

Impact of Integration and Globalization on Business Risk and loans in Slovak Agriculture

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Abstract. The paper evaluates the effects of integration and globalization on individual farms in Slovakia after EU accession in 2004. The decrease in employment in agriculture is a result of technological progress, changes in individual family preferences and low income in agriculture in comparison to other sectors of economy. In the production commodities with low labor input dominate. Cereals, oilseeds and industrial crops dominate the agriculture production in Slovakia. Large farms benefit in form of economy of scale and agricultural output of farms remains low in Slovakia. The paper compares the risk of crop and animal production based in individual farm data using Markowitz portfolio theory. The crop production is more risky due to higher effects of weather condition compared to animal production. The second part of the paper evaluates the changes on access to credit and finance gap of farms in Slovakia. Based on individual interviews with representatives of demand and supply of loans the paper concludes that large the Common agricultural policy is playing a dominant role in access to credit. Banks consider the CAP subsidies to be a stable income factor and good collateral for loans. The loan market is dominated by short term loans and the majority of the market offers are coming from 4 commercial banks. The finance gap exists towards small farmers and farmers with animal production and special crops.

1 Introduction

Farming is generally a risky business (1). This is due to the combination of environmental conditions, unpredictable economic shocks, and consequently, the financial situation of farm. Additionally the higher risk increases the financial risk resulting in lack of external funding. Financial intermediaries, especially banks, are risk averse and therefore the higher risk of the borrower results in credit constraints.

Limited use of improved technologies has been identified as a major factor contributing to low agricultural productivity in developing countries (2). The limited access to adequate credit for farmers to purchase improved inputs remains a major challenge in the agricultural production process (2,3). Adequate access to credit has the potential to impact technology adoption, thereby improving agricultural productivity and sustainable agricultural intensification (2).

Rural development and, in particular, farm productivity, can be influenced by several factors; one is access to credit. Access to credit may affect farm productivity because

farmers facing binding capital constraints would tend to use lower levels of inputs in their production activities compared to those not constrained. Improved access to credit may therefore facilitate optimal input use and have a major impact on productivity. Thus, access to credit allows farmers to satisfy their cash needs induced by the agricultural production cycle and consumption requirements (4).

In transition economies access to credit increases the total factor productivity up to 1.9 percent per 1,000 EUR of additional credit, indicating that an improved access to credit results in adjusting the relative input intensities on farms. This finding is further supported by a negative effect of better access to credit on labour, suggesting that these two are substitutes (5). Credit markets work imperfectly even in countries with a developed market economy and government intervention (6).

The paper analyses risk and access to credit in Slovak agriculture based on individual farm data and interviews with main finance providers and farmer's organisations in Slovakia.

2 Methodology

The data used for the analysis are from the database of Ministry of Agriculture and Rural Development of the Slovak Republic. The modified Markowitz portfolio theory approach was used to estimate the total risk of five portfolios consisting of all agricultural farms, capital companies, cooperatives, crop farm and animal farms. We assumed that the return of the investor is based on the profit of the company and the equity invested. Therefore, we considered return on equity ROE (Eq. 1) to be equivalent to the return on stocks, generally used in the case of quoted companies. Measuring volatility of return in the Markowitz portfolio theory is based on the average return over the observed period for each investment. We calculated the average return on equity EROE_i (Eq. 2) for each individual farm.

$$ROE_i = \frac{\text{Earnings After Taxes}}{\text{Shareholders Equity}} \quad (1)$$

$$EROE_i = \sum_{i=1}^t ROE_i \cdot d_i \quad (2)$$

Where ROE_i is return on equity of farm "i", d_i is a weight of ROE_i over the observed period (5 years, d_i = 0.20), t is number of years in observed period, i, j are individual farms. The individual risk of each farm (σ_i) is calculated using the standard deviation.

$$\sigma_i = \sqrt{\sum_{i=1}^t (ROE_i - EROE_i)^2 \cdot d_i} \quad (3)$$

Where σ_i is standard deviation of the individual return on equity (individual farm risk), ROE_i is individual return on equity, EROE_i is average individual return on equity.

The portfolio risk is determined by three variables: weight of the individual investment in portfolio (w_i), standard deviation of the individual investment - individual risk (σ_i), and covariance, relation between the ROE_i and ROE_j (σ_{ij}). To take into account market portfolio of all agriculture farms, the weight w_i of each farm is determined by farm market share, which is the share of the farm's equity on the total equity of all farms. The covariance represents the relationship between returns on equity of farms (Eq 4) and Σ covariance matrix (Eq. 5). The portfolio risk is then measured according to eq. 6

$$\sigma_{ij} = \frac{1}{n} \sum_{i=1}^n (ROE_i - EROE_i)(ROE_j - EROE_j) \tag{4}$$

$$\Sigma = \begin{bmatrix} \sigma_{11} & \sigma_{12} & \sigma_{13} & \dots & \sigma_{1k} \\ \sigma_{21} & \sigma_{22} & \sigma_{23} & \dots & \sigma_{2k} \\ \sigma_{31} & \sigma_{32} & \sigma_{33} & \dots & \sigma_{3k} \\ \dots & \dots & \dots & \dots & \dots \\ \sigma_{k1} & \sigma_{k2} & \sigma_{k3} & \dots & \sigma_{kk} \end{bmatrix} \tag{5}$$

$$\sigma_p = \sqrt{\sum_{i=1}^n w_i^2 \cdot \sigma_i^2 + \sum_{i=1}^n \sum_{j=1}^n w_i \cdot w_j \cdot \sigma_{ij}} \tag{6}$$

Where w_i is an individual weight of i -farm (farm's equity) in a portfolio (total equity of all farms) and n is number of farms.

The expected return on equity of portfolio is estimated by the multiplication of $k \times 1$ vector of individual weights of portfolio (w) and $k \times 1$ vector of corresponding individual expected returns on equity (the sum of multiplication of each farm's expected ROE and its share in the market portfolio).

$$EROE_p = \sum_{i=1}^n EROE_i \cdot w_i \tag{7}$$

Where $EROE_p$ is expected portfolio return on equity and $EROE_i$ is the average return on equity of individual farm.

3 Results

The accession of the Slovak Republic to the EU and the application of the Common Agricultural Policy (CAP) resulted in reducing risk of agriculture.

Table 2. Development of profitability and risk of farms in Slovakia

Period	1	2	3	4	5	6	7	8	9	10
Profitability	-0.4	-0.02	0.18	0.67	1.99	0.45	0.2	0.93	0.78	0.08
Systemic risk	2.61	2.64	2.26	1.91	1.00	3.61	3.41	3.4	2.99	2.62

Source: Own calculations

3.1 Volume of the loans in agriculture

Adoption of CAP did also contribute to a significant increase of bank loans since 2004. Between 2009 and 2013, the volume of funds did not increase due to the financial and economic crisis. But after 2014 banks did ease the credit standards that resulted in combination with increased support from CAP to an increase of outstanding loans for agriculture in Slovakia.

Increase was not proportional across all types of loans based on maturity. Single Area Payment Scheme, which is the main part of the CAP I. Pillar budget in Slovakia, in

Combination with Greening subsidies led to a significant increase in short-term loans. In 2018, operations and investments of farms were supported with bank loans with outstanding volume 746 mil. EUR. Compared to 2017 the volume increased by 4,7% annually. The total amount of short-term loans was 306 mil., medium-term loans 171 mil. EUR and long-term loans 269 mil. EUR. The share outstanding loans in agriculture in total outstanding loans in Slovakia reached 1.38% in 2018. Compared to the year of accession to EU in 2004 the total outstanding loans increased more than 330% in 2018 (Table 2).

Table 2. Outstanding loans in agriculture in Slovakia (in thousand EUR)

Year	TOTAL loans	Short-term	Medium-term	Lend-term	Failed loans
2004	221,566	103,084	71,315	47,167	n.a.
2005	286,261	118,801	107,234	60,226	25,892
2006	289,470	129,399	92,952	67,118	25,855
2007	322,363	135,994	100,988	85,382	n.a.
2008	413,965	176,091	121,612	116,263	n.a.
2009	395,589	139,779	139,160	116,650	n.a.
2010	380,967	190,113	92,001	98,853	n.a.
2011	414,304	202,924	91,300	120,080	n.a.
2012	401,470	201,501	80,764	119,205	9,998
2013	425,934	212,435	103,273	110,226	28,865
2014	477,082	239,946	92,232	144,904	28,727
2015	543,230	272,931	101,993	168,306	32,667
2016	650,314	274,900	146,220	229,194	35,144
2017	712,432	286,364	170,756	255,312	45,499
2018	746,082	306,130	170,569	269,383	42,358

Source: National Bank of Slovakia, own processing

Short-term loans are the most demanded loans by farms. They have low interest rates and are offered by banks with collateral in form of subsidies from CAP. Banks set the volume limit based on the subsidies to be received in the year from the I. Pillar. Short term loans have the share 41% in total loans in agriculture. (Fig. 1)

Medium-term loans (23.0%) with a maturity of one to five years had the lowest share in the loan structure. Compared to 2017 medium-term loans did not increase but did increase in previous years.

Long-term loans with maturities of more than 5 years had a share in total outstanding loans 36%. The increase in medium-term and long-term loans can be attributed to investments in long-term tangible assets as a contribution to the financing of the RDP projects 2014-2020 or the purchase of farms which has been increasing in recent years in Slovakia.

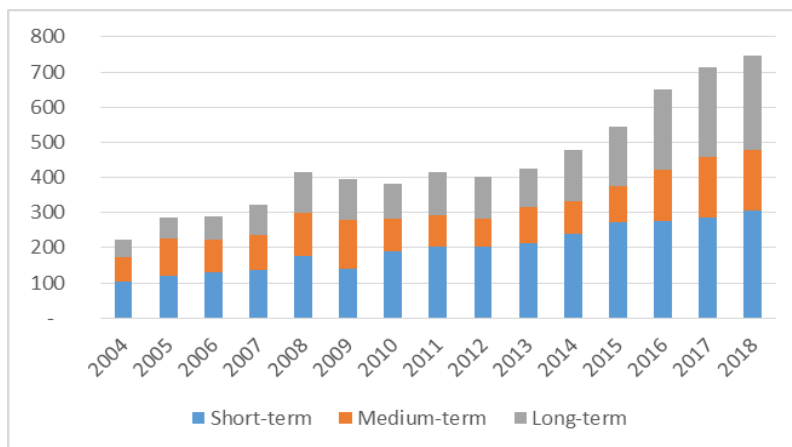


Fig. 1. Development and maturity structure of loans in Slovak agriculture (in mil. EUR)

Banks link the repayment of loans to the period when farms receive subsidies. The majority of subsidies farmers collect in December. Therefore there is a huge discrepancy in outstanding loans between end of November and end of December. Volume of loans in November is significantly higher when compared to December (Fig. 2).

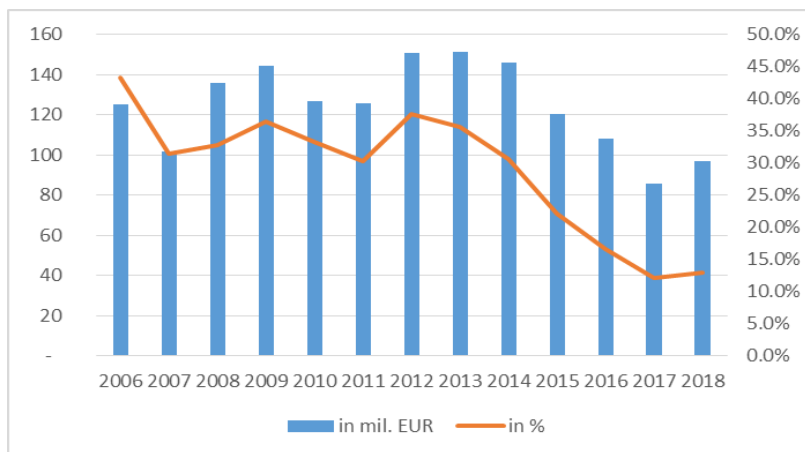


Fig. 2. How much are outstanding loans in November compared to December?

3.2 Importance of loans in financing farms in Slovakia

Bank loans are important for farmers in Slovakia. They form 11.1% of liabilities and owner's equity in Slovakia while the share of subsidies is 8.4% (Table 3). Based on national data, farmers in Slovakia acquire new fixed assets from owner's equity by 66%, bank loans by 26% and the rest is covered from subsidies and other funds (Table 4).

Table 3. Structure of funds to finance farm assets in Slovakia

	2015	2016	2017
Owner`s equity	44.8%	44.4%	44.8%
Liabilities	47.2%	47.3%	46.8%
-out of which Bank loans	10.7%	11.2%	11.1%
Subsidies	8.0%	8.4%	8.4%

Source: Green report, Ministry of Agriculture and Rural Development of Slovak republic

Table 4. Share of funds in financing new fixed assets in Slovak agriculture

	2015	2016	2017
Owner`s equity	64.7%	66.5%	65.7%
Bank loans	24.6%	25.5%	25.6%
Subsidies	14.7%	5.0%	2.8%
Other funds	10.8%	7.9%	8.7%

Source: Green report, Ministry of Agriculture and Rural Development of Slovak republic

Farmers in Slovakia carried out investment in 2017 from own resources (profit and write offs) and from external resources. Bank loans were the most important external source for investment. Bank loans to agriculture increased annually by 9.6% in 2017 (Table 13). Medium-term (1-5 years) and long-term (more than 5 years) loans grew faster than short-term loans. Growth of loans was supported by low interest rate too. Short-term loans dominate (40,2% of all bank loans in 2017). The amount of short-term loans is linked to direct payments of the farm, which serve as a collateral. Medium-term and long-term bank loans served to pre-finance or co-finance projects from Rural Development Program (RDP) too.

3.3 Finance Providers and financial products for farmers

Slovak agriculture is mainly financed by commercial banks. In 2018 there were 27 banks registered in Slovakia. Of them, four provide a bulk of all credit to farmers (Table 5).

Table 5. List of main banks providing loans to farmers in Slovakia

Bank	Address
Slovenská sporiteľňa, a.s.	Tomášikova 48, 832 37 Bratislava
Tatra banka, a.s.	Hodžovo námestie 3, 811 06 Bratislava
Všeobecná úverová banka, a.s.	Mlynské nivy 1, 829 90 Bratislava
UniCredit Bank Czech Republic and Slovakia, a.s.,	Šancová 1/A, 813 33 Bratislava

Source: National bank of Slovakia

UniCredit Bank with the market share of 30% in the segment of agricultural loans is traditionally the biggest bank for farmers in Slovakia because it is the country's successor of Polnobanka which was set up as a specialized financial institution for farming sector. UniCredit Bank is followed in agricultural loans by Všeobecna uverova banka with market

share of 25%, Tatra Banka, which has market share of 20% and Slovenska sporitelna (10%).

In addition to bank loans, financial institutions provide to agricultural sector also leasing services and bank guarantees. Loans can be further divided into general loans and specific agricultural loans. General loans are used by all types of clients including farms while specific agricultural loans are created for the use of farmers only. To access general loans farmers can approach all 27 commercial banks registered in Slovakia. Specific agricultural loans are provided by 6 banks.

- Financial products for farmers in Slovakia cover>
- Loans
 - General loans
 - Specific agricultural loans
- Leasing
- Guarantees

The value of agricultural leasing market is 149 mil. EUR, which is about 20% of the value of agricultural loan market. Farmers use leasing to finance trucks, combines, tractors, harvesters, and other types of machinery. Machinery serves as a collateral and leasing companies can offer services to farmers with higher risk. The state-owned Slovenská záručná a rozvojová banka (Slovak guarantee and development bank) provides guarantees to commercial banks that extend loans to farmers. In 2017 the share of guarantees on all financial products in Slovak agriculture was less than 2%.

Favourable business conditions after the accession of Slovakia into the EU and rising CAP subsidies play an important role in financing of agriculture in Slovakia. Farming risk has been declining since the joining of the EU in 2004. The accession of the Slovak Republic to the EU in 2004 and the introduction of the CAP in Slovak agriculture led to a decrease in the risk of farming in Slovakia due to enhanced stability of markets and policies. This contributed to an increase in the volume of agricultural loans.

Banks normally provide short term loans in the amount of 100% of direct payments, in some cases to good costumers 150% of direct payments that the farm receives. About half of medium-term and long-term loans are used to pre-finance and co-finance RDP 2014-2020 investment projects.

Long-term loans are used by farmers in Slovakia also to purchase land. Land purchases serve to expand the farm or to buy the land that was rented. Slovak farmers have the highest share of rented land among all the EU member states. For purchase of land some commercial banks provided long-term investment loans up to 15 years. The amount of loan for the purchase of land ranges from € 3,000 to € 330,000 and farms have to contribute with 10-20% of their own resources. The demand for loans for purchase of land is driven by low interest rates, higher direct payments, and the expectation of increasing of land prices in the future. Price of land was kept low due to significant fragmentation of land ownership and high transaction costs to purchase or rent land. Consolidation of land ownership in the future within a state programme financed by RDP funds or national funds will lead to lower transaction costs at the land market and higher land prices.

Banks offer loans to farmers in Slovakia with flexible interest rates. Interest rates increase with the maturity of loans. Short-term loans are offered with interest rate EURIBOR + 2% on average, medium-term loans EURIBOR + 2.5% on average and long-term loans EURIBOR + 3% on average. Loans to purchase land are characterized by the highest interest rates.

Leasing market is focusing on financing vehicles and passenger cars for farmers. The volume of leasing for farms in Slovakia is 149 mil. EUR in 2018. Main banks providing loans in Slovak agriculture own leasing companies which are active in providing leasing services to farms.

3.4 Access to finance in Slovakia: Who suffers?

Currently the situation on the money and financial market is favourable for farmers. Banks offer loans with relatively low interest rates. In Slovakia, large farms are dominant. They cover 90% of land and provide 95% of agricultural production. Generally large farms have no problem to obtain loans, according to representatives of farm associations and banks. Large farms can have loan application rejected if the planned project is too risky. Very specialized farms and farms specializing in animal production are considered riskier than average. Farms that heavily depend on the weather conditions, i.e. farms producing fruits and vegetables are considered riskier too, specifically if insurance is not sufficient. Start-ups that have no history and inferior collateral are also considered very risky by the banks.

Small farms have the most difficult access to credit in Slovakia. The market is dominated by large farms. Small farms have been created only recently. They do not have sufficient credit history and collateral. Furthermore, small farms and young farmers especially have huge investment needs that require significant amount of loans. Most small farms are the first generation farm. Furthermore, infrastructure in Slovakia, including the structure of suppliers of inputs and purchasers of outputs, banks and provider of services are used to deal with large farms not with small farms which have not existed until 1989. Large farms are significantly helped by high amount of direct payments that they receive. Direct payments are either used to invest or as a collateral for loans. Small farms with low direct payments cannot invest enough from direct payments or have low collateral. The estimated gap in financing of small farms in Slovakia is 100 mil. EUR.

Banks have no specific product for small farms. Some banks do not deal with farms with lower agricultural area than 20 hectares or even 100 hectares due to high transaction costs. Small farms do not pass through their selection criteria. For that reasons small farms receive loans not as businesses but as households only. Long-term loans are also difficult to obtain by farms and have higher interest rates.

Land market imperfections negatively affect credit market. Extreme fragmentation of land ownership hinders the use of land as a collateral. In many cases buildings cannot be used as collateral due to unclear property rights. Low prices of land make land an insufficient collateral for loans.

4 Conclusions

The volume of loans in Slovak agriculture is increasing rapidly since 2004. The increase was negatively affected by the economic crisis from 2009-2013. Slovakia has a dual structure of farms. Large farms dominate the sector. Slovak farms have credit constraint especially for long-term loans and in sub-sectors in which Slovak agricultural production is declining (animal production, fruits and vegetables).

Credit market fails to provide sufficient loans to small and young farmers. Banks do not have appropriate financial products for small and young farmers. Small farms in Slovakia are the result of the dissolution of state-owned cooperatives after 1989. They have a short business history and majority of them have relatively low assets and insufficient collateral. Many small farms are not linked to credit markets.

About 17% of all farms (4 300) are managed by young farmers (less than 40 years). Most of those farms are smaller than 100 ha. Small young farmers have higher demand for loans than other small farmers. The average loan capacity of young small farmers is 150 000 EUR.

About 50% of all loans in Slovakia in 2018 were guaranteed by direct payments. Most banks provide working capital to farms in the amount of annual farm's direct payments. One quarter of all agricultural loans are used for pre-financing or co-financing of RDP

projects. Interviews confirmed high demand for financial instruments among farmers. In addition to the elimination or reduction of credit constraint, FIs could replace inefficient RDP grants that suffer from high administrative burden, inappropriate timing, low frequency of calls for proposals as well as from lengthy or non-transparent evaluation and monitoring process.

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