CAPITAL STRUCTURE AND FINANCIAL PERFORMANCE OF AGRICULTURAL COMPANIES – EVIDENCES FROM THE MACEDONIAN AGRICULTURAL SECTOR IN TRANSITION

Simonovska Ana [†‡], Gjosevski Dragan [†], Campos Monica [††]

[†] Institute of Agricultural Economics, Faculty of Agricultural Sciences and Food, University Ss. Cyril and Methodius – Skopje, Republic of Macedonia
[††] Centre for Analysis and Synthesis, Lund University – Lund, Sweden
[‡] Contact author: Simonovska Ana, e-mail: krstevska_a@yahoo.com

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Abstract

Asymmetries between the emerging capital and credit market in the Republic of Macedonia in addition to the restructure of the agricultural sector limit the agricultural companies' financial decisions and their possibilities to profit. Considering capital market imperfections typically for transition economies this paper attempts to identify empirical evidences for structural determinants on Macedonian agricultural companies' financial performance and to explain the financial strategy of these companies to earn profit. The relationship between the ratio on assets return is used to measure financial performance and structural determinants of capital, earnings and financial business. The relationship is econometrically tested by the specification of a fixed-effect model. Following previous studies relaying on the pecking-order theory and the trade-off theory, the analysis applies on a dynamic panel data consisting of 26 Macedonian agricultural companies originating from the former *agrokombinates*, during the period 2006-2010. The agricultural companies' capital structure determinant is tested by the specification of two different models: the first model uses debt-to-equity ratio as a capital structure indicator and the second one uses the debt ratio. Results suggest that Macedonian agricultural companies in the short run are limited by pricing flexibility undertaking different strategies to increase profitability. More efficient strategies are undertaken by growing agricultural companies operating on their fixed assets. However these agricultural companies are confronting with inefficiencies in the use of working capital reducing the ability to supply at an increase market demand. Statistical evidences do not support the hypothesis of that high-levered agricultural companies in Macedonia have higher opportunities to profit. Probably due to asymmetries between the national capital and credit markets and agricultural companies, increasing risk exposure. Hence, Macedonian agricultural companies prefer more assets than debt, considering financial risk in the long run decisions. This strategy seems to be a good financial strategy for growing agricultural companies with the ability to generate sufficient liquidity to meet exogenous market conditions.

Key words: Financial agricultural companies' performance, capital determinants, fixed effect model, econometrics.

Introduction

The transition process in the Republic of Macedonia has given rise to major structural and economic changes through ever. Before 1991, the Macedonian agricultural sector consisted of large-scale farms – *agrokombinates* and cooperatives (Galev and Arsovski, 1990). Today, the decentralisation of the sector, by privatisation, implies that small-farm households, for which half of them are smaller than 1 ha (SSO, 2007), represents the agriculture (Mathijs and Noev, 2004; Redman, 2010) while 10% of the total arable land is distributed among former *agrokombinates* which is less than 1% of the total farms (SSO, 2011). According to Volk *et al*. (2010) a fragmented agriculture, denoted by small holders, leads to economic rigidities in the long run. Experiences of post-transition countries show that small-scale farms have had more difficulty to adopt a market-oriented behaviour through profit maximisation (Lerman *et al*., 2002). However, Swinnen (2003) has questioned the existence of large farms in transition economies since their market shares are continuously falling.

Despite of the negative consequences of a fragmented agriculture on farms' performance, Macedonian farmers are still facing financial distress, confronting with imperfect capital pricing since the concentration of banking financial decisions (Angelova and Bojnec, 2012), soft budget constraints on business farms (Zinych and Odening, 2009) and credit constraints, mostly due to high transaction costs in farming and financial intermediation. However, as a result of several negotiations between the Agricultural Credit Discount Fund (ACDF) and private national banks, capital pricing in rural areas is in favour of farmers, which is reinforced by the national and international support programs for investments in agriculture, the Instrument for Pre-accession Assistance for Agriculture and Rural Development (IPARD) and the Rural Development Program.

Empirical evidences show that the firms' capital structure strongly depends on the transition's environment and adjustment rate as well as market asymmetries between the banking systems and firms. In Romania, for instance, the capital structure of listed firms was low-levered because of the bank's unwillingness to grant loans to old firms considering it too risky (Hussain and Nivorozhkin, 1997). Firms generally increase their leverage as a result of the banking development system (Haas and Peeters, 2004), using monetary policy as a guidelines. Financial decisions are however, strongly influenced by fiscal policy and the development of macroeconomic indicators (Dragota and Semenescu, 2008). Rigidities in the supply of corporate credit markets also affects the adjustment rate to the target financial leverage of private firms (Nivorozhkin, 2003). The determinants of the firms' capital structure also differ between transition economies. Haas and Peeters (2004) found that the firm's profitability and age are the most robust determinants in Romania. In Poland and Hungary the size of the firm is the most important determinant (Devic and Krstic, 2001) while in Czech dairies is the ability of the individual firm to invest external capital (Chmelikova, 2002). For the specific case of Macedonian firms, Deari and Deari (2009) show that listed and unlisted firms primarily follow the pecking-order pattern followed by the trade-off postulates, that is they primarily follow a hierarchical capital structure decisions logical to given capital and credit market circumstances. Similar findings are for the joint-stock firms preferring a more conservative approach of financing avoiding debt in their capital structure (Arsov, 2010).

There are a few research evidences about how the individual's firm capital structure in transition economies affects its performance, also there are no research evidences accounting for Macedonian agricultural companies. That in fact, agricultural companies' financial performance is restricted by disadvantages arising from a fragmented agriculture and asymmetries between the national emerging capital and credit market. Hence, this paper attempts to identify empirical evidences for structural determinants on Macedonian agricultural companies' financial performance and to explain the capital structure policy of these companies as a financial strategy to increase profitability. The relationship between the ratio on assets return as a measure on financial performance and structural determinants of capital, earnings and financial business is tested by econometrically specifying a fixed-effect model. Following previous studies on financial strategies relaying on the pecking-order theory and the trade-off theory, the analysis applies on a dynamic panel data consisting of 26 Macedonian agricultural companies originating from the former *agrokombinates*, during the period 2006-2010. The agricultural companies' capital structure determinant is tested by the specification of two different models: the first model uses debt-to-equity ratio as a capital structure indicator and the second one uses the debt ratio.

Results suggest that Macedonian agricultural companies in the short run are limited by pricing flexibility undertaking different strategies to increase profitability. More efficient strategies are undertaken by growing agricultural companies operating on their fixed assets. However these companies are confronting with inefficiencies in the use of working capital reducing the ability to supply at an increase market demand. Statistical evidences do not support the hypothesis of that Macedonian agricultural companies' reliance more on debts than on equities increases possibilities to profit. Hence, Macedonian agricultural companies prefer more assets than debt, considering financial risk as a strategy to increase profitability in the long run.

The paper is organised as follows. The next chapter is a literature review. It presents dissimilarities between economies in transition and Western countries based on market imperfections followed by a review of selected empirical studies. Chapter three briefly describes the Macedonian agriculture sector in transition followed by the motivation of our empirical model. Chapter four presents the econometric approach and results. The paper ends with a short discussion and presents the conclusions.

Market Imperfections in Western and Transition Economies – A Short Literature Review

According to classical financial theory firm's financial structure is irrelevant for the value of the firm assuming perfect capital market conditions (Moddigliani and Miller, M&M 1958; 1959), through the adjustment of nominal interest rates the levels on debt-to-equity ratio reminds in equilibrium (Stiglitz, 1969). However, in the presence of market imperfections, the introduction of a tax shield allows optimal solutions for the firm's capital structure. That is, if the firm is financed purely based on debt (M&M, 1963) highlighting the importance of the firm's financial structure (Stiglitz, 1974; 1988). Additionally, the taxation of profits and the existence of bankruptcy costs enable the validity of seeking for the optimal capital structure of firms, introducing the trade-off theory (Kraus and Litzenberger, 1973; Scott, 1976; 1977; Kim, 1978). That is, firms are able to balance bankruptcy costs by benefits of tax shields derived from taking on debt. It is assumed that firms reach the optimal level of their capital structure by setting a target debt ratio to achieve. Firms increase the leverage determined by the debt-to-equity ratio up to steady-state where the utility of an additional unit of debt is equal to the cost of debt, including incurred costs due to a greater probability of financial distress (Myers, 1984; Bradley *et al.*, 1984).

There are several empirical findings in the Western financial literature for the trade-off between debt and equity financing. Recent studies on firms in the United Kingdom show evidences on the existence of the trade-off pattern of financial decisions. Firms adjust relatively fast to their long-term target borrowing ratios since deviations from the steady-state has significant impact on their performance (Ozkan, 2001) while in Swiss the adjustment process to steady state is slower due to the country's specific institutional arrangements (Gaud *et al.*, 2005). Evidences on transition economies show that in the process of financial decisions there is a difference depending on the determinants of the firms' capital structure. Chmelikova (2002) estimates a trade-off model for practical use in Czech dairies, in order to explain the correlation between debt ratio and financial distress by considering the firm's individual ability of investing external capital. Findings show that the relationship between the factors determining the capital structure among Czech dairies is irregular concluding that applying a uniform model on different production activities would give rise to misleading conclusions. Devic and Krstic (2001) explore the determinants of corporate capital structure in Poland and Hungary considering the firm's leverage by tangibility, size, profitability and growth opportunities. The analysis is consistent with the trade-off theory and results show that the firm's size is the most important determinant in the process of financial decision, whereby the inverse relation between profitability and leverage supports the pecking-order theory.

The capital structure theory develops in a new direction by introducing agency costs between financial intermediaries and firms (Jensen and Meckling, 1976; Myers, 1977) and information asymmetries between lenders and borrowers (Myers, 1984; Myers and Majluf, 1984). Actually, the

pecking-order theory relays on information asymmetry assuming that firms do not reach a steady-state on a specific debt ratio, debt-to-equity ratio -which is the measure of debt in relation to equity, and the debt ratio -which is the measure of debt in relation to assets. Instead, managerial decisions follow a hierarchy scheme in order to support financial decisions, *e.g.* internal funds are preferred over external financial sources turning to be preferred over raising equity (Myers, 1984; Myers and Majluf, 1984). Graham (2000) shows that firms are flexible in terms of financing. However, the study of Dragota and Semenescu (2008) offers opposite evidences for Romanian firms. They found out a pecking-order pattern on information asymmetries between banks and firms influencing financial decisions of listed companies. Among others, Fama and French (2002) are critical to the trade-off theory and to the pecking-order theory, considering that once the optimal capital structure collapses, the firms' debt rate is moving very slowly towards a new steady-state of debt. Nevertheless, recent studies analyse the financial behaviour of Macedonian firms based on both theories. Deari and Deari (2009) analyses influencing factors such as, profitability, value of tangible assets, size and growth rate on the leverage of 62 Macedonian listed and unlisted companies concluding that firms' financial decisions are at a beginning consistent with the pecking-order pattern, since the continuously development of the Macedonian financial market, to then follow the trade-off postulate. Arsov (2010) finds similar results for 46 Macedonian joint-stock companies showing strongly preferences on a conservative financial approach, for which half of the firms have no debt in their capital structure.

Already in 1989, Fischer *et al.* focuses on a dynamic capital structure choice, in a continuous time framework and in the presence of transaction costs. Nivorozhkin (2003) applies a dynamic trade-off capital structure model to examine the determinants of the target financial leverage of private firms by relating the adjustment rate in the Czech Republic and Bulgaria. Results show that Bulgarian corporate credit markets are less supply-constrained and firms adjust to targeted leverage faster than the Czech. Haas and Peeters (2004) uses a dynamic model based on the trade-off theory for Central and Eastern European firms. They consider quantitative and qualitative developments of financial systems by studying the endogenous factors influencing the deviations from the targeted leverage. In general, firms in transition economies increase leverage as a result of the development of the banking system in where the most robust determinants are found to be the firms' profitability and age.

Recently research focus is on the influence of firm's capital structure level in relation to endogenous factors on the performance of the firms. The idea is driven by the principal hypothesis prevalent in the M&M's work, as well as in the different theories of capital structure. This approach uses different measures on the firm's performance to explain the relation between financial behaviour and performance.

The analysis of capital market structures in Western and transition economies involves differences in the underlying reasons of market imperfections and the determinants of the firms' capital structure. Econometric applications outlying the relationship between capital structure and the firm's performance are recently gaining greater attention in Asian transition countries, due to their explosive economic growth. Typically indicators on financial performance are return on equity, return on assets, earning per share, market value of equity to the book value of equity and Tobin's Q while firm's capital structure measures include short-term debt, long-term debt, debt ratio, and debt-to-equity ratio (Abu-Rub, 2012). Beyond indicators on financial leverage, Zeitun and Tian (2007) consider growth, financial business indicators such as size, tax and tangibility to explain the firm's performance. Majumdar and Chhibber (1999) also consider the firms' age, degree of diversification and capital intensity additionally to control variables on exogenous determinants such as type of business groups, market orientation and time effects.

Khan (2012) and Saaedi and Mahmoodi (2011) use panel data techniques to investigate the relationship between firm's capital structure and its performance. Khan (2012) applies a pooled ordinary least square regression on 36 engineering sector firms in Pakistan. Results indicate a significantly negative relationship between the firm's performance measured by the return on assets, gross profit margin and Tobin's Q, while a negative but not statistical significant relationship between financial leverage and firm performance measured by the return on equity. Saaedi and Mahmoodi (2011) use pooling panel model to test how different capital structure indicators affect the firm's performance indicators finding a positive relationship between the capital structure and performance measured by earnings per share and Tobin's Q.

The pecking-order theory and the trade-off theory explain the financial behaviour of firms by analysing the choice of firms' capital structure in different scenarios. However, the issue of attaining perfect equilibrium in the firms' capital structure still remains open. Studies on capital structure theories attempt to explain the determinants of the firm's capital structure being financial strategy to increase profit in where some of the findings are consistent with the trade-off theory while most typically for transition economies is the pecking-order theory.

The Macedonian Agricultural Sector in Transition

The capital and credit market in the Republic of Macedonia – as other economies in transition – is denoted by a lack of competition in the national banking system (Angelova and Bojnec, 2012) followed by high transaction costs in financial intermediation. However, the Agricultural Credit Discount Fund, ACDF, interacts with commercial national banks in the administration of the capital and credit market in rural areas. The ACDF provides sustainable financial services in agriculture and renews loan commitments. Moreover, Instrument for Pre-accession Assistance for Agriculture and Rural Development (IPARD) and the Rural Development Program provide support on investments in agriculture. However, in despite of credit subsidies, there are still credit restrictions strangling the flow of funds for Macedonian agricultural companies.

Official records on individual agricultural companies, once known as *agrokombinates* and cooperatives, are provided by the Central Register of the Republic of Macedonia (2012) in the form of financial reporting statements (balance sheets and income statements). The information includes 26 agricultural companies for a period of five years, 2006-2010. The privatisation process has established a new ownership structure including limited liability companies, stock companies, cooperatives, influencing the companies' earnings, capital and financial business structures and their possibility to profit.

The return on assets reflects the performance of agricultural companies on how well they utilise their fixed assets in making earnings, or simply, the earnings per asset unit. For selected Macedonian large companies including food processors, Arsov (2008) considers 5% as the floor limit of the return on assets. However, for agricultural companies the return on assets is 1%, reaching its top level of 2% in 2007 probably due to an improvement on the investment environment supported by lowered credit interest rates. The agricultural companies' earnings structure is explained by the asset turnover and the net profit margin. It shows the company's strategy in increasing profit opportunities. The asset turnover is the ratio of net sales over total average assets measured between two time periods. It is a measure on sales income per employed assets varying between 0.01 and 2.55 for agricultural companies. The net profit margin indicates the amount of net income available to equity holders. The higher the net profit margin is the more pricing flexibility a company may have in its operations. For the selected agricultural companies there is a negative relationship between the asset turnover and the net profit margin, which is decreasing over time probably due to financial rigidities.

Since the main objective of this paper is to find empirical evidences between the capital structure and the performance of agricultural company we consider two indicators on capital structure, separately in order to determine the financial strategy of agricultural companies in increasing or decreasing opportunities to profit. The debt-to-equity ratio – is the ratio of total debt over total equity, while the debt ratio – is the ratio of total debt over total assets. The debt-to-equity ratio measures the firms' leverage and is proposed by the financial literature (Abu-Rub, 2012; Zeitun and Tian, 2007) as an indicator on the company's capital structure. Financing through debt is considered to offer the lowest cost of capital inducing, however, a greater risk exposure to high-levered companies that hold significantly more debt than equity in their capital structure. The debt-to-equity ratio for Macedonian agricultural companies is 2.04 signalling that these companies rely more on debts than on equities to increase profitability. However, some of the companies are showing a positive debt-to-equity ratio but lower than 1 implying the opposite, *i.e.* the company relies more on equities in financing their assets. Considering the debt ratio, it measures the financial risk companies are facing. Agricultural companies are holding more assets than debt with a ratio of 0.45. In average the ratio remains constant through the observed period varying among agricultural companies between 0.01 and 0.96.

The financial business orientation in agricultural companies – as one of the main strategies to improve profitability in the short run has also been influenced by the reorganisation of the agricultural sector. Most of the agricultural companies specialise in crop production as during the former system. Today there is a more diversified production structure. In general, 69% of the agricultural companies diversify production as a strategy to increase profitability and to reduce the market risk. According to Devic and Krstic (2001) the size of the firms is one of the most important determinants in financial decisions *i.e.* larger agricultural companies have higher leverage than smaller. They measure size by taking the logarithms of net sales. However, we calculate size as the share of the company's individual net sales in relation to the total net sales for all companies in the sample. It is a structural indicator to control financial stability, varying between 3% and 51%. Large and well-established companies operating at a higher size percentage, over the average of 16% of net sales, may show a better performance than smaller farms operations, under the average percentage size. This is probably due to established contractual sales arrangements with buyers. Inventory assets serve as buffers to meet market uncertainties easily turned into liquid assets as in the case of cereal and apple production. Besides following market signals, cereals serve as a state commodity reserve. Inventory assets are sometimes supplying time lags driven due to the retained unfinished production. The inventory assets for agricultural companies are in average 13% of total assets. Of particular interest is the continuously increasing of inventory assets during the period, especially for cereal producers, probably due to the instability of cereals world prices and the need for replenishment of cereal stocks to recover the financial crisis. Capital intensity, the ratio of fixed assets over total assets, is in average 0.58 and confirms that agricultural companies operate on their fixed assets (Barry and Ellinger, 2012). However, operating on fixed assets induces to inefficiently use of working capital resulting in a supply-shortness at an increase in the market demand. The quick-liquidity ratio shows the companies' ability to cover current liabilities capturing determinants in the business cycle, as an industrial development indicator. The wide variation of the quick-liquidity ratio among companies indicates that there are high liquidity constraints among some of the companies, while others are high liquid. The quick-liquidity ratio in 2009 is 2.12, the highest for the observed period and the lowest 0.34 is observed in 2010.

In the specification of the model we also consider two controlling variables for dynamic panel properties, a sales growth dummy and a time-dummy variable denoting the year 2007. The agricultural companies' sale growth rate is in average 27%, which fluctuates from year to year, reaching its bottom for the period in 2007 in where the growth rate is only 6% which contradicts to the growth peak of the entire economy (Dimitrievski *et al.*, 2010). However sales growth rate is rapidly recovered increasing up to 54% in 2010 probably due to post-crisis recovery of the overall economy. The entire bank credit flow doubled this year suggesting increased investment activities. A sales growth dummy controls for 40% of the agricultural companies showing a negative growth rate. Some of the main variables in the model: return to assets; net profit margin and sales growth rate are showing extreme values for the year 2007 probably due to exogenous effects on the entire economy *i.e.* increase in GDP and decrease in average annual inflation rate.

Table 1 presents a summary of descriptive statistics for the data set and in appendix I there is a detail specification of the variables.

Transition of former *agrokombinates* resulted in less specialized agricultural production with weak return on invested capital, only 1% in comparison with 5% of other industries. Low profitability of agricultural companies is induced by low net profit margins which is specific for agricultural production. The proportion of fixed assets in total assets is relatively high and this coincides with Barry and Ellinger's (2012) description of agricultural businesses. Agricultural companies hold capital intensive strategy for making profit, but have not yet adopted market-oriented strategy, holding very little inventory to follow market signals. This give rises to liquidity risk. Mainly debt is preferred over equity in consistence with the M&M's findings from 1963, probably due to preferable interest rates exercised by domestic and international agricultural support programs. However, long-run support in agriculture may discourage efficient operation of farm businesses, as evidenced in the Ukrainian agriculture by Zinych & Odening (2009). Assets are preferred over debt indicating fewer investment activities of Macedonian agricultural companies in despite of the available agricultural investment

support. Next follows the specification of the econometric models and the interpretation of the estimated results.

Table 1. Summary Statistics for 26 agricultural companies during the years 2006-2010

Variable names	*Abbreviations*	*Mean*	*Std. Dev*	*Min.*	*Max.*
Company Performance					
Return on assets	ROA	0.01	0.02	0.00	0.12
Earnings Structure					
Asset turnover ratio	AT	0.58	0.44	0.01	2.55
Net profit margin	NPM	0.07	0.12	-0.12	0.68
Capital Structure					
Debt-to-equity ratio	DTER	2.04	3.76	0.01	24.20
Debt ratio	DR	0.45	0.25	0.01	0.96
Financial Business Structure					
Sales growth rate	SGR	27.42	78.54	-65.99	468.76
Specialisation	SPEC	0.31	0.46	0.00	1.00
Size of agricultural companies	SIZE	0.16	0.11	0.03	0.51
Inventory	INV	0.13	0.11	0.00	0.60
Capital intensity	CI	0.58	0.22	0.06	1.00
Quick-liquidity ratio	LR	1.48	3.47	0.02	31.90
Control Variables					
Dummy for sales growth	SG	0.60	0.49	0.00	1.00
Dummy for year 2007	TIME	0.20	0.40	0.00	1.00

Econometric Specification of the Models

To test for structural determinants on the financial performance of agricultural companies in the Republic of Macedonia measured by the return on assets (ROA), a fixed effect model (Baltagi *et al*., 2003) is derived by first considering a simple linear regression model. This model shall support the explanation of the agricultural companies' financial strategy to earn profit considering the pecking order theory and trade-off theory of capital structure. The econometric specification is conducted in three different steps.

Step 1: Disregarding on time properties in the panel data, a simple linear regression model is estimated by the ordinary least square technique correcting for heteroscedasticity (Gujarati and Porter, 2009). That is, when the variance of the error term is not constant, as follows:

$$ROA_i = \alpha_i \mathbf{ES} + \delta_i \mathbf{CS} + \gamma_i \mathbf{FBS} + \lambda_i \mathbf{C} + e_i \quad (1)$$

In accordance to table 1, the vector **ES** includes the earnings structure variables; **CS** denotes the capital structure variable, either DTER or DR; **FBS** is the vector on the financial business structure variables except of the sales growth rate, which is a control variable included in the vector **C** together with the time variable for the year 2007. The control variable also substitutes for the intercept of the model. The variance of the error term e_i is

$$Var\left(e_i \,|\, \alpha_i \mathbf{ES}; \delta_i \mathbf{CS}; \gamma_i \mathbf{FBS}; \lambda_i \mathbf{C}\right) = \sigma_i^2, \forall i \in 1,...,n \quad (1a)$$

Correcting for heteroscedasticity reduces the error term for the estimates on capital structure DTER and DR resulting in unbiased standard error of the parameter values and thereby in unbiased inference test results. We also test for multicollinearity problems in the specification of the model. For the variable SIZE in the **FBS**-vector we test the specification of the logarithms on net sales according to Devic and Krstic (2001). However, the variance of inflation factor for this variable is V.I.F = 35.91 which is higher than the rule of thumb V.I.F. =10 for severe mullticollinearity problems. Hence we define SIZE as the share of the company's net sales in relation to total net sales, see tables 1 and 1a, in appendix II for estimated results.

Step 2: The specification of the fixed effects model allows for panel data properties. That is, the individual variation among 26 agricultural companies and the variation within each of the companies through five years. The fixed effect model allows also for endogenity of all the explanatory variables and individual effects. That is since the definition of the variables, for which some of them are time invariant, and correlated with individual explanatory variables, (see section 3 for details). Another property of the fixed effect model is that it makes possible to control for variables that have not or cannot be measured. A fixed effect 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. We opt for removing the intercepts on individual effects and time effects from our estimations keeping the effects of the chosen control variables.

Assuming that the ROA is linearly dependent on the specified set of explanatory variables the data set consists of 26 clusters of agricultural companies i = 1,…, 26 where some of the indicators vary during 2006-2010, t = 1,…, 5 while others are time constants. 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 – the debt-to-equity ratio and the debt ratio. The variable debt-to-equity ratio is time varying, and the model is as follows

$$\begin{aligned} ROA_{i,t} &= \lambda_t SG + \mu_i TIME + \alpha_{1i,t} AT + \alpha_{2i,t} NPM \\ &+ \delta_{1i,t} DTER \\ &+ \gamma_{1i,t} SPEC + \gamma_{2i} SIZE + \gamma_{3i,t} INV + \gamma_{4i} CI + \gamma_{5i,t} LR + v_{i,t} \end{aligned} \tag{2}$$

while the model denoting debt ratio is

$$\begin{aligned} ROA_{i,t} &= \lambda_t SG + \mu_i TIME + \alpha_{1i,t} AT + \alpha_{2i,t} NPM \\ &+ \delta_{1i} DR \\ &+ \gamma_{1i,t} SPEC + \gamma_{2i} SIZE + \gamma_{3i,t} INV + \gamma_{4i} CI + \gamma_{5i,t} LR + v_{i,t} \end{aligned} \tag{2a}$$

The intercept l_t varies for each point in time, while m_i is time invariant and $v_{i,t}$ varies for each agricultural company at each point of time. That means that $v_{i,t}$ represents purely random variation at each point of time, $v_{i,t}$ $(0,\sigma^2)$. Results are presented in appendix II, tables 2 and 2a respectively.

For equation (2) the capital structure variable DTER is not found to be statistical significant while DR which is time varying in equation (2a) and is statistical significant.

Step 3: As a third and final step we analyse the effects of negative and positive sales growth by dividing the sample into agricultural companies with positive and negative sales growth. This step offers explanation on which capital structure strategy of agricultural companies induces growth. The model indicating capital structure by debt-to-equity ratio is

$$\begin{aligned} ROA_{i,t} &= \mu_i TIME + \alpha_{1i,t} AT + \alpha_{2i,t} NPM \\ &+ \delta_{1i,t} DTER \qquad ; \text{for } SG = \begin{cases} 1 \\ 0 \end{cases} \\ &+ \gamma_{1i,t} SPEC + \gamma_{2i} SIZE + \gamma_{3i,t} INV + \gamma_{4i} CI + \gamma_{5i,t} LR + v_{i,t} \end{aligned} \tag{3}$$

while the model denoting capital structure with the debt ratio is

$$ROA_{i,t} = \mu_i TIME + \alpha_{1i,t} AT + \alpha_{2i,t} NPM + \delta_{1i} DR + \gamma_{1i,t} SPEC + \gamma_{2i} SIZE + \gamma_{3i,t} INV + \gamma_{4i} CI + \gamma_{5i,t} LR + v_{i,t} \quad ; \text{for } SG = \begin{cases} 1 \\ 0 \end{cases} \tag{3a}$$

The models are estimated by the restricted maximum likelihood technique, referring back to Bartlett (1937). Results are presented in tables below.

Starting with the model denoting capital structure with the debt-to-equity ratio DTER, results presented in table 2 are interesting. The goodness of fits of the models indicates good inferences based on the restricted parameters of the log-likelihood function reinforced by the estimates of the residuals indicating unbiased error terms. Not surprisingly, better results fits the sample on positive growth sales, SG = 1, where the Akaike information criteria is lower than for the sample on negative sales growth.

Table 2. Fixed effects model by the REML method; DTER denoting capital structure

	Positive Sales Growth, SG = 1			*Negative Sales Growth, SG = 0*		
Variable names	*Estimate*	*t-value*	*F-value*	*Estimate*	*t-value*	*F-value*
Earnings Structure						
AT	0.0278	6.23	38.76	0.0101	3.57	12.77
NPM	0.1032	8.19	67.13	0.1001	10.51	110.45
Capital Structure						
DTER	-0.0001	-0.38	0.15	-0.0001	-0.11	0.01
Financial Business Structure						
SPEC	-0.0087	-2.32	5.37	0.0008	0.41	0.17
SIZE	-0.0360	-2.28	5.20	-0.0120	-1.15	1.33
INV	-0.0457	-2.8	7.83	-0.0055	-0.54	0.29
CI	0.0053	1.07	1.14	-0.0042	-1.6	2.56
LR	0.0001	0.33	0.11	0.0007	1.62	2.61
Control Variables						
TIME	0.0096	2.01	4.03	0.0031	1.77	3.15
Goodness of fits of the model						
Number of observations	66			44		
Residual	0.00017			0.00003		
-2 Res Log Likelihood	-308.1			-251.9		
AIC	-306.1			-249.9		
BIC	-304.0			-248.4		

The positive effects of earnings structure on the return on assets are found to be strongly statistically significant in where the results of the F-test confirm these effects to be fixed effects. The effects of assets turnover on ROA show a significant difference between agricultural companies having positive and negative sales growth implying that the company's strategy in increasing profitability is for a more efficiently investment on assets when firms are increasing production capacity while the net profit margin remains similar between the two operation systems, allowing for pricing flexibility in the short run.

The capital structure denoting time varying effects on the debt-to-equity ratio variable shows, as expected, a negative relationship on the return on assets, however this variable is not found to be statistically significant or these effects to be fixed.

The variables denoting financial business structure for specialisation, size of agricultural companies and inventories are found to be negative related to ROA and statistically significant for the sample on positive sales growth, which is not the case for the sample on negative sales. In particular,

the effect of specialisation is negatively related to ROA for agricultural companies indicating positive sales growth while the opposite effect is for agricultural companies with negative sales growth however it is not found to be statistically significant, signalling for diversification as a good strategy to increase profitability. Unexpected, is the result of company's size indicating a negative effect on the return on assets. Since this variable is restricted to the total net sales, one possible explanation is that an increase in the agricultural company's net sales in relation to total net sales is likely to reduce their profitability, that is their probability to expand economies of scales decreases, while smaller agricultural companies still operates at increasing economy of scales. The indicator of inventory assets is negative related to return on assets implying that time lags in the retailer chain are influencing the possibility to convert these inventories into liquidity assets.

Interesting are the results of capital intensity implying that financing operations by equity is positive related on return on assets just for agricultural companies operating at positive sales growth, however these results are not found to be statistically significant. Neither there are the effects of quick-liquidity ratio on agricultural companies' financial performance operating at positive sales growth, while the interpretation of the quick-liquidity ratio for companies operating at negative sales growth is positive related to ROA implying that companies are able to cover current liabilities taking advantages on the fluctuations of the business cycle. The effect of the dummy variable for year 2007 positively influences the agricultural companies' financial performance and is consistent with the entire economic growth in the country.

Similar results are presented in table 3 for the model on the capital structure debt ratio, which is a time invariant variable. This specification indicates good measures on the models' goodness of fits.

Table 3. Fixed effects model by the REML method; DR denoting capital structure

	Positive Sales Growth, SG = 1			*Negative Sales Growth, SG = 0*		
Variable names	*Estimate*	*t-value*	*F-value*	*Estimate*	*t-value*	*F-value*
Earnings Structure						
AT	0.0292	6.79	46.07	0.0097	3.26	10.65
NPM	0.1033	8.59	73.76	0.1006	10.73	115.21
Capital Structure						
DR	-0.0131	-2.32	5.40	0.0011	0.30	0.09
Financial Business Structure						
SPEC	-0.0075	-2.07	4.28	0.0006	0.28	0.08
SIZE	-0.0279	-1.82	3.33	-0.0121	-1.17	1.37
INV	-0.0406	-2.57	6.62	-0.0066	-0.64	0.42
CI	0.0096	1.88	3.54	-0.0044	-1.63	2.65
LR	0.0000	-0.01	0.00	0.0008	1.66	2.77
Control Variables						
TIME	0.0090	1.97	3.87	0.0030	1.68	2.84
Goodness of fits of the model						
Number of observations	66			44		
Residual	0.00016			0.00003		
-2 Res Log Likelihood	-318.7			-256.1		
AIC	-316.7			-254.1		
BIC	-314.6			-252.5		

The estimator on debt ratio is found to be negatively signed and statistically significant for the sample on agricultural companies operating at positive sales growth. The opposite results are obtained for the sample on agricultural companies with negative sales growth. That is probably since agricultural companies operating at positive sales growth are also holding more assets than debt, reinforcing the results of Arsov (2008). Furthermore, estimated results presented in tables 3 and 3a in appendix II, exclude the effects of quick-liquidity ratio as a short-run indicator, turning the estimated

parameter values on the debt ratio to be negatively signed for both samples operating at positive and negative sales growth. Taking in mind that debt ratio is also a measure on companies' financial risk and the negative effects on return on assets it is likely that agricultural companies in the long run are considering financial risk in their decisions on financial performance by accruing more assets than debt.

Discussion and Conclusions

This study examines how Macedonian agricultural companies' earnings, capital and financial business structures influence on financial performance and additionally explains the capital structure strategy to increase profitability. According to the literature structural determinants depends on the transition's environment and adjustment rate as well as asymmetries between capital and credit markets. However, knowledge about the effects of structural determinants on agricultural companies' performance can be used as a guideline to reinforce possibilities to profit in a transition economy.

Agricultural companies' financial performance is restricted by disadvantages arising from a fragmented agriculture and asymmetries between the national emerging capital and credit market. The former *agrokombinates* transformed into less specialized agricultural production capacities characterized by low profitability. The earnings structure suggests that Macedonian agricultural companies in the short run are limited by pricing flexibility undertaking different strategies in order to increase profitability. More efficient investments are undertaken by growing agricultural companies holding an intensive capital strategy, operating on their fixed assets. However these companies induce inefficiencies in the use of working capital reducing the ability to supply at an increase market demand. By holding small inventories agricultural companies may easily follow market signals adjusting production capacity, especially for non-growing agricultural companies.

Agricultural companies in Macedonia rely more on debt than on equity to operate activities. However, statistical evidences do not support the hypothesis that high-leverage increases opportunities for agricultural companies to profit. Probably due to asymmetries between the national capital and credit markets and agricultural companies, increasing risk exposure. However, in line with Arsov (2008) results suggest that agricultural companies prefer more assets than debt, considering financial risk in the long run decisions. This strategy seems to be a good financial strategy to increase profitability of agricultural companies with positive net sales growth while the opposite is valid for those companies operating at negative net sales growth. Agricultural companies facing a negative equity signal financial distress, without the ability to generate sufficient liquidity. A typical agricultural company with a good financial performance is a low-levered agricultural company showing a positive net sales growth, relaying on assets rather than debt, smaller than the average size in terms of net sales, diversifying production with a few inventories, operating at high capital intensity and able to cover current liabilities taking advantages on the fluctuations of the business cycle. That is since an increase in the company's net sales in relation to total net sales is likely to reduce the possibility to expand economies of scales without new capital investments, while smaller agricultural companies still operate at increasing economy of scales.

Through the transition process in the Republic of Macedonia agricultural companies are suffering great financial distress affected by the restructure in the agricultural sector and asymmetries in the capital and credit markets, today characterized by imperfect capital pricing. Imperfections in the capital market in rural areas along with the entire macroeconomic environment in the country create rigidities in the credit supply affecting the adjustment rate to the target capital structure in transition economies. Agricultural companies follow a financial strategy pattern in congruence with the pecking-order theory *i.e.* assets are preferred over debt turning to be preferred over raising equity. However, financial decisions differ between growing and non-growing agricultural companies. Agricultural companies without liquidity constraints follow the pecking-order pattern preferring assets rather than debt as a strategy to profit, while liquidity constrained agricultural companies increase leverage to profit which is more consistent with the static trade-off theory.

In general, the pecking order pattern in the financial decision-making is found to be a proper capital structure strategy given a transition rural capital market environment, stimulating growth of the agricultural companies. As this study considers only the performance of agricultural companies it would be interesting to investigate financial decisions for the entire agricultural sector including small-holders in order to more specifically analyse the asymmetries in the capital and credit market, such as the effects of credit subsidies on individual farms and agricultural companies.

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Appendices

Appendix I. Specification of the variables in the model

Variable names	*Abbreviations*	*Definitions*
Company Performance		
Return on assets in %	**ROA**	Net income in relation to total average assets, between current and previous year
Earnings Structure		
Asset turnover ratio	**AT**	Net sales in realtion to total average assets, between current and previous year
Net profit margin	**NPM**	Net income in realtion to total net sales
Capital Structure		
Debt-to-equity ratio	**DTER**	Total debt in relation to total equity
Debt ratio	**DR**	Total debt in realtion to total assets
Financial Business Structure		
Specialisation in %	**SPEC**	Dummy variable, D = 1 for Specialisation and D =0 otherwise
Size of agricultural companies in %	**SIZE**	Individual net sales in relation to the total net sales
Inventory in %	**INV**	Inventory in relation to total assets
Capital intensity	**CI**	Fixed assets in relation to total assets
Quick-liquidity ratio	**LR**	Differences between current assets and inventory in relation to current liabilities
Control Variables		
Dummy for sales growth	**SG**	Dummy variable, D = 1 for negative sales growth and D =0 otherwise
Dummy for year 2007	**TIME**	Dummy variable, D = 1 for year 2007 and D =0 otherwise

Appendix II: Estimated Results

Table 1. Heteroscedasticity consistent OLS; DTER denoting capital structure

	OLS		Heteroscedasticity Consistent	
Variable names	*Estimate*	*Std. Error*	*Std. Error*	*V.I.F**
Earnings Structure				
AT	0.0225	0.0032	0.0061	4.07
NPM	0.1040	0.0091	0.0184	1.50
Capital Structure				
DTER	-0.0002	0.0003	0.0001	1.38
Financial Business Structure				
SPEC	-0.0041	0.0025	0.0027	1.66
SIZE	-0.0226	0.0111	0.0104	4.18
INV	-0.0343	0.0113	0.0145	3.01
CI	-0.0009	0.0033	0.0033	3.84
LR	0.0002	0.0003	0.0003	1.28
Control Variables				
SG	0.0013	0.0024	0.0018	3.15
TIME	0.0049	0.0026	0.0027	1.41

Variance of Inflation

Explanatory power of the model R^2: 79.61; Adj R^2: 77.57

Table 1a. Heteroscedasticity consistent OLS; DR denoting capital structure

	OLS		Heteroscedasticity Consistent	
Variable names	*Estimate*	*Std. Error*	*Std. Error*	*V.I.F**
Earnings Structure				
AT	0.0238	0.0032	0.0061	4.16
NPM	0.1032	0.0088	0.0177	1.49
Capital Structure				
DR	-0.0102	0.0040	0.0039	4.12
Financial Business Structure				
SPEC	-0.0032	0.0024	0.0025	1.70
SIZE	-0.0194	0.0108	0.0099	4.20
INV	-0.0293	0.0111	0.0130	3.11
CI	0.0021	0.0034	0.0038	4.38
LR	0.0001	0.0003	0.0002	1.33
Control Variables				
SG	0.0019	0.0024	0.0016	3.10
TIME	0.0054	0.0025	0.0026	1.42

Explanatory power of the model R^2: 80.76; Adj R^2: 78.83

Table 2. Fixed effects model; DTER denoting capital structure

Variable names	*Estimate*	*t-value*	*TYPE III SS*	*F-value*
Earnings Structure				
AT	0.0225	7.02	0.0061	49.35
NPM	0.1040	11.40	0.0162	129.86
Capital Structure				
DTER	-0.0002	-0.66	0.0001	0.44
Financial Business Structure				
SPEC	-0.0041	-1.67	0.0003	2.80
SIZE	-0.0226	-2.03	0.0005	4.11
INV	-0.0343	-3.04	0.0012	9.25
CI	-0.0009	-0.27	0.0000	0.07
LR	0.0002	0.71	0.0001	0.5
Control Variables				
SG	0.0013	0.53	0.0000	0.28
TIME	0.0049	1.90	0.0004	3.60

Explanatory power of the model R^2: 73.03

Table 2a. Fixed effects model; DR denoting capital structure

Variable names	*Estimate*	*t-value*	*TYPE III SS*	*F-value*
Earnings Structure				
AT	0.0238	7.57	0.0067	57.27
NPM	0.1032	11.69	0.0161	136.71
Capital Structure				
DR	-0.0102	-2.54	0.0008	6.44
Financial Business Structure				
SPEC	-0.0032	-1.31	0.0002	1.72
SIZE	-0.0194	-1.79	0.0004	3.22
INV	-0.0293	-2.63	0.0008	6.93
CI	0.0021	0.60	0.0000	0.36
LR	0.0001	0.22	0.0000	0.05
Control Variables				
SG	0.0019	0.82	0.0001	0.67
TIME	0.0054	2.14	0.0005	4.56

Explanatory power of the model R^2: 74.55

Table 3. Fixed effects model by the REML method; DTER denoting capital structure, without Quick liquidity ratio LR

	Negative Sales Growth, SG = 0			*Positive Sales Growth, SG = 1*		
Variable names	*Estimate*	*t-value*	*F-value*	*Estimate*	*t-value*	*F-value*
Earnings Structure						
AT	0.0130	4.86	23.59	0.0253	7.93	62.92
NPM	0.1109	11.92	142.06	0.1054	8.92	79.56
Capital Structure						
DTER	-0.0002	-0.63	0.39	-0.0002	-0.50	0.25
Financial Business Structure						
SPEC	0.0033	1.85	3.41	-0.0070	-2.08	4.33
SIZE	-0.0052	-0.52	0.27	-0.0310	-2.38	5.64
INV	-0.0129	-1.39	1.92	-0.0378	-2.92	8.54
CI	-0.0053	-2.13	4.52	0.0036	0.81	0.66
Control Variables						
TIME	0.0021	1.18	1.38	0.0096	2.15	4.61
Goodness of fits of the model						
Number of observations	52			78		
Residual	0.00003			0.00016		
-2 Res Log Likelihood	-317.3			-395.6		
AIC	-315.3			-393.6		
BIC	-313.5			-391.4		

Table 3a. Fixed effects model by the REML method; DR denoting capital structure, without Quick liquidity ratio LR

	Negative Sales Growth, SG = 0			*Positive Sales Growth, SG = 1*		
Variable names	*Estimate*	*t-value*	*F-value*	*Estimate*	*t-value*	*F-value*
Earnings Structure						
AT	0.0136	5.02	25.24	0.0264	8.70	75.65
NPM	0.1096	11.78	138.84	0.1056	9.47	89.7
Capital Structure						
DR	-0.0039	-1.19	1.43	-0.0141	-2.92	8.54
Financial Business Structure						
SPEC	0.0035	2.00	3.99	-0.0060	-1.87	3.49
SIZE	-0.0054	-0.54	0.29	-0.0217	-1.73	2.98
INV	-0.0103	-1.09	1.20	-0.0306	-2.45	5.99
CI	-0.0043	-1.60	2.57	0.0078	1.76	3.10
Control Variables						
TIME	0.0025	1.38	1.91	0.0089	2.12	4.50
Godness of fits of the model						
Number of observations	52			78		
Residual	0.00003			0.00014		
-2 Res Log Likelihood	-323.1			-408.9		
AIC	-321.1			-406.9		
BIC	-319.4			-404.6		

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