FACTOR MARKETS

Comparative Analysis of Factor Markets for Agriculture across the Member States

245123-FP7-KBBE-2009-3

WORKING PAPER

No. 2, September 2011

Kyösti Pietola, Sami Myyrä & Anna-Maija Heikkilä

The Penetration of Financial Instability in Agricultural Credit and Leveraging

ABSTRACT

This paper describes the aggregate rural capital markets of the EU and the main differences between the markets of its member countries. The results of our study suggest that the agricultural credit markets are still quite segmented and the segments are country- rather than currency- or region-specific. Financial instability in Europe is also penetrating the agricultural sector and the variation of interest rates for agricultural credit is increasing across countries. Perhaps the most dramatic signal of growing financial instability is that the financial leverage (gearing rate) of European farms rose in 2008 by almost 4 percentage points, from 14 to 18%. The 4 percentage-point annual rise was twice the 2 percentage-point rise observed during the economic recession in the late 1980s and early 1990s. The distribution of the financial leverage of agriculture across countries does not, however, reflect the distribution of country-specific risk premiums in the manner that they are observed in government bond yields. Therefore, in those countries that have the weakest financial situation in the public sector and in which the bond markets are encumbered with high country-specific risk premiums, the agricultural sector is not directly exposed to a very large risk of increasing interest rates, since it is not so highly leveraged. For example in Greek and Spanish agriculture, the financial leverage (gearing) rate is only 0.6% and 2.2% respectively, while the highest gearing rates are found elsewhere (in Denmark), reaching 50%.

FACTOR MARKETS Working Papers presents work being conducted within the FACTOR MARKETS research project, which analyses and compares the functioning of factor markets for agriculture in the member states, candidate countries and the EU as a whole, with a view to stimulating reactions from other experts in the field. See the back cover for more information on the project. Unless otherwise indicated, the views expressed are attributable only to the authors in a personal capacity and not to any institution with which they are associated.

Available for free downloading from the Factor Markets (www.factormarkets.eu) and CEPS (www.ceps.eu) websites

ISBN-13: 978-94-6138-126-2

FACTOR MARKETS Coordination: Centre for European Policy Studies (CEPS), 1 Place du Congrès, 1000 Brussels, Belgium Tel: +32 (0)2 229 3911 • Fax: +32 (0)2 229 4151 • E-mail: info@factormarkets.eu • **web:** www.factormarkets.eu

Contents

List of Figures

The Penetration of Financial Instability in Agricultural Credit and Leveraging

Kyösti Pietola, Sami Myyrä and Anna-Maija Heikkilä*

Factor Markets Working Paper No. 2 / September 2011

Introduction

Because money moves fast, modern capital markets should be better integrated across different market regimes than labour and commodity markets. Thus, local, rural capital markets should be closely linked not only to the domestic financial market within the country but increasingly so to the EU and even to global financial markets. Recently, it has become evident that under the modern financial systems, information, large economic shocks and the instability observed in the international markets are also inevitably transmitted to the local capital markets. The sector- and country-specific financial risks are additionally reflected by international investors, and these risks quickly transmit to the cost of money that each country and sector has to pay.

Nevertheless, rural capital markets may also work imperfectly, e.g. because of transaction costs, liquidity constraints and informational imperfections. These imperfections affect both the supply and demand sides of the markets. As a result, many issues and characteristics of EU rural capital markets are important to address in order to make the market more efficient and support the development of local agricultural businesses within the EU that are competitive and resilient.

One crucial issue is the existence of supply constraints in EU rural finance. The rural financial system often cannot supply funds to farms in amounts or on terms conducive to socially desirable levels of production and investment. Credit-rationed firms are not able to borrow the desired amount of capital. Credit rationing has been a prominent problem in the rural credit market in the past, especially when the overall credit markets were regulated. Now that the capital and credit markets have been liberalised, credit rationing is linked more to the informal efficiency of the market and to the size of risk premiums required in the lending rates than to explicit and quantitative lending constraints. More recently, the problems implied by excessive risk premiums have been further exacerbated, as European financial systems have become more unstable and fragile. Country-specific risk premiums embedded in the lending rates have substantially increased, and as a result loan rates in the rural capital market may have increased to the extent that rural firms no longer have fair access to credit.

Credit rationing and excessive risk premiums embedded in the financial market have significant economic consequences, since they lead to under-investment, the under-employment of production factors and under-production. Therefore, the standard approach within the EU has been that each time the EU has expanded, extensive structural adjustment, credit and investment programmes have been established to increase the supply of low-cost capital in the new member countries and better integrate them into the common market. The successive policy interventions have played an important role in economic integration processes. Even in old member countries, investment in more competitive agricultural structures has often been promoted through investment aid programmes, since the necessary

* Kyösti Pietola is professor in economics, Sami Myyrä is senior economist and Anna-Maija Heikkilä is agricultural economist at the MTT Agrifood Research Finland, Economic Research in Helsinki.

investment would otherwise have been delayed and the sector would have slid into a low productivity trap.

Various theoretical studies have also modelled credit constraint in general as well as in agriculture. A major group of models on credit constraint focuses respectively on adverse selection (hidden information) (e.g. Stiglitz and Weiss, 1981; Carter, 1988), moral hazard (hidden action) (e.g. Boot et al., 1991; Boucher et al., 2005), and costly contract enforcement and ex-post asymmetric information (e.g. Bester, 1994). Yet the empirical literature on rural credit constraints is considerably smaller (Benjamin and Phimister, 2002; Blancard et al., 2006; Färe et al., 1990), and that on the EU even more so.

To better understand the functioning of the EU's rural capital markets and their effects, it is important to have information on *the extent to which (rural) capital markets are integrated and linked to one another across the EU.* Despite the importance of this issue, not many studies have analysed it, as most integration studies have concentrated on the integration of commodity markets. The few studies that do exist argue that capital markets are still rather segmented across the EU. For example, Ball et al. (2008) demonstrated that capital costs in agricultural production differ substantially among OECD countries. The price farmers pay when purchasing equipment is thus crucial to the competitiveness of agriculture in Europe. Moreover, differences in prices for the same equipment experienced by farmers in different member states constitute distortions in competition on the internal market. It is therefore important to relate these variations to differences in the institutional framework in capital markets across EU countries.

In addition to studying horizontal market integration across the EU, *it is also important to examine the role of vertical integration and its interaction with subsidies in the provision of rural finance.* There is literature on the impact of credit subsidies on rural financial markets, and how they may affect the availability of farm credit (Binswanger and Deininger, 1997; Adams et al., 1984). In addition, other types of subsidies (e.g. subsidies from the common agricultural policy) may also affect farm credit. For example, farms may directly use the single farm payment to pay for farm activities and thus substitute for missing credit (Ciaian and Swinnen, 2009). Subsidies may also affect bank credit if future subsidies are used as collateral. This is especially important in the new member states and candidate countries, where imperfect competition and the unequal distribution of bargaining power within the agri-food supply chain can be observed. It has also been demonstrated that direct payments raise the expected value of marginal investment, because they reduce the risk of bankruptcy over the farmer's operating time horizon and thus affect farm assets (Vercammen, 2007).

Nevertheless, very few studies have identified this issue and none have empirically analysed the impact of vertical integration in the agri-food chain and farm access to credit, which may be particularly important in the new member states and candidate countries.

Perhaps the reasons for the rarity of empirical analyses of the capital market lie in the lack of detailed financial statistics. Publically accessible statistics on the performance of rural capital markets are thin when compared, for instance, with commodity market statistics. Eurostat statistics, for example, include detailed statistics on commodity markets across European member states,[1] but no information exists on the cost of capital that farmers face in European member states.

This paper attempts to fill the gap in descriptive statistics by computing certain indicators of rural capital markets from public data sources. We describe the key indicators of financial market data to highlight how the capital markets in EU countries are linked to one another, and furthermore, how the rural capital markets are linked to the country-specific capital markets. In doing so, we first identify the cost of money (the borrowing rates) using different indicators. The benchmarks for the rural loan rates are taken from the interbank offered

[1] See Eurostat's website, "Statistics, Agriculture" (http://epp.eurostat.ec.europa.eu/portal/page/portal/agriculture/data/database).

rates, government bond rates and household borrowing rates. We then look at the investment volumes and provide some insights into the potential role of agricultural investment programmes in the rural capital market. After this we move on to the leverage position and distribution of loans in EU agriculture. The leverage position in particular is expected to affect the risk exposure of farmers and thus to have a significant impact on the risk premiums charged for agricultural loans. The final section concludes.

1. The cost of money: Interest rates

In describing the cost of money, we have constructed indicators of the supply and demand sides of the market. The benchmark data on the aggregate supply side are measured by two types of interest rates. The first is the short-term, interbank offered rate. For the eurozone, these Euro InterBank Offered Rates (EURIBOR) were accessed from the Statistical Data Warehouse of the European Central Bank (ECB). Examples of member countries that have their own currencies were obtained from the websites of the countries' own central banks.

The second supply-side indicator is a selection of ten-year government bond rates paid in the secondary market. These data were also collected from the ECB's website and the countries' own central bank websites. The government bond rates reflect the country-specific cost of money, including the country-specific risk premiums, while excluding the borrower-specific effect, such as the sector funded.

On the borrower and demand sides we have two distinct indicators. The first is the interest paid by households on new loans for housing purchases. The maturity of these loans varies between five and ten years. Still, these data do not represent the rural capital market alone. To the best of our knowledge, no separate data that are specific to the rural capital market are available from public sources of financial data.

The second set of demand-side data is specific to the rural capital market and imputed from the Farm Accountancy Data Network (FADN). These data represent the effective interest rates paid on all outstanding loans, both short and long term, by agriculture and farming households as recorded in the FADN. At the same time, taking into account the distribution of loans between those with a short and long duration, these data actually represent quite well the other long-term indicators, as described above. About 82% of all agricultural debts are classified as long- or medium-term loans in the FADN, and these loans by definition have a duration of at least one year. The effective interest rates are computed from the amount of outstanding loans and the total amount of interest paid within each calendar year.

For each country we further compute the difference between the household loan rate and the interest paid by farmers. The difference is later on referred to as the 'agri premium'. In these comparisons, only the December 2008 data are used, since this is the last available year in the FADN at the time of writing this report.

The FADN is a survey carried out by the EU member states. It collects accountancy data from about 80,000 agricultural holdings every year. The FADN is the only source of micro-economic data that is harmonised, with the bookkeeping principles being the same in all EU member states. Only commercial agricultural holdings, defined by economic size (RI/CC 882 Rev. 8.1), are included in the FADN, and therefore the data cover no more than 39% of all agricultural holdings. These farms nonetheless account for more than 90% of all commercial agricultural production in the EU.[2]

The empirical data were collected from a database maintained by MTT Economic Research, Finland (www.mtt.fi/eufadn). The original data source is FADN-EC-DG AGRI/L3. In the FADN, the debts are presented in two variables: 1) long- and medium-term loans and 2) short-term loans. Short-term loans have a maximum duration of 12 months. The loans sum

[2] Refer to the European Commission's website, "Agriculture and Rural Development, Analysis, FADN" (http://ec.europa.eu/agriculture/analysis/fadn/index_en.htm).

up to the total debt. Total external factors reduced from farm net value added to produce the farm net income are divided into three items: wages paid, rent paid and interest paid. Our interest is on interest paid. The cost of money is derived by dividing the interest paid[3] by the total debt. Results for the accounting year 2008 are the latest ones available for this study.

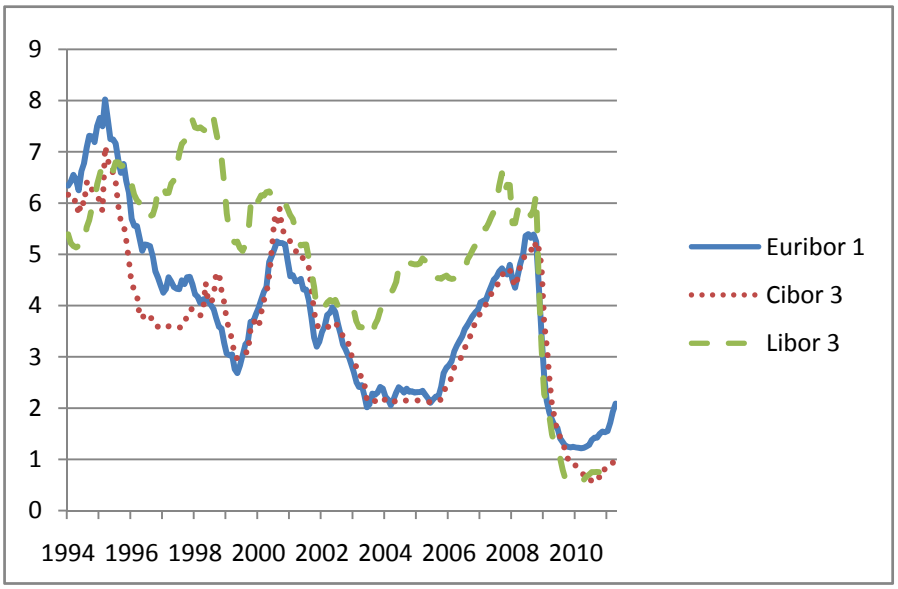
1.1 Interbank offered rates

In the eurozone, the short-term rate is the EURIBOR for a one-year duration, as available from the ECB's Statistical Data Warehouse (Figure 1). Figure 1 also depicts the interbank rates for the UK (LIBOR, three months) and Denmark (CIBOR, three months) as examples of countries that have maintained their own currencies.

These data suggest substantial variation in short-term rates across time. The rates have peaked three times since 1994. Besides the short-term peaks and cycles, the rates have followed a downward sloping pattern over time and decreased to historical lows in the 2010s. Subsequently, the rates have again turned towards an upward sloping trend. The data highlight that the country-specific short-term interbank rates outside the eurozone are not necessarily well synchronised with the EURIBOR, and in some countries such as the UK, they have substantially deviated from the EURIBOR rates. Nevertheless, the most recent monetary policies responding to the global financial crisis have been similar in the eurozone and outside it, with the interbank offered rates showing similar patterns across the currency zones.

It is expected that the overall fluctuations in short-term interbank offered rates across time will also have implications for and spillover effects on rural and more local capital markets.

Figure 1. One-year EURIBOR, three-month LIBOR and three-month CIBOR rates as monthly averages from April 1994 to April 2011 (ECB, Bank of England and Danmarks Nationalbank)



1.2 Government bond yields

The government bond yields are based on prices paid in the secondary markets and they reflect the country-specific risks more than the interbank offered rates. A selection of these rates is sufficient to highlight how the European capital market has recently changed. The ECB rate declined until autumn 2010 and thereafter began a rising trend. The government-specific rates, however, had already started to increasingly deviate from one another in

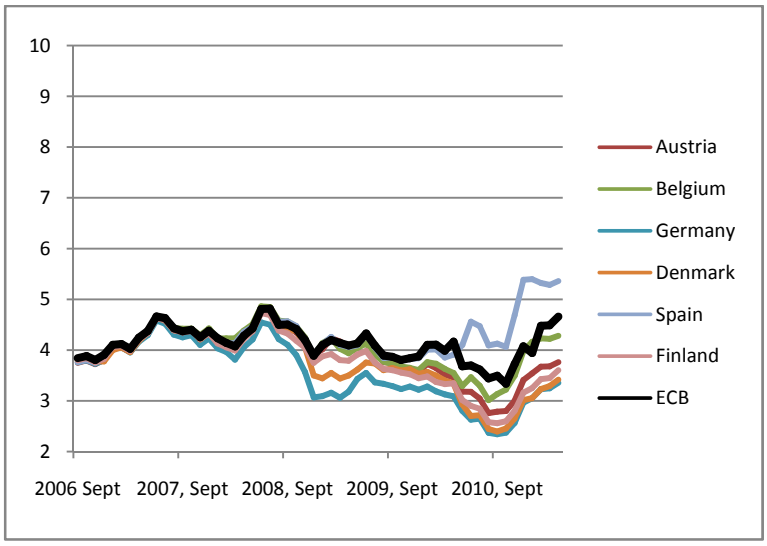
[3] Interest paid includes all interest, charges and fees related to debts.

autumn 2008 (Figures 2 and 3). Most of them continued sliding downwards, although some of them started to rise. In 2010 the bond yields showed large country-specific discrepancies and signalled significant country-specific risks. The variation in annual bond yields across countries has more than quadrupled within a three-year period since the beginning of 2008 (Figure 3).

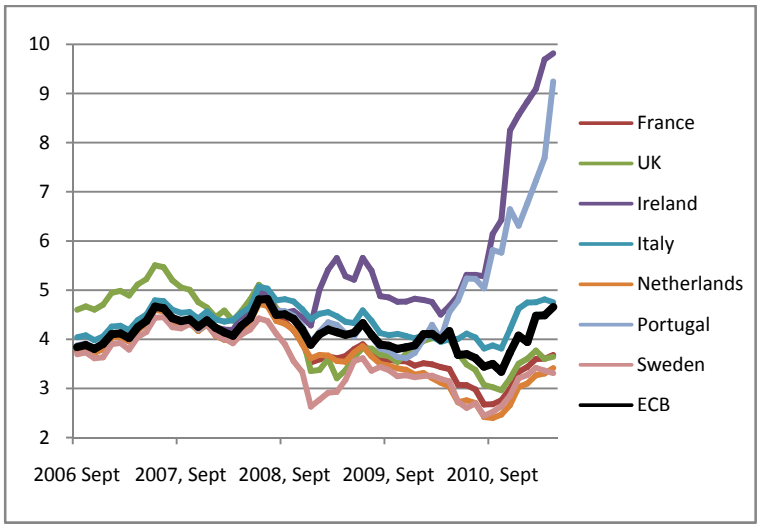
It is likely that the large deviations in bond yields will have implications for and spillover effects on the rural capital markets in different countries. This spillover effect on rural capital markets is further examined below.

Figure 2. Bond yields – Central government bonds (bullet issues), ten-year maturity, in selected European countries (monthly averages in the secondary market)*

Panel 2a

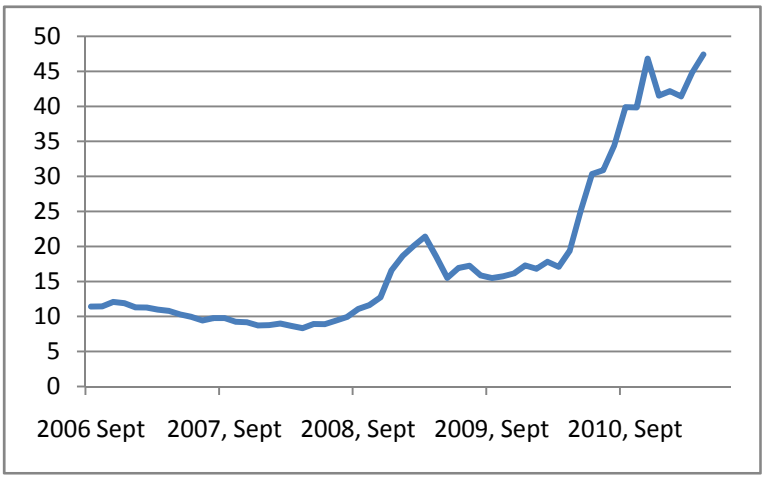


Panel 2b



* Only those countries that have sufficient data for ten-year bond yields in the public domain are depicted in the figure.

Figure 3. Standard deviation (% from the average) of government bond yields across the selected countries, from September 2006 to April 2011



Note: The countries are those shown in Figure 2.

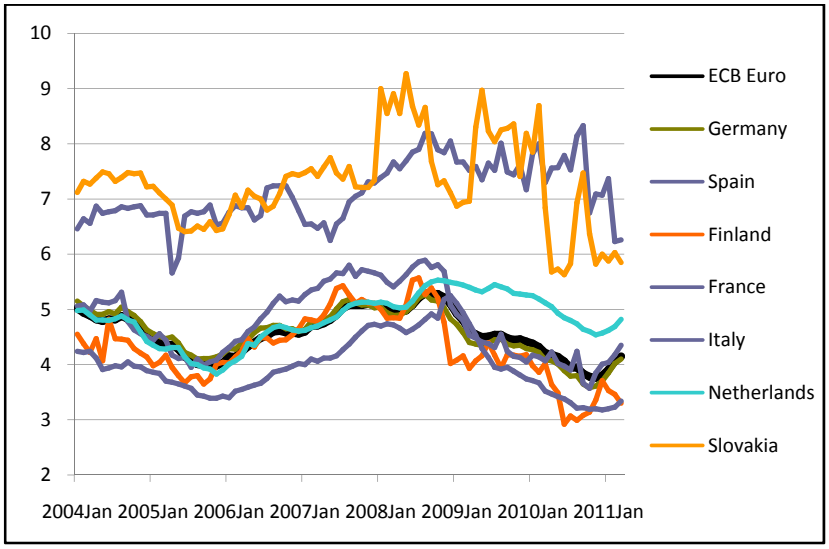
1.3 Borrowing rates for housing purchases

Our first indicator on the borrowing side is the household rate paid in lending for house purchases, excluding revolving loans and overdrafts, convenience and extended credit card debt. These loans are classified as having a maturity of over five and up to ten years. The data were obtained from the MFI Interest Rate Statistics of the ECB's Statistical Data Warehouse.

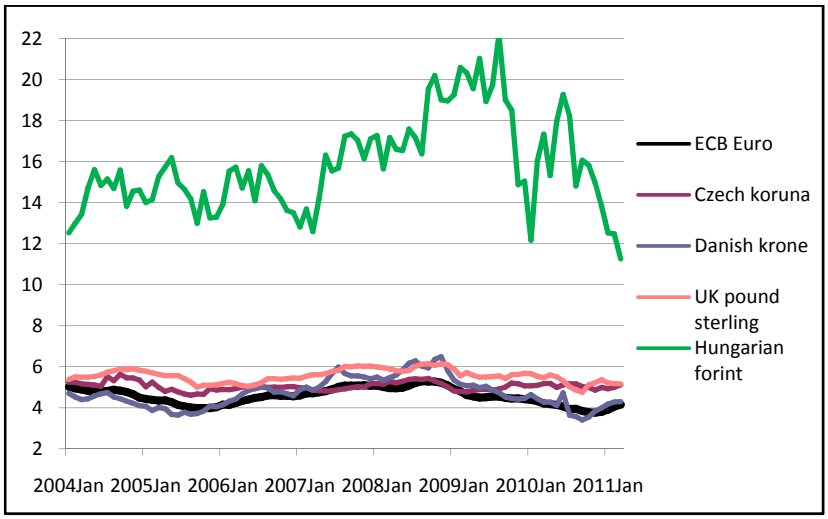
Similar to the bond yields, these interest rates suggest that the current capital market or at least the risk premiums included in the borrowing rates differ substantially among European countries (Figure 4). The eurozone does not seem to define a homogeneous market regime or draw a line between euro countries and countries outside the eurozone. The rates display wide variations across the countries within the eurozone, and most of the borrowing rates in national currencies closely follow the euro average. Thus, the deviations seem to be country-specific rather than currency-specific.

Figure 4. The household borrowing rates in selected European countries (%)*

Panel 4a. Eurozone countries



Panel 4b. Non-eurozone countries



* Only countries that have sufficient data for household borrowing rates in the public domain of the ECB are depicted in the figure.

Source: MFI Interest Rate Statistics from the ECB's Statistical Data Warehouse.

1.4 Loan rates paid by agriculture

As mentioned above, at least to our knowledge there are no consistent statistics on interest rates that have been paid by agriculture and by rural capital markets in European countries. Therefore, we have imputed an approximation for these interest rates using the financial accounts of the FADN. The interest rate paid for agricultural loans is computed by dividing the total annual interest payments by the total amount of outstanding loans at the end of the year. The resulting approximation of the interest rate does not distinguish between short- and long-duration credits, but it roughly corresponds to the duration of the above-reported long-term bond yields and household borrowing rates, since most agricultural loans are long-term loans. On top of the interbank offered rates, these rates should involve country-specific risk premiums, comparable with those of bond yields and household borrowing rates. In addition, they account for the sector-specific characteristics of local agricultural capital markets in rural areas. These characteristics include risk premiums on agricultural funding, the implications of potential credit constraints, and in some countries also interest rate support paid through their structural adjustment and investment programmes in agriculture. The standard is that EU accession has resulted in extensive structural-adjustment programmes in agriculture in new member countries.

The average interest rate paid for all EU agricultural loans over the 20-year period of 1989–2008, as recorded in the FADN, was 5.6%. This rate was 4.0% at its lowest in 2005 and 2006, and 7.9% at its highest in 1991.

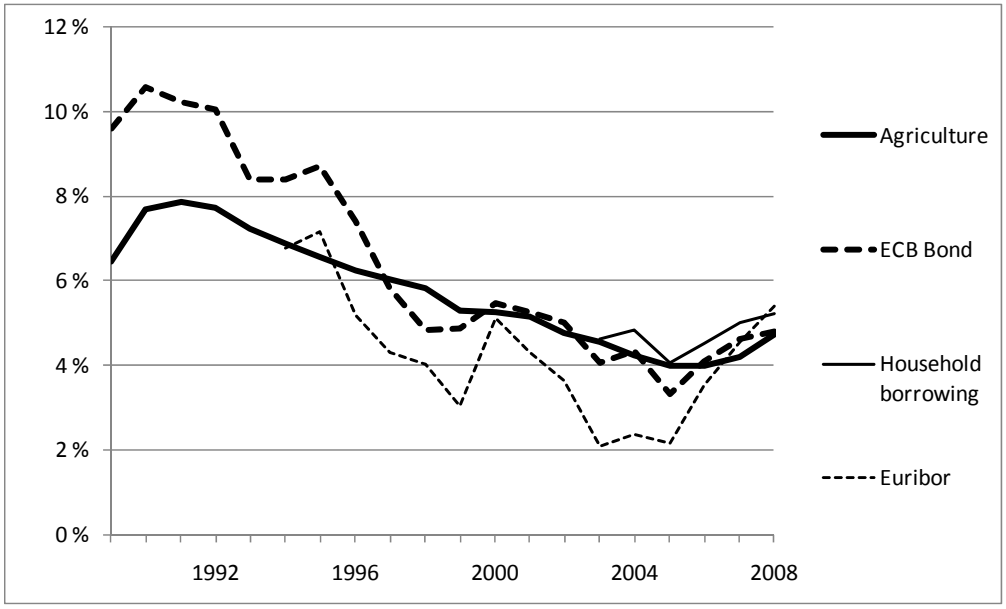
The data further suggest that the interest rates paid for agricultural loans followed quite well the general financial patterns and other interest rates in Europe (Figure 5). There have nonetheless been a few deviations. First, the agricultural loan rates were substantially below the government bond rates in the late 1980s and early 1990s. The discrepancy then gradually shrank until 1997, when the agricultural loan rates and the bond rates coincided. Thereafter, agricultural rates stayed at the same level as bond rates. One reason may be that increasing liquidity and decreasing market rates not only transmitted to the agricultural loan rates but they also reduced the effective interest rate support involved in agricultural loans.

Second, agricultural interest rates seem to exhibit smoother patterns than the interest rates for long maturity bonds and loans. Yet this seemingly significant difference may result from computational differences. In agricultural loans, the borrowing rate represents the stock of all outstanding loans, whereas the other indicators are based on new household loans and

current interest rate quotations for government bonds. The rates for new loans and quotations in the secondary bond market probably reflect the changing market environment more rapidly than the corresponding rates for all outstanding loans. If financial institutions change their margins, for example, the new margins will be applied faster to new loans than to the outstanding stock of all loans.

Like government bond and household borrowing rates, the rates for agricultural loans began to increase in 2007, even though the interbank rates continued to decrease. These data suggest that the first signals of the systemic government risks in overall European economies emerged in 2007. These risks also started to take hold in the agricultural credit market and interest rates. Thus, although the agricultural and food sector could at least potentially exhibit counter-cyclical characteristics when compared with other economic sectors, the counter-cyclicality is not reflected in the agricultural credit market and interest rates.

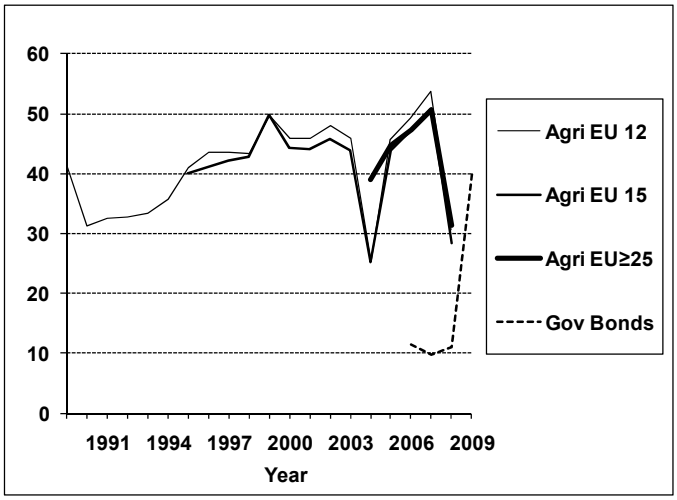
*Figure 5. Interest rates for agricultural loans in the EU: The ECB ten-year bond yield, the lending rate for household purchases (2003–) and one-year EURIBOR (1994–)**



* These three rates are based on July quotations for each year. We also computed geometric averages for each year from the monthly quotations. These averages give a similar picture of interest rate movements as the July quotations.

Our data on agricultural loan rates and bond rates only overlap for the three years of 2006 to 2008. These overlapping years nevertheless suggest that agricultural loan rates varied substantially more across countries than bond rates (Figure 6). Thus, either the distribution of risks embedded in the agricultural capital market was larger than in the market for government bonds, or alternatively, the local credit constraints or policy interventions varied among countries, implying substantial country-specific deviations in agricultural loan rates. It is notable that the new member states joining the EU in 1995 and 2004 did not have a large impact on the standard deviations of agricultural loan rates across countries. It remains to be seen how the recent developments in the European financial market will finally affect the agricultural credit market. It is likely that the increasing variations in government bond rates among countries will also transmit to the agricultural credit market, which has already shown much larger differences across countries than, for instance, household borrowing rates.

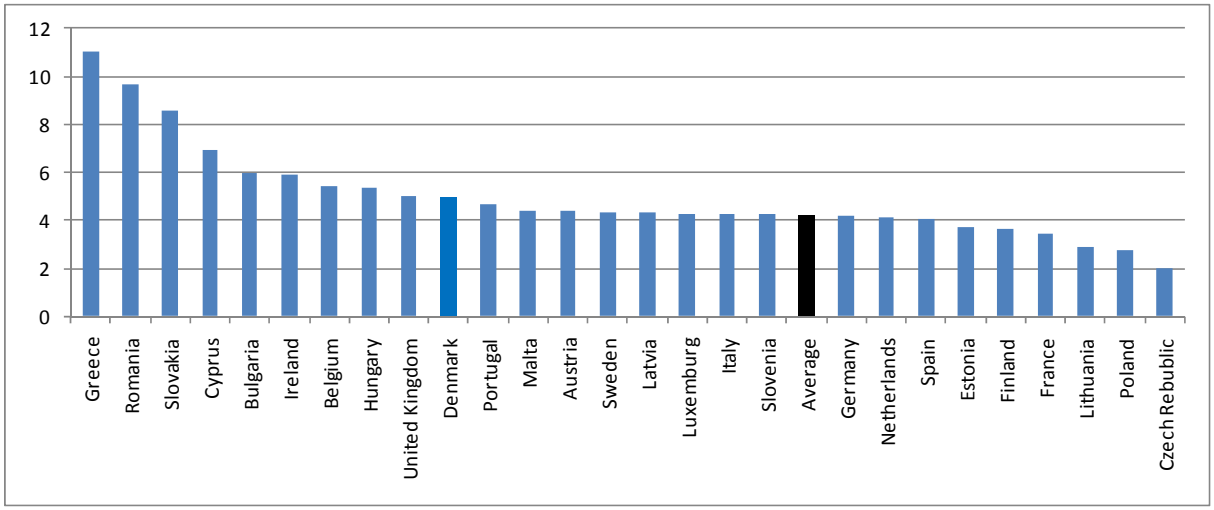
*Figure 6. Standard deviation (% from the average) of agricultural loan rates and government bond yields across the selected countries**



* The bond yields are taken for September and the countries are those shown in Figure 2.

For country comparisons, we computed geometric means of agricultural loan rates for each member country over the years 2004–08 (Figure 7). For this period, the average rate paid for the total EU agricultural loan stock was estimated at 4.2%. Although most of the country-specific rates were close to the average of 4.2%, the spread of the rates was wide at the tails. The rate was highest in Greece (11%) and lowest in the Czech Republic (2.0%). Thus, the highest rate was more than twice the average and the lowest at less than half of the average.

Figure 7. Geometric mean of agricultural loan rates in 2004–08 in the EU member countries (%)*



* The average rate represents all loans in EU agriculture, i.e. the rate is weighted by the outstanding loans.

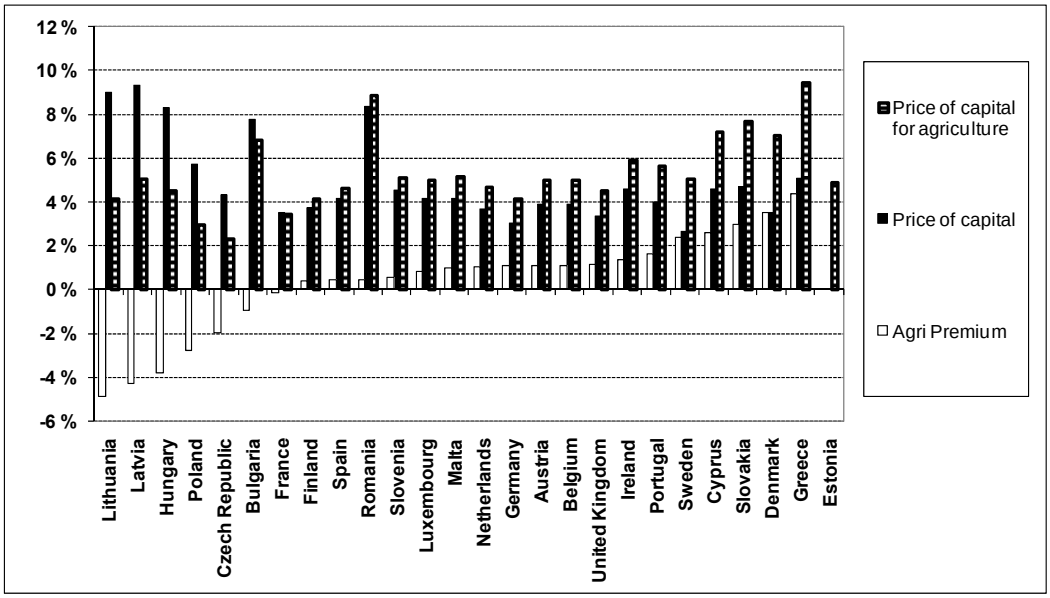
Since general loan rates and bond rates vary among countries, the absolute country-specific differences do not, as such, reveal the agriculture-specific deviations from the general credit markets in different countries. Therefore, we further computed an interest rate premium that was paid in agricultural loans in each country in 2008. This agricultural premium, the 'agri premium', is defined as the difference between the agricultural loan rate and the rate paid for household loans (Figure 8).

The agri premium ranged between -4.9% and +4.4% and was negative in seven countries. The lowest agri premiums were in Lithuania (-4.9%), Latvia (-4.3%), Hungary (-3.8%) and

Poland (-2.8%). In the Czech Republic, the agri premium was also negative (-2%), and because the country's general loan rates were also low, the negative agri premium reduced the agricultural interest rates to the lowest level among EU countries. These figures clearly evidence investment aid programmes based on loan rate subsidies for agriculture. This aid is not necessarily transparent or accessible in either the income statements or the balance sheets.

The agri premiums were highest for Greece (+4.4%), Denmark (3.5%), Slovakia (3.0), Cyprus (2.6) and Sweden (2.4). At the same time, even though the agri premiums were lower for Ireland and Portugal, for instance, than in Sweden, their agricultural loan rates were substantially higher than those in Sweden, since the overall loan rates in these countries were high. Such high agri premiums must be related to excessive risks or a strong demand for loans in agriculture compared with other industrial sectors. In Denmark and Slovakia, the size of farms has increased very rapidly. Thus, banks might have felt uncertain when financing this growth. On the other hand, farms in Greece and Cyprus have been operating almost solely based on their own capital. This might indicate that farms have experienced credit rationing by some institutional setting.

Figure 8. Interest rates for agricultural loans across the EU in 2008



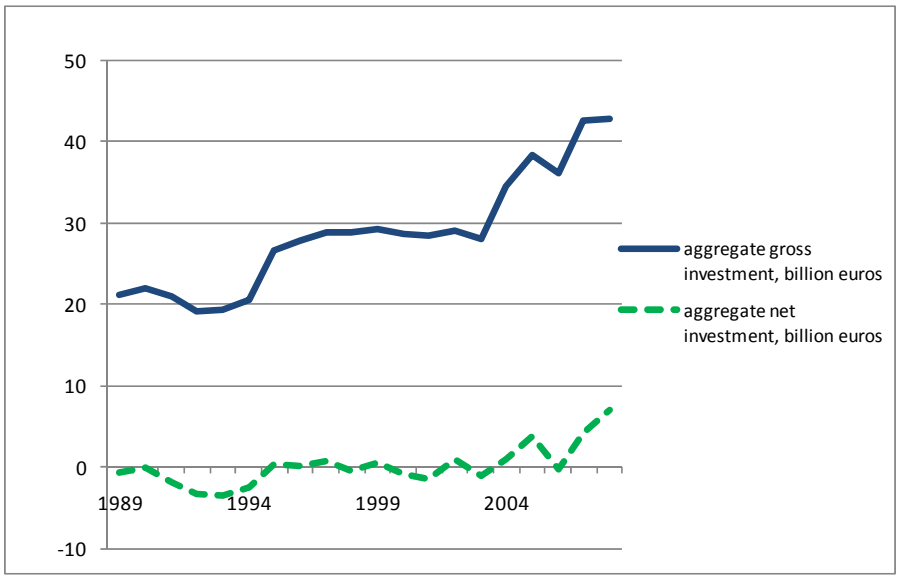
Sources: ECB; long-term interest rates for assessing convergence among the EU member states and FADN-EC-DG AGRI/L3 (http://ec.europa.eu/agriculture/rica/), 21 March 2011.

2. Investment

The total gross investment in EU agriculture increased from €20 billion at the end of the 1980s to over €40 billion in 2008 (Figure 9). The aggregate investment pattern nevertheless suggests that investment primarily grew during EU enlargements, e.g. in 2004. Thus, the structural adjustment programmes implemented in the new member countries have played a role in these aggregate development figures.

Net investment was negligible, varying at around zero for most of the time. The economic recession in the early 1990s also caused agricultural investment to plunge to such a low level that the net investment was clearly negative. The most recent data show some signals that net investment could be increasing.

Figure 9. Gross and net investment in EU agriculture (€ billion)



When we normalise the investment figures per farm, the patterns are still quite similar to those at the aggregate level (Figure 10). The net investment varied at around zero, but the gross investment increased from about €5,000 to almost €10,000 per farm. Notably, however, the increase in average farm size is still embedded in these figures. In other words, the gross investment per farm rose as a function of increasing farm size.

If we further normalise the investment figures per capita, the gross investment patterns become flatter than those above (Figure 11). The gross investment initially varied at around €100 per capita and then grew to around €120 per capita, being at its highest level of €133 per capita in 2007. Net investment again varied at around zero and at its highest was €22 per capita in 2008.

Figure 10. Gross and net investment in EU agriculture (€1,000 per farm)

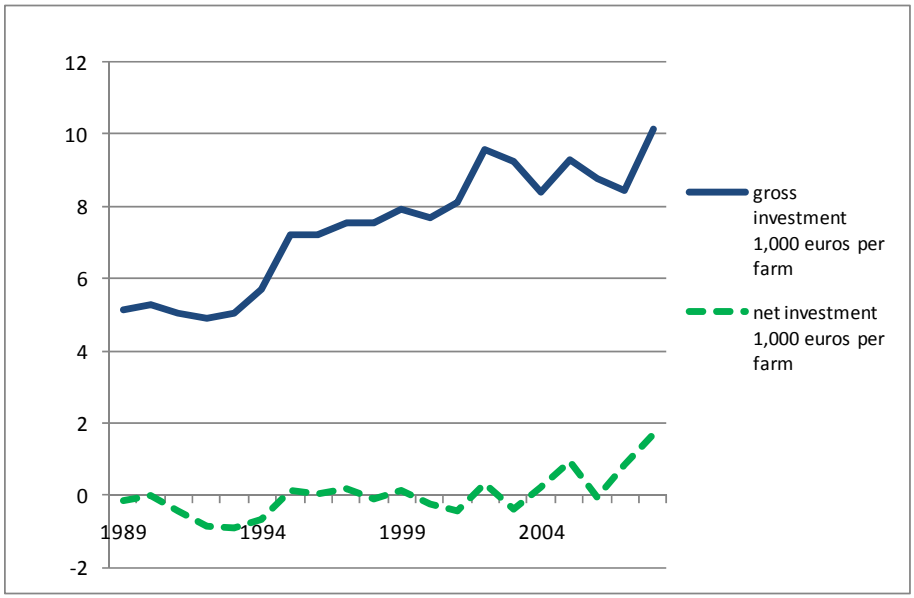
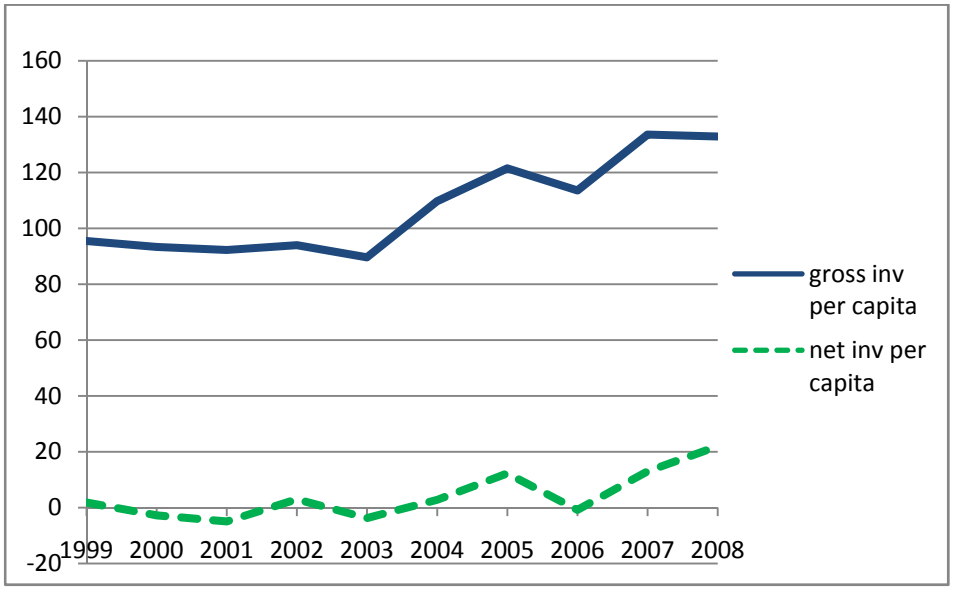


Figure 11. Gross and net investment in EU agriculture (€ per capita)



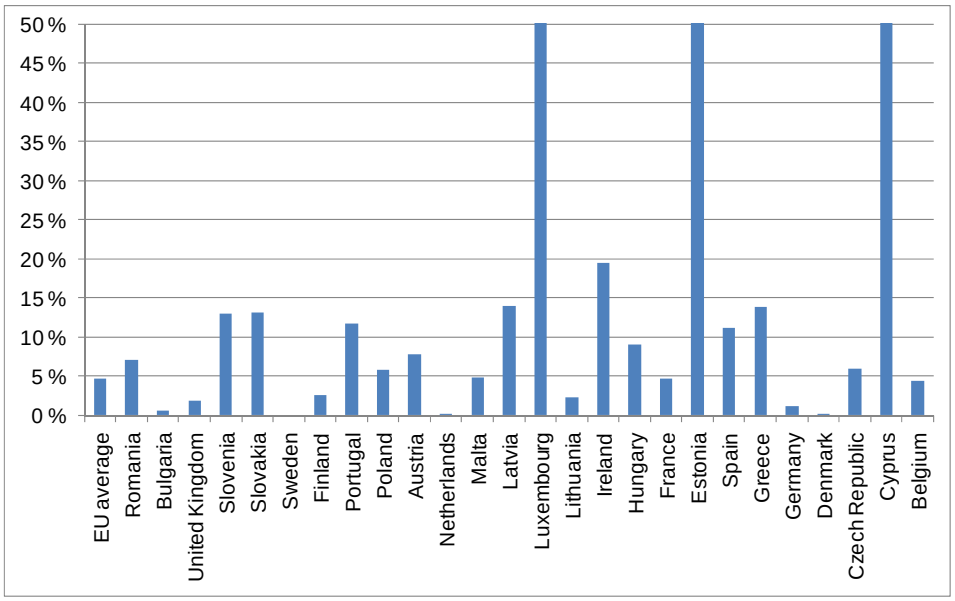
3. The role of investment support

The average share of investment support in total gross investment in EU agriculture, as recorded in the FADN, was 4% over the period 1989–2008. The annual variation of this share was small, being 3.2% at its lowest in 2000 and 4.8% at its highest in 2006.

In 2008, investment support on average accounted for 4.7% of total gross investment in the EU (Figure 12). The variation among countries of the role of investment support in gross investment was high. For example, in Luxembourg (176%) and Estonia (262%), the amount of investment aid exceeded the gross investment. This seemingly unrealistic outcome might be owing to differences among countries in the bookkeeping principles implemented for investment aid. The highest level of per-farm investment aid in 2008 was recorded in Slovakia (€14,137 per farm).

Investment aid was absent in Sweden, and a very low level of investment aid, totalling less than 1% of gross investment, was recorded for Bulgaria, the Netherlands and Denmark.

*Figure 12. Investment aid as a percentage of gross investment in 2008**



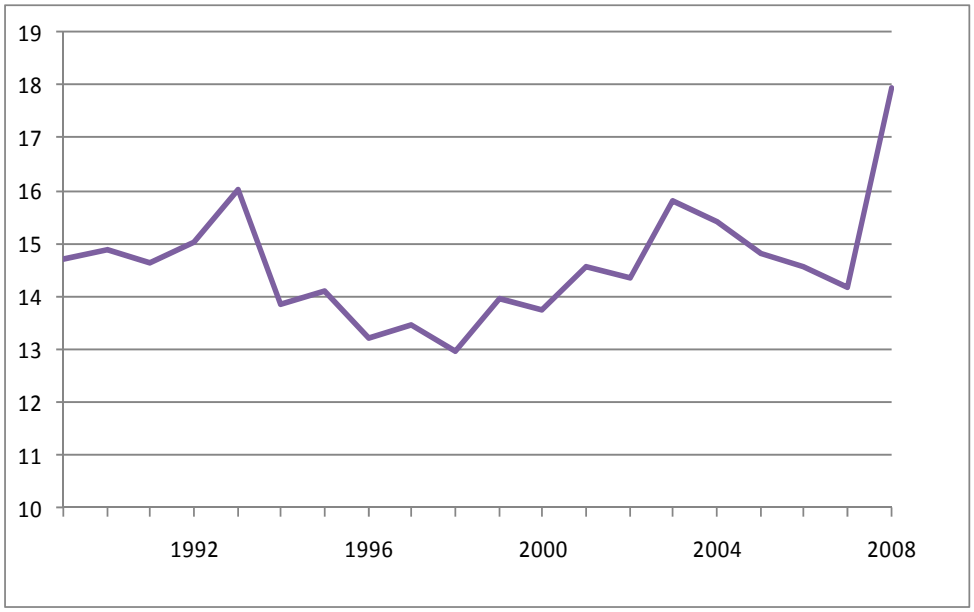
* Percentages in Luxembourg (176%), Estonia (262%) and Cyprus (69%) exceeded the scale used.

4. Financial leverage and debt structure

4.1 Financial leverage (gearing)

The geometric average of financial leverage (gearing) for EU agriculture was 14.6% over the period 1989 to 2008 (Figure 13). It rose by more than 2 percentage points during the 1980–90 recession. Thereafter, it decreased to a low of 13% and started to increase again in 1999. In 2008, the financial leverage soared from 14.1 to 17.9%. The jump of almost 4 percentage points within a year was higher than ever before in our sampling period and twice the size of the jump in the 1980–90 recession. The jump was due to significantly increased debts. On average, debts on EU farms increased from €39,118 in 2007 to €50,022 in 2008. At the same time, equity decreased slightly from €235,574 to €229,046. These results may provide the first signals of how the recent financial crisis has also hit the agricultural sector in the EU.

Figure 13. Overall financial leverage (gearing) in EU agriculture (%)*



* Gearing is calculated as the debts divided by the sum of debts and equity.

The degree of financial leverage varies considerably among countries (Figure 14). In 2008 it was lowest in Greece (0.6%) and highest in Denmark (49%). It is notable that in countries such as Greece, Spain and Ireland, the financial leverage of agriculture does not reflect the high leverage position of the public sector. The small size of debts per farm and especially per economic size unit (ESU) in these countries suggests that the low level of financial leverage in agriculture stems from small amounts of debt rather that high equity prices.

In Denmark and the Netherlands, which are in the opposite tail of the distribution, the high degree of financial leverage results from large amounts of debt per farm and per ESU rather than from low equity prices. In these countries the country-specific risk embedded in the government bond market is still low, but if it increases and interest rates peak, the economic feasibility of highly leveraged agricultural holdings may be jeopardised.

Figure 14. Financial gearing in agriculture in EU countries in 2008 (%)

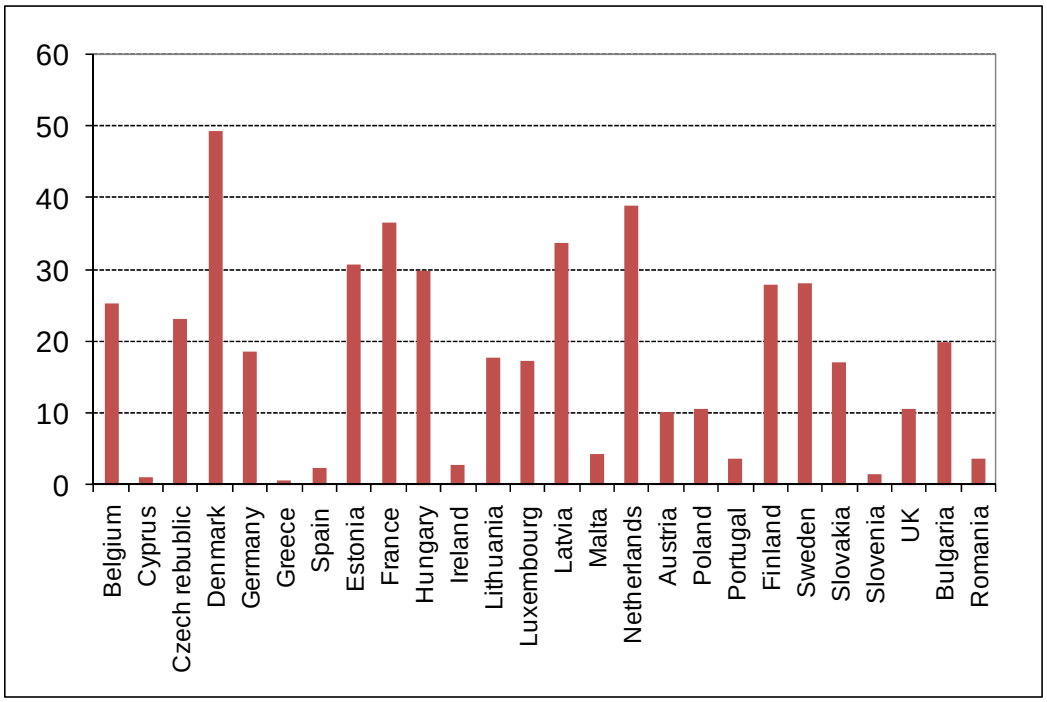


Figure 15. Debts per farm among EU countries in 2008 (€ per farm)

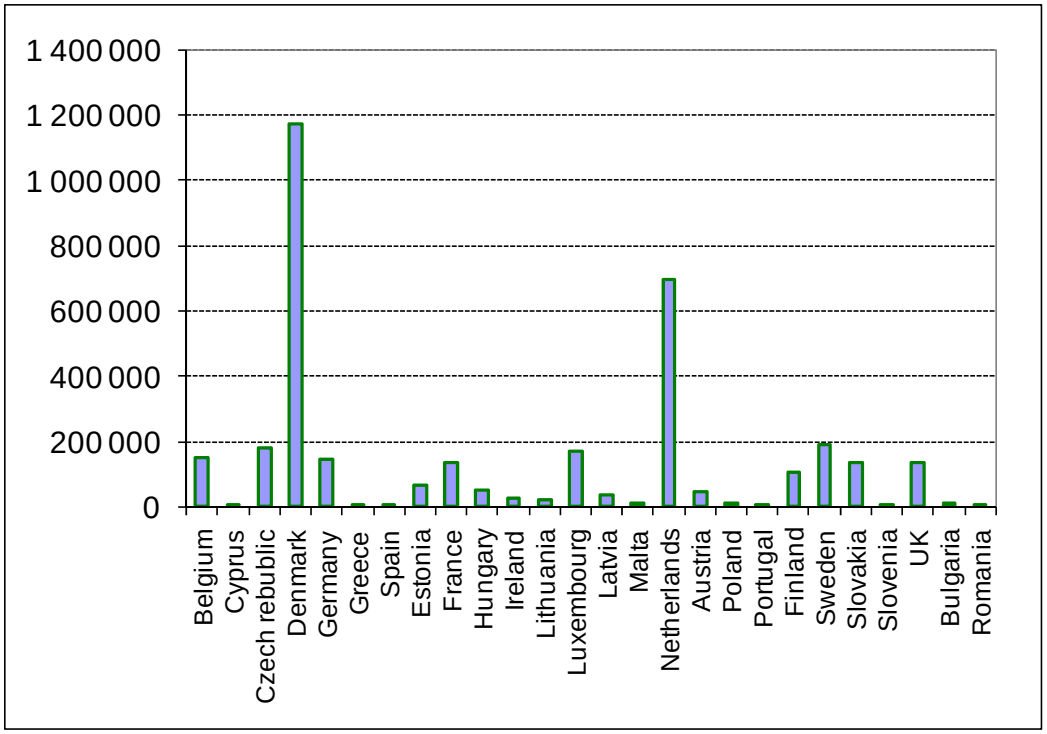
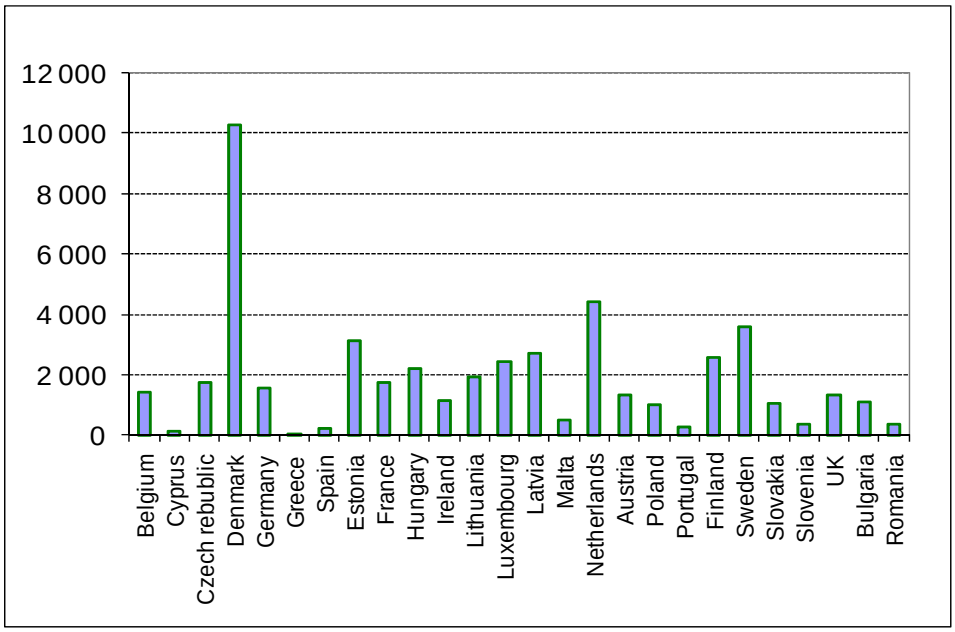


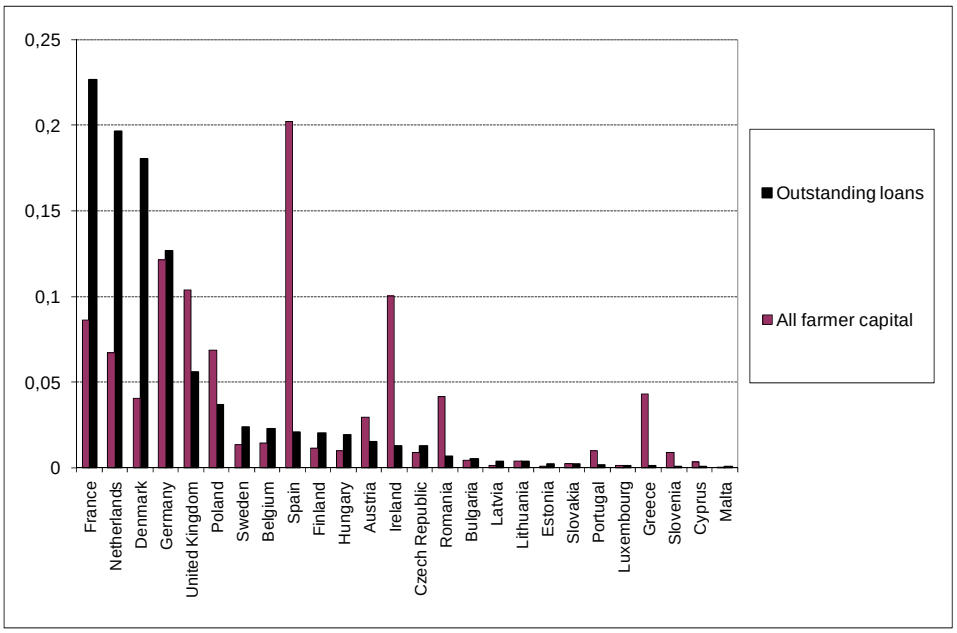
Figure 16. Debts per farm among EU countries in 2008 (in € per ESU)



4.2 Spatial distribution of debts and assets

Owing to the lack of coverage of the total outstanding loans in EU agriculture in the FADN data and statistics, the figures are normalised and presented in a percentage form (Figure 17).

Figure 17. Distribution of outstanding loans and farmers' total capital in EU agriculture among member states in 2008



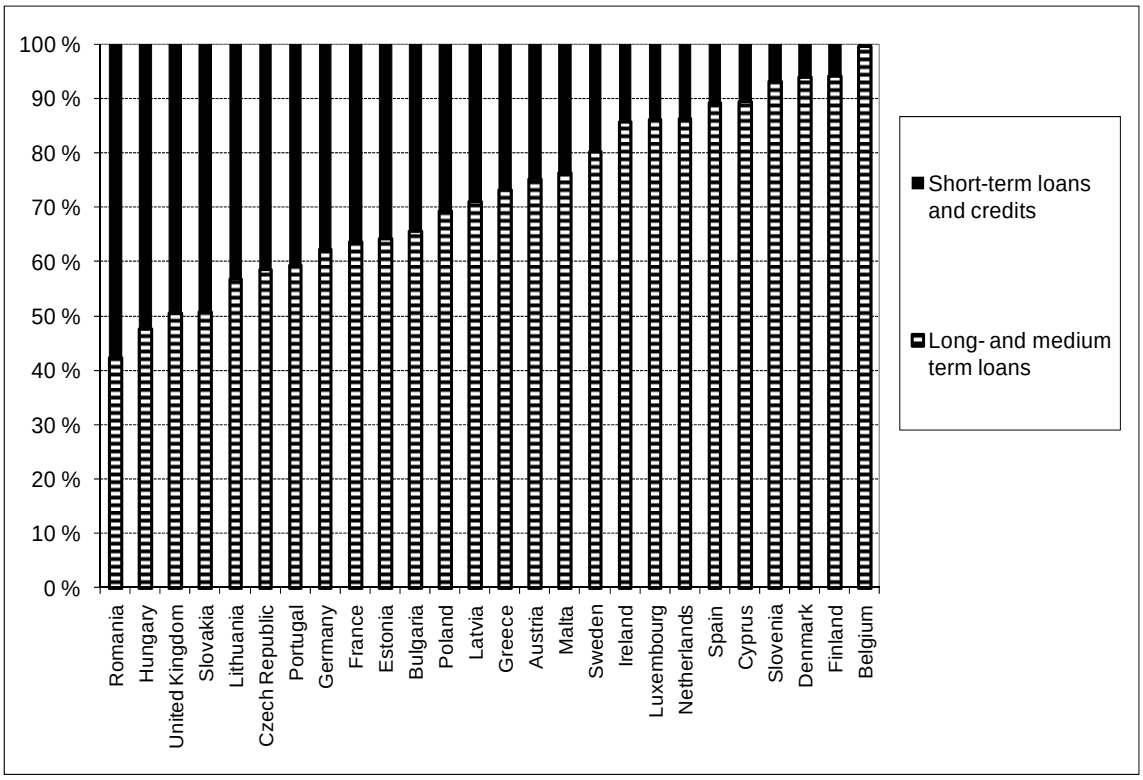
Most of the debts in EU agriculture are concentrated in a very small number of countries, and in some cases also in a small geographical area. Farmers operating in France, the Netherlands and Denmark carry 60.3% of all liabilities, but the collateral value of their farm enterprises covers only 19.4% all agricultural capital owned by farmers in the EU. In Denmark, where the debts per farm are the highest, the average farmer pays annual interest payments of €82,233 on his/her total debts of €1,174,426. At the other end of the scale are farmers operating in Spain, Ireland and Greece, who account for 34.5% of all capital owned

by farmers in the EU but carry only 3.5% of all debts. The proportions of debts and capital are almost equal in the Baltic countries, Lithuania, Estonia and Latvia. In Luxembourg, Slovakia, Malta and Bulgaria, these shares are also in balance. Spain differs clearly from other EU countries. Spanish farmers account for 20.2% of all agricultural capital, but only 2.1% of all agricultural debts.

4.3 Distribution of short- and long-term debts

There are considerable differences in agricultural debt structures among the EU member states. These structures are represented by the ratio of short- to long-term debts (Figure 18). In new member states such as Romania, Hungary, Slovakia and Lithuania, a major proportion of total debts consists of short-term loans and credit. This credit is needed for the day-to-day operations of farms. The share of short-term loans is also sizable in the UK because the total debt compared with the turnover of UK farms is small. Belgium represents those member states in which all loans are long- or medium-term loans and are thus probably used for funding agricultural investment. Long- or medium-term loans also predominate in Finland, Denmark and Slovenia.

Figure 18. Allocation of total agricultural loans between short- and long-term loans in the EU member states in 2008



5. Concluding remarks

On average, and at the most aggregated EU level, agricultural loan rates have smoothly followed the main development patterns generally observed in the financial markets. The agricultural loan rates gradually decreased until 2005 and then embarked on a rising trend, similar to government bond yields and household lending rates.

The agricultural credit market and hence the lending rates and leverage positions have displayed wide variations across countries. The data support the view that the agricultural credit market has exhibited substantially larger country-specific characteristics, such as

informational inefficiencies, risk premiums and constraints, than the European financial markets in general.

It is notable that early in the sampling period the interest rates varied across countries much more in the agricultural credit market than in the secondary market for government bonds and household lending. It is likely that the country-specific variations in the agricultural leverage positions and accordingly the risk premiums charged for agricultural loans may have contributed to the large variations in agricultural loan rates. The negative agriculture-specific premiums observed also suggest that investment support has contributed to and reduced the agricultural lending rates in several countries.

Towards the end of our sampling period in agriculture in 2008, the data provide the first signals of growing financial instability and the current financial crisis in Europe. The instability started to significantly increase government bond yields and household lending rates in some countries, and this increase was gradually transmitted to the agricultural credit market. At the total EU level, the agricultural borrowing rates had already begun to show a rising trend in 2007, but they remained at a relatively low level. In 2008 the average borrowing rate was estimated at 4.7%, which was still below the 5.6% average rate over the 20-year period of 1989–2008 and quite close to the all-time low of 4.0% observed in 2005 and 2006.

Perhaps the most dramatic signal of financial instability also hitting agriculture was the sudden worsening of the financial leverage (gearing) rate. In 2008 the gearing rate rose by almost 4 percentage points to 18%. Before 2008 it had remained quite stable, ranging annually between 13 and 16%. The 4 percentage-point rise observed in 2008 was twice the 2 percentage-point rise observed during the economic recession in the late 1980s and early 1990s.

The emerging financial crisis was not yet reflected in increasing variance in agricultural borrowing rates across countries for two reasons. First, the country-specific variance in agricultural borrowing rates had also been wide in the past. Second, in a large number of countries, agricultural loan rates had not yet increased much and the rates had remained close to the EU average. Dramatic changes were only observed in the tails of the distribution, where the interest rate discrepancies were the largest. At the uppermost end of the tail the agricultural loan rate increased to about 11% (Greece), while at the lowest end of the distribution the corresponding rate remained at 2.3% (Czech Republic).

The different market regimes within each financial sector are country-specific and not defined by the currency zones. There is considerable divergence both within and outside the eurozone. It seems that the turbulence and instability has been even greater and the borrowing rates have peaked even higher in some euro countries than in countries outside the eurozone with their own currencies.

It is characteristic of the agricultural credit market that countries differ in their regulations and have more or less aggressive expansion strategies. Therefore, the leverage positions of agricultural firms differ substantially among countries. The most leveraged agricultural sectors and the largest risk exposures to increasing borrowing rates in the agricultural credit market are found in Denmark, which is outside the eurozone. Thus, the consequences of the spread of financial stability beyond the eurozone could in some cases be exacerbated, with the crisis having serious direct effects for the European agricultural sector.

The distribution of the financial leverage of agriculture across countries does not reflect the distribution of country-specific risk premiums in the manner that they are observed in government bond yields. Therefore, in those countries that have the weakest financial situation in the public sector and in which the local interest rates are embedded in high country-specific risk premiums, the agricultural sector is not directly exposed to a very large risk of increasing interest rates, since it is not so highly leveraged. An example of these countries is Spain, where the financial leverage (gearing) rate is only 2.2%, while the average gearing among all EU countries is 18% and the highest country averages for gearing rates

reach 50%. The differences in the distributions of government and agricultural leveraging, as such, will provide some hedge for the European agricultural sectors against the financial problems in the public sector. Nevertheless, the dynamic financial spillover effects and economic implications through revised budget policies will also expose agricultural sectors to large risks in these countries.

Agricultural gross investment within the EU grew from €20 billion in 1980 to more than €40 billion in 2008. The main reason for this growth, however, was the continual increases brought about by the enlargement of the EU. If we normalise agricultural investment per capita, the investment pattern was smooth and rose only slightly, from about €100 to €130 per capita. The net investment varied at around zero, but at the end of the sampling period in 2008 it had increased to a clearly positive level. As the net investment ranged most of the time at around zero, it may not fully explain the increasing leverage positions.

References

Adams, D.W., D.H. Graham and J.D. Von Pischke (1984), "Undermining Rural Development with Cheap Credit", in D.W. Adams, D.H. Graham and J.D. Von Pischke (eds), *Undermining Rural Development with Cheap Credit*, Westview Special Studies in Social, Political and Economic Development series, Boulder, CO and London: Westview Press, pp. 1-7.

Ball, V.E., W.A. Lindamood, R. Nehring and C.S.J. Mesonada (2008), "Capital as a factor of production in OECD agriculture: Measurement and data", *Applied Economics*, Vol. 40, No. 10, pp. 1253-1277.

Benjamin, C. and E. Phimister (2002), "Does Capital Market Structure Affect Farm Investment? A Comparison using French and British Farm-Level Panel Data", *American Journal of Agricultural Economics*, Vol. 84, No. 4, pp. 1115-1129.

Bester, H. (1994), "The Role of Collateral in a Model of Debt Renegotiation", *Journal of Money, Credit and Banking*, Vol. 26, No. 1, pp. 72-86.

Binswanger, H.P. and K. Deininger (1997), *Explaining Agricultural and Agrarian Policies in Developing Countries*, Policy Research Working Paper No. WPS 1765, World Bank, Washington, D.C.

Blancard, S., J.P. Boussemart, W. Briec and K. Kerstens (2006), "Short- and Long-Run Credit Constraints in French Agriculture: A Directional Distance Function Framework using Expenditure-Constrained Profit Functions", *American Journal of Agricultural Economics*, Vol. 88, No. 2, pp. 351-364.

Boot, A.W.A., A.V. Thakor and G.F. Udell (1991), "Secured Lending and Default Risk: Equilibrium Analysis, Policy Implications and Empirical Results", *Economic Journal*, Vol. 101, No. 406, pp. 458-472.

Boucher, S., M.R. Carter and C. Guirkinger (2005), *Risk Rationing and Wealth Effects in Credit Markets*, ARE Working Paper No. 05-010, Department of Agricultural and Resource Economics, University of California, Davis.

Carter, M.R. (1988), "Equilibrium Credit Rationing of Small Farm Agriculture", *Journal of Development Economics*, Vol. 28, No. 1, pp. 83-103.

Ciaian, P. and J.F.M. Swinnen (2009), "Credit Market Imperfections and the Distribution of Policy Rents: The Common Agricultural Policy in the New EU Member States", *American Journal of Agricultural Economics*, Vol. 91, No. 4, pp. 1124-1139.

European Commission (2006), *Definitions of variables used in FADN standard results*, DG Agriculture and Rural Development, Community Committee for the Farm Accountancy Data Network (FADN), RI/CC 882 Rev. 8.1, Brussels, 21 November.

Färe, R., S. Grosskopf and H. Lee (1990), "A Nonparametric Approach to Expenditure-Constrained Profit Maximisation", *American Journal of Agricultural Economics*, Vol. 72, No. 3, pp. 574-581.

Stiglitz, J.E. and A. Weiss (1981), "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, Vol. 71, No. 3, pp. 393-410.

Vercammen, J. (2007), "Farm Bankruptcy Risk as a Link between Direct Payments and Agricultural Investment", *European Review of Agricultural Economics*, Vol. 34, No. 4, pp. 479-500.

Comparative Analysis of Factor Markets for Agriculture across the Member States

245123-FP7-KBBE-2009-3

The Factor Markets project in a nutshell

Title	Comparative Analysis of Factor Markets for Agriculture across the Member States
Funding scheme	Collaborative Project (CP) / Small or medium scale focused research project
Coordinator	CEPS, Prof. Johan F.M. Swinnen
Duration	01/09/2010 – 31/08/2013 (36 months)
Short description	Well functioning factor markets are a crucial condition for the competitiveness and growth of agriculture and for rural development. At the same time, the functioning of the factor markets themselves are influenced by changes in agriculture and the rural economy, and in EU policies. Member state regulations and institutions affecting land, labour, and capital markets may cause important heterogeneity in the factor markets, which may have important effects on the functioning of the factor markets and on the interactions between factor markets and EU policies. The general objective of the FACTOR MARKETS project is to analyse the functioning of factor markets for agriculture in the EU-27, including the Candidate Countries. The FACTOR MARKETS project will compare the different markets, their institutional framework and their impact on agricultural development and structural change, as well as their impact on rural economies, for the Member States, Candidate Countries and the EU as a whole. The FACTOR MARKETS project will focus on capital, labour and land markets. The results of this study will contribute to a better understanding of the fundamental economic factors affecting EU agriculture, thus allowing better targeting of policies to improve the competitiveness of the sector.
Contact e-mail	info@factormarkets.eu
Website	www.factormarkets.eu
Partners	17 (13 countries)
EU funding	1,979,023 €
EC Scientific officer	Dr. Hans-Jörg Lutzeyer