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**Does the agricultural policy foster agricultural development?
Evidences on corrections of the rural capital imperfection in the
Republic of Macedonia**

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Abstract

In transition economies, capital structure decisions are not driven from the market, but on farmers' expectations to receive financial support from the government. These observations raise the necessity for empirical evidences for RM on whether agricultural support programs, affecting capital structure decisions and other specific farm structural characteristics, foster improvements in farm performance. The results support that agricultural companies worry less about their capital structure hindering investments and thus, restructuring of the agriculture.

Key words: Farm performance, soft-budget constraints, capital structure decisions, agricultural companies, econometrics.

Introduction

Changes in the agricultural sector and in the banking system that emerged with the transition process in the Republic of Macedonia (RM) create obstacles for the agricultural investment development. Limitations in the access to funds, arising from the imperfection of the agricultural and rural capital market, is mostly due to high transaction costs and the existence of asymmetric information in financial intermediation, as well as due to the existence of some forms of soft-budget constraints. Despite the observed recent development of the agricultural and rural capital market as a result of the increased supply of affordable interest rates for farmers, as well as governmental programs to support agriculture, farmers still face an insufficient supply of financial services which are the basis of the investment process. The development of agriculture requires overcoming the limitations in agriculture and banking system by ensuring sustainable mechanisms of the agricultural and rural capital market.

In fact, one of the most important factors impeding economic restructuring in transition countries is the imperfection of the capital markets (Maskin, 1996; Wunner, 2001). In this regard, the government in RM has taken measures to correct the agricultural and rural capital market imperfections through implementation of support programs in agriculture. Despite the improved availability of external capital to farming, the agricultural and rural capital market remains underdeveloped and presents a major restriction to efficient allocation of farm investments. That is, since farmers have no incentive to restructure by themselves, affecting their farm financial behaviour. Thus, capital structure decisions are not driven from the market, but on farmers' expectations to receive financial support from the government (Kornai, 1986). If perfect capital market conditions existed, investment decisions would be independent from financial decisions (Modigliani and Miller, 1958; 1959).

These observations raise the necessity for empirical evidences for RM on *whether agricultural support programs, affecting capital structure decisions and other specific farm structural characteristics, foster improvements in farm performance.*

The results shall contribute to: 1) Development of econometric model so to assess the impact of financial decisions in agriculture; 2) Identification of the existing farm financial strategies to profit under imperfect agricultural and rural capital market, and 3) Analysis of the impact of the financial support in agriculture on farm profitability. This shall further contribute to an understanding of the demand for agricultural and rural capital services, and shall create a basis for guiding future policy developments of the agricultural and rural capital markets in transition agriculture.

Econometric Specification of the Model

In order to identify the effects of capital structure decisions along with government support programs and other farm structural determinants on farm performance, we use an econometric application on a balanced panel, consisting of 160 Macedonian agricultural companies, $i = 1, \dots, 160$, observed during the period from 2006 to 2010, $t = 1, \dots, 5$. We test the relationship between the return on assets ratio (ROA) as a measure of farm profitability and the structural determinants of profitability, emphasizing the capital structure effects, including the farm financial assistance. We specify a fixed-effects econometric model, which allows for panel data properties. That is, the individual variation among 160 agricultural companies and the variation within each of the companies through five years. Another

property of the fixed-effects model is that it makes possible to control for variables that have not or cannot be measured. A fixed-effects model treats unobserved differences between clusters as a set of fixed parameters that can either be directly estimated or be removed of the estimating equations.

Assuming that the ROA is linearly dependent on the specified set of explanatory variables, in order to identify the financial strategy of agricultural companies for increasing opportunities to profit, we consider two indicators of capital structure consistent with the theories of capital structure, as follows: the first model uses the debt-to-equity ratio (DTER), which measures the total debt in relation to total equity (1), and the second model uses the debt ratio (DR), which measures the total debt in relation to total assets (1a). Additionally, a fixed set of explanatory variables occur in both relationships. That are, the net profit margin (NPM) and its partial effects (NPM2) that capture the pricing flexibility of the agricultural companies; the share of inventory in total assets (INV), and the measure of capital intensity (CI), which is the share of fixed in total assets. We include dummy variables for utilization of funds from the agricultural support programs, holding value of 1 if an agricultural company was rewarded a financial assistance, and value of 0 otherwise. In this respect, DP is the dummy for the Direct Payments and RDP for the Rural Development Program. We exclude the Instrument for Pre-accession Assistance for Agriculture and Rural Development (IPARD) from the analysis since the payments were first realised during 2012, which is outside the observed period. The definition of the variables and their descriptive statistics is presented in Appendix I.

The model (1) denoting the debt-to-equity ratio as a capital structure measure shows no statistical significance, unlike the debt ratio in the model (1a) which is statistically significant. The results presented in table 1, confirm that the correct model is the fixed-effects one. The Hausman's specification test ($prob > Chi^2 = 0.0000$) rejects the null hypothesis of that the random-effects model is appropriate. Hence, the diagnostic check with the Pesaran's CD test ($Pr = 0.6786$) rejects the alternative hypothesis of that the serial correlation is detected.

Finally, the following fixed-effects model is specified:

$$\begin{aligned}
 ROA_{i,t} = & \alpha_i + \beta_1 NPM_{i,t} + \beta_2 NPM2_{i,t} \\
 & + \gamma_1 DR_{i,t} \\
 & + \delta_1 INV_{i,t} + \delta_2 CI_{i,t} \quad ; \text{ where } DP_{ijt} = 1; RDP_{ijt} = 1; (i = j). \quad (1a) \\
 & + \sum_{j=1}^N (\lambda_{1j} DP_{i,j,t} + \lambda_{2j} RDP_{i,j,t}) + \varepsilon_{i,t}
 \end{aligned}$$

Results

The return on assets (ROA) reflects the performance of agricultural companies on how well they utilise their fixed assets (or investments) in making earnings, or simply, the earnings per asset unit. For the selected agricultural companies, the return on assets is in average 1.7%, showing more variations between the years than between the agricultural companies. Additionally, the net profit margin explains the profitability strategy. The net profit margin has a positive and statistically significant impact on the profitability of agricultural companies, confirming that the pricing flexibility is important for achieving higher

profitability, since it allows price reduction under competitive market conditions. However, profitability increases up to a maximum net profit of 0.66 MKD* (or 0.011 Euros) income from every MKD (or Euros) income generated from sales. If the net profit margin exceeds this ratio, then profitability will begin to decline. This determinant captures the partial effects of the net profit margin and is statistically significant, confirming that agricultural companies' reliability on profit on sales rather than on assets' efficiency is a good strategy for increased profitability.

The debt-to-assets ratio has a negative and statistically significant impact on the return on assets. The observed agricultural companies hold high total debt of 1.3; which is higher than the recommended benchmark by Barry *et al.* (2000) of 0.5 for the agricultural sector. The high indebtedness has a negative effect on farm performance, reducing profitability by 0.3%.

Table 3. Results from the econometric specification of the model; DR denoting capital structure

Variables	Fixed-effect model results
Debt ratio (DR)	-.0028978*** (.0003306)
Net-profit margin (NPM)	.2776823*** (.050669)
Partial effects of NPM	-.2117955** (.0730147)
Inventory share (INV)	-.2142439*** (.0281684)
Capital Intensity (CI)	-.0710437** (.0240612)
Direct Payments (DP)	-.0109184* (.005369)
Rural Development Program (RDP)	.0118608 (.0129305)
Intercept (average)	.0842203*** (.0151823)
F-test	23.79***
R ²	.0188
SEE ($\hat{\sigma}_v$)	.0678
$\hat{\sigma}_u$.0605
Rho	.4437
N	800

Legend: * p<.05; ** p<.01; *** p<.001

profitability. Direct payments have a negative impact on profitability of the agricultural companies and the effect is statistically significant at the 0.05 confidence level. Direct

Given that the total debt is a measure of financial risk, the negative effects on profitability indicates that agricultural companies may need to consider this risk in the long-term financial decisions, or should aspire to dispose more assets than debt.

The capital intensity is on average 46% and confirms Barry and Ellinger's (2012) finding that farm businesses are highly capital intensive, operating on their fixed assets due to the dominance of the agricultural land and other real estate. However, too much fixed in total assets significantly reduce profitability. In this case, each additional unit of fixed asset employed, decreases profitability by 7%. Another important asset which is specific for the agricultural sector is inventory. Inventory assets serve as buffers to meet market uncertainties easily turned into liquid assets, although sometimes they are driven from the retained unfinished production. The inventory assets for farm companies are in average 18.7% of total assets which significantly reduce profitability by 21%.

The different types of financial intervention by the government and other organizations, designed to overhaul the agricultural and rural capital market has a different impact on

payments do not lead to structural changes in agriculture since they are measures that support farm sustainability. Therefore, in the long run, they lead to a reduction in farm profitability by 1% with each unit employed subsidy. On the other hand, the Rural Development Program supports investments development and therefore, positively affects the profitability of agricultural companies. However, this effect is not statistically significant for the observed agricultural companies since there is a small percentage of utilization of these funds.

Discussion and Conclusions

Agricultural companies in transition, worry less about their capital structure due to the existence of soft budget constraints, since the supply of additional funds is not a function of their solvency and profitability situation. Therefore, the issue of achieving a perfect balance in the capital structure of the agricultural companies in transition is complex. The imperfection of the agricultural and rural capital market along with the low fixed prices in agriculture, increase the demand for government intervention in agriculture, thus changing the farm financial behaviour. Agricultural companies neglect the financing issues since are being confronted with an alternative financial sources – financial assistance from external sources. Farmers expect to be rescued by the state, and therefore are not motivated to invest, especially not in high-risky projects. That is the reason behind the high utilization of the direct payments. Direct payments do not stimulate structural changes, but are important for maintaining the existing agricultural structures. While, programs that support investments and thus, structural changes, are poorly utilized.

Considering that this demand is based on a collective basis, the government needs to respond positively and intervene just to avoid political unrest by this social group. The more often financial intervention is aimed at maintaining the existing structures in agriculture, the more farmers will expect to receive this kind of support. Not guided by motives of maximizing profitability, farmers retain the existing farm structures by investing mostly in low-risk investments and current assets.

This situation may change only if the state has changed the model of implementation of measures to support agriculture, followed by institutional changes to allow stimulation of investments. Government actions in transition economies must be directed towards the creation and regulation of appropriate agricultural policy and sustainable development of credit mechanisms to agriculture in order to avoid the negative consequences of the imposed soft budget constraints. Empirical evidences from other countries in transition also support that restructuring can be promoted only by hardening of the budget constraints, while maintaining soft budget constraints may lead to the opposite. The expectations to get a financial aid do not lead to a self-motive motive for restructuring.

Information on the presence of soft budget constraints in agriculture is particularly important for understanding the investment and financial decisions in terms of transition. With a weak industrial sector, agriculture remains as an essential component of economic development in the transition countries.

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Appendix I. Specification of the variables and descriptive statistics

Table 1. Specification of the variables and descriptive panel analysis

Variable	Definition		Mean	Standard deviation	Number of observations
ROA	Return on assets, as net income in relation to total average assets, between current and previous year.	Overall	.0174	.0760	N = 800
		Between		.0344	n = 160
		Within		.0678	T = 5
NPM	Net profit margin, as net income in relation to total net sales.	Overall	.0697	.1262	N = 800
		Between		.0773	n = 160
		Within		.0999	T = 5
NPM2	Partial effects of the net profit margin.	Overall	.0208	.0838	N = 800
		Between		.0489	n = 160
		Within		.0681	T = 5
DR	Debt ratio, as total debt in relation to total assets.	Overall	1.3206	9.9591	N = 800
		Between		6.4270	n = 160
		Within		7.6214	T = 5
DTER	Debt-to-equity ratio, as Total debt in relation to total equity.	Overall	4.2516	20.7888	N = 790
		Between		13.2439	n = 158
		Within		16.0518	T = 5
CI	Capital intensity, as fixed assets in relation to total assets.	Overall	.4616	.2637	N = 800
		Between		.2408	n = 160
		Within		.1088	T = 5
INV	Inventory share, as inventory in relation to total assets.	Overall	.1874	.1854	N = 800
		Between		.1581	n = 160
		Within		.0975	T = 5

Table 2. Descriptive panel analysis of the dummy variables

Variable	Definition	Year	Number of observations	% companies that were not financially assisted (D=0)	% companies that were financially assisted (D=1)
DP	Dummy for Direct Payments, if DP=1, financial assistance was awarded, and DP=0 otherwise.	2006	160	100	100
		2007	160	100	100
		2008	160	24	76
		2009	160	12	88
		2010	160	6	94
RDP	Dummy for Rural Development Program, if DP=1, financial assistance was awarded, and DP=0 otherwise.	2006	160	100	100
		2007	160	100	100
		2008	160	87	13
		2009	160	93	7
		2010	160	94	6