average capital costs per hectare among agroholding members) are observed in all three size groups in the figure. The surprisingly low capital costs of small agroholding members may stem from organizational reasons, i.e., the farms may use services from their mother company that fall into the category of material costs. Figure 5 further shows that, on average, more material inputs are used by agroholding members, suggesting that they enjoy higher liquidity than independent farms. Agroholding members also have a lower labor input per hectare, possibly suggesting higher hidden unemployment among independent farms. However, according to interviews with agroholding managers, hidden unemployment is observed also on their farms, although to a lesser extent.

The value of production per hectare does not show substantial differences between agroholding members and independent farms (see Figure 5), although

one would expect agroholding members to have better storage facilities and more developed distribution chains.

Figure 5: Value of output per hectare and input use per hectare for agroholding members and independent farms in Ukraine

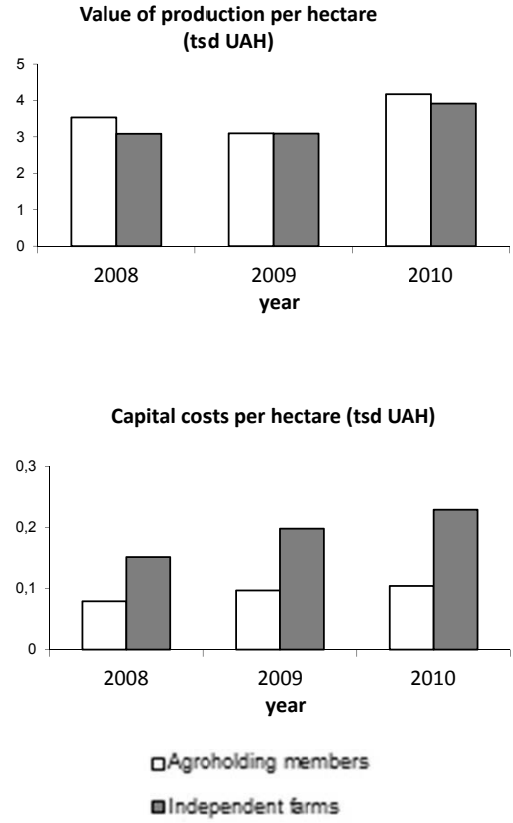
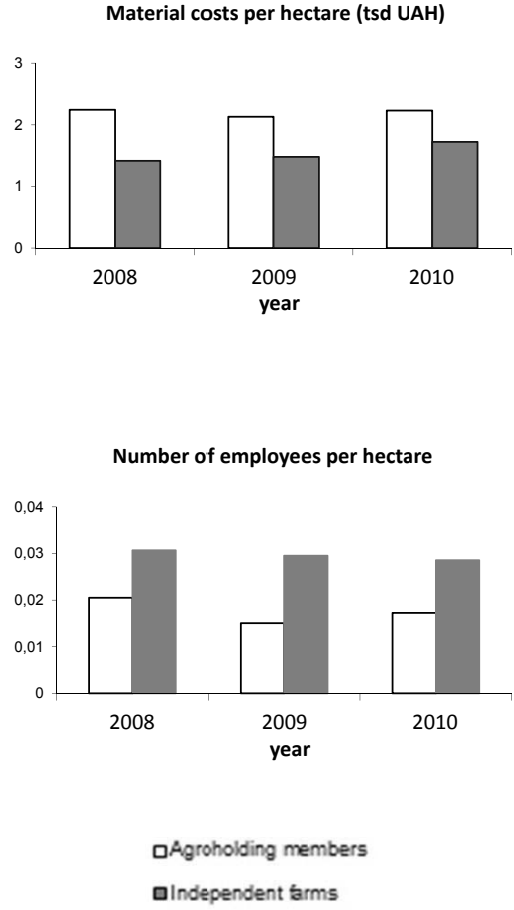
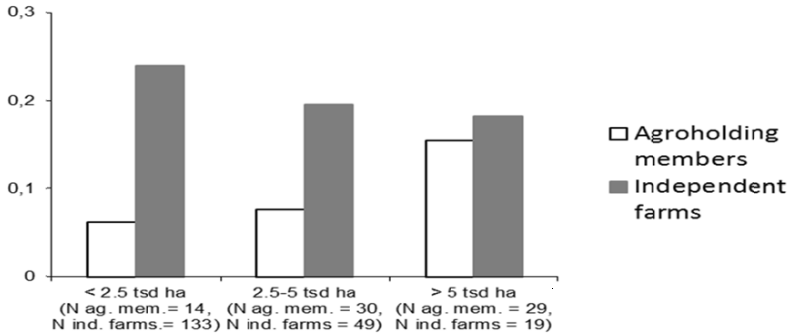


Figure 5 (continued)



Source: KATARIA et al. (2013).

Figure 6: Average capital costs (measured by depreciation expense) by size group for agroholding members and independent farms in Ukraine, 2010 (tsd UAH per hectare)



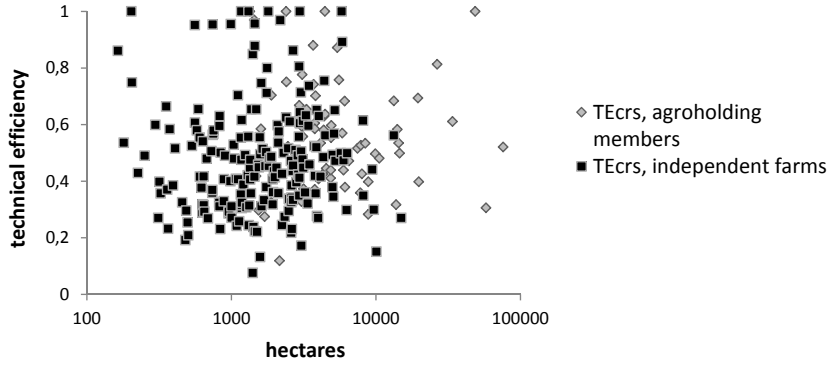
Source: KATARIA et al. (2013).

3.4.2 Efficiency and productivity

The differences between agroholding members and independent farms in Ukraine were further analyzed using efficiency and productivity measures. The efficiency measure compares each firm with the best performers in the sample. We calculated the efficiency measures using the non-parametric Data Envelopment Analysis (DEA) as originally proposed by FARRELL (1957) (for an overview of this method see, e.g., COELLI et al., 2005). An advantage of DEA is that it does not require specification of a functional form for the production function. The DEA approach constructs a non-parametric piecewise-linear isoquant consisting of the best performing firms in the sample (see, e.g., CHARNES et al., 1978; BANKER et al., 1984). The results presented below are based on an output-oriented DEA. The output oriented approach tells us by what amount the output can be expanded for given levels of inputs. Total factor productivity (TFP) change and its components (technical change and efficiency change) were further analyzed using the Malmquist TFP index (FÄRE et al., 2004).

Efficiency scores were obtained using different reference groups (all farm-year observations, all farms in a single year, and separately for agroholding members and independent farms). A plot of DEA efficiency scores for the year 2010 (using both groups of farms in this year as the reference group) is displayed in Figure 7. The figure illustrates that the size effect is not strong, that the average efficiency scores are low in both groups, and that huge differences exist among farms within either group.

Figure 7: Efficiency plot for the year 2010 (Ukraine): Technical efficiency assuming constant returns to scale (CRS)



Source: KATARIA et al. (2013).

Table 8 shows the average DEA efficiency scores obtained when using all farm-year observations as the reference group. Consistently with Figure 7, the average efficiency score of agroholding members is slightly higher than the average efficiency score of independent farms (0.452 versus 0.416 when assuming constant returns to scale), but, again, the low average efficiency scores indicate a large heterogeneity among the farms in the sample and substantial room for improvement within both groups. Efficiency scores derived using either agroholding members or independent farms as reference groups (not shown here) also displayed low average levels, again indicating a large heterogeneity among farms within the groups.

Table 8: Summary of efficiency scores using all farms and all years as reference group (Ukraine)

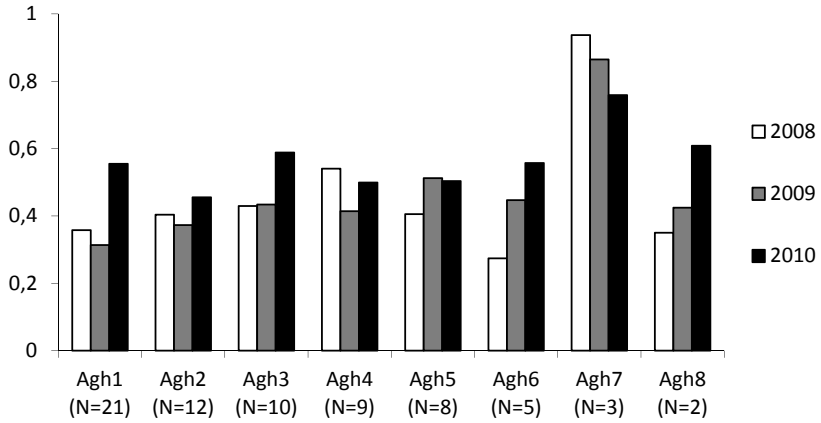
	Independent farms (N=603)		Agroholding members (N=219)		All farms (N=822)	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**
TEcrs*	0.416	0.172	0.452	0.201	0.426	0.180
TEvrs**	0.450	0.198	0.506	0.225	0.465	0.206

Source: KATARIA et al. (2013).

Notes: * Efficiency score assuming constant returns to scale.
** Efficiency score assuming variable returns to scale.

Figure 8 shows the technical efficiency aggregated to the level of the agroholdings by year for eight of the agroholdings represented in the dataset (agroholdings with fewer than two operations represented in the dataset were excluded). The figure shows that almost all agroholdings improved the average efficiency of their farms during the three-year period. There further seems to be a tendency of convergence in efficiency among the agroholdings. In other words, agroholdings that were least efficient in the first years improved to the greatest extent (Agh 6 and 8 in Figure 8), while the most efficient agroholding (Agh7 in Figure 8) lost some of its advantage.

Figure 8: Technical efficiency (CRS) scores by agroholding for Ukraine*



Source: KATARIA et al. (2013).

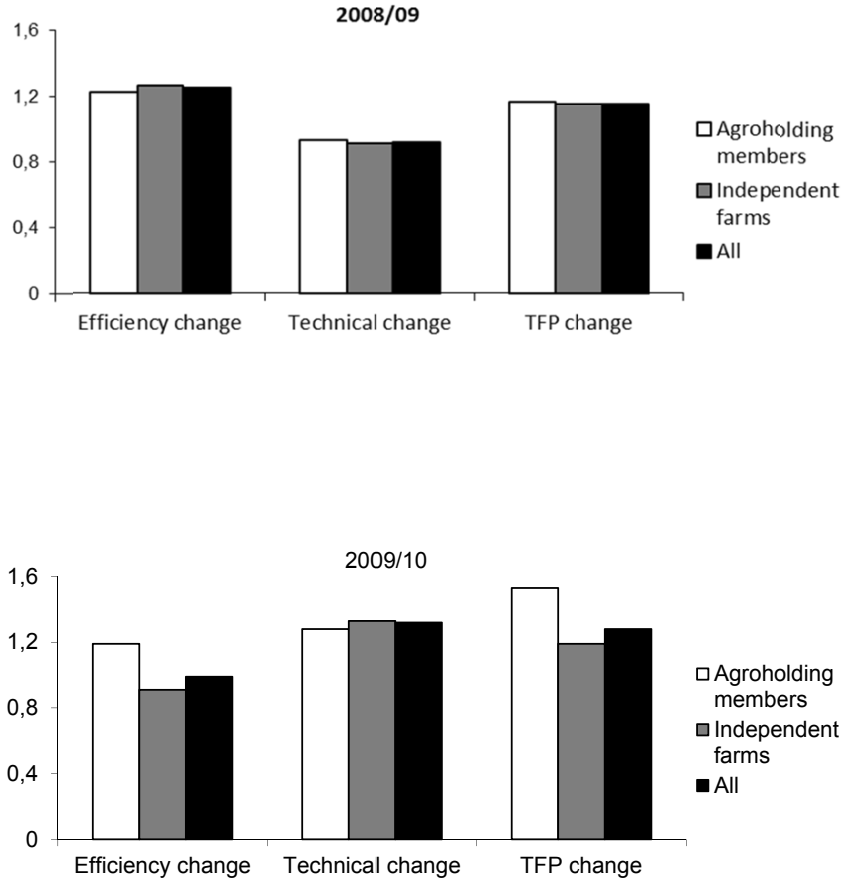
Note: * Only agroholdings with at least two operations are included. N is the number of agroholding members represented in the sample.

Total factor productivity (TFP) and its components (technical change and efficiency change)[10] were analyzed for the periods 2008-09 and 2009-10. Technical change implies a shift in the production frontier and in the present setting, due to the short time period involved, it mainly represents variations in weather conditions and in output prices between the years. Figure 9 shows that TFP increased, on average, for both groups of farms during the two periods and that the increase in TFP in the second period was substantially greater for agroholding members than for independent farms. As further can be seen in Figure 9,

[10] Change in TFP = technical change × change in TE(vrs) × change in scale efficiency = technical change × change in TE(crs).

the greater TPF increase for agroholding members in the second period is associated with a greater increase in technical efficiency. This is in line with the previous finding illustrated in Figure 8: initially underperforming agroholdings managed to reduce the inefficiency of their member farms.

Figure 9: Change in total factor productivity (TFP) and its components during the periods 2008/09 and 2009/10

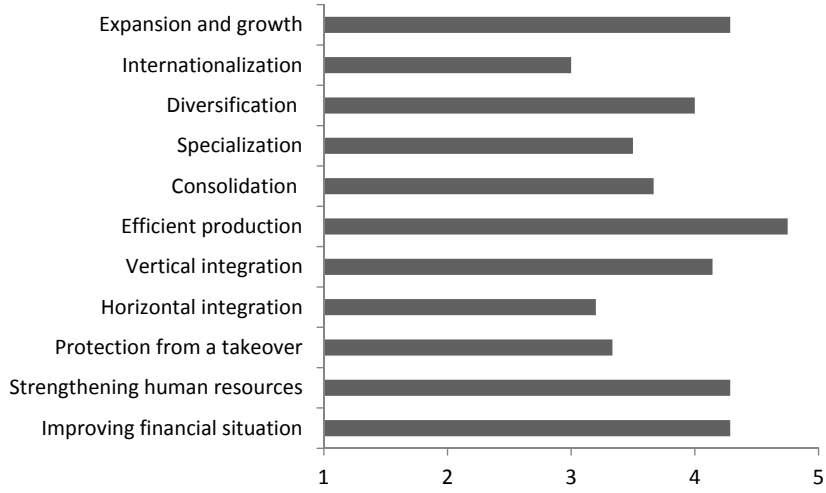


Source: KATARIA et al. (2013).

3.5 Strategies, constraints, and risks: Managers' perspective in Ukraine

The findings of the productivity analysis in section 3.4.2 are in accordance with the view of the agroholding managers. According to Figure 10, increasing efficiency is seen as the main strategic challenge. All of the interviewed managers are of the opinion that production efficiency at farm level is not fully realized. In fact, seven of the eight interviewed managers assess that production efficiency potentials are realized to 70 % or less. Strengthening the human resource base, expansion and growth as well as improving the financial situation are identified as other important strategies (see Figure 10).

Figure 10: Perceived importance of current strategies (Ukraine)*



Source: Own survey, 2012.

Notes: * Scale: 1 – Not important at all, 2 – Not so important, 3 – Neutral, 4 – Important, 5 – Very important; average values, N=8.

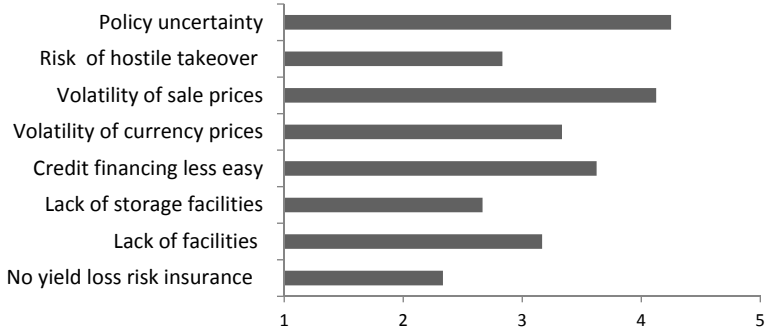
Figure 11 shows that management skills and human capital are seen as important barriers to higher production efficiency. Corruption and a general lack of transparency are identified as additional barriers. Unpredictable policies, corruption, and volatilities are viewed as the main risk (Figure 12).

Figure 11: Perceived importance of barriers to higher production efficiency (Ukraine)*

Source: Own survey, 2012.

Notes: * Scale: 1 – Not important at all, 2 – Not so important, 3 –Neutral, 4 – Important, 5 – Very important; average values, N=8.

Figure 12: Perceived importance of potential risk factors (Ukraine)*



Source: Own survey, 2012.

Notes: * Scale: 1 – Not important at all, 2 – Not so important, 3 –Neutral, 4 – Important, 5 – Very important; average values, N=8.

4 Conclusion and interpretation

This chapter aims to shed light on the growing phenomenon of agroholdings observed in post-Soviet countries, especially in Russia and Ukraine. It provides empirical findings regarding efficiency, productivity, and risk for two groups of farms in Russia and Ukraine: farms that are members of agroholdings and independent farms that are not associated with any agroholding.

Agroholding members in Oryol Oblast in Russia appear to be larger than independent farms. Due to restructuring processes that they underwent after joining a business group, agroholding members employ on average a smaller number of workers than independent farms. However, these adjustments in land and labor have not resulted in higher land and labor productivities in agroholding members because of simultaneous changes in capital and material inputs. An estimation of the risk production function reveals similar production technologies for both groups of farms in terms of production elasticities and efficiency. Differences between independent farms and agroholding members by these measures are not significant.

Yet, agroholding members appear to adopt riskier technologies in comparison with independent farms and they are unable to realize as much technical change as the other group. Both observations are consistent with developments in the period under investigation. In the second half of the 2000s, agroholdings experienced severe financial problems that impeded further growth of agricultural production. Moreover, the result of riskier technologies can be viewed in relation to farm size. Since agroholding members are larger, they experience greater variation of total output given constant land productivity.

A similar pattern for agroholding members and independent farms is also observed regarding access to output markets. For grain and milk, both organizational forms receive on average the same price. This does not necessarily imply that the functioning of the product markets is frictionless; it may be simply the consequence of the tendency of agroholdings to align their price policies with the average prices in the region. The same may hold for the prices for material inputs.

Given the similarities in technology and partial productivities, it is surprising that agroholding members in Oryol Oblast are able to pay higher prices for most of the inputs. The higher land rent in agroholding members suggests that the mother companies are able to extract rent from agricultural production. Whether this has positive or negative effects on agricultural production cannot be determined without further information concerning the use of money – whether for further investment or for private consumption purposes.

Similarly to Russian agroholding members in Oryol Oblast, Ukrainian agroholding members are observed to be larger than independent farms. The findings presented for Ukraine in Section 3 show large differences in efficiency and productivity for both agroholding members and independent farms, which cannot be explained by differences in farm size. Although Ukrainian agroholding members have a somewhat higher efficiency on average, and particularly in the most recent year (2010), large heterogeneity has been observed within the two groups of farms as well as between different agroholdings.

The Ukrainian data indicate, contrary to the Russian data, that agroholding members use capital more efficiently than independent farms (capital use is measured by depreciation). Other observed differences in input use between agroholding members and independent farms in Ukraine were higher expenditure on material inputs and lower use of labor per hectare in agroholding members. The former is likely explained by better access to finance in agroholding members, whereas the latter might be due to hidden unemployment in the independent farms or more efficient use of labor in agroholding members. It has been further observed that average productivity change in the last period is significantly higher for agroholding members than independent farms. The results suggest that this may be due to catching-up of initially underperforming agroholdings as they managed to reduce the inefficiency of their member farms. The large heterogeneity among farms indicates that factors such as management skills, access to knowhow, and human capital may be crucial for high agricultural productivity. Overall, there is substantial room for efficiency improvement among both agroholding members and independent farms in Ukraine.

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AGRICULTURAL COOPERATIVES IN ISRAEL: PAST AND PRESENT[1]

YOAV KISLEV

Close to eighty percent of the agricultural output of Israel is produced on cooperative farms. In this chapter, I review the principal features of the past and more recent, still evolving, history of the two main forms – though not the only forms – of farm cooperatives: the *moshav*, a cooperative village, typically of 80-100 families, and the *kibbutz*, a commune with 100-800 members. An in-between type is the *collective moshav*, where the land is farmed collectively but households are owned privately. Associated with these units are second-order cooperatives – organizations whose members are themselves cooperatives, not individuals – *regional cooperative associations* serving moshavim and kibbutzim (the plural forms), and several nationwide bodies. Evidently due to its idiosyncrasies, the kibbutz has been the subject of intensive scrutiny and research; a recent count found more than five thousands publications. Much less has been written about the moshav although, as I trust the reader will realize, it also offers interesting economic, social, and institutional lessons.

1 HISTORIC MILESTONES

The second half of the 19th century saw pogroms in Jewish communities in Eastern Europe, driving many to migrate westward; a small trickle went to Palestine, then part of the Turkish Ottoman Empire. They formed the first wave of the Zionist movement – to repopulate the land of the Bible with the people of the

[1] I am in debt for information and advice received from many knowledgeable people. Particular thanks go to Shlomit Arbel and Gadi Rosenthal, who shared with me written documents and spent hours discussing issues raised in the review. Dvoira Auerbach edited the manuscript. The responsibility for errors, shortcomings, and opinions is mine.

Bible. Most of the newcomers did not join the small, existing Jewish communities in Palestine; they established separate towns and villages. Some brought capital from abroad but most were assisted in their efforts – land purchasing and investments in agriculture – by money from the Jewish Diaspora, both private philanthropy and national funds. This mode of operation continued even after the establishment of the State of Israel, with new settlements set up by the Jewish Agency (the major Zionist organization that operated in Palestine and still operates in Israel) and delivered to the auspices of the government only after "maturation".

The Ottoman Empire collapsed in World War I, English and Australian forces took over Palestine, and by a decision of the League of Nations the land became a British mandate.

The Zionist project met with resistance, Jews and Arabs clashed violently and recurrently, and when the British government limited immigration Jewish underground groups turned to illegal shipping of refugees and to terrorism. The country was not easy to rule and after World War II "the Palestine question" was handed over to the United Nation. In 1947, the UN General Assembly resolved on a partition of the land into two states, Arab and Jewish. The Arabs did not accept the verdict.

The State of Israel was established in May 1948 and it was immediately invaded by armies from several Arab countries. The war ended in a ceasefire with Israel stretching over an area considerably larger than envisaged in the UN resolution. Another consequence of the war was that 600,000 Palestinian Arabs left their homes and their fields and moved as refugees to areas outside Israel. The young country opened its gates to Jewish immigrants and 700,000 came within the first four years, doubling the number of Jews in Israel. Others followed thereafter.

After a period of shortages and difficulties, Israel's economy enjoyed growth and development for close to two decades, but by the early 1970s prices started rising and inflation escalated. It was halted in 1985 with drastic policy measures that hurt a great number of economic entities. Most agricultural cooperatives experienced a traumatic financial crisis. For many of them, the period since the crisis has been a period of reconstruction.

2 BEGINNING AND LONG RUN TRENDS

The history of the kibbutz started with the economic failure of a farm administrated by a public organization on the shores of the Sea of Galilee. Part of the land of the failed farm was given over, at their request, to the farm's workers. They were replaced a year later, in 1910, by a group of twelve youngsters who established on that spot the first kibbutz (Degania).

Although the twelve saw themselves as socialists and called their group a commune, the kibbutz was born spontaneously: the opportunity arose and they grasped it. Theory and ideology evolved later; but the idea of communes of pioneers settling the Land of Palestine caught the imagination of many throughout the Jewish diaspora, particularly in Eastern Europe, and by the end of World War I there were already several hundred youngsters preparing for farm life in Palestine. In due course, they came over, joined existing kibbutzim, or established communes of their own.

Reflecting political affiliations, kibbutzim were divided into federations ("movements" in Hebrew). The three major federations spanned the spectrum from Labor (center) to the left, a smaller federation was orthodox religious, and one single kibbutz was associated with the Communist Party. For decades the federations were headed by charismatic leaders articulating ideology and political guidance.

The first moshav (Nahalal) was established in 1921 and it was preconceived, modeled after the American family farm supplemented with cooperative ideas. The farms in the moshav were to be worked by family members, with mutual assistance if needed. Marketing and purchase of farm inputs was to be done cooperatively. The second-order marketing cooperative, Tnuva, was founded in 1926. It served all agricultural cooperatives, started by marketing general farm products but later specialized in dairy, poultry and beef. Today it is by far the largest dairy in the country.

Gradually, the kibbutzim and the moshavim grew in numbers and spread over the country. In 1947, just before the establishment of the State of Israel, there were 127 kibbutzim and 87 moshavim (Table 1). Today their numbers have reached 266 and 443 respectively, including 35 collective moshavim, with a population of 145,000 in the kibbutzim (nearly half of them adult members) and 290,000 in the moshavim.

Table 1: Cooperative communities in agriculture

	1947	**2011**
Kibbutzim	127	266
Moshavim	87	443

Most of the growth came after 1948 when many more moshavim than kibbutzim were set up. This was a period of "absorption" of large numbers of immigrants, the country had land, water projects were being developed, but the kibbutzim had lost in the holocaust their main source of pioneers – young people from

the Jewish diaspora in Europe. The immigrants that did come were not ready for or willing to pursue kibbutz life. Family farming was deemed more appropriate.

Agriculture in the kibbutzim is diversified – field crops, horticulture, and livestock. Most family units in the moshavim also started as diversified farms; but with time, many specialized in single lines: dairy, orchards, or flowers. Both kibbutzim and moshavim started off very poor and were assisted by national funds, but the kibbutzim had gained better access to the capital markets and accordingly they tended to rely on mechanical activities and left labor-intensive lines such as vegetables and flowers, particularly in greenhouses, to moshavim and private farming.

Agriculture in Israel, as in many other countries, experienced significant technological improvement and increased capital intensification. As the State economy grew, the opportunity cost of farm operators in agriculture increased; the cost of hired labor was reduced, especially when, after 1992, laborers from Thailand came to work on Israeli farms. Consequently total labor input in agriculture was reduced over time but the share of hired labor increased markedly. Many members in moshavim ceased farming, or their children did not continue in agriculture, while the remaining operators increased the scale of their farms. In kibbutzim the changes were manifested in a reduction of the number of members working in agriculture and expansion of manufacturing and services.

Kibbutzim and moshavim were also organized in second-order cooperatives, mostly regional associations that, among other activities, took care of water provision, transportation, or cultivation of remote fields. The "purchasing organizations" occupied a special place. The function of these associations was to act for moshavim or kibbutzim in the markets, particularly buying farm inputs on wholesale terms for distribution to their members. As agriculture developed the purchasing organizations established regional enterprises providing auxiliary services such as feed mills, slaughter houses, fruit packaging facilities, and cold storage. Being intermediaries in products and commodities, the purchasing organizations were naturally drawn into credit intermediation; later, the growth of this activity placed them at the heart of the financial crisis of the 1980s.

Other second-order cooperatives operated on the national scale; among them, Tnuva, the independent marketing enterprise, several credit funds, and purchasing cooperatives that extended across regional boundaries. These cross-regional associations were usually run by a kibbutz or moshav federation to serve the needs of its members.

3 KIBBUTZ, PRE-CRISIS: SOCIETY

The kibbutz was a commune.[2] In principle, members had no private property; they received their perquisites in kind. The dwellings were modest – a small single room per couple, food was served in a collective dining room, clothes were washed in the kibbutz laundry and, in ideologically strict kibbutzim, members did not have private clothes: they wore whatever they received each week from the general pool.

Again, in principle, members were assigned to work wherever the need arose, some in the kibbutz and others outside – if remunerative employment could be found. With time, as the kibbutz economy developed and diversified, members began to specialize in lines of production or services. Kibbutzim were generally ready to send their members to be trained, formally and informally, and to advance their technical qualifications. The structure of the kibbutz was here of great help, a member leaving temporarily could in most cases be replaced on his job. A family farm operator, in the moshav or elsewhere, could not so easily go away for a significant length of time.

Education occupied a special place in the life of the kibbutz. Children lived in communal homes and spent but two or three hours a day with their parents (only in a handful of kibbutzim did children stay with their parents overnight). Investment in schooling was intensive and the kibbutzim built teaching programs aimed at preparing their youngsters for life in the community. This regime was the subject of numerous academic studies and popular descriptions. Most often it was judged favorably; a book by an eminent Chicago psychologist was titled *The Children of the Dream* and an author who grew up on a kibbutz named her memoir *We Were the Future*.

Although a twelve year curriculum was the common standard, for many years schools in kibbutzim did not prepare for academic studies and higher education was allowed to a limited number of members and restricted to subject areas the kibbutz deemed necessary for its development. This attitude changed as the economic standing improved in most kibbutzim in the 1960s and the 1970s, and college or university training of their own choice became the right of all kibbutz youngsters. Other standards were also relaxed: dwellings expanded and members received budgetary allowances to spend at their choice on clothes, furniture, and other needs.

Economic conditions improved in most kibbutzim but, due to natural and social circumstances – or sheer luck – some kibbutzim did significantly better than

[2] The discussion of early periods is conducted in past tense; tenses will shift when more recent events are reached.

others. These differences did not much affect standards of living; guided by instructions coming down annually from the federations, the kibbutzim maintainned similar consumption and welfare outlays. As a result, kibbutzim in better shape accumulated equity and those that stayed behind gathered debts. There were no direct monetary transfers between kibbutzim.

A landmark change was the shift to family lodging: children moved to live with their parents. The change was gradual, in one kibbutz after the other, mostly in the late 1970s and early 1980s. It was a renunciation of a fundamental principle in the established educational doctrine and was adopted only after long and sometimes heated deliberations. In more than a few kibbutzim, these were the young mothers, women who themselves had grown up on the kibbutz, who did not want their children to relive their own experience of heavy peer pressure, strict discipline, distant parents, and, particularly, lack of privacy and the insecurity of being left alone at night.

The shift to family lodging marked and was one expression of a profound though informal structural change: the rise of the traditional family as a fundamental social unit in the kibbutz. The first-comers saw their groups as comprising collective families of brothers and sisters; but when the second generation, and then the third, appeared on the scene, families naturally clustered into "clans" that often acted in unison on internal kibbutz issues. These changes highlighted the gender question. It was said that the educational regime originated with the first mother handing over her newborn child to another woman to care for while she returned to milk the cows. This precedence notwithstanding and despite recurring expressions of the desire of women in kibbutzim to share with men responsibilities and tasks, most were assigned as a matter of course to education and service functions. The rise of the family and the return of the children only intensified differentiation.

The implementation of the shift to family dwelling required heavy investment, but the common feeling was that money was not a problem as unrestricted credit was easily available. In fact, however, for many kibbutzim this project was one of the last major capital outlays before the outbreak of the severe financial crisis of mid-1980s.

4 KIBBUTZ, PRE-CRISIS: MISSION AND ASSESSMENTS

Viewed from the present perspective, the kibbutz mission, summarized in slogan style below, seems obvious and natural. Historically it emerged from the experience of the founders and not least from soul searching and deliberations, often long into the night, of young people struggling with the weight of tradition, sudden freedom, separation from families, backbreaking work, and intoxicating philosophies:

- Nation building;
- Revival of Jewish agriculture;
- Back to manual labor;
- Creation of a just society;
- Promotion of socialism.

This was a difficult undertaking. By some estimates 80 percent of those joining kibbutzim left after a short or longer stay.

4.1 Nation building

When Palestine was under the British mandate, kibbutzim were settled wherever land could be purchased and in this way they often defined the borders of the state to be. Indeed, the partition map of the 1947 UN Resolution included most of the kibbutzim within the area of the future Jewish state, and some that had been left out by the resolution were later incorporated within the borders of the State after the 1948 war.

The kibbutzim were also instrumental in the development of a military capability, should an armed conflict erupt. Groups of young people stayed on kibbutzim combining work and (clandestine) training; they were ready to go the moment the war broke out.

The creation of the State inaugurated a new era although at the time many in the kibbutzim did not recognize (or refused to recognize) how profound a change this was. As indicated above, quite a few kibbutzim were established right after 1948 – many on the borders where their presence was vital. Still, their mission as nation builders lost its urgency and pressure. The roots of the long-run process of erosion of the kibbutzim's position at the forefront of the Israeli society were planted when it was realized that the new immigrants would not join them in masses.

4.2 Socialism

Being communes, the kibbutzim accomplished the mission of socialism to its fullest; but only internally. Outside it was mainly slogans and rhetoric; the call "To Zionism, to Socialism, to the Brotherhood of Nations" was printed daily on the front page of the newspaper of a kibbutz party. But, except for the very early days, members of kibbutzim did not belong to the proletariat; they may have marched on May Day, but they did not share the experience of the country's working class. The gap was manifested with the issue of hired labor.

In the early days of the State, when food was in short supply and employment was hard to find, the kibbutzim were asked to expand production, particularly of vegetables, with the help of hired hands. Most refused; by ideology they could not exploit the labor of others. One group of kibbutzim went part of the way:

officially farm production was done by an outside company created specifically for this function. But the façade did not fool anybody; the work was on kibbutz land and under the supervision of its members who returned at the end of the day to what could be seen from the outside as an oasis of greenery and social care. The practice of hired labor was later tolerated and spread to all kibbutzim, but the rift between the kibbutzim and the new immigrants – who constituted most of the working class of the country – did not abate and the gap, opened generations ago, is still wide.

Whatever the practice, ideological spirits were often high and controversies heated, sometimes reaching crisis proportions. In one case, seventy members from several kibbutzim left in 1927 for the Soviet Union, the land of true socialism, and set up a kibbutz on the Crimean Peninsula. Only three or four survived the Soviet regime, World War II, and the murderous German occupation.

A deeper crisis that affected the largest kibbutz federation had been developping gradually for almost two decades; the line of demarcation was between left and central-leaning members. The differences reached a crisis proportion in the early 1950s, and once again the attitude to the Soviet Union was the immediate cause. The Eastern Block supported Israel in the UN and in its early steps; as the Cold War intensified, members in kibbutzim were split between Soviet sympathizers and the majority who agreed with the Labor Party that Israel should belong to the Western Camp. The breakup occurred mainly on the issue of education, as parents of one side refused to let their children sit in classes taught by teachers holding a different opinion. In several cases kibbutzim split up physically, in others members moved to another kibbutz close to their political affiliation. People who for decades worked and suffered and celebrated together could not continue to live on the same piece of land. It took however only a short time for the Soviet block to change its policy and for sympathy and admiration to turn into disappointment and criticism; other differences also mellowed. With a little patience the crisis could have been avoided.

4.3 Politics

Members of kibbutzim were active politically. Again, the collective structure conveniently supported fulltime activists. They were also admired by the society of the young country for their pioneering endeavors. In the 1950s, when they were less than 4 percent of the population, kibbutz members formed a fifth of the representatives in the early Knessets (parliaments) and occupied up to six seats in the cabinet. The power base thus created helped to support policies favoring kibbutzim (and often also moshavim) in agriculture and in other economic spheres, finance in particular. However, as time passed, the glamor and the power faded. Only a single kibbutz member was voted to the Knesset in the

most recent elections of January 2013 and even he does not belong to a party that favors kibbutzim or cooperation.

4.4 Fundamental dilemma

The effort to adhere to the principle of self-labor in agriculture, manufacturing, and services – that is, all tasks are performed by members and hired workers are not employed – raises a fundamental dilemma, even if the issue of new immigrants is disregarded. In a competitive market, the return to labor in the kibbutz will be the same as the wages of unskilled, and relatively poor, workers in the economy. But by their background and aspirations, the members of the kibbutzim compared themselves with the urban middle class. So long as the country was poor and the economy egalitarian, adherence to the principle did not pose much of a problem; but development brought differentiation, and the kibbutzim were threatened with the possibility of being left behind their non-farm reference group. The moshavim faced the same threat. The urgency of the dilemma – whether to stick to the principle and risk losing members, or to compromise ideologically – was mitigated in several ways: production quotas were imposed by the government in the late 1950s, raising prices and increasing returns to farmers; state budget subsidies were later added, in particular for livestock products; and, as we shall see below, credit was also made easy, which supported capital intensification and consumption-oriented outlays. As we shall also see below, ideology was not always strictly adhered to and, when quotas were partially relaxed, subsidies eliminated, and credit restricted – ideology had to give way to economic reality

5 Classic moshav

The founders of the early moshavim asserted repeatedly that they were true socialists and would have surely agreed with the stated missions of the kibbutzim. But a seemingly minor qualification in the list of moshav principles – "with family units" – created significant differences between the two forms of organization.

Both the kibbutz and the moshav functioned within the legal framework of the Cooperative Societies Ordinance, but the kibbutz, where members could easily join and leave, operated mainly as a normative society following conventions of behavior and social habits – whether they were written or only generally accepted. The moshav, with families more heavily attached to their farms and properties, had to be founded on a stronger formal basis; it was a contractual society, and explicitly so. The original fundamental principles of the moshav were,

- Farming as the main source of income;
- Family units;
- Self-labor;

- Mutual aid;
- Mandatory cooperation in services;
- National land.

To implement the principles, each moshav adopted by-laws and appropriate institutions with authority to manage the cooperative association and its affairs. The mode of activity of the moshav, internal and external, reflected its nature and was aimed at augmenting its particular structure.

Unlike the conventional way in which a cooperative is formed by farmers voluntarily pooling together some of their tasks – in the moshav, the cooperative preceded the individual units. The association received land from the Jewish Agency and it, in turn, allocated the land to its members. Similarly, the moshav received bulk quantities of water, distributed it to its members for irrigation or household use, and paid the provider. When food supply was judged to have reached surplus levels and production quotas were imposed, they were assignned to the moshav for allocation to its members. The association acted as the village municipality, building schools, paving roads, and providing other public services. It also employed auxiliary workers, teachers, accountants, nurses, and other "professionals" who often lived in the moshav but were not active farmers. The costs of these activities were covered by the members, who paid taxes that the moshav imposed on products marketed or inputs purchased through the association.

Relying on cooperative spirit and practice, the moshavim created lively communities and advanced economically despite natural and political obstacles. However, they also encountered internal difficulties. The constraints imposed by the structure and rules of the moshav were occasionally biting. A farm could not be subdivided; only one son or daughter could continue on the parents' farm, others had to leave the moshav and, unless the farm was sold, the parents lacked resources to help non-succeeding children. Farm products had to be marketed only through the cooperative association even if private dealers offered higher prices. Farmers were prohibited from using hired labor even if their harvest rotted in the fields. Members in need of help often felt that they were at the mercy of the association functionaries. Operators who consistently lagged behind were shown the way out. Such hardships, when encountered by individual families, could be no less onerous than the collective but more diffused social controls of the kibbutzim.

Despite the obvious economic and social advantages of cooperation, members sometimes could not resist the desire or need to act separately: seek outside employment, market privately, allow a neighbor to cultivate their land. Some associations treated violators harshly; others cared less or were too weak to impose discipline. Carried by the logic that minor breaches open the door to

complete abandonment of norms, the moshav federation (there was one general federation and several minor ones) tried since its early days to strengthen adherence to the rules and even attempted to write the ideology of the moshav into state law. The proposed law would augment the power of the federation over individual moshavim and the power of the moshav over its members. The bill was vehemently opposed by many of the young, second-generation members of moshavim, who agreed with the norms but objected to state enforcement. The, Labor-centered government supported the bill but failed in its attempt to get it passed by the Knesset. By that time (1969) the strict normative framework of the moshav was already coming unstitched – in particular, hired workers started appearing in large numbers – and no law could arrest the rising economic forces.

6 Immigrants' moshavim

In its early years, Israel experienced unemployment, food shortage, and lack of financial resources. Immigrants, arriving in large waves, were housed in temporary camps, only a few worked, and they were fed and cared for by public agencies; to alleviate the situation, more than fifty thousand of them were directed to agriculture to set up new moshavim. It seemed so simple: each family received a plot of land, a little house, basic equipment and livestock – with proper advice and instruction they could soon start farming and rely on the institutions of the moshav for support and services. The reality was different. The newcomers had no experience in agriculture or in cooperation, many left and went back to the camps or sought better opportunities in town; those who stayed had to struggle with primitive living conditions and lack of basic necessities. The government (actually the Jewish Agency) helped, but its means were limited. The established veteran moshavim were ambivalent about the new ones. They were proud that the moshav, and not the rival and more popular kibbutz, was winning the day, and scores of their members went to live temporarily with the new immigrants and assist them in their first steps in the unfamiliar environment. But distance was also kept, the newcomers were made to form Immigrants' Moshavim, they were not invited to join the old, established villages.

Following several years of teething pains, the new moshavim grew into farming communities and contributed to the expansion of Israel's agricultural production, which quickly reached surplus proportions. Leadership naturally grew in the new moshavim, but although cooperative associations were formally instituted, in most places the ideology of the moshav was not strictly adhered to. Realizing that the veteran regional associations would not accept them for fear of jeopardizing financial stability, the immigrants' moshavim set up, with the help of the government, second-order regional cooperatives of their own. This had been done by the late 1950s and early 1960s. Up to that point, the moshav as a whole

was responsible for its members: water provision could be cut off when some of the farmers failed to pay. To avoid this eventuality, the new regionals, unlike the established ones, dealt directly with individual farmers.

Working at the regional level opened the road to the political arena. With large numbers of potential voters behind them, new immigrants became part of the leadership of the federation of the moshavim and the first active moshav farmer to become, in 1974, a member of the cabinet as the Minister of Agriculture was from an immigrants' moshav (Aharon Uzan).

Starting in the late 1960s, agriculture – particularly that in the moshavim – enjoyed a flourishing period that lasted for approximately 15 years: subsidies were expanding, the country's real rate of exchange more than doubled, local prices of export products were rising, and credit was easily available. Veterans and new farmers responded by expanding into the production of export crops. Cotton, mechanically picked, was grown mostly in kibbutzim, and horticulture – fruits, vegetables and flowers – was the domain of the moshavim. At that time, exports were managed by three specialized agencies and this concentration increased the role of the cooperative associations at both the region and the village level. At the same time, the cultivation of labor-intensive crops had to rely on large numbers of hired hands, compromising the principle of self-labor.

7 COOPERATIVE FINANCE

Cooperation in agriculture was originally built on necessity and ideology; however, with time and economic development, financial issues came to the fore. As indicated above, the cooperative in the moshav and the second-order associations of moshavim and kibbutzim provided purchasing, marketing, and other services. They were also involved in finance. The financial activity was encouraged, or even necessitated, by the ownership structure in cooperative agriculture. Land in moshavim and in kibbutzim was, and still is, owned by the state; there is no private landownership. Therefore farms cannot use land as collateral to obtain credit. The lacuna was replaced by so-called mutual guaranties: members in a moshav guaranteed the debt incurred by their associations, and moshavim and kibbutzim signed mutual, i.e., reciprocal, documents of guaranty. The cooperatives functioned as the hubs of the system of mutual guaranties. In some instances, credit was extended to individual famers or kibbutzim, in which case the village association or the regional cooperative were the instruments facilitating the comprehensive guaranties. In other cases, the village and the second-order cooperatives themselves raised credit and distributed it to their members, again under mutual guaranty. Consequently, cooperation in finance was strongly intertwined with the other aspects of farm activities; particularly, to back the guaranties, marketing had to be done solely through the cooperative

channels – the association in the moshav and Tnuva for both the moshavim and the kibbutzim. The banks were freed from the need to examine every individual creditor separately.

The guaranties were signed routinely on the insistence of the banks but the routines were empty. I do not know of a single case were a guarantor – kibbutz, moshav, or individual member – had to cover the debt of others. Cooperative credit relied, implicitly and by experience, on government backing.

The settlers in the moshavim and the kibbutzim came to Israel penniless; they had to rely on public assistance for tools and first inputs. Indeed, agricultural development was from its inception a national project creating fosterage relations between the farm sector – cooperatives in particular – and the government and other supporting national agencies. Beside agricultural research, extension, and planning, the principal channel of public economic assistance was in the form of credit for investment projects and other economic activities (the government also assisted manufacturing, especially if intended for export). The expressed responsibility for the sector created conditions of soft budget constraints: knowing that the government would come to their rescue should they run into difficulties, cooperatives went easily into debt (and readily signed guaranties). Generally the rescue came as "conversion." When cooperatives encountered difficulties in recycling their short-term debt, it was converted to long-term credit that the debtors were supposed to be able to service conveniently. The relief however was short-lived. In one case, observed in the 1950s, debt conversion was implemented in 72 kibbutzim; three years later all but two had incurred larger short-term liabilities than they had previously and were again expecting government rescue.

The government recognized the predicament and offered, in the early 1960s, a solution in the form of "concentrated credit": kibbutzim and moshavim that would channel their financial activities through a single bank and agree to supervision by the Ministry of Agriculture were assured stable credit lines to satisfy their (approved) needs. The program operated satisfactorily for several years, but then economic circumstances changed: the supply of commercial credit expanded (after 1974 Israel, like many other countries, experienced an inflow of recycled oil money); trusting the government to assist cooperatives in distress, banks were happily extending short-term loans to purchasing cooperatives and national funds who, in turn, redirected the resources to their members – kibbutzim, moshavim, and regional enterprises. Concentrated credit crumbled and its demise heralded the slide of the sector into the financial crisis.

8 THE ROAD TO THE CLIFF

The financial crisis took time to brew. Although most of the years were a good time for agriculture, the period following the 1973 war and up to 1985 was Israel's Lost Decade: growth stagnated; government deficits grew; debt, internal and external, accumulated; and prices rose. Inflation accelerated from 20 % per annum at the beginning of the period to 450 % at its end. It was halted abruptly in mid-1985.

Inflation was not a smooth process, it moved irregularly; likewise, policies to halt inflation or to accommodate the country to the rising prices fluctuated over a wide range of measures, introducing uncertainty and abrupt changes of economic conditions. In addition, bookkeeping and financial reporting became meaningless; farmers and cooperatives did not really know what their economic situation was. Inflation-adjusted accounting was introduced in 1982, but this was too late in the game. Another associated effect was that money became cheap; available data indicate that in 1979 the real rate of interest on commercial credit was -11 % (negative) and much lower on government approved short- and long-term debt. This was a honey trap. At the beginning of the period the value of debt eroded and the cooperatives accumulated assets. Consequently, the demand for credit expanded and farmers were pressing for additional finance, which they claimed was too slow to come.

The bureaucracy agreed with the farmers. An example was a committee of public officials that submitted in 1979 a detailed report on credit in agriculture. The core of the document was the calculation of the "financing gap", the difference – it was significant – between yearly investment in the sector and long-term credit. The government was called to fulfill its duty and close the gap. Whether it was sheer ignorance or favoritism, the members of the committee did not realize that agriculture was willingly expanding its capital outlays, relying on available and convenient short-term credit – trusting that the accumulating debt was the problem of the government: it would never let moshavim and kibbutzim down.

Easily available credit at negative real rates encouraged overinvestment in large risky projects. This tendency was extended and exaggerated when economic conditions could not be gauged due to inflation and shortage of funds was closed by recycling short-term debt. Officials in cooperatives were judged mainly by the projects they set up and government offices approved and supported regional enterprises with little if any regard for other available institutions. The tendency was strengthened by the desire of the moshavim to imitate the manufacturing industries in the kibbutzim. In the mid-1980s, the State Comptroller examined more than 300 regional enterprises and found that most of them did

not fully utilize their existing capacity; they did not even cover operating costs. In one case, an enterprise was built and completed – and then left idle, never to produce anything.

When credit was flowing freely, everything looked rosy: machines were new, orchards were young, houses in good state of repair, public areas green. Many operators in moshavim constructed new greenhouses; the kibbutzim increased their investments in manufacturing enterprises. Optimism ruled; even the banks were not exempted. A political upheaval sent a shock wave: the Labor-centered government was ousted in 1977 by a right-wing coalition of parties whose rhetoric was explicitly anti-kibbutz. The change sounded an alarm in the kibbutzim and the two largest federations raised significant amounts of money "to hold for rainy days", a large share of it abroad (an early action of the new government was to free the foreign currency market). The availability of these funds supported for a while the feeling of easy credit but the atmosphere changed after a short time when large sums of money were lost in the stock exchange and the gray market, foreshadowing the financial crisis to come. The gravity of the situation was realized, at least by some, but too late for amendments. When the crisis erupted, the per capita debt of the kibbutzim was several times larger than that of the moshavim. (The religious kibbutzim were an exception; they had not expanded heavily into manufacturing, had not sought new credit sources, and had invested their surplus money in solid instruments. They rode out the financial turbulence, when it came, relatively easily.)

Available credit was channeled partly to consumption; it was estimated in the 1970s that the standard of living in the kibbutzim was on a par with their urban reference groups, thus augmenting social stability and attractiveness. However, easy credit also intensified the inherent inefficiencies in the kibbutzim. Although most members worked diligently, shirking could not be completely avoided and indifference to common costs and returns was also noted (it was reported that electricity bills in the residential area of a kibbutz fell by 40 % once members began to be charged individually). However, much more damaging than personal slackness were inflated services, schools with small numbers of children, expensive public buildings, and lax scrutiny of investments. Personal choice was also limited: "to each according to his needs" meant that others decided, even if democratically. Reforms adopted in the wake of the financial crisis were aimed at least partly to mend these shortcomings.

9 THE FINANCIAL CRISIS AND ITS RESOLUTION

In 1985, when inflation reached devastating rates, a left-right coalition government, trusting it had the support of significant parts of the public, adopted a drastic stabilization program: prices, wages, and nominal exchange rates were

fixed and credit was constrained. Immediately the inflation dropped from more than 400 percent to 20 percent annually and was further suppressed later; one consequence was that real annual rates of interest jumped to 30-40 percent and even higher. It was realized that the debt of agriculture was so large that it threatened the stability of the national banks; they refused to recycle short term debts and allowed the resulting overdrafts to swell with the exorbitant rates of interest. Regional and national cooperatives collapsed and all their obligations were to be attributed to their members – the kibbutzim, the village associations, and the farmers in the moshavim. Agriculture suffered doubly as the real exchange rate fell by a third, subsidies were cut, and the sector's terms of trade worsened. Many, in particular in the moshavim, could not continue farming.

The government, the banks, and the cooperatives tried to solve the crisis. Repeatedly they signed agreements to settle the debts and repeatedly they had to realize that the debts were not settled. Finally, a law was passed in 1992 specifying the way repayment ability would be assessed for each and every moshav member. An administration was set up to implement the law; soon a parallel administration started working on the debts of the kibbutzim. The work lasted twenty years and is only now (2013) coming to completion. The moshavim were assigned to repay 10 percent and the kibbutzim 30 percent of their calculated debts (no detailed information is available), the remaining sums were erased; covered by the banks, the government and some private creditors. All mutual guaranties were canceled and all purchasing organizations of the moshavim were closed down. Three quarters of Tnuva, the marketing giant, were sold several years ago to private interests and some kibbutzim and moahsvim used the money received for debt payments. In one aspect – perhaps the only aspect to count–the settlements were a complete success: no one, not a kibbutz, a moshav or an individual farmer had to leave the land in lieu of debt repayment. But far reaching changes have occurred and are occurring.

10 RESTRUCTURING

The financial crisis threatened the livelihoods of a large number of kibbutzim and caused many members, particularly young ones, to leave. Kibbutzim in stress reacted by encouraging their members to find employment off the kibbutz, hiring outsiders as managers, charging members for services, and, most revolutionary, paying members market-rate salaries. These and other "privatization" measured raised the question of whether communities adopting such practices could still be regarded as kibbutzim. A public-government committee was appointed and, after a lengthy study, a new definition was adopted by law in 2005. The old definition was a single terse sentence indicating collective ownership and leaving the details to the by-laws of the individual kibbutz. The new definition is spread over several pages of regulations. Three types are

recognized. *Collective Kibbutz* is the old conventional entity. *Renewed Kibbutz* is a kibbutz where any of the following holds: members receive salaries; the housing is privately owned; the collective means of production are privatized by distributing shares to members – provided that voting rights remain vested in the community at large. The third type is new, *Urban Kibbutz*; more than a few such small communes have sprung in recent years.

The bulk of the regulations deals with the renewed kibbutz and specifies in great detail the minimum requirements of assistance to the elderly or the needy and the way assets may be privatized. With these changes the kibbutz was transformed from a normative society to a legal-based entity; members and outsiders, among them tax authorities, know the rules of the game. Disputes have already been brought before courts.

The renewed kibbutz differs from an ordinary rural community in two ways. First, it maintains an internal "safety net" of mutual responsibility for basic necessities and vital services to all members, financed by returns from the collective enterprises and levies imposed on the wage earners; and second, it may democratically change its status. The kibbutz was never perfectly egalitarian – elites emerged and may have enjoyed preferred amenities (free use of cars was a notorious eyesore), but much greater differences can now be found in the renewed communities and complaints of deprivation have been heard (opinion surveys are conducted regularly but quantitative economic data are not available). Particularly controversial is the situation of the pensioners; many claim that the monetary allotment assigned to them by the new regulations is too small, especially compared to the salaries younger members receive in the kibbutz or outside. This controversy may yet tear some kibbutzim apart. Still, surveys indicate that the majority of the members are satisfied with the reforms and agreed that they improved performance and welfare.

Less than a third of the kibbutzim have not changed to renewed and stayed collective, although most have gone part of the way, for example, employing hired labor in manufacturing or paying members for weekend work. In general the collective kibbutzim are well-to-do. The majority of their members naturally accept the traditional ideology, but they also enjoy certain advantages; among them, secured, comfortable standard of living; work in a familiar environment; intensive social interaction; they are not evaluated and do not have to evaluate their neighbors and friends in pecuniary terms. Kibbutzim that could afford it stayed collective despite the inherent inefficiencies. The commune that originated as a means to overcome poverty, shortage, and hardships has become a luxury good.

In the kibbutz, particularly in the renewed kibbutz, the crisis and the changes it caused affected drastically the way of life of the individual members, but the

economic activities of the community – in agriculture, manufacturing, and commercial services – remained collective. In the moshav the most affected level was the cooperative. All regional purchasing organizations of moshavim disappeared and the associated economic enterprises, feed mills, slaughter houses, cold storage, and the like were sold or closed down. Officially, the village associations remained intact but they lost many of their functions and much of their power; in particular, they no longer provide inputs, marketing services, and – most importantly – financial intermediation. Also, they no longer extend aid to households in difficulties. Farm operators in the moshavim are now served directly by private agencies and in quite a few places by small local cooperatives or partnerships that stepped in to fill the void. As indicated, self-employed agricultural labor has decreased over time. Most moshavim are now rural communities with a relatively small number of farmers who have increased the scale of their operations by expanding livestock enterprises or renting land from their neighbors (purchasing is impossible); field and barn work is usually done with the help of hired hands.

11 MANUFACTURING

Manufacturing in the kibbutzim started with small workshops, a natural expansion in several places was into food canning as an extension of agricultural production; later it branched into other lines and spread effectively to all the kibbutzim (some established commercial services such as hotels or shopping centers). Manufacturing was deemed to have several beneficial effects: it could use labor freed from agriculture, particularly the elderly, it opened opportunities for professional development of young members, and it added to the portfolio of economic activities of the community. These expectations were, at least partly, realized but problems were also encountered. Manufacturing on a significant scale was established when credit was available; infusion of capital increased demand for labor and hired workers were called in – some to perform manual and repetitive work and others as experts. For many kibbutzim this was the first breach of the principle of self-labor. Other problems were social; with manufacturing came a regime of professional delineation and hierarchy, alien to the nature of the kibbutz community.

Manufacturing also poses risks: a kibbutz will generally operate only one or two industrial lines and it would be difficult to find in its small community people who can run and manage a complex production process in a competitive environment. Indeed, in the nature of risk, the manufacturing establishment of some kibbutzim succeeded, grew, and even achieved global reach, while many others failed and had to close down. Today, a third of the kibbutzim do not have any manufacturing activities, but for the sector as a whole, the value of output in manufacturing is much higher than the value of the product of agriculture.

12 REGIONALS

Regional, second-order cooperatives were first established by kibbutzim in the 1940s and early 1950s as purchasing organizations intended to reduce transaction costs and augment market power in the provision of production inputs; they were followed by similar organizations set up by veteran moshavim and later also by new immigrants' moshavim. As indicated, the regionals were drawn into financial intermediation; this was true for both sectors, but the differences between them turned out to be crucial.

In the moshavim, most of the credit came through the regionals; it was transferred to village associations and thence to individual members. When the financial crisis hit, everyone was responsible and everyone claimed to rely on the all-embracing web of mutual guaranties. There was no way but to acknowledge, as the law finally did, that these debts could not be collected and the regionals had to be liquidated with all their enterprises.

The situation in the kibbutzim was different. Although the regionals in the kibbutz sector also engaged in financial intermediation, this was on a relatively small scale; individual kibbutzim had direct access to banks and to other major sources represented by federation-level funds. These funds were closed down after the crisis but the sector's regionals survived, admittedly due to debt settlements and sufficient write-offs. A fortunate period followed. In the 1990s Israel absorbed large numbers of immigrants from the former Soviet Union and the economy expanded. Pertinent to our story, meat consumption (beef and particularly poultry) doubled and the volume of operations of the regionals, the providers of feed and owners of slaughter and processing facilities, grew to unprecedented magnitudes. Growth in monetary terms was further augmented when world grain and oil seed prices rose markedly. The regionals accumulated surpluses which they used to assist distressed kibbutzim and to expand their own operations. Today the regionals are still organized as cooperatives, but in fact they are holding companies in partnerships with kibbutzim and private interests. One regional holds for its member-kibbutzim a 20 % share in Tnuva.

13 RESOURCE REALLOCATION AND IDEOLOGY

Net income in agriculture grew significantly since the 1990s and it rose particularly in the first decade of the 2000s. Considering that the sector's terms of trade were consistently deteriorating, improved income was especially remarkable; it was a realization of augmented efficiency. Since the crisis, its resolution, and reconstruction, agriculture has experienced a period of resource reallocation. Kibbutzim separated their economic activities from the affairs of the communities and hired experts to manage each segment. In renewed kibbutzim members or

outsiders are assigned to work only where their contribution exceeds the salary they receive, others work off the kibbutz; many kibbutzim went into partnerships with other kibbutzim in field crops and dairy livestock (partly to comply with stringent environmental regulations); the country's broiler production has been concentrated in the kibbutzim where economies of scale are realized; several regionals manage the cultivation of orchards and marketing of fruits jointly with individual kibbutzim; and one regional created a poultry integration styled on the American model.

Parallel changes occurred in the moshavim. Farm sizes are now larger than they used to be and in more than a few places two or three operators share land or livestock enterprises. Hired workers are employed wherever they may contribute. Services and inputs are purchased on the market and farmers are no longer tied to inefficient village or sector providers. Although prosperity is not shared by all, general farm income has risen.

Manufacturing also witnessed significant structural changes. Several kibbutzim created partnerships and others sold parts of their activities to private interests. Such moves have brought in business expertise and capital that can be used to cover debt or to fund retirement plans. Another benefit is diversification – not to hang the future of the kibbutz too heavily on a single source of income, even if at present it is laying golden eggs.

The economic landscape in the kibbutzim and the moshavim has changed markedly in the last two or three decades. Shopping and service centers are seen in the countryside, many residents – members and others – commute regularly to work away from their homes, but small, local enterprises are also flourishing. Most conspicuous is rural tourism, inns in the kibbutzim and B&B in the moshavim; but a variety of other establishments can also be found in both sectors, hairdressing, tour-guiding, boutique bakeries, computing, and what not.

These changes run counter to the wording and spirit of the original ideology of cooperation – whether in the communal kibbutz or of the family variety in the classic moshav. Naturally, ideology was set aside when the traumatic crisis hit and economic rescue became paramount, but the dilution of the ideological basis started earlier. The members of moshavim and kibbutzim were not hermits sanctifying scarcity and seclusion. They were part and parcel of the Israeli society and when the country's living standards improved, while terms of trade of agriculture deteriorated, the "fundamental dilemma" raised its head and the cooperatives could not stay behind; they had to give up, gradually and even painfully, their basic principles. They accepted hired labor – first new immigrants, then in manufacturing and in greenhouses – and they agreed to family dwellings and private partnerships. For youngsters born in kibbutzim and moshavim the

shedding of ideology was a lot easier than for their parents. The financial crisis and its aftermath sealed the departure from orthodox ideology.

The reforms and restructuring do not assure the future of the kibbutzim. In particular, where the collective enterprises do not generate enough income to support the elderly and other common services, the kibbutz may find it necessary to impose relatively high community taxes on its wage-earning members; but this could be a vicious circle – the best and the brightest may leave. The mere existence of the locality will be further endangered where, due to legal difficulties, the kibbutz is prevented from accepting outsiders as residents.

15 RURAL COMMUNITIES AND THEIR LAND

Kibbutzim and moshavim are small communities; their populations have aged not only with time, but also with the tendency of younger people to leave. One solution was "expansion", the development of residential areas for young families of non-members, including the younger generation who chose to live in their birthplace without becoming full-fledged members of the kibbutz or the moshav. Formally, the locality was then transformed into a municipality where some of the residents hold membership in a separate association. In addition, kibbutzim and moshavim rented out land to commercial enterprises. These real estate activities created income; again, it was used where needed to assist in debt repayment. They also sparked opposition: the land was given for farming; additional income belonged to the public at large and not to a small, select minority. The opposition was led by a group of youngsters representing immigrants of the early days of the State of Israel – mostly of "eastern" origin: from the Middle East and North Africa. When the case was brought before the Supreme Court, it ruled in 2002 in favor of the opposition. The popular utterance was against the kibbutzim, but the moshavim were also severely affected. Expansion and development programs were set back and land issues, including the privatization of housing in the kibbutzim, are now in flux. In the meantime, land prices in urban areas of Israel have risen sharply and ownership of a house or an apartment is now unaffordable to many budding families. But this issue and its possible connection to farm land policy is beyond the scope of this chapter.

16 EPILOG

It is impossible to imagine today the difficulties the first-comers had to face; the shortages, sometimes starvation, diseases, hard work, and uncertain future. The new immigrants in the early days of the State did not have it easier. They were hauled by trucks without their consent to isolated places in the desert or on the hills and had to start from nothing. The achievements of these people are laudable; today the country's agricultural output is twenty times its 1950

level and the lion's share of the credit is due to cooperative farms; kibbutzim further branched into manufacturing. But cooperation, close to the way it was originally envisaged, is practiced only in a relatively small number of collective kibbutzim. In other places, cooperation is followed only where it can be justified by cold economic calculation.

The founders of the kibbutzim and the moshavim hoped to spread socialism and equality to all corners of the land, but history may judge that farm cooperation in Israel functioned as an instrument to achieve other, associated goals more than as an end to itself. However, as an instrument it was highly successful; Jews returned to the land and the country is covered by agricultural communities, most of them cooperative (some in areas occupied in 1967, but they are a different story). Ideology may have been abandoned, but the ideological candle has not been snuffed out completely – new kibbutzim are still being set up, some with ecological inclinations and many others in urban centers. Young people keep trying and will probably continue trying the experience of togetherness and public service.

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