The 82nd Annual Conference of the Agricultural Economics Society

Royal Agricultural College

31st March to 2nd April 2008

Can the CAP payments facilitate the growth of individual farms in the NMS post-EU accession?

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Abstract

The impact of the introduction of the EU Single Area Payments (SAP) on farm strategy is investigated for a sample of Lithuanian farms, utilising farm accounting and survey data. The applications of two investment models demonstrate that the credit market in Lithuania was imperfect prior to accession and that some farms were financially constrained. The introduction of the SAP has a significant, positive influence on farmers' intentions to expand their farm area compared to a baseline scenario of the continuation of pre-accession policy. The switch in policy has a more pronounced effect on farms that were previously credit constrained. While the SAP has been presented as a policy support that is decoupled from production, its introduction will nevertheless have *ex post* coupled effects, most notably an income multiplier effect on credit constrained farmers.

Keywords: Single Area Payments (SAP), Common Agricultural Policy (CAP), credit, Lithuania

JEL codes: Q18, Q14

Acknowledgements

This paper benefited from research funding by EU FP6 project IDEMA (Implications of Decoupling and Modulation on the Enlarged Union) SSPE-CT-2003-502171. The authors acknowledge Romualdas Zemeckis, Egle Stonkute and Rima Daunyte.

1. Introduction

Accession to the European Union (EU) and, specifically, adoption of the Common Agricultural Policy (CAP) has led to a substantial increase in real support to farmers in most of the New Member States (NMS) of Central and Eastern Europe, through the implementation of the Single Area Payment (SAP). The payments are decoupled from production and distributed on a simple flat-rate, per hectare basis and are much higher than pre-accession national support. In addition, NMS can top-up SAP, up to agreed limits, with national funds. Given the centrality of direct payments, any understanding of the effect of adoption of the CAP in the NMS, requires an assessment of the impact of the SAP on farmers' behaviour. However, remarkably little attention has been given to understanding the relationships between the SAP and farm strategies and, as yet, no consensus, has emerged on likely impacts. For instance, while some have argued that adoption of the CAP will lock farmers into agriculture and therefore impede structural change (Ciaian and Swinnen, 2006), others see accession as an important catalyst for rapid adjustment (Raiser *et al.*, 2003).

This paper contributes to this debate by focusing on one of the key issues affecting farm strategy, namely farmers' financial constraints. Although the SAP, is decoupled (*ex ante*), it may still have (*ex post*) an income effect and stimulate farm investment and thus farm expansion. In the case of perfect credit markets, transfers through decoupled payments should not affect farm investment and production. However, credit markets are in general imperfect, largely due to asymmetric information, screening, monitoring and enforcement problems (Hoff *et al*., 1993). Due to this, lenders may ration borrowers by refusing to fund part or all of their loan applications. Such credit market issues are exacerbated in agriculture, particularly during the period of transition to a market economy (Latruffe, 2005; Petrick, 2004; Davis *et al*., 2003; Swinnen and Gow, 1999). Thus, transfers through decoupled payments may improve liquidity and therefore reduce farmers' borrowing costs. In the context of accession to the EU, the implementation of generous decoupled payments may help mitigating some of these constraints and lead to increased investment. Indeed, when a farm is credit constrained it might underutilise productive assets compared to a situation of no constraints (Sadoulet *et al*., 2001). However, as the CAP payments represent a secure and increasing stream of income, borrowers can pledge an increase in their repayment capacity (Collender and Morehart, in ERS/USDA 2004). Additionally, land values are expected to increase due to the capitalisation of support post accession and this will also allow farmers to pledge more collateral (see Latruffe and Le Mouël, 2006).

The objective of the paper is to assess the impact of the SAP on farmers' strategies in the NMS. Given that the pre-accession period was typically characterised by the presence of binding credit constraints, the main proposition of this paper is that, the CAP flat-rate area payments will relieve liquidity constraints and affect production decisions and the expansion of farms. In other words, the SAP could have an 'income' effect, as the flat monetary transfers increase farmers' income and may allow them to purchase more production factors than would have been the case otherwise. The paper draws on farm level data and investigates specifically the case of one state that joined the EU in 2004 – Lithuania. The study only focuses on commercial farms, which are included in the Farm Accountancy Data Network (FADN) sample, as they are more likely to be eligible and respond to the change in support. To capture the specific effect of the implementation of the CAP, we segment farmers on the basis of their financial constraints and assess the linkage with growth intentions under two policy scenarios, namely continuing pre-accession policy and implementation of SAP.

The paper is structured as follows. The next section describes the Lithuanian context and the following section presents an overview of the methodology and data. Section four presents the analytical results and section five concludes.

2. Lithuanian farms before and after accession

Before the reforms in the 1990s, agriculture in Lithuania generated 28 percent of GDP (OECD, 1996). The cost-price squeeze during the period of transition, late payments by processors to farmers and delayed payments of government subsidies, augmented the financial problems and tightened the liquidity constraints of many farmers (OECD, 1996). The lack of loan finance, in particular, impeded the development of the land market. During the mid-1990s, Davies and Cook (1995) carried out a farm survey and found that under the then prevailing system farmers were credit constrained. Credit constraints have been recognised by policy makers. The pre-accession policy included interest rate subsidies, that accounted for 30-70 percent of the loan interest rate. Nearer to accession, Lithuania provided a 50 percent interest rate subsidy on loans for the purchase of agricultural land (Meyers *et al.*, 2004). A Rural Credit Guarantee Fund was established with the aim of facilitating access to credit for farm businesses which did not possess sufficient collateral. Although there were improvements in the 2000s, smaller farmers that would have liked to expand their farm were still financially constrained.

Accession to the EU has increased the funds available to farmers. Prior to accession, Lithuania implemented direct payments linked to production of selected crops and livestock, but their amount was low. For instance, cereals were supported at 11 Euro/ha in 2002 and the slaughtered premium was 57 Euro/head. This constitutes the baseline scenario against which farmers' intentions under SAP have been analysed in this study. Post-accession, the SAP for crops and grassland was 32.5 Euro/ha in 2004 increasing to 45.6 Euro/ha in 2005. In addition the coupled top-ups were almost flat across all crops and grass land – 56.8 Euro/ha in 2004 and 56.4 Euro/ha in 2005. The only exceptions were flax for fibre with top-ups in 2004 equal to 134.2 Euro/ha and in 2005 to 124.4 Euro/ha, and protein crops whose top-ups were increased from 56.8 Euro/ha in 2004 to 89.7 Euro/ha in 2005. An additional 18.8 Euro/ha on all land located in less favoured areas (LFA) has been funded by the Lithuanian government as a top-up. Overall there has been an increase in payments for most crop and livestock products since the introduction of the SAP and national top-ups. Exceptions from this are flax for fibre and linseed in all regions, and potatoes and vegetables in non LFA regions. Thus, farmers who are expected to benefit the most from the change in policy are arable crop producers, the producers of previously unsupported crops, and farmers in LFA.

3. Methodology and data

The investigation of the link between farm financial constraints and growth intentions is based on a FADN sub-sample of individual farmers and a survey of intentions of the same farmers. Firstly, FADN data for 2000-2002 were used to investigate whether investment decisions of some farmers in the sample were constrained prior to accession due to a shortage of finance. For this, an augmented accelerator investment model is employed, followed by a second stage which characterises those farmers who were the most constrained. Secondly, intentions of constrained and non-constrained farms are compared, using answers from the intention survey.

First stage: investment model

Investment models are commonly used to assess the presence of financial constraints in a sample. Standard investment models explain firms' investment decisions by relating the firms' investment demand to explanatory variables that proxy investment opportunities. Then, as proposed by Fazzari *et al*. (1988), a variable representing the firms' internal resources is included in the standard model. If the estimated coefficient for this variable is significant, this

means that some of the sample's firms face financial constraints. The authors justified this approach by Modigliani and Miller's (1958) claim that in a perfectly functioning capital market, internal (retained profits) and external (loans) financings are perfect substitutes, and therefore neither plays a role in investment decisions. Thus, if proxies for any source of financing have a significant influence in investment demand models, this provides evidence of capital market imperfections that constrain some firms financially. A stronger explanation is provided by Hubbard (1998), who shows that, in the case of a perfect capital market, the firm's opportunity cost of internal funds is equal to the market interest rate. By contrast, in the presence of market imperfections such as information asymmetries, the firm's shadow cost of external financing is greater than the one for internal financing. The gap between both costs forces some firms to resort to the cheaper internal source of funds. However, such funds might be limited, and therefore, firms' investment decisions are constrained by the availability of internal resources. This justifies the addition of an internal funds' proxy to standard investment models, to test for the presence of financially constrained farms in the sample. Investment models with such internal resources' variable are referred to as augmented.

Then, a second stage of analysis is required to identify the most financially constrained firms. This second stage, mainly introduced by Fazzari *et al*. (1988), consists in separating the sample's firms into groups of *a priori* constrained and unconstrained firms. As explained by Hubbard (1998) this intuitive approach must use sorting criteria that allows the identification of firms that face a wedge between the cost of external and internal financings, compared against those for which both financings are similarly costly (unconstrained firms). The augmented investment model is then re-estimated for each group of firms separately, the most constrained group being the one displaying the highest sensitivity to the internal resource variable. This splitting approach has been widely used in the literature. Studies conducted for the manufacturing and health sectors, have distinguished between firms based on four principal characteristics: maturity (well established businesses are known to lenders, thus reducing information costs), size (firms with greater collateral), membership of larger groups (improving their access to loans), and the nature of the financial and ownership structure (e.g. Hoshi *et al*., 1991; Calem and Rizo, 1995; Aggarwal and Zong, 2006). Regarding studies dealing with agriculture, farm size has also been commonly employed, as well as, amongst other variables, collateralisable assets, indebtedness level, financial performance and human capital (Bierlen and Featherstone, 1998; Benjamin and Phimister, 2002; Chaddad *et al.*, 2005;

Latruffe, 2005). All these variables capture researchers' *a priori* expectations concerning which farms face high external financing costs.

In this paper, the investment model used is the accelerator model (Koyck, 1954). Based on early observations that industries' demand for new capital increased when demand for the final good accelerated, it relates the change in the stock of capital to sales' growth,. The former variable is the investment and the latter variable proxies the farm's opportunities as Hubbard (1998) demonstrated. The standard accelerator model is given by equation (1), while the augmented model, to test for the presence of financially constrained farms, is given by equation (2). In this model, a cash flow variable is added to equation (1), representing the farms' availability of financial resources:

$$\frac{I_t}{K_{t-1}} = \alpha_0 + \alpha_1 \frac{(S_t - S_{t-1})}{K_{t-1}} + \varepsilon_t \quad (1)$$

$$\frac{I_t}{K_{t-1}} = \alpha_0 + \alpha_1 \frac{(S_t - S_{t-1})}{K_{t-1}} + \alpha_2 \frac{CF_{t-1}}{K_{t-1}} + \varepsilon_t \quad (2)$$

where subscript t represents the period, K is the farm total capital stock, I is the gross investment, S is the level of sales, CF is the cash flow (calculated as total farm revenue minus wages, rentals and interest), α_0, α_1, and α_2 are parameters, and ε is the error term. The normalisation by the capital stock allows us to control for size effects. Panel data techniques are not used to estimate the models in (1) and (2), as the time series is too short (two periods, 2000-2001 and 2001-2002). Simple ordinary least squares, including a year dummy, are thus employed.

It is expected that, if the sample contains farms that were financially constrained during the period studied (2000 to 2002), the cash flow coefficient, α_2, has a positive and significant sign. In order to identify which farms were the most constrained, farms are split into two sub-groups using the sample's 2000 average of specific, discriminating variables as separating thresholds. Several discriminating variables are used in turn to create the sub-groups, based on previous studies as mentioned above: such as human capital characteristics (e.g. age, education, successor, participation in a farmer union); farm characteristics (e.g. initial size, reliance on farming); location (e.g. regions, LFA); indebtedness, profitability and past reliance upon subsidies, to capture the possible income effect. Model (2) is then re-estimated for both sub-groups. The sub-group presenting the highest coefficient for the cash flow

variable is the most financially constrained. This method to identify more financially constrained farms has several shortcomings. However, for the objective of this study in which it was necessary to have some indication of farms that were more financially constrained under the pre-accession period in order to identify whether they have different growth intentions under SAP in comparison to the rest of the sample farms, this more workable method was preferred.

Second stage: intention survey

The post-accession growth intentions of farmers are then compared between the sub-groups identified in the first stage, using responses from a survey conducted in early 2005 within the framework of the EU FP6 IDEMA project, SSPE-CT-2003-502171. While not receiving widespread attention, surveys of farmers' intentions have been seen to offer two main research strengths. First, because farmers base their answers on their expectations about the evolution of their environment, survey results give a good insight into farmers' business confidence, which is otherwise difficult to capture (Thomson and Tansey, 1982). This provides a good approximation of how farmers will behave in the short-run as their expectations bias their intentions and decisions (Harvey, 2000). Second, the reliability of intention-based surveys appears robust as follow-up studies have indicated that the majority of surveyed farmers actually implemented their intended behaviour (Harvey, 2000; Thomson and Tansey, 1982; Tranter *et al*., 2004).

The survey sought to compare farmers' intentions holding everything else but the policy reform constant, in order to understand the potential impact of the implementation of the SAP. Respondents were asked to state whether they intended to exit or stay in farming in the next five years, and for those who intended to stay whether they planned to increase or decrease their farm area or maintain the *status quo* under two scenarios: a baseline scenario of continuation of the pre-accession national policies, and the scenario that entails the introduction of the SAP and national coupled top-ups.

Sample's statistics

Data were collected through face to face interviews in 2005. The sample represented a stratified FADN sub-sample. The farms sampled are fairly representative in terms of Economic Size unit (ESU), but from the point of view of specialisation, Cereals, Oilseeds and Proteins (COP) and general cropping are over-represented whilst mixed crops, mixed livestock and others are under-represented. Altogether 220 farmers were interviewed. Among

them, only 152 in each scenario intended to stay the farming sector beyond five years. Among those, more respondents would like to expand their farm under the SAP regime than they would have done if the national pre-accession policy had remained in place (51 compared to 24 percent) (Table 1). This provides the first indication that the introduction of SAP has lifted some obstacles to farm expansion.

Table 1: Share of respondents who intend to grow in size, decrease or remain constant under both scenarios (%)

	Intend to grow in size	Intend to keep the same area or to decrease in size	Total number of respondents (% in brackets)
Baseline scenario (continuation of pre-accession policy)	24	76	152 (100)
SAP and coupled top-ups	51	49	152 (100)

4. Results

The standard accelerator investment model on the full sample (220 farms each year) is appropriate for the sample studied, as the coefficient for the growth in sales is positive and significant, indicating that investment demand is based on market opportunities (Table 2). Similarly for the augmented model, as the cash flow coefficient is significant and positive, it shows that, for at least for some farms, investment demand is sensitive to internal liquidity and thus internal and external funds do not act as perfect substitutes. This reveals the presence of financial constraints for some farms.

Table 2: Results of the accelerator investment model on the full sample

	Standard model		Augmented model	
	Coefficient	Signif.	Coefficient	Signif.
Intercept	0.236	***	-0.011	
Sales' growth/total assets	0.534	***	0.711	***
Cash flow /total assets			0.473	***
Dummy = 1 if period 2001-2002	-0.305	***	-0.228	***
Number of observations	440		440	
R-square	0.140		0.217	

As explained in the methodology section, sample farms were split into two sub-groups according to the characteristics that were thought to discriminate in respect to financial constraints. The characteristics considered in turn were the following:

- A/ Subsidies as a share of revenue plus subsidies. It is assumed that farms with a higher share of subsidies are less constrained as subsidies may help farms overcome their finance shortage for investment.
- B/ Farm size measured by their utilised agricultural area (UAA). Size refers to the intrinsic characteristics of the farm which may make external finance more costly for some farms than the others, namely for small farms the screening, monitoring and enforcement costs could be too high.
- C/ Share of output sold. More market-integrated farms (with a higher share of output sold) may be less financially constrained.
- D/ Debt to total asset ratio. Highly indebted farms may find it difficult to obtain further loans. On opposite, farmers who did not receive loans in the past may be less likely to be awarded one.

For each sub-group A to D, the average of the sample in 2000 has been used as a threshold for defining the groups (share of subsidies in revenue - 5.7%; UAA - 79.9 ha; share of output sold - 61.5%; debt to asset ratio - 0.097).

Model (2) is estimated for each sub-group separately. A larger and significant coefficient for the cash flow variable indicates that the sub-group is more constrained. Table 3 presents the value of the cash flow coefficients. These results reveal that farmers receiving more subsidies prior to accession had better access to credit and therefore suggest that subsidies, in the past, have been used as a source of financing. Additionally, smaller farms, those with a low share of sold output and those with little indebtedness, were more credit constrained. This is consistent with the idea that potentially higher screening, monitoring and investment costs for small farms limit access to credit. Similarly, farms that were less integrated into the market and had less experience of receiving external loans were also more credit constrained. This is consistent with previous studies concerning credit constraints in the NMS (e.g. Latruffe, 2005; Petrick, 2004).

Table 3: Cash flow coefficient of the augmented accelerator model for sub-groups

A	Low share of subsidies in the revenue	0.721
	High share of subsidies in the revenue	0.550
B	Small UAA	0.713
	Large UAA	0.529
C	Low share of sold output	0.683
	High share of sold output	0.352
D	Low debt to asset ratio	0.641
	High debt to asset ratio	0.461

In a second stage, farmers' intentions to increase/decrease or maintain their farmed area under the SAP are compared across sub-groups (Table 4). The share of credit constrained farmers intending to grow under the SAP scenario is larger than under the pre-accession policy. This is also the case for unconstrained farmers, but the effect is less pronounced. In other words, the rate of change between the share of farms intending to grow under pre-accession policy and the share of farms intending to grow under SAP is consistently greater for the sub-groups that had been identified as constrained (shaded boxes in Table 4). The investigation of farmers' intentions therefore suggests that accession to the EU and the introduction of the SAP may relax the financial restraints of the more constrained farmers.

Therefore, it seems that subsidies do constitute an important facilitator of on-farm investment. Indeed, we have been able to identify farmers receiving less subsidies prior to accession as more credit constrained and to find that the introduction of the SAP have a more pronounced effect on the plans of more credit constrained farmers, irrespective of the fact that the SAP are considered by the European Commission (2003) as decoupled.

Table 4: Share of farms that intend to grow under pre-accession policy (Scenario 1) and under SAP plus top-ups (Scenario 2) (%), and rate of change between both shares

		Share under Scenario 1	Share under Scenario 2	Increase rate (%)
A	Low share of subsidies in the revenue	25.2	54.1	114.7
	High share of subsidies in the revenue	22.4	46.3	106.7
B	Small UAA	24.2	53.8	122.3
	Large UAA	24.6	47.5	93.1
C	Low share of sold output	23.2	50	115.5
	High share of sold output	25.3	52.4	107.1
D	Low debt to asset ratio	25.5	54.5	113.7
	High debt to asset ratio	24	45.1	87.9

Note: the increase rate is calculated as (Share under Scenario 2 – Share under Scenario 1)*100 / Share under Scenario 1.

5. Conclusions

The implementation of the SAP in the NMS means higher and more predictable payments. Therefore, it is not surprising that in Lithuania it leads to a greater willingness to operate larger farms. Regarding the growth of land area, the introduction of the SAP and national top-ups provided incentives to pursue expansionist farm strategies for both financially constrained and less financially constrained farmers. However, there is some evidence that constrained farmers are even more likely to be willing to grow than less constrained farmers. This suggests the existence of an income effect of the *ex ante* decoupled SAP. This is due to the

fact that a secure direct payment can be directly reinvested or used as collateral to access credit. Payments are thus likely to facilitate expansion, especially among farmers whose expansion plans were previously constrained. This is in agreement with the argument put forward by Sadoulet, *et al* (2001), that transfer programmes are likely to have an income multiplier effect on credit constrained farmers. Overall, these early findings also confirm that due to market imperfections, the introduction of CAP payments in the NMS will have *ex post* coupled effects. As farmers want to grow, implementation of the SAP will lead to the fuller utilisation of agricultural land and an increase in the demand for land.

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