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From Public to Private Governance of Agri-food Supply Chains in Transition Countries : Some Theoretical and Empirical Lessons

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the lessons learned.“**

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Introduction ¹

The objective of the seminar is to draw lessons from the experience of agricultural transition. This paper contributes to this objective by presenting lessons from the transition of the governance of the agri-food supply chains. My presentation will use both empirical evidence and theory to bring out some of the key lessons.

It is useful to start by pointing out that one of the main insights from the study of the transition process is that it may have learned the profession as much about the workings of a market economy and the governance processes in general than it did about the transition process itself. The dramatic increase in the study of the role of institutions in economic performance and development is a sign of the lessons from the past 15 years.

The governance systems of agri-food supply chains are crucial factors in the organization of trade and production, and have major impacts on economic performance and development.² The governance of food and agricultural commodity value chains in transition countries have undergone tremendous changes in the past decades. In particular, one can identify a dramatic shift from public (or state) governance to private governance of the agri-food systems. Companies and property rights have been privatized, markets liberalized, and economies integrated into global food systems.

Important lessons from these changes were (a) that the shift to a “market system” coincided with much more disruptions than anticipated, contributing to the output and productivity fall in the 1990s, and (b) that the growth of the “market system” was only partially based on (spot) “markets” but a variety of other institutional arrangements – often “hybrid organizations” in Oliver Williamson’s (1985) framework – have emerged as the preferred governance structures in agri-food markets.

In this paper we discuss the importance of these changes in governance, their implications for efficiency and equity, and the effects in transition countries. The discussion in this paper draws on our empirical and theoretical work in this field.

¹ The paper summarizes key findings from several of our studies. We refer to these studies for more detailed arguments, data and empirical evidence, and analyses (see also reference list).

We would like to use this occasion to thank many colleagues with whom we have collaborated on these research issues and from whom we have learned through many discussions and exchanges, including Hamish Gow, Tom Reardon, Csaba Csaki, Azeta Cungu, Liesbeth Dries, Nivelin Noev, Chris Foster, Jan Falkowski, Domenica Milczarek, Etleva Germenji, Volker Beckman, Monika Hartmann, Miet Maertens, Siemen van Berkum, Benoit Blarel, Matthew Gorton, Marc Sadler, Bill Liefert, Kees van der Meer, Steve Jaffee, Emmanuel Hidier, and various colleagues at the OECD, EBRD and the World Bank who have been very supportive of our work in this field.

² There is an extensive literature on the governance of economic activities in general (e.g. Williamson 1985) and on supply chain governance in particular (e.g. Gereffi et al., 2005). An important focus in this literature is on the non-market coordination of economic activities and transactions in commodity chains.

Privatization and liberalization

In the Communist world the entire agri-food system was under strict control of the state. This system of state intervention and control has undergone tremendous changes as a global process of liberalization induced dramatic changes in many of these regions. In the transition world, the liberalization of prices, trade and exchanges, the privatization of the state enterprises etc. removed much of the state control over the commodity chains as well as the vertical coordination in the chains.

These developments have been reinforced by the liberalization of trade and investment regimes in transition and developing countries – policy reforms which often accompanied the privatization and domestic price reforms. Trade liberalization caused major changes in trade of agri-food products, while the liberalization of the investment regimes induced foreign investments in agribusiness, food industry, and further down the chain, with major implications for farmers (Dries and Swinnen, 2004). Several food sectors in Eastern Europe, such as the sugar, dairy, and retail sector, have received massive amounts of foreign investment, which now holds dominant market shares. An example is the rapid growth of modern retail chains (“supermarkets”) in transition and developing countries which was triggered by the reform process in former state-controlled economies (Reardon and Swinnen, 2004) – see figure 1.

Associated with these changes is the spread of (private and public) food standards and an increase in the share of high-value products in agricultural production, food consumption, and trade. Consumers are increasingly demanding specific quality attributes of processed and fresh food products and are increasingly aware of food safety issues. These food quality and safety demands are most pronounced in rich country markets (and increasingly in urban markets of low-income countries) and affect producers through domestic supply chains, trade, and foreign investment.

Interestingly, while the liberalization and privatization process has caused the growth of private “markets”, these organization of these markets has been far from uniform. The simplest framework from Oliver Williamson distinguishes between “markets” (spot markets) on the one extreme and “hierarchies” (such as fully vertically integrated companies) on the other extreme, and a variety of “hybrid organizations” (including various forms of contracting between separate companies) in between those extremes. In those terms, the current agri-food markets in transition countries represent a rich mixture of all these types of organizations, going from spot markets to the (re-)emergence of huge vertically integrated agri-food companies in Russia.³ We also observe a variety of contract systems, introduced by private companies as a means to coordinate exchange in vertical commodity supply chains. In the rest of this presentation we focus on the emergence of hybrid forms of vertical coordination, on which conditions have stimulated their growth, and on their effects on efficiency and income distribution. Through this analysis of the hybrid forms we also learn about the other farms, since these will emerge in the extreme conditions.

From Public to Private Vertical Coordination

³ See Serova (2007) for an analysis of the Russian agri-food complexes.

State-controlled vertical coordination

Under the Communist regime, production and processing were centrally planned and vertically integrated. Industries were composed of large state-owned firms. The central authority provided contract enforcement and transacting parties faced a low (or zero) probability of contract breach. Vertical coordination (VC) was widespread in state-controlled food supply chains as production at various stages and the exchange of inputs and outputs along the chain was coordinated and determined by the central command system.

Most analyses pointed at the deficiencies and inefficiencies of these systems. State-controlled VC in centralized agricultural marketing systems in Communist countries was often motivated by political motives and by objectives to provide cheap food for urban markets, the maximization of foreign exchange earnings, the creation of rural employment, ascertaining the viability of certain businesses, etc. This was considered one of the primary causes of the inefficiency of the Soviet farming complex (Johnson and Brooks, 1983).

Liberalization, privatization, and the break-down of vertical coordination

This system of vertical coordination has undergone tremendous changes in the 1980s and the 1990s. Reforms caused several institutional changes, which lead to contract breaches, the collapse of vertical coordination and major disruptions in the food chain – as it did elsewhere in the economy (Blanchard and Kremer, 1997; Gow and Swinnen, 1998, 2001). First, economic reforms split the vertically integrated chains into autonomous enterprises. Second, privatization and restructuring of the companies in the agri-food chain created many independent enterprises. Third, the previous legal system or the central planning authority was no longer able to enforce the contractual terms and a new legal enforcement mechanism was absent or ineffective. Fourth, macro-economic reforms and price and trade liberalization caused dramatic changes in both nominal and relative prices.

These dramatic and unanticipated shocks caused major disruptions and, in the absence of legal enforcement mechanisms, widespread contracting breaches resulted. The probability of contract breach was reinforced by two factors. First, the combination of macro-economic reforms, the simultaneous institutional reform of the banking system, both raising the cost of capital, and the cut in government subsidies caused severe financial distress for companies, thereby effectively reducing their capital costs of breaching the contract. Second, from a dynamic perspective, the probability of contract breach was self-reinforcing, as it undermined the reputation of the processing company, thereby reducing reputational incentives to honor future contracts.

A widespread form of transition hold-ups has been long payment delays for delivered product. Such payment delays effectively provided processors with an interest free loan from suppliers for the length of the delay, and caused a major drain on much needed cash flow for suppliers. Gow and Swinnen (1998) documented this problem with examples from the sugar and dairy sector in Slovakia in the early 1990s. Gorton et al (2000) find that food processing companies in 1999 considered late payments the single most important obstacle to company growth in Czech Republic and Slovenia, and number 3 out of 12 causes in Hungary.

Not only food processing companies breached contracts. Other widespread examples were when suppliers did not deliver the quality or quantity agreed upon. Quality and guaranteed supplies of raw material is crucial for processors, but processors in transition countries often have severe problems in obtaining sufficient quality supplies. Enforcing quality, and timely deliveries, is difficult in general in some sectors, e.g. such as the food industry with agricultural production affected by unobservable factors, and even more problematic in transition countries. Changes in property rights, restructuring, macro-economic reforms, etc. all affect the farms' operation, and hence the volume and quality of their output.

These exchange disruptions had major negative effects. First, they caused additional financial strain and worsened suppliers' already severe cash flow and profitability problems. A major effect of this was massive slaughtering of livestock throughout transition countries as farms could no longer finance feed at intensive livestock operations. Cattle and hog stocks fell dramatically over the 1990s in many countries.

Second, companies changed their activities and investments. In general, they cut back on relationship-specific investments. For example, a case study by Gow et al. (2000) shows that after the reforms which caused severe payment delays by a Slovakian sugar processing company, sugar beet deliveries to the processing company declined by around 30% from 1990 to 1993, and contracted hectares fell even more. Cungu and Swinnen (2003) find in a representative survey of 371 Hungarian farming enterprises, of which 318 were contracting with processors, that there is a significant negative effect of the perceived likelihood of contract breaches on the farms' investments in capital assets. Other general responses were to shift exchange to spot markets, or cash transactions, to terminate activities waiting for better market conditions, or to internalize exchange transactions through vertical integration. An example of the latter is grain farms, who traditionally delivered their products directly to mills, who started investing in on-farm storage facilities.

The emergence of private vertical coordination

However, following privatization and liberalization, new forms of VC have emerged and are growing (Swinnen, 2007; World Bank, 2005). These are no longer state-controlled but are introduced by private companies. Private traders, retailers, agribusinesses and food processing companies increasingly contract with farms and rural households to whom they provide inputs and services in return for guaranteed and quality supplies.

The emergence and spread of private VC is caused by the combination of, on the one hand, an increasing demand for products of high quality and safety standards with private sector investments and increasing consumer incomes and demands (both domestically and through trade) and, on the other hand, the problems which farms face to supply such products reliably, consistently and timely to processors and traders due to a variety of market imperfections and poor public institutions.

Farmers in transition countries face major constraints in realizing high-quality, consistent supplies. These include financial constraints as well as difficulties in input markets, lack of technical and managerial capacity etc. Specifically for high-standards

products, farmers might lack the expertise and have no access to crucial inputs such as improved seeds. To guarantee consistent and quality supplies, traders and processors engage in VC to overcome farmers' constraints.

The importance of VC in transition countries is further explained by the lack of efficient institutions and infrastructure to assure consistent, reliable, quality and timely supply through spot market arrangements. VC is in fact a private institutional response to the above described market constraints. To overcome problems of enforcement and constraints on quality supplies, private VC systems are set up by processors, traders, retailers and input suppliers.

Increasing consumer demand for quality and food safety is another driving force behind private VC in transition and developing countries. Investment by modern processors and retailers (supermarket chains) reinforces the need for supplying large and consistent volumes by their use of private standards and requirements of extensive supervision and control of production processes.

There is growing evidence on the importance of these developments.⁴ Over the past years, researchers from Leuven have implemented a series of surveys in the CEE dairy sector. There we find that vertical coordination (including the provision of credit, inputs and loan guarantees) is strongly positively correlated with the progress in reforms (see figure 2). Case studies by van Berkum (2006) and van Berkum and Bijman (2006) further confirm that the introduction of vertical integration with farm assistance programs is becoming the norm rather than the exception in Eastern European dairy sectors. After (often foreign) take-overs and investments, dairy processing typically plant started a series of quality improvement services and assistance programmes for farms delivering milk to the plants. The type of assistance and logistics differ between companies and regions to address local characteristics (eg domination of small versus large farms; and quality and technological standards of farms), but the strategic approach is very similar.

Surveys by White and Gorton (2004) of agri-food processors in five CIS countries found that food companies which used contracts with suppliers grew from slightly more than one-third in 1997 to almost three-quarters by 2003. There is also significant growth of supplier support measures – including credit, inputs, prompt payments, transportation, and quality control – as part of these contracts. Over 40% of processors in the CIS sample offer credit to at least some of the farms that supply them; and 36% offered inputs, in 2003.

In more developed situations, or where farms are in a better managerial and financial situation, reducing risk is an important element in contracting. For example, at the end of the 1990s, in the Czech Republic, Slovakia and Hungary, 80% of corporate farms sold (at least some) crops on contract, and 60-85% sold animal products on contract (table 1). However, for most of those farms with contracts quoted security of outlets and prices as the main reasons for entering in contracts with processing companies. This contrast strongly with less developed situations, such as small cotton farms in

⁴ A review of empirical evidence and studies in various countries and sectors is in Swinnen (2006, 2007) and in World Bank (2005). See also various other studies by Csaba Csaki and Csaba Forgacs at Comenius University in Budapest, by Jan Falkowski and Domenica Milczarek at the University of Warsaw, by Silke Boger and Volker Beckman at Humboldt University, by Liesbeth Dries (KU Leuven), by Siemen van Berkum (LEI/WUR), by Matthew Gorton (Newcastle University), and their colleagues, and by the FAO Investment Center and EBRD.

Kazakhstan, where contracting with processors is also widespread (71% of farms in the survey used contracts, including the provision of seeds, credit and irrigation), the most important reason for contracting is access to inputs.

The Efficiency and Equity Effects of Vertical Coordination with Costly Enforcement and Imperfect Factor Markets

While some have emphasized that the emergence of private VC can be an engine for economic growth, rural development and poverty reduction; others have stressed a series of problems with these developments. One important issue is the enforcement of such contractual arrangements in transition countries which are often characterized by poorly functioning enforcement institutions which can add significantly to the cost of contracting and which may prevent actual contracting to take place.⁵

Another important issue is that the rapid growth of these modern supply chains in transition (and other emerging or developing) countries has stimulated a vigorous public debate in the development community on the income distributional effects of these changes. Some have argued that they are reinforcing inequality and poverty as they are excluding the weakest from participating in these vertically coordinated processes and that large and often multinational companies are extracting all the surplus from the gains through their bargaining power within the chains (e.g. Reardon and Buerdegé 2002). Others find more positive effects on development (e.g. Dries and Swinnen, 2004; Maertens and Swinnen, 2006).

To address these issues, we present a theoretical model and summarize some empirical evidence to evaluate the sustainability and impact of VC in transition countries. We distinguish between efficiency effects and equity effects.

A Conceptual Model

In this section, we present a conceptual model to explain the observed differences in chain governance, in particular the (lack of) emergence of VC and the distribution of the created surplus along the value chain.

Consider the situation where a household farm or a farming company – which we refer to as “the *farmer*” – can sell farm products to a trader or a processing or retailing company – which we refer to as “the *processor*”. This processor sells the product (after transporting, processing, retailing, etc) to consumers – either domestically or internationally. Let θ represent the value that is created by this transaction, net of the “processing” costs. Hence, θ is the value to be distributed between the processor and the farmer, taking into account the farmers production costs.

The production of commodities for the market requires some (specific) input use (e.g. fertilizers, credit, seeds, technology). Assume that to produce one unit of output, the farmer requires specific inputs with a value of I on top of his standard production cost for subsistence production (e.g. labour, land). We assume that these specific inputs are not available to the farmer because of factor market imperfections. This is a realistic

⁵ There is an extensive literature on the role of formal and informal enforcement institutions in development, e.g. North, Platteau, Greif, Fafchamps, etc.

assumption as in many developing countries local producers and households face important factor market constraints. These constraints hurt both farmers and processors: they prevent farmers from producing for the market and constrain the raw materials for the processing firm.

If the processing firm has access to the required inputs, the processor can act as an intermediary in the input market and provide (sell or lend) the inputs to the farmer. This, again, is a realistic case since the processor may have better collateral, more cash flow or face lower transport or transaction costs in accessing the inputs. If so, the processor will consider offering a contract to the farmer, which includes the provision of inputs and the conditions (time, amount and price) for purchasing the farmer's product. We assume that the processor provides the farmer with the full amount of required inputs I per unit of production, or the processor does not provide any inputs⁶.

Note that in such a contract, each agent can hold-up the other agent. On the one hand, the farmer can divert the inputs to other uses, such as selling them or applying them to other production activities; or he may apply the inputs as agreed but then sell the output to competing buyers for a higher price. On the other hand, the buyer may pay a lower price to the farmer than was originally agreed on, or simply postpone payment – a common practice in reality.

In the rest of this section we will show graphically and discuss under which conditions a contract is agreed upon and enforced (implying the creation of surplus) and the distribution of the contract surplus (A formal analysis is in Swinnen and Vandeplass (2007)). The participation constraints of the farmer and the processor and their incentive compatibility constraints play a crucial role here.

Markets with perfect enforcement

To establish a baseline result, we start with assuming perfect (and costless) contract enforcement. Hence, if there exists a contract that satisfies both the farmer and the processor's participation constraints, it will be realized. The participation constraints state that the contract should yield a higher payoff for both agents than the disagreement outcome, where the farmer and the processor do not trade at all.

As enforcement is guaranteed, there is no risk of opportunistic behavior by any of the contract parties. In this case, we assume that the contract surplus is shared according to each agent's bargaining power⁷. The farmer's bargaining power is denoted as β , the processor's bargaining power is denoted as $1-\beta$. The contract surplus S is defined as the surplus created by the contract over the sum of the initial outside options of the contracting agents: it is the value θ minus the extra production cost I due to the specific inputs. The division of the surplus is illustrated in Figure 2. Whereas ΔY denotes the share of the surplus accruing to the farmer, ΔI is the processor's share. If $\beta = 1-\beta = 0.5$, the surplus of the contract is shared equally; for $\beta < 0.5$, the processor is

⁶ Implying that the application of any amount of inputs below the optimal amount of inputs I is resulting in a lack of marketable surplus.

⁷ This bargaining power is as in Porter's Five Force Framework (1979) determined by factors as the degree of differentiation of inputs delivered by the farmer, the presence of substitutes for these inputs, the farmer concentration to firm concentration ratio, the importance of the concerned trade volume, etc.

appropriating a larger part of the surplus than the farmer. Note that the total payoff is formed by adding each agent's outside option to his share of S .

For $\theta < I$, the quality premium is insufficient to justify the specific inputs cost. Contract formation would be inefficient here. This is what we call *efficient separation*. For any value of $\theta \geq I$, contract formation is efficient, and surplus is always created. For $\beta=0.5$, $\Delta Y = \Delta \Pi = 0.5 S$. Note that one of the major determinants of bargaining power is farmer versus processor concentration. If the processor has a monopsony, β can be relatively low, down to zero. On the other hand, in the case of a farmer's market⁸, the farmer's bargaining power can be substantially higher, even in the case of a monopsonistic processor.

Markets with costly enforcement

When enforcement is costly, it is no longer certain that contracts will be honored. Opportunistic behavior may emerge. Hold-ups occur if one of the agents has an attractive alternative to contract compliance. First, we discuss the case where the farmer has the opportunity to hold up the processor. In the next section, we also take into account the case where the processor has an opportunity to hold up the farmer. To understand under which conditions contracting will be sustainable and what the impacts are on the total surplus and on its distribution, we will start by considering the extreme situation where there are no external enforcement institutions – which is equivalent to assuming that external enforcement is prohibitively costly.

One-sided holdup

Assume only the farmer can potentially hold up the processor, namely by diverting the received inputs to other uses, such as selling them, or applying them to other production activities (e.g. subsistence food crops); or by applying the inputs but then selling the high-quality output to a competing processor at a higher price. Indeed, if a competing processor values the high-quality product as much as the contracted processor does, the former can still earn more profits on it, as she has not paid for the specific inputs required for producing it.

The farmer's incentive compatibility constraint captures the necessary condition for the farmer to voluntarily comply with the contract. It states that the farmer's income from the contract must at least be as much as his outside option, obtained from breaching the contract and selling elsewhere. Swinnen and Vandeplas (2007) show how this is equivalent to the concept of *efficiency wages* (Salop 1979), whereas the employer pays a higher wage to his employees to minimize their incentive to quit and seek a job elsewhere, and define the difference between the producer price under costless enforcement and under prohibitively costly enforcement as an "efficiency premium". The higher the specific inputs cost I is, or the higher the price is that competing buyers offer for the farmer's produce on the local market, the higher this efficiency premium must be.

Figure 3 shows how efficient separation still occurs for $\theta < I$, where the extra value created by the contract is too small to justify the specific inputs cost. However, for $I <$

⁸ A farmer's market implies there is a limited supply capacity, such that the few farmers available are of increased importance to the potential buyer(s).

$\theta < 2I$, contracts break down although they could be profitable for both agents: *inefficient separation* occurs. The reason is that for $I < \theta < 3I$, the farmer has an outside option that is more attractive than what he would get under an equal division of the contract surplus S . Indeed, if he would resell the received inputs (instead of using them), he can earn an amount I on top of his disagreement payoff. So this is what the processor should ultimately offer the buyer under the contract as well, by means of an efficiency premium on top of his usual surplus share. Otherwise, the farmer's ICC is not satisfied. This obviously requires that $S \geq I$, for the processor's PC to remain satisfied at the same time. If $I < \theta < 2I$, then $0 < S < I$, and there is no division of S that allows for simultaneous satisfaction of the farmer's ICC and the processor's PC. Inefficient separation occurs. For $2I < \theta < 3I$, the processor is able to pay the farmer an efficiency premium that covers the difference between his equal division outcome and his outside option. The rest of the surplus will then accrue to the processor. Due to this efficiency premium, opportunistic behavior by the farmer is ruled out, and contracting is sustainable.

Hence, over the interval $2I < \theta < 3I$, the surplus going to the farmer is constant at $\Delta Y = I$. Notice that without efficiency premium, ΔY would range from $0.5I$ to I . The share going to the processor increases from 0 to I over this interval.

So far, we ignored reputation costs. However, if he breaks a contract, the supplier may suffer a loss in terms of reputation, or social capital, or opportunities for future trade. This reputation loss, denoted φ^s , puts a brake on opportunistic behavior, as the outside options for contract breach are reduced by an amount φ^s . In this case, the inefficient separation interval narrows and the efficiency premium decreases. Note that farmers can benefit from weak contract enforcement institutions, through the efficiency premium, but may lose from inefficient separation.

The actual outcome depends on several factors, in general, the implications for surplus sharing are as follows: farmers will receive a higher income when, *ceteris paribus*, (a) the value in the chain is higher, (b) their bargaining power is higher, (c) when their opportunity costs (of signing the contract as well as of honouring the contract once it has been signed) are higher and (d) when their reputation cost is lower.

Finally, another way to enforce contracts is by engaging third party enforcement, if it is not prohibitively costly. Less inefficient separation would occur, but the total contract surplus will be reduced. Define H as the cost of hiring a third party. Then the surplus is $S(H) = \theta - I - H$; if $S(H) > 0$ then the remaining surplus would be shared proportionally to β and $1 - \beta$.⁹

Two-sided holdup

Apart from the farmer, the processor could as well behave opportunistically, by paying a lower price to the farmer than was originally agreed on, or by postponing payment, as is observed in reality. If the processor behaves opportunistically, he can appropriate the contract surplus up to the farmer's outside option at that moment, minus his reputation

⁹ Examples of third party enforcement are paying for mafia protection, or for supervision. Alternatively, when the most probable destination of delivered inputs is the non-contract, subsistence crops, input diversion incentives may be overcome by offering farmers additional inputs as fertilizers and pesticides for their own food crops

loss from breaching the contract. He is more likely to do this if his reputation costs are low and the alternative sales options for the farmer are poor (compared to the value to the processor). Obviously, the supplier will foresee that the processor can act in such way. If the ex-post renegotiated price is lower than the payoff he can gain through input diversion, he will be first to breach the contract.

More general, with opportunistic behavior by the processor, not all contract conditions are credible and the surplus distribution is constrained. This is illustrated in Figure 4: for $\varphi^s=0$ (the reputation cost of the farmer) and $\varphi^p=3I/2$ (the reputation cost of the processor). The maximum surplus share that a farmer can expect to receive equals the reputation cost of the processor.¹⁰

Notice that what is going on in this case is that (the equivalent of) a *negative* efficiency premium is paid by the farmer to the processor in high value chains to make the contract sustainable.

This model leads us to conclude that opportunistic behavior affects (a) the frequency of inefficient separation and (b) the division rule for surplus sharing. First, when enforcement gets costly, and reputation costs are low, inefficient separation appears. If the value in the chain (θ) is sufficiently high, this can be overcome by paying an efficiency premium (either positive or negative). For lower values of θ , this is beneficial to the farmer. For very high values of θ , this benefits the processor. This is intuitive, as the risk for hold-up behavior by the farmer is particularly high in low value chains, whereas the risk for hold-up behavior by the processor is high for high values chains.

But inefficient separation will still occur (a) if the value θ is low, (b) if reputation costs (φ^s and φ^p) are low and/or or contract enforcement is difficult (costly), and (c) if alternative sales outlets are limited.

Some Empirical Evidence

Efficiency effects

The impact of private VC systems on productivity is difficult to quantify as several other factors affect output simultaneously and as company level information is difficult to obtain. Still, the evidence suggests that successful private VC has important positive effects, both direct and indirect.

The direct impact is on the output and productivity of the processing company that initiates vertical contracting and of its suppliers involved in VC schemes. Supplying farmers have experienced beneficial effects on output, productivity, and product quality – and ultimately on incomes – through better access to inputs, timely payments, and improved productivity with new investments. Case studies indicate that private VC programs can lead to strong growth in output, quality and productivity. For example, case studies of the sugar and dairy sectors in East Europe show how new private contracts and farm assistance programs caused output, yields, and investments to grow dramatically (Gow et al, 2000; Swinnen, 2006). In the case of Polish dairy farms, milk

¹⁰ Now, remember that the minimum surplus share that is required to prevent the farmer from input diversion, equals $I-\varphi^s$. Hence, if $\varphi^s=\varphi^p=0$, inefficient separation will occur over the whole domain of θ .

quality rose rapidly following contract innovations by dairy processors in the mid 1990s. The share of the market held by highest quality milk increased from less than 30% on average in 1996 to around 80% on average in 2001 (Dries and Swinnen, 2004). In this study we find that the impacts of vertical integration are widespread, and are important also for small farms. The survival and growth of the farms during this process of rapid restructuring is positively related to the extent of company assistance programs provided to suppliers. Moreover, farms delivering to dairy companies with more assistance, invest more and grow faster.

Indirect effects emerge through household and farm spillovers as households' risk reduces; their access to capital increases and the productivity of non-contracted activities increases. Next to farm assistance VC also implies guaranteed sales, often at guaranteed prices, which comes down to decreased marketing risk for farmers. Coordinating firms also share in the production risk of farmers through ex ante provision of inputs and credit. Moreover, credit arrangements and prompt cash payments after harvest in VC programs improves farmer's cash flow and access to capital. Reduced risks, improved income stability and access to capital are particularly important effects in the case of capital and insurance market imperfections. In addition, contract-farming can lead to productivity spillovers on other crops, resulting from management advice, access to improved technologies, better input use, etc.

Equity Effects

There are two potential equity issues with VC processes. The first concerns the distribution of rents in vertically coordinated food supply chains. There is, as far as we know, no good survey-based empirical work on transition countries measuring the distribution of rents in the VC systems. Several studies provide circumstantial evidence of positive effects by showing that VC is associated with increased investments, quality, and growth of farms, including small farms, in transition (eg White and Gorton, 2004; Dries and Swinnen, 2004).

The second issue concerns the participation and exclusion of small and poorer farmers in modern VC chains. The capacity of emerging VC in agri-food supply chains to serve as an engine of pro-poor economic growth critically depends on the types of farmers that are included in contract schemes. VC has the potential to affect the way income is distributed within a rural economy and can exacerbate existing patterns of economic stratification (Warning and Key, 2002). If agro-industrial firms prefer to contract with wealthier farmers, then poorer households will be excluded from direct benefits. There are three important reasons why this might be so. First, transaction costs favour larger farms in supply chains. Second, when some amount of investment is needed in order to contract with or supply to the company, small farms are often more constrained in their financial means for making necessary investments. Third, small farms typically require more assistance from the company per unit of output.

However, there are also reasons why agro-industrial firms do contract with smallholders and poorer farmers. First, the most straightforward reason is that companies have no choice. In some cases, small farmers represent the vast majority of the potential supply base. Second, while processors may prefer to deal with large farms because of lower transaction costs in e.g. collection and administration, contract enforcement may be more problematic, and hence costly, with larger farms. Processors repeatedly emphasized that farms' willingness to learn and a professional attitude were

more important than size in establishing fruitful farm-processor relationships. Third, in some cases small farms may have substantive cost advantages. This is particularly the case in labour intensive, high maintenance, production activities with relatively small economies of scale. Fourth, processors may prefer a mix of suppliers in order not to become too dependent on a few large suppliers.

Empirical observations show a very mixed picture of actual contracting, with much more small farms being contracted than predicted based on the arguments above. In fact, surveys in Poland, Romania and CIS find no evidence that small farmers have been excluded over the past six years in developing supply chains. In the CIS, the vast majority of companies have the same or more small suppliers in 2003 than in 1997 (Swinnen, 2006; World Bank, 2005).

Concluding Comments

The governance of agri-food supply chains in transition countries has dramatically changed. The most important change is from public (or state) governance to private governance of the agri-food systems, and from domestically oriented to globally integrated. Companies and property rights have been privatized, markets liberalized, and food supply chains integrated into the global economy. An important aspect of these changes is that liberalization and privatization initially caused the collapse of state-controlled vertical coordination. However, more recently, privately governed vertical coordination systems have emerged and are growing rapidly. This is a response to consumer demand for food quality and safety on the one hand and the farms' production constraints caused by factor market imperfections on the other hand.

In this paper we have shown theoretically and empirically that these changes have major effects on quality, equity and efficiency of the agri-food systems and, more generally, have major implications for economic performance and development in these countries (and beyond).

There are several lessons we can draw from this process. Most importantly, it has provided insights in the working of a market economy, which is a much more complex and much less monolytic organization than often assumed (and preached). Transition has also taught us that institutional changes can be costly but still worthwhile to pursue. It has also learned that specific circumstances require specific organizational and institutional solutions (adjustments) to govern exchanges. The functioning (or not) of contract enforcement systems, both formal and informal, has major implications for efficiency and for income distributions. It is also clear that transition in this field has not yet finished and that as investment and institutional changes continue that the organization of the market – the governance of the supply chains -- will continue to change and adapt. Finally, it is also clear that we do not yet sufficiently understand all the changes that are taking place and their implications and that this should be an important field for future research.

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Table 1: Share of farms selling on contract in Central Europe (as % of total)

Type of Contract	Czech		Slovak	Hungary	Bulgaria
	NRIF*	RIF*			
<i>Individual farms</i>					
Contract for crop products	4	37	29	8	5
Contract for livestock products	1	13	4	10	3
Contract for animals	2	7	6	na	na
Contract for any product	5	46	35	17	7
<i>Corporate Farms</i>					
Contract for crop products		79	82	86	42
Contract for livestock products		73	83	59	23
Contract for animals		49	77	na	na
Contract for any product		96	98	94	43

*RIF = Registered individual farms ; NRIF= non-registered individual farms

Table 2: Farm assistance programs offered by dairy companies in Central Europe

Company Name	Credit	Input supply	Extension service	Veterinary service	Bank loan guarantee
POLAND**					
Mlekpól	Y	Y	Y	N	Y
Mleczarnia	N	Y	N	N	Y
Kurpie	Y	Y	Y	N	Y
Mazowsze	Y	Y	Y	N	N
ICC Paslek	Y	Y	Y	N	Y
Warmia Dairy	Y	Y	Y	Y	Y
BULGARIA					
Merone	Y(2000)	Y(????)	Y(1992)	N	N
Fama	Y(1994)	Y(1994)	N	N	Y(once)
Mlekimex	Y(1997)	Y(1997)	Y(1999)	Y(1997)	Y(1998)
Danone	Y(1997)	Y(1998)	Y(2000)	Y(1995)	Y(1999)
Iotovi	N	Y(1995)	N	N	Y(1995)
Milky World	Y(1999)	Y(1999)	Y(1999)	N	Y(1999)
Markelli	Y(1999)	Y(1998)	N	N	N
Mandra Obnova	Y(1998)	Y(2000)	Y(2000)	N	N
Meggle	Y(2001)	Y(2001)	Y(2001)	N	N
PRL	N	N	Y(2002)	N	N
Serdika 90	Y(1997)	Y(1997)	Y(1997)	N	N
SLOVAKIA					
Liptovska	Y(2000)	N	Y(1994)	N	N
Mliekospol	Y(1999)	N	Y(1992)	Y(1992)	Y(1992)
Rajo	Y(2001)	Y/N	Y(1992)	N	N
Levicka	Y(1998)	Y(1998)	Y(0000)	N	Y(1998)
Tatranska	Y(2001)	Y(2000)	Y(0000)	N	N
Nutricia Dairy	Y(2000)	N	N	N	Y(2000)
ROMANIA					
Danone	Y	Y	Y		Y
Friesland	Y	Y	Y		Y
Promilch	Y	Y	Y		Y
Raraul	N	Y	Y		N

* Either the company provides inputs and the farmer pays back later, or the company offers forward credit, which the farmer uses to buy inputs.

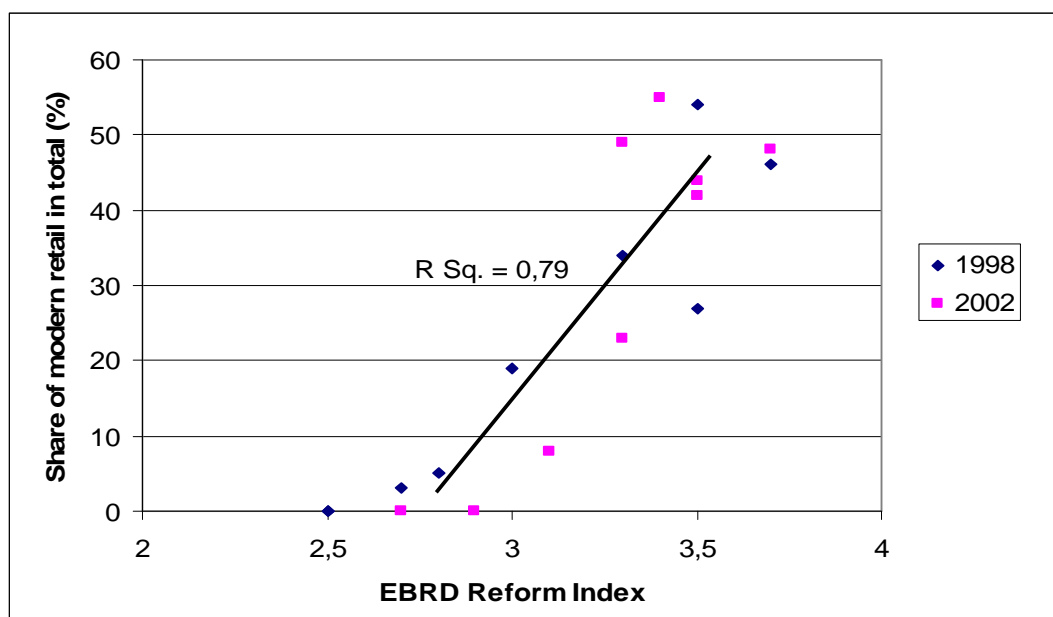
** In Poland no distinction is made between credit for dairy-specific investments and general investments. Farm-level evidence shows that the dairy companies mainly support dairy-specific investments

Source: based on Swinnen et al. (2006) and van Berkum (2006)

Table 3: Contract motivations for farms in Central Europe and the former Soviet Union

Reasons for contracting (% of farmers)	Czech 1999	Slovak 1999	Hungary 1997	Kazakhstan
	Most important reason			
Higher prices	9	8	10	
Stable prices	7	22	33	
Guaranteed sales	64	50	43	8
Guaranteed price				3
Pre-financing	7	13	3	75
Access to inputs/credit	7	6	11	10
Access to technical assistance				0
Stable income				
Higher income				
Income during the lean period				
Other	6	2	0	3

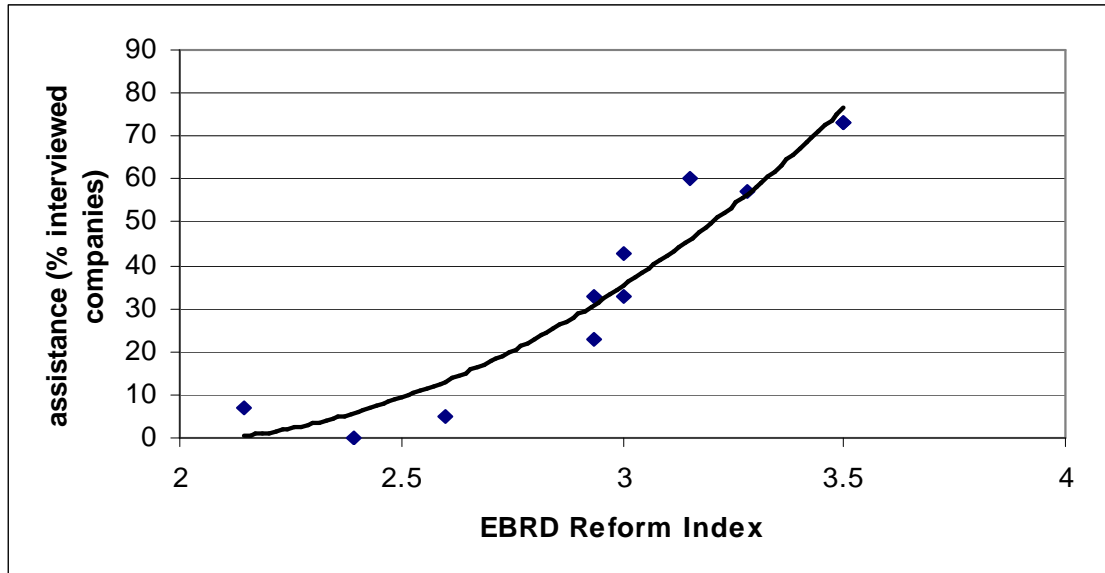
Figure 1: Impact of economic reforms on the growth of the modern retail sector in transition countries



* Data includes Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, Ukraine

Source: Dries, Reardon and Swinnen, 2004

Figure 2. Impact of economic reforms on vertical coordination (*) in the dairy sector of transition countries ()**



* Share of dairy companies providing substantive assistance to farms as part of production contracts

** Data based on surveys in Albania, Bulgaria, Poland, Slovakia (between 1994 and 2004)

Source: Swinnen, Dries, Noev and Germenji (2006)

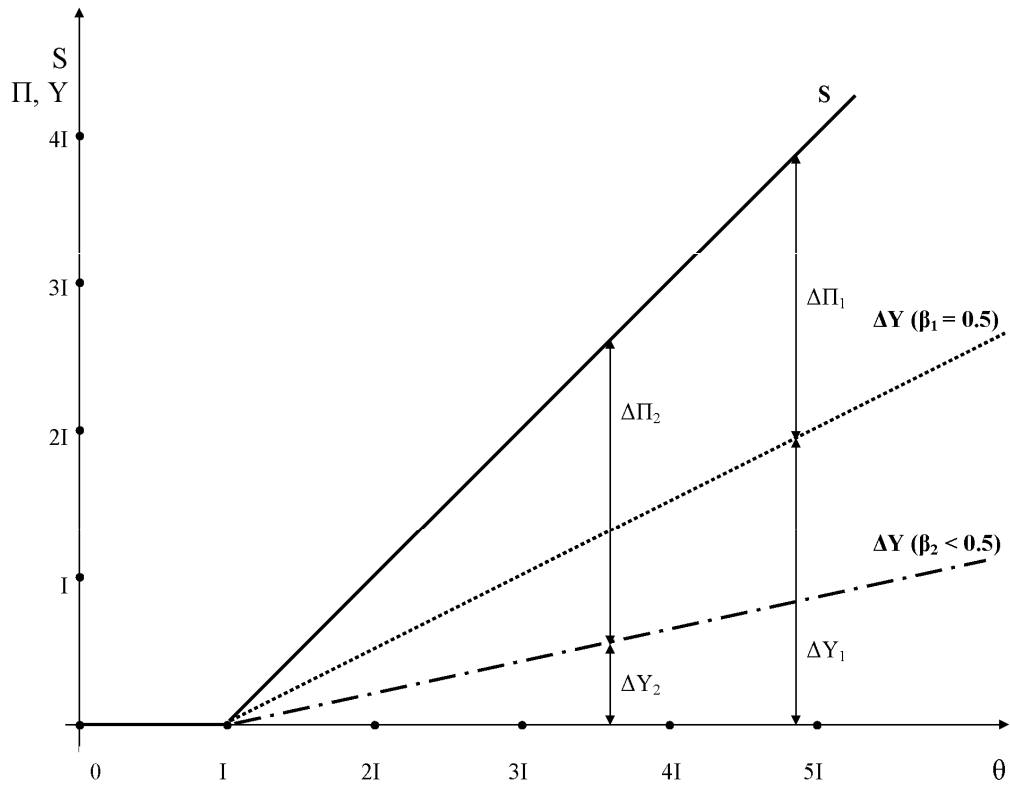


Figure 3: Equity and Efficiency of Contracting without Enforcement Co

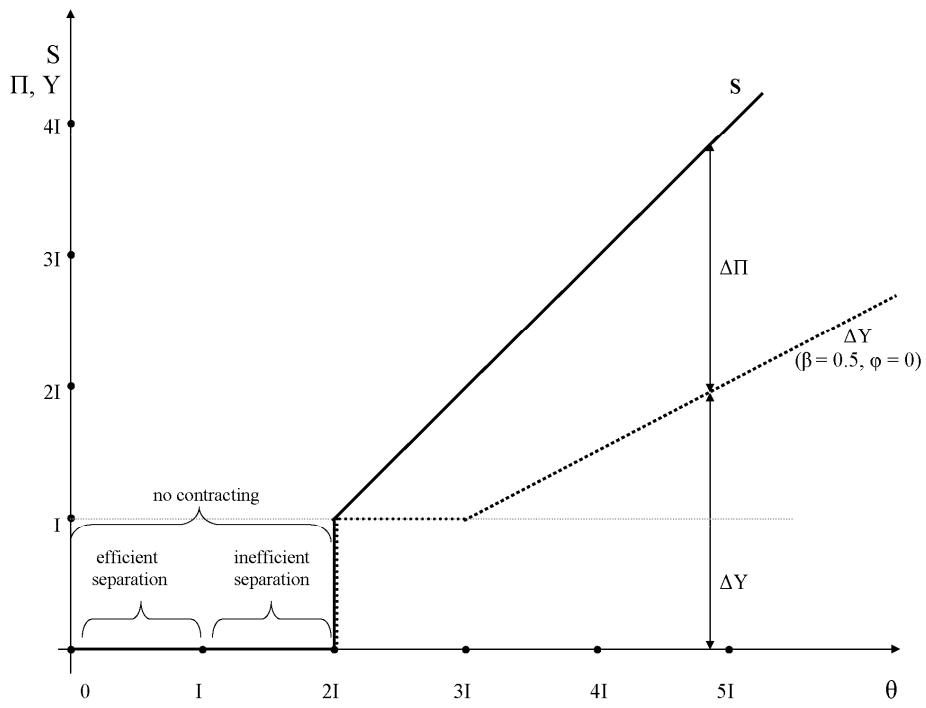


Figure 4: Equity and Efficiency of Contracting with Enforcement Costs

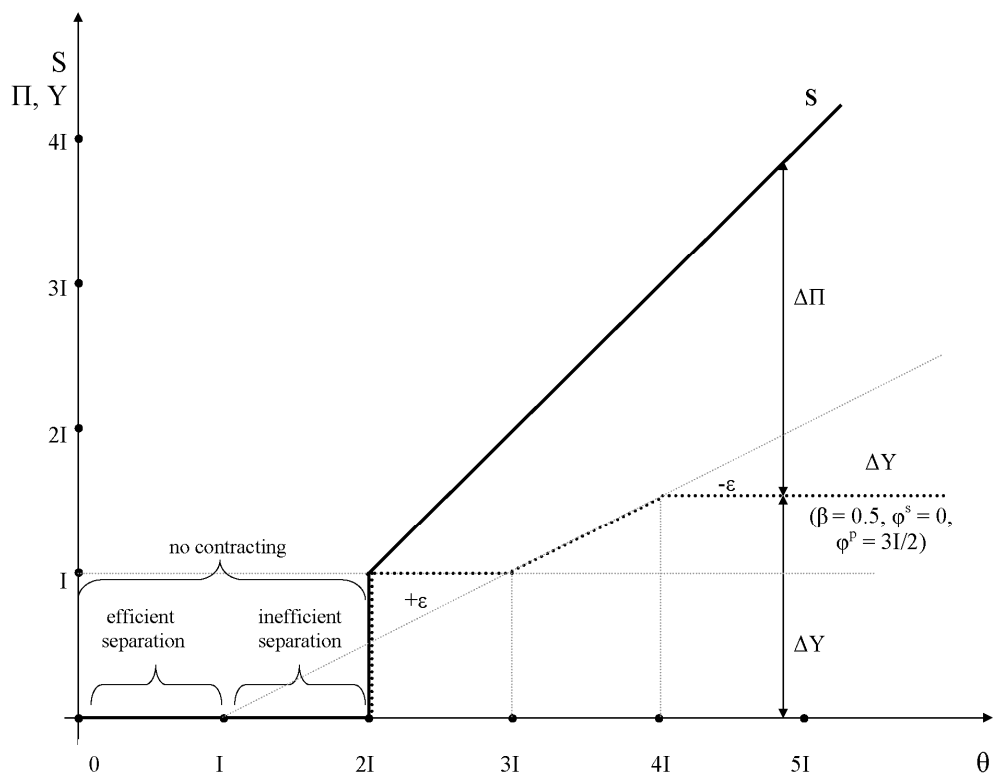


Figure 5: Equity and Efficiency of Contracting with Enforcement Costs and Two-sided Hold-Ups