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**ASSESSMENT OF THE IMPLICATIONS OF CHANGES  
IN INCOME SUPPORT POLICIES ON FINANCIAL HEALTH  
OF FARMS IN CANADA AND THE USA  
(AT THE INDUSTRY AGGREGATE LEVEL)**

**Abstract**

*Agricultural policy is a key determinant of the condition of the entire farm sector and individual farms at the micro level. Previous publications focused on the impact of agricultural policy tools on farms and their market surroundings, the effects of which were quantified at the macroeconomic level utilising the Producer Support Estimate (PSE). Detailed studies of the balance sheet and profit and loss account of the companies in the sector, including in-depth analysis of the financial indicators were barely explored. This publication fills the gap.*

*The aim of the publication is to analyse the extent to which alternations in the tools of agricultural policy affect the financial condition of farms. The main research method utilised is financial ratio analysis. The research covers the 2009-2014 period. Income assistance programmes in Canada and the United States have the greatest impact on the liquidity and profitability of the sector, while the impact on the management of net working capital and long-term assets is negligible. Similar phenomenon was observed by analysing the solvency ratios. Both in Canada and the US, the impact of direct aid programmes on the net profit exhibits a strong downward trend since the 2006-2009 financial crisis. Canadian direct payments accounted for more than 95% of agricultural entities' net income in 2009. Therefore, they were the only safety buffer which allowed farms to break even and maintain profitability. Whereas American farms are significantly less dependent on state assistance, since in the post-crisis year 2009 direct payments accounted only for around 13% of net profit and had been falling gradually until 2014.*

*Policy instruments in Canada and the US under review, quantification of their impact on the financial condition of the agricultural sector using the tools utilised by corporate finance, as well as thorough description of the adaptation of the solutions to the Polish agriculture are altogether the starting point for mid-term review of the Common Agricultural Policy (CAP) in 2017.*

**Keywords:** agricultural policy, agricultural finance, financial ratio analysis.

**JEL codes:** Q12, Q14, Q18, G38, N52.

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## Introduction

Assessment of financial results of changes in agricultural policy is an important research area of agricultural finance. Olson (2011) systematises the key agricultural policy tools directly influencing farms and presents how governments of respective countries support or restrict the activity of farmers. The effects are quantified at the macroeconomic level of the economy with the use of an averaged Producer Support Estimate (PSE)<sup>1</sup>. Comparisons of capital structures, returns on equity (ROE) and returns on assets (ROA) between the agricultural sector and non-financial enterprises outside of agriculture were started by Erickson, Mishra and Moss (2001). Former scientific studies analyse agricultural policy reforms, in particular CAP (Agrosynergie, 2011; Berg and Kramer, 2008; Kulawik et al., 2014), but there are not enough in-depth studies basing on financial ratio analysis and models using sensitivity analyses of financial condition of enterprises depending on the use of respective agricultural policy tools.

The publication analyses to what extent the agricultural policy changes affect the financial condition of respective farms at the micro level (farm level) and aggregated level, and whether the farms would be able to survive without support from the state. The conducted sensitivity analysis researched the values of financial ratios depending on the functioning of support tools, such as agricultural policy programmes dedicated to farmers in Canada or the US. Adaptation of solutions from Canada and the United States to European agriculture in the context of mid-term review of the CAP in 2017 is a current problem requiring scientific research. These countries have comprehensive solutions referring to most of the socio-economic and environmental problems of farmers at their disposal, and in particular: seasonal alignment of revenues by subsidisation of savings<sup>2</sup>, securing profitability and operating profit margins, disaster insurance or emergency relief in the event of natural disasters.

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<sup>1</sup> According to the OECD the Producer Support Estimate ratio is “the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm gate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income.”

<sup>2</sup> The term “subsidising savings” means government payments to annual revenues, aimed at support to investments. It is one of the four pillars of agricultural policy in Canada (AgriInvest programme).

Even in case of large-scale and efficiently managed Canadian and American farms, exclusion of agricultural policy tools leads to a drop in the return on assets (ROA) below the weighted average cost of capital (WACC), and the return of equity (ROE) below the cost of equity (CoE), measured based on the capital asset pricing model (CAPM) (Kay, Edwards and Duffy, 2012; Barry and Ellinger, 2012). From the perspective of the Value-Based Management (VBM) theory the owner-investor, controlling such an enterprise, will maximize profits by dissolving the enterprise, dividing it into pieces and selling out assets. In case of family farms, where the farmer accepts a satisfactory income and is able to regularly limit the consumption level, the unwavering assumption in corporate finance on profit maximization does not check out<sup>3</sup>. Whereas the existence of agricultural companies based on hired workforce is unjustified from the economic standpoint without support in the form of respective agricultural policy tools, because the owner is not able to permanently generate returns on investments above the financing costs – value destruction takes place (conclusion relying on ROE/ROA calculation in this paper). The issue of costs of capital exceeding the adjusted profitability, i.e. obtained upon exclusion of agricultural policy support programmes, is more severe in Canada than in the US.

The paper first compares the agricultural policy mechanisms and solutions applied in Canada and the US. To this end, empirical research based on financial data from 2009-2014 were used to model financial statements at the aggregate level – for the entire sector of agricultural companies in countries considered in the research and then for ratio analysis. The entire paper ends with conclusions and recommendations, including also an indication of directions of further in-depth empirical research.

### **Research aim, methodological issues and data sources**

A principal aim of the paper is identification of effects of agricultural policy tools in Canada and the US on the results of farms by analysis of all categories of financial ratios used in the financial analysis: operational management efficiency (growth and profitability ratios), investment management efficiency (performance and long-term assets management ratios), financial management efficiency (liquidity and debt ratios) and DuPont decomposition of profitability ratio.

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<sup>3</sup> In the attempts to adapt the corporate finance studies to family farms, the underlying assumption on profit maximisation is often discarded by American economists (Bubl and Stephenson, 2006). Władysław Grabski described differing behaviours of family farms and companies based on hired workforce in the crisis conditions – the scale of family farm insolvency was minor because they limited consumption level, while companies based on hired workforce had to pay salaries on an ongoing basis. Moreover, despite the economic goal the farmer may be also driven by the goal of prestige / size or a farmer may run activity resulting from an obligation to continue the operation of a farm. Profit is then a factor to achieve the actual goal. The issue of discarding the classical assumption on profit maximization by farm owners was discussed by Tomczak (2006, *Gospodarka rodzinna w rolnictwie. Uwarunkowania i mechanizmy rozwoju*).

To enable detailed ratio analysis, first the Balance Sheet and Profit and Loss Accounts (B/S and P&L accounts) were modelled and then the elements directly linked to respective agricultural policy were removed from the B/S and P&L accounts and their impact on the ratios upon exclusion or major decrease in support programmes was compared. Figure 1 illustrates methodological proceedings.

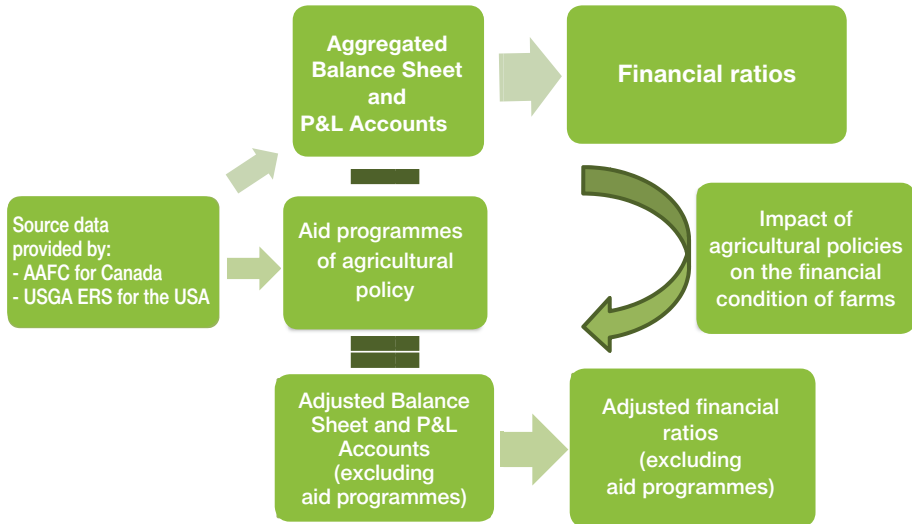


Fig. 1. Impact of the aid programmes of agricultural policy on the financial condition of farms – conceptualisation of the research process.

Source: own study.

The key research method is financial ratio analysis (Dudycz, 1999; Flejterski, 2007; Sierpińska and Jachna, 2004). The research covers the 2009-2014 period. Table 1 presents categories and groups of financial ratios used in the comparison.

Table 1

*Categories and groups of financial ratios used for impact assessment of agricultural policies on the financial condition of farms*

Category	Group	Ratio	
Assessment of operational management efficiency	Growth ratios	Growth in revenues year-on-year (YOY)	
	Profitability ratios	Gross margin	
		EBIT margin	
		Net income margin	
Assessment of investment management efficiency	Performance ratios – management of working capital	Net working capital / revenues	
		Working capital turnover ratio (revenues / net working capital)	
		Receivables turnover ratio	
		Inventory turnover ratio	
		Liabilities turnover ratio	
		Receivables conversion cycle in days	
	Long-term assets management		Inventory conversion cycle in days
			Liabilities conversion cycle in days
			Net long-term assets turnover ratio
			Net long-term assets / revenues
Assessment of financial management efficiency	Liquidity ratios	Fixed assets turnover ratio	
		Current ratio	
		Quick ratio	
	Debt ratios		Cash ratio
			Total liabilities <sup>a</sup> to equity
			Debt <sup>b</sup> to equity
			Net debt <sup>c</sup> to equity
			Debt to balance sheet total
DuPont decomposition of profitability	Profitability ratios	Debt to balance sheet total	
		Net debt to balance sheet total	
		Interest coverage ratio	
		Operating return on assets (ROA)	
		Return on equity (ROE)	

<sup>a</sup> In the ratio “Total liabilities to equity” the sum of all liabilities is the numerator: payable to suppliers (accounts payable) and creditors (interest-bearing liabilities).

<sup>b</sup> The item “Debt” includes all liabilities payable to creditors to from the interest is paid (interest-bearing liabilities), both short-term (current liabilities – short-term debt), and long-term (non-current liabilities – long-term debt).

<sup>c</sup> Net debt is debt less cash and cash equivalents encompassing highly liquid marketable securities.

Source: own study.

## Agricultural policy tools in Canada and the US – an attempt at comparison

Canada and the US are one of the largest producers of agricultural products worldwide and one of the largest net food exporters, although the share of agriculture in the GDP and employees employed in the agricultural sector in the entire population much decreased in the 20th century, just like in other developed countries. Agriculture remains an important element of the analysed economies and their supporting agricultural policies were compared in the same research period which was taken for calculations of financial ratios, i.e. as of 2009.

Table 2

### *Characteristics of farms in Canada and in the US*

Specification	Canada	USA
Number of farms	205 730	2 109 303
Sum of the farm size (million haa)	64.8	370.1
Average farm size (ha)	315	176
Utilised agricultural area (million ha)	35.4	157.7
Amount of revenues	CAD 51 billion <sup>b</sup> USD 38 billion	USD 395 billion
Value of revenues per hectare	CAD 787 per ha USD 594 per ha	USD 1067 per ha
Average value of revenues per farm	CAD 247 898 USD 187 029	USD 187 266
Employment level in agriculture	293 925	3 180 074
Employment per 100 ha of UAA	0.83	2.02
Number of employees per one farm	1.43	1.51

<sup>a</sup> Data for the US provided in acres were converted into hectares according to the following conversion rate 1 ha=2.47105 acre.

<sup>b</sup> Values expressed in Canadian dollars (CAD) were converted into American dollars (USD) according to the average annual market rate USD:CAD=1.32545 for the entire period from January to December 2016. (convergent with the 2016 Statistics Canada Census period), calculated on the basis of data provided by oanda.com.

Source: own calculations; Statistics Canada 2016 Census of Agriculture, [www.statcan.gc.ca/eng/ca2016](http://www.statcan.gc.ca/eng/ca2016); USDA NASS 2012 Census of Agriculture, [www.agcensus.usda.gov/Publications/2012/](http://www.agcensus.usda.gov/Publications/2012/).

The agricultural policy of Canada (AAFC, 2014) focuses on elimination of business risk with the use of 4 systematised programmes, which were given their final form in March 2009:

- AgriInvest – “subsidising savings” of farmers at the level of maximum 1% of annual revenues by deposition of payments by federal and provincial governments to especially designated bank accounts in financial institutions eligible for the programme. Funds can be withdrawn at any time and intended for any investment objective.
- AgriStability – insurance of profit margin activated in case of its drop by at least 15%.
- AgriInsurance – insurance in the event of disasters and other natural threats.
- AgriRecovery – is a disaster relief assistance intended for use by the federal governments in case of quick response to natural disasters.

Moreover, Olson (2011) draws attention to the existence of additional support instruments for federal governments. Canada uses price support policy on the market of dairy products, poultry and eggs through the system of production duties and quotas as well as the national price-fixing organisations. Production quotas are marketable only within the boundaries of respective provinces. The Canadian Wheat Board (CWB) is a body statutorily responsible for marketing and sales of wheat and barley from western Canada. Governmental aid is targeted at environmental improvements and covers the following main groups of products: biofuels, beef and organic plantations. For irrigation projects, it is possible to share costs between the farmer and the federal government. To recap, agricultural policy in Canada is well-developed in terms of the number of aid programmes and it is targeted mainly at keeping the profit margin by farms – it is characterised by microeconomic approach.

In 1996, the US decoupled the amount of aid payments from the production levels and reduced production limits imposed on farmers. However, in 2002 agricultural policy returned to direct support coupled with production level, because of the financial stress in the sector, caused by the 1996 policy change.

The key instruments functioning in the US agricultural policy:

- Support to production level:
  - direct payments (DP) calculated based on current market prices per unit of crops harvested so far and per area;
  - counter-cyclical payments (CCP) basing on the current prices set forth in the Bill and historical production<sup>4</sup>;
  - loan-deficiency payments (LDP) basing on current prices set forth in the Bill<sup>5</sup> and current production;
  - marketing loans for corn and other cereals, soy and other oil plants, rice, cotton, peanuts, edible seeds of some legumes.

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<sup>4</sup> Current production is not necessary to pay direct payments and counter-cyclical payments (DP&CCP).

<sup>5</sup> Target prices set in the Bill are slightly lower than the actual market prices, thus, counter-cyclical payments and loan-deficiency payments (CCP&LDP) will be triggered only as a result of a clear collapse of prices of agricultural products on the global markets.

- Revenue support through the Average Crop Revenue Election (ACRE) programme launched in 2009 and setting the state revenue guarantees that are an alternative to programmes of direct payments and counter-cyclical payments (DP&CCP)<sup>6</sup>.
- Support to income on milk production by the Milk Income Loss Contract (MILC), basing on the difference between the statutory price and market price with a maximum milk volume limit for each farm.
- Continuing cereal producer support programme in the event of natural disasters replaces relief solutions.

Table 3 synthetically presents conclusions from the analysis of changes in agricultural policies in researched countries, and adaptation of foreign solutions to the situation in the Polish agriculture. Strengths, weaknesses and adaptation of the solutions used in Canada and the US were classified by type of mitigated risk in agricultural activity (Barry and Ellinger, 2012).

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<sup>6</sup> Farmers choosing Average Crop Revenue Election (ACRE) programme instead of direct payments and counter-cyclical payments (DP&CCP), do not get counter-cyclical payments (CCP), and their direct payments (DP) are reduced by 20%. The interest on marketing loans is also reduced by 30%. Farmers have to report all their crops to the ACRE programme, although the potential transfers are paid for each type of cereals separately. Transfers under ACRE are made upon meeting the following two conditions: (1) the amount of state revenue per acre is lower than the state revenue guarantee per acre, (2) the actual revenue per acre of a specific farm is lower than the benchmark ratio set for it. The state revenue guarantee and revenue benchmark individual for each farm is calculated on the basis of moving averages of crop yields for a state and the farm and 2-year national average market price (American-wide). The actual revenue is calculated using the national market price.



Table 3  
 Agricultural policies in Canada and the US by type of mitigated risk – strengths, weaknesses and adaptation to agriculture in Poland

Country	STRENGTHS	WEAKNESSES	Adaptation to agriculture in Poland
Canada	<p><b>MARKET AND PRICE RISK</b></p> <ul style="list-style-type: none"> <li>• Farmers' savings' support utilising the AgriInvest programme compensates for income unpredictability, mitigates risks, allows for investments in farm assets.</li> </ul> <p><b>PRODUCTION AND INCOME RISK</b></p> <ul style="list-style-type: none"> <li>• AgriStability insurance programme counteracts profit margin fluctuations by 15%+; payments for farmers achieving lower profit margin than 85% of five-year average. In exchange, the farmer pays a premium depending on the insurance amount.</li> </ul> <p><b>RISK OF LOSS DUE TO UNFORTUNATE ACCIDENTS AND NATURAL DISASTERS</b></p> <ul style="list-style-type: none"> <li>• The AgriInsurance and AgriStability programmes prevent negative consequences of natural disasters – production loss insurance and assets insurance on a farm.</li> </ul>	<p><b>MARKET AND PRICE RISK</b></p> <ul style="list-style-type: none"> <li>• Policy targeted on price support instruments (duties, production quotas exchangeable between provinces, national price-fixing organizations) may distort the equilibrium between supply and demand on the markets of dairy products, poultry and eggs.</li> </ul>	<p><b>PRODUCTION AND INCOME RISK</b></p> <ul style="list-style-type: none"> <li>• Agriculture insurance programme – the issue of establishing a relevant basis (Canada: it is based on fluctuations in the profit margin) and mechanism for the premium level paid by the farmer (see the US – counter-cyclical direct payments and loan-deficiency payments, it is based on drops in market prices to the level set in the legislation).</li> </ul>
USA	<p><b>MARKET AND PRICE RISK</b></p> <ul style="list-style-type: none"> <li>• Well-developed production support system through direct payments and preferential loans – income support does not cause as many major disruptions in demand and supply equilibrium as price support.</li> <li>• Predictable and firm counter-cyclical policy due to absolute minimum prices included in the legislations – upon a drop in market prices to their level, counter-cyclical direct payments and loan-deficiency payments are launched.</li> </ul> <p><b>PRODUCTION AND INCOME RISK</b></p> <ul style="list-style-type: none"> <li>• Revenue support programme (ACRE) depending on state average income on farm yields and America-wide market prices – accommodating central policy eliminating income discrepancies in respective states.</li> </ul> <p><b>RISK OF LOSS DUE TO UNFORTUNATE ACCIDENTS AND NATURAL DISASTERS</b></p> <ul style="list-style-type: none"> <li>• Long-term natural disaster prevention programme in place of temporary and ad hoc programmes.</li> </ul>	<p><b>MARKET AND PRICE RISK</b></p> <ul style="list-style-type: none"> <li>• Counter-cyclical policy focused on support resulting solely from a drop in market prices of produced goods to the level established in the legislation and does not take into account the cost aspects (see Canada, AgriStability programme basing on a drop in profit margin).</li> </ul>	<p><b>MARKET AND PRICE RISK</b></p> <ul style="list-style-type: none"> <li>• Introduction of revenue solutions from the ACRE programme into the CAP (basing on local benchmarks), considering EU countries as separate states of the US will enable to mitigate discrepancies in treating agriculture in respective countries.</li> </ul>

Source: own study based on descriptions of Canadian aid programmes published by the Agriculture and Agri-Food Canada (AAFC), <http://www.agr.gc.ca>; and American Programmes – USDA Economic Research Service (ERS), <http://ers.usda.gov/>.

The assessment of effects of state intervention in agriculture depends on:

- amount of government intervention,
- geographical location against countries and policies of reference,
- holding or not the status of a farmer.

An universal measure applied to assess the amount of government intervention in agriculture is the Producer Support Estimate (PSE). According to OECD definition of 2009 the PSE is: “the annual monetary value of gross transfers from consumers and taxpayers to support agricultural producers, measured at farm gate level, arising from policy measures, regardless of their nature, objectives or impacts on farm production or income” (as in: Olson, 2011). The PSE covers the following components:

- market price support,
- budgetary payments,
- budget revenue forgone, i.e. gross transfers from consumers and taxpayers to support agricultural producers, resulting from agricultural policy support mechanisms based on:
  - current output,
  - input use,
  - utilised agricultural area / animal population / payments / incomes (short- and long-term perspective),
  - non-commodity criteria.

Upon comparison of the impact of agricultural policies in different regions / countries the PSE ratio expressed in percentages (%PSE) of gross farm revenues – and the absolute value of the very PSE ratio is included in the gross proceeds of a farm. Table 4 presents its differentiation depending on the researched countries and their agricultural policies.

Table 4

*Percentage comparison of the Producer Support Estimate (%PSE)  
in surveyed OECD countries, 2011-2013*

Specification	2011	2012	2013	2011	2012	2013
	Aggregate PSE (USD million)			%PSE (as % of farm gross revenues)		
USA	31 038	33 548	31 022	8	8	7
Canada	7 516	7 801	6 028	15	15	12
EU-27/EU-28 <sup>a</sup>	108 331	110 952	116 257	18	20	20
OECD	258 473	266 382	257 950	18	19	18

<sup>a</sup> As of 2013, Croatia is considered as the 28<sup>th</sup> European Union Member State.

Source: OECD, Agricultural Policy Monitoring and Evaluation: OECD Countries.

Analysing the average for all OECD countries, there was – in the last years – a clear downward trend of %PSE given the growth in the global prices on the market of agricultural products. The highest dynamics of %PSE drop was noted in the US.

### **Assessment of the impact agricultural policies on the financial condition of farms**

Aggregated Canadian<sup>7</sup> and American<sup>8</sup> data was used to model the impact of changes in agricultural policies on the financial condition of agricultural companies. The economic and financial analysis covered analysis of: profit and loss account, balance sheet and ratio analysis for the sector of agricultural companies (aggregated data). The research considered agricultural enterprises because the institutes from Canada and the US failed to provide data on family farms<sup>9</sup>.

#### **Balance sheet and profit and loss account for Canadian farms – model approach**

Based on financial data, the population of 187 443 was used to prepare a model of aggregated profit and loss account and balance sheet for companies from the Canadian agricultural sector. Next, the impact of aid programmes was excluded from the model and their impact on 5 groups of ratios of financial analysis was analysed: liquidity, profitability, performance (management of net working capital – including cash conversion cycle, long-term assets management), debt, ROA/ROE (based on DuPont decomposition of ROE).

The success of the Canadian agricultural companies is growth in revenues with decreasing share of aid programmes in the creation of the overall revenues sum. At the beginning of the research period, in 2009, the aid programmes accounted for 95.75% of net profit. In 2013, the impact of aid programmes on net profit was almost twice as low and amounted to 42.43%. Growing strength of the sector with regards to revenue generation and simultaneous independence from the direct payments and moderate improvement in cost control proclaims strong economic condition of Canadian farms and optimum structuring of aid programmes. Partly it is also the result of a price growth on global markets. They have digressive impact on the net profit in the years of the sector growth,

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<sup>7</sup> The Canadian data, acting as financial batch input data for the model, was acquired directly from the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in Ottawa. This data was collected in a book *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

<sup>8</sup> The American data, acting as financial batch input data for the model, was downloaded from the resources of the US Department of Agriculture Economic Research Service (USDA ERS). It was stored in a spreadsheet in the Farm Income and Wealth Statistics, <http://ers.usda.gov/data-products/farm-income-and-wealth-statistics/balance-sheet.aspx>; access date 07.2016.

<sup>9</sup> In case of agricultural enterprises, cost of goods sold (COGS) includes the labour costs given the employment of hired workers. Whereas for family farms, where the labour costs do not include a valuation of own labour, the final category of the profit and loss account is the farm income.

while in the post-crisis 2009 they were the necessary safety-net, because they ensured profitability of the sector at the net-profit level. Moreover, in 2013 programme payments decreased to the level of CAD 2.7 billion (CAD – Canadian dollars), from the level of CAD 3.4 billion a year before, and the improving market conditions reduced the dependence of farms on federal aid. In 2013, Canadian farms noted an average of CAD 387 948 of operating revenues and CAD 318 276 of operating expenses, generating average operating profit at the level of CAD 69 673.

Table 5

*Simplified profit and loss account (P&LA) – aggregated data for farms in Canada*

<b>At the end of December 31, in CAD million</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>Total revenue</b>	<b>44 561.0</b>	<b>44 325.0</b>	<b>49 634.0</b>	<b>53 763.0</b>	<b>54 843.0</b>
including: return on sales	41 269.0	41 190.0	46 156.0	50 359.0	52 159.0
including: aid programmes (1)	3 290	3 135	3 478	3 405	2 684
<b>Cost of goods sold (COGS)</b>	<b>31 190.7</b>	<b>29 610.2</b>	<b>33 173.4</b>	<b>35 053.2</b>	<b>36 253.4</b>
Gross profit	13 370.3	14 714.8	16 460.6	18 709.8	18 589.6
Selling, general and administrative expenses (SG&A)	5 920.7	6 120.1	6 414.0	6 742.5	7 029.9
Other operating costs	1 623.4	2 113.5	1 331.2	1 657.0	2 606.1
<b>Operating profit (EBIT)</b>	<b>5 826.1</b>	<b>6 481.2</b>	<b>8 715.5</b>	<b>10 310.2</b>	<b>8 953.7</b>
Net interest costs	2 388.0	2 258.9	2 350.7	2 489.1	2 627.3
<b>Profit before deducting taxes = net profit<sup>a</sup></b>	<b>3 438.1</b>	<b>4 222.3</b>	<b>6 364.8</b>	<b>7 821.1</b>	<b>6 326.4</b>
<b>(excluding aid programmes)</b>					
Return on sales	41 269.0	41 190.0	46 156.0	50 359.0	52 159.0
Adjusted gross profit	10 078.3	11 579.8	12 982.6	15 305.8	15 905.6
Adjusted operating profit (EBIT)	2 534.1	3 346.2	5 237.5	6 906.2	6 269.7
Adjusted net profit	146.1	1 087.3	2 886.8	4 417.1	3 642.4
% reduction of net profit (2)	95.75%	74.25%	54.64%	43.52%	42.43%

<sup>a</sup> Pre-tax income equals net income given the zero CIT rate for agricultural companies.

Key:

(1) Aid programmes – aggregated value of gross direct payments and producer premium under programmes described in section 1.2., included into the sum of revenues of the agricultural sector.

(2) Percentage decrease of net income – ratio of aid programme value to net income including aid programmes, expressed in percentages.

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

Aid programmes do not have a direct impact on the balance sheet in a financial year when they are paid, because they contribute to profit and loss account. They contribute to increasing the net profit, which may increase equity in the next year.

The balance sheet of Canadian farms testify to their very strong financial condition. In 2013, a Canadian farm had on average CAD 2.8 million of assets, CAD 0.5 million of debt and thus CAD 2.3 million of equity.

Table 6

*Balance sheet – aggregated data for the entire farm sector in Canada*

<b>At the beginning of the year on January 1, in CAD million</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>ASSETS</b>						
Cash	2 634.9	2 771.8	2 692.4	3 007.6	3 211.0	3 475.8
Receivables	2 976.1	3 320.7	3 478.3	3 371.7	3 240.5	3 680.9
Inventory	21 149.5	24 207.8	26 487.6	28 560.9	32 354.8	33 357.4
<b>Current assets</b>	<b>26 760.5</b>	<b>30 300.4</b>	<b>32 658.3</b>	<b>34 940.2</b>	<b>38 806.3</b>	<b>40 514.0</b>
Tangible fixed assets	303 063.4	320 871.9	346 661.7	389 152.6	433 930.2	474 205.2
Other long-term assets	6 326.7	7 849.1	8 370.7	9 069.2	9 402.1	10 123.7
<b>Fixed assets</b>	<b>309 390.1</b>	<b>328 721.0</b>	<b>355 032.3</b>	<b>398 221.8</b>	<b>443 332.4</b>	<b>484 328.9</b>
<b>TOTAL ASSETS</b>	<b>336 150.6</b>	<b>359 021.4</b>	<b>387 690.7</b>	<b>433 162.0</b>	<b>482 138.7</b>	<b>524 843.0</b>
<b>LIABILITIES</b>						
Amounts due to customers	11 249.0	11 957.8	12 111.5	13 294.3	14 291.7	15 388.6
<b>Total short-term liabilities</b>	<b>11 249.0</b>	<b>11 957.8</b>	<b>12 111.5</b>	<b>13 294.3</b>	<b>14 291.7</b>	<b>15 388.6</b>
Long-term debt	46 478.3	48 548.3	51 001.5	54 303.2	60 316.5	64 262.9
<b>Total long-term liabilities</b>	<b>46 478.3</b>	<b>48 548.3</b>	<b>51 001.5</b>	<b>54 303.2</b>	<b>60 316.5</b>	<b>64 262.9</b>
<b>Total liabilities</b>	<b>57 727.2</b>	<b>60 506.0</b>	<b>63 113.0</b>	<b>67 597.5</b>	<b>74 608.2</b>	<b>79 651.4</b>
<b>Equity</b>	<b>278 423.4</b>	<b>298 515.3</b>	<b>324 577.7</b>	<b>365 564.5</b>	<b>407 530.4</b>	<b>445 191.5</b>
<b>TOTAL LIABILITIES</b>	<b>336 150.6</b>	<b>359 021.4</b>	<b>387 690.7</b>	<b>433 162.0</b>	<b>482 138.7</b>	<b>524 843.0</b>

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

### **Ratio analysis of Canadian farms**

Upon exclusion of aid programmes, the short-term liquidity ratios did not change because they are calculated based on the quotients of balance sheet components. On the grounds of these ratios, it can be stated that the Canadian agricultural sector does not have problems with keeping liquidity at a satisfactory level.

Only the quick ratio is below the reference value equal to one, given the high level of inventory, but it is compensated by a satisfactory level of other ratios much exceeding their reference values – 2.0 for current ratio and 0.2 for cash ratio also known in literature (Franc-Dąbrowska, 2008) as immediate liquidity ratio.

Table 7

*Short-term liquidity ratios for the entire farm sector in Canada*

<b>Ratios</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Current ratio	2.53	2.70	2.63	2.72	2.63
Quick ratio	0.51	0.51	0.48	0.45	0.47
Cash ratio	0.23	0.22	0.23	0.22	0.23
Operating cashflow ratio	2.53	2.70	2.63	2.72	2.63
<b>(excluding aid programmes)</b>					
Liquidities: NO CHANGE					

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

In 2009-2013, the impact of aid programmes on margins gradually weakened. The Canadian farms got their profitability independent from aid programmes.

Table 8

*Profitability ratios for the entire farm sector in Canada*

<b>Margins</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>Gross margin</b>	<b>30.0%</b>	<b>33.2%</b>	<b>33.2%</b>	<b>34.8%</b>	<b>33.9%</b>
Operating profit margin (EBIT)	13.1%	14.6%	17.6%	19.2%	16.3%
<b>Net margin</b>	<b>7.7%</b>	<b>9.5%</b>	<b>12.8%</b>	<b>14.5%</b>	<b>11.5%</b>
<b>(excluding aid programmes)</b>					
<b>Gross margin</b>	<b>24.4%</b>	<b>28.1%</b>	<b>28.1%</b>	<b>30.4%</b>	<b>30.5%</b>
Operating profit margin (EBIT)	6.1%	8.1%	11.3%	13.7%	12.0%
<b>Net margin</b>	<b>0.4%</b>	<b>2.6%</b>	<b>6.3%</b>	<b>8.8%</b>	<b>7.0%</b>
<i>Reduction of net margin (in percentage points)</i>	7.30 pp	6.90 pp	6.50 pp	5.70 pp	4.50 pp

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

Aid programmes have an insignificant impact on management of net working capital (including: cash conversion cycle) and given their share in revenues, they have a positive impact on 3 ratios: share of net working capital in revenues, working capital turnover ratio and receivables conversion cycle in days.

From the perspective of financial management, more visible is their impact on ratios linked to long-term assets where they are important for each considered measure, especially they contribute to a drop in the share of long-term assets in revenues.

Table 9

*Performance ratios for the entire farm sector in Canada*

<b>Specification</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>MANAGEMENT OF NET WORKING CAPITAL</b>					
Net working capital / revenues	34.9%	40.3%	37.6%	39.6%	39.5%
Working capital turnover ratio (revenues / net working capital)	2.86	2.48	2.66	2.52	2.53
Receivables turnover ratio	13.42	12.74	14.72	16.59	14.90
Inventory turnover ratio	1.29	1.12	1.16	1.08	1.09
Liabilities turnover ratio	2.61	2.44	2.50	2.45	2.36
Receivables conversion cycle in days	27.20	28.64	24.80	22.00	24.50
Inventory conversion cycle in days	283.28	326.51	314.25	336.90	335.84
Liabilities conversion cycle in days	139.93	149.30	146.27	148.82	154.93
<b>(excluding aid programmes)</b>					
Net working capital / revenues	37.7%	43.3%	40.4%	42.3%	41.5%
Working capital turnover ratio (revenues / net working capital)	2.65	2.31	2.48	2.36	2.41
Receivables conversion cycle in days	29.37	30.82	26.66	23.49	25.76
<b>OTHER RATIOS: NO CHANGE</b>					
<b>MANAGEMENT OF LONG-TERM ASSETS</b>					
Net long-term assets turnover ratio	0.14	0.12	0.12	0.12	0.11
Net long-term assets / revenues	737.7%	801.0%	802.3%	824.6%	883.1%
Fixed assets turnover ratio	0.14	0.13	0.13	0.12	0.12
<b>(excluding aid programmes)</b>					
Net long-term assets turnover ratio	0.13	0.12	0.12	0.11	0.11
Net long-term assets / revenues	796.5%	861.9%	862.8%	880.3%	928.6%
Fixed assets turnover ratio	0.13	0.12	0.12	0.12	0.11

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

Table 10

*Debt ratios for the entire farm sector in Canada*

Specification	2009	2010	2011	2012	2013
Liabilities-to-Equity	0.20	0.19	0.18	0.18	0.18
Debt-to-Equity	0.16	0.16	0.15	0.15	0.14
Net-Debt-to-Equity	0.15	0.15	0.14	0.14	0.14
Debt-to-Capital	0.14	0.14	0.13	0.13	0.13
Net-Debt-to-Capital	0.13	0.13	0.12	0.12	0.12
Interest Coverage Ratio	2.44	2.87	3.71	4.14	3.41
<b>(excluding aid programmes)</b>					
Interest Coverage Ratio	1.06	1.48	2.23	2.77	2.39

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

Table 11

*DuPont decomposition of ROE for the entire farm sector in Canada*

Specification	2009	2010	2011	2012	2013
NOPLAT / revenues	13.1%	14.6%	17.6%	19.2%	16.3%
x Revenues / net operating assets	0.13	0.12	0.12	0.12	0.11
= <b>Operating ROA</b>	<b>1.7%</b>	<b>1.7%</b>	<b>2.1%</b>	<b>2.2%</b>	<b>1.8%</b>
+					
Spread	-3.5%	-2.9%	-2.5%	-2.1%	-2.6%
x Net financial leverage	0.15	0.15	0.14	0.14	0.14
= Profit on leverage	-0.5%	-0.4%	-0.3%	-0.3%	-0.3%
<b>ROE = ROA + (Spread x Leverage)</b>	<b>1.2%</b>	<b>1.3%</b>	<b>1.7%</b>	<b>1.9%</b>	<b>1.4%</b>
<b>(excluding aid programmes)</b>					
NOPLAT / revenues	6.1%	8.1%	11.3%	13.7%	12.0%
x Revenues / net operating assets	0.12	0.11	0.11	0.11	0.10
= <b>Operating ROA</b>	<b>0.7%</b>	<b>0.9%</b>	<b>1.3%</b>	<b>1.5%</b>	<b>1.2%</b>
+					
Spread	-4.5%	-3.8%	-3.3%	-2.9%	-3.1%
x Net financial leverage	0.15	0.15	0.14	0.14	0.14
= Profit on leverage	-0.7%	-0.6%	-0.5%	-0.4%	-0.4%
<b>ROE = ROA + (Spread x Leverage)</b>	<b>0.0%</b>	<b>0.3%</b>	<b>0.8%</b>	<b>1.1%</b>	<b>0.8%</b>

NOPLAT – net operating profit less adjusted tax; Spread=Operating ROE – Effective interest rate on debt taking into account taxes<sup>10</sup>.

Source: own calculations based on financial data published by the Research and Analysis Directorate in Agriculture and Agri-Food Canada (AAFC) in *Farm Income, Financial Conditions and Government Assistance Data Book*, 2014.

<sup>10</sup> Effective interest rate on debt, taking taxes into account was defined as a relation between net interest expenses after tax to net debt (Bernard, Healy and Palepu, 2003).



Aid programmes have a very important impact on the ability of farms to cover liabilities, which is clear in case of the Interest Coverage Ratio<sup>11</sup>. In 2013, as a result of hypothetical exclusion of all agriculture support mechanisms it drops by 30% – from 3.41 to 2.39.

Keeping the debt ratios at a satisfactory level is an important premise, which should be considered upon restriction of direct payments. This is evinced by historically low number of farm bankruptcies in Canada – in 2013 it was 66 out of 187 443 companies. The number of bankruptcies continued on a downward trend as of 1998 (AAFC, 2014).

Agricultural sector in Canada is characterised by a very low, single-digit operating ROA and ROE. The operating ROA is lower than the weighted average cost of capital (WACC) and ROE is lower than ROA (calculated utilising the capital assets pricing model, CAPM). Thus, from the owner's point of view, value destruction takes place.

### **Balance sheet and profit and loss account for American farms – model approach**

The United States Department of Agriculture – Economic Research Service (USDA – ERS) made the data available for the period between 2014 and 2015 and a projection for 2016, however, calculations prepared on their basis were presented only to keep the time framework which allows for comparisons to the model Canadian approach.

Just like in the case of Canadian companies, there is a dynamic growth in the total revenues, especially at the turn of 2010/2011 and 2011/2012. However, the share of aid programmes in revenue creation remained at a low level throughout the researched period between 2010 and 2014 and decreased at a rate comparable to that in Canada.

The American farms were characterised by good enough financial condition and independence from aid programmes since the percentage decrease in net profit upon their exclusion is slight and only in 2010 exceeds single-digit values. Based on comparison of aggregated revenues for 2013 it was stated that the farm sector in the US is almost 8.7-time larger<sup>12</sup> than in Canada. Whereas the absolute value of aid programmes is only 4 times higher. At the revenue level, the efficiency of the American model is over two times higher than that of the Canadian one. At the net profit level, the impact of federal support on the financial result is

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<sup>11</sup> The Interest Coverage Ratio is the relation of the net profit, interest expenses and tax expenses to interest expenses, i.e. costs of interest-bearing liabilities. It shows how many times during a financial years the net profit is able to cover the costs of interest-bearing liabilities.

<sup>12</sup> To compare the size of the American and Canadian agricultural sector in 2013 the average annual exchange rate was taken of USD 1=CAD 1.0381 for the entire period from January to December 2013, calculated on the basis of data provided by oanda.com.

4 times higher for Canada than for the US. The deeper the analysis of the P&LA, the supremacy of American solutions is clearly higher.

The American farms are characterised by historically low levels of debt. Assets are financed mostly by equity

Table 12

*Simplified profit and loss account (P&LA) –  
aggregated data for the entire farm sector in the US*

<b>At the end of December 31, in USD thousand</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Total revenue</b>	<b>353 595 937</b>	<b>407 010 766</b>	<b>451 297 357</b>	<b>455 023 850</b>	<b>466 653 111</b>
including: return on sales	341 204 279	396 590 236	440 662 239	444 020 054	456 886 266
<i>including: aid programmes (1)</i>	<i>12 391 658</i>	<i>10 420 530</i>	<i>10 635 118</i>	<i>11 003 796</i>	<i>9 766 845</i>
Cost of goods sold (COGS)	197 690 108	224 499 966	246 779 001	249 732 624	266 920 381
<b>Gross profit</b>	<b>155 905 829</b>	<b>182 510 800</b>	<b>204 518 356</b>	<b>205 291 226</b>	<b>199 732 730</b>
Selling, general and administrative expenses (SG&A)	44 484 109	44 488 745	53 468 833	56 209 416	56 922 320
<b>Operating profit (EBIT)</b>	<b>111 421 720</b>	<b>138 022 055</b>	<b>151 049 523</b>	<b>149 081 810</b>	<b>142 810 410</b>
Net interest expenses	15 123 737	14 585 885	15 790 797	14 015 242	14 688 548
<b>Profit before deducting taxes = net profit<sup>a</sup></b>	<b>96 297 983</b>	<b>123 436 170</b>	<b>135 258 726</b>	<b>135 066 568</b>	<b>128 121 862</b>
<b>(excluding aid programmes)</b>					
Return on sales	341 204 279	396 590 236	440 662 239	444 020 054	456 886 266
Adjusted gross profit	143 514 171	172 090 270	193 883 238	194 287 430	189 965 885
Adjusted operating profit (EBIT)	99 030 062	127 601 525	140 414 405	138 078 014	133 043 565
Adjusted net profit	83 906 325	113 015 640	124 623 608	124 062 772	118 355 017
<i>% reduction of net profit (2)</i>	<i>12.87%</i>	<i>8.44%</i>	<i>7.86%</i>	<i>8.15%</i>	<i>7.62%</i>

(1) Aid programmes – aggregated value of gross direct payments and producer premiums under programmes described in section 1.2., included into the sum of revenues of the agricultural sector.

(2) Percentage decrease of net profit – ratio of aid scheme value and net profit including aid programmes, expressed in percentages.

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

Table 13

*Balance sheet – aggregated data for the entire farm sector in the US*

<b>At the beginning of the year on January 1, in USD thousand</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>ASSETS</b>					
Cash	5 809 932	6 708 513	7 703 337	7 848 275	8 119 445
Receivables	101 500 248	131 926 602	78 376 691	103 067 611	77 996 614
Inventory	184 893 409	181 976 790	191 843 101	209 677 664	191 192 498
<b>Current assets</b>	<b>292 203 589</b>	<b>320 611 905</b>	<b>277 923 129</b>	<b>320 593 550</b>	<b>277 308 557</b>
Tangible fixed assets	2 018 436 448	2 317 042 195	2 499 887 275	2 623 736 941	2 584 507 868
<b>Fixed assets</b>	<b>2 018 436 448</b>	<b>2 317 042 195</b>	<b>2 499 887 275</b>	<b>2 623 736 941</b>	<b>2 584 507 868</b>
<b>TOTAL ASSETS</b>	<b>2 310 640 037</b>	<b>2 637 654 100</b>	<b>2 777 810 404</b>	<b>2 944 330 491</b>	<b>2 861 816 425</b>
<b>LIABILITIES</b>					
Amounts due to customers	23 460 955	17 918 145	19 599 180	26 740 893	0
<b>Total short-term liabilities</b>	<b>23 460 955</b>	<b>17 918 145</b>	<b>19 599 180</b>	<b>26 740 893</b>	<b>0</b>
Long-term debt	271 011 179	279 082 399	295 376 272	318 960 666	364 261 262
<b>Total long-term liabilities</b>	<b>271 011 179</b>	<b>279 082 399</b>	<b>295 376 272</b>	<b>318 960 666</b>	<b>364 261 262</b>
Total liabilities	294 472 134	297 000 544	314 975 452	345 701 559	364 261 262
<b>Equity</b>	<b>2 016 167 904</b>	<b>2 340 653 556</b>	<b>2 462 834 953</b>	<b>2 598 628 931</b>	<b>2 497 555 163</b>
<b>TOTAL LIABILITIES</b>	<b>2 310 640 038</b>	<b>2 637 654 100</b>	<b>2 777 810 405</b>	<b>2 944 330 490</b>	<b>2 861 816 425</b>

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

### **Ratio analysis of American farms**

Based on the current ratio and quick ratio, it was found that the American farms are characterised by a major overliquidity. The aforementioned ratios are multiples of their reference values. Overliquidity was caused by keeping too high level of current assets compared to low level of short-term liabilities, which has a negative impact on profitability.

Table 14

*Short-term liquidity ratios for the entire farm sector in the US*

<b>Ratios</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Current ratio	12.45	17.89	14.18	11.99
Quick ratio	4.57	7.74	4.39	4.15
Cash ratio	0.25	0.37	0.39	0.29
<b>(excluding aid programmes)</b>				
Liquidity: NO CHANGE				

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

Despite high liquidity, the American farms keep very high profitability. The impact of aid programmes on its level is slight.

Table 15

*Profitability ratios for the entire farm sector in the US*

<b>Margins</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
<b>Gross margin</b>	<b>44.1%</b>	<b>44.8%</b>	<b>45.3%</b>	<b>45.1%</b>	<b>42.8%</b>
Operating profit margin (EBIT)	31.5%	33.9%	33.5%	32.8%	30.6%
<b>Net margin</b>	<b>27.2%</b>	<b>30.3%</b>	<b>30.0%</b>	<b>29.7%</b>	<b>27.5%</b>
<b>(excluding aid programmes)</b>					
Gross margin	42.1%	43.4%	44.0%	43.8%	41.6%
Operating profit margin (EBIT)	29.0%	32.2%	31.9%	31.1%	29.1%
<b>Net margin</b>	<b>24.6%</b>	<b>28.5%</b>	<b>28.3%</b>	<b>27.9%</b>	<b>25.9%</b>
<i>Reduction of net margin (in percentage points)</i>	2.6 pp	1.8 pp	1.7 pp	1.8 pp	1.6 pp

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

The American farms are characterised by better performance than Canadian farms. They keep high level of net working capital regardless of the level of support from the federal budget.

When comparing the US to Canada only the relation of net long-term assets to revenues is lower in case of farms from the US. Just like in the case of liquidity research, while analysing performance, the role of current assets in the creation of strong financial position is quite clear.

Table 16

*Performance ratios for the entire farm sector in the US*

Specification	2010	2011	2012	2013	2014
<b>MANAGEMENT OF NET WORKING CAPITAL</b>					
Net working capital / revenues	74.4%	72.7%	55.5%	62.9%	57.7%
Working capital turnover ratio (revenues / net working capital)	1.34	1.38	1.80	1.59	1.73
Receivables turnover ratio	3.36	3.01	5.62	4.31	5.86
Inventory turnover ratio	1.07	1.23	1.29	1.19	1.40
Liabilities turnover ratio	8.43	12.53	12.59	9.34	no data
Receivables conversion cycle in days	no data	no data	no data	no data	no data
Inventory conversion cycle in days	341.37	295.86	283.75	306.46	261.45
Liabilities conversion cycle in days	43.32	29.13	28.99	39.08	no data
<b>(excluding aid programmes)</b>					
Net working capital / revenues	77.1%	74.6%	56.9%	64.4%	58.9%
Working capital turnover ratio (revenues / net working capital)	1.30	1.34	1.76	1.55	1.70
Receivables conversion cycle in days	108.58	121.42	64.92	84.73	62.31
OTHER RATIOS: NO CHANGE					
<b>MANAGEMENT OF LONG-TERM ASSETS</b>					
Net long-term assets turnover ratio	0.18	0.18	0.18	0.17	0.18
Net long-term assets / revenues	570.8%	569.3%	553.9%	576.6%	553.8%
Fixed assets turnover ratio	0.18	0.18	0.18	0.17	0.18
<b>(excluding aid programmes)</b>					
Net long-term assets turnover ratio	0.17	0.17	0.18	0.17	0.18
Net long-term assets / revenues	591.6%	584.2%	567.3%	590.9%	565.7%
Fixed assets turnover ratio	0.17	0.17	0.18	0.17	0.18

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

Contrary to Canada, the impact of American aid programmes on debt coverage is negligible. In the researched period, the Interest Coverage Ratio only slightly dropped after complete exclusion of support policies. In 2013, it fluctuated around 10, i.e. net profit over a financial year covered interest expenses ten times.

In the considered time horizon, from 2010 to 2014, the American farms noted on average 2.7-time higher ROA and 3.4-time higher ROE than Canadian companies. These ratios were reduced by a maximum of 0.5 pp upon deduction of the effects of aid programmes, but showed values proving value creation for owners.

Table 17

*Debt ratios for the entire farm sector in the US*

Specification	2010	2011	2012	2013	2014
Liabilities-to-Equity	0.15	0.13	0.13	0.13	0.15
Debt-to-Equity	0.13	0.12	0.12	0.12	0.15
Net-Debt-to-Equity	0.13	0.12	0.12	0.12	0.14
Debt-to-Capital	0.12	0.11	0.11	0.11	0.13
Net-Debt-to-Capital	0.12	0.10	0.10	0.11	0.12
Interest Coverage Ratio	7.37	9.46	9.57	10.64	9.72
<b>(excluding aid programmes)</b>					
Interest Coverage Ratio	6.55	8.75	8.89	9.85	9.06

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

Table 18

*DuPont decomposition of ROE for the entire farm sector in the US*

Specification	2010	2011	2012	2013	2014
NOPLAT / revenues	31.5%	33.9%	33.5%	32.8%	30.6%
x Revenues / net operating assets	0.15	0.16	0.16	0.16	0.16
= <b>Operating ROA</b>	<b>4.9%</b>	<b>5.3%</b>	<b>5.5%</b>	<b>5.1%</b>	<b>5.0%</b>
+					
Spread	-0.8%	-0.1%	0.0%	0.6%	0.9%
x Net financial leverage	0.13	0.12	0.12	0.12	0.14
= Profit on leverage	-0.1%	0.0%	0.0%	0.1%	0.1%
<b>ROE = ROA + (Spread x Leverage)</b>	<b>4.8%</b>	<b>5.3%</b>	<b>5.5%</b>	<b>5.2%</b>	<b>5.1%</b>
<b>(excluding aid programmes)</b>					
NOPLAT / revenues	29.0%	32.2%	31.9%	31.1%	29.1%
x Revenues / net operating assets	0.15	0.15	0.16	0.15	0.16
= <b>Operating ROA</b>	<b>4.3%</b>	<b>4.9%</b>	<b>5.1%</b>	<b>4.7%</b>	<b>4.7%</b>
+					
Spread	-1.4%	-0.5%	-0.4%	0.2%	0.5%
x Net financial leverage	0.13	0.12	0.12	0.12	0.14
= Profit on leverage	-0.2%	-0.1%	0.0%	0.0%	0.1%
<b>ROE = ROA + (Spread x Leverage)</b>	<b>4.2%</b>	<b>4.8%</b>	<b>5.1%</b>	<b>4.8%</b>	<b>4.7%</b>

NOPLAT – net operating profit less adjusted tax; Spread=Operating ROE – Effective interest rate on debt taking into account taxes<sup>13</sup>.

Source: own calculations based on financial data published by the United States Department of Agriculture – Economic Research Service (USDA – ERS), <http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics.aspx>, access date: 07.2016.

<sup>13</sup> Effective interest rate on debt, taking taxes into account was defined as a relation between net interest expenses after tax to net debt (Bernard, Healy and Palepu, 2003).

### **Summary and final conclusions**

The key agricultural policy tools in Canada are focused on keeping profitability and eliminating fluctuations in the profit margins of farms, i.e. on relative measures and bottom-line growth in profit and loss account. Whereas agricultural policy decision makers in the US opt for support for financing absolute measures, especially revenue support, highlighting the advantages of the American agriculture given the scale effects and supporting the top-line growth of the profit and loss account. This translates into a different path of value creation selected by the American farms, which to a lesser extent base on the operating leverage, and – from the perspective of financial liquidity – have a major security buffer in the form of cashflows almost 10 times covering the interest cost. Changes in agricultural policy in the US have a much smaller impact on liquidity and profitability of farms, which testifies to their economic independence from subsidies. However, the agricultural policy of Canada is more adequate to the situation in the European agriculture in the context of the mid-term review of the CAP for 2014-2020, where it is more important to keep profitability of farms and establish a strong cash position from the perspective of operating cashflow to ensure liquidity and solvency. Only the next stage can be maximization and monetization of scale effects, partly by adaptation of American solutions.

The paper does not present a detailed analysis of aggregated financial statements and groups of ratios for the European agricultural companies being the beneficiaries of CAP. A condition to create a similar model to the Canadian and American ones is collection of complete data, allowing for reconstruction of pro-forma financial statements. It was not possible to achieve it at the level of the entire EU-28, although detailed analyses concerning the impact of direct payments on farms in respective countries do exist – for example for Germany, research by Kleinhanss (2014).

The proposed further steps in financial modelling of farms will cover estimation of parameters which are the assumptions to the model of discounted cashflows and valuation of agricultural companies. For small and fragmented entities the most difficult task is separation of cashflows belonging to a family farm from operating cashflow. It is required to formulate an exact definition of free cashflows for all capital donors<sup>14</sup>. Designing a model for valuation of agricultural companies will allow for use of Value-Based Management (VBM) tools. Together with introduction of capital-intensive innovations, companies thus described may become capital market players as beneficiaries of Private Equity/Venture Capital financing, hybrid financing (mezzanine funds, debt with

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<sup>14</sup> FCF (Free Cashflow For Firm) is the basic measure in the valuation of companies with discounted cashflow method using the DCF (discounted cashflow) model. In the business practice the DCF is the most popular model of valuation in the income approach.

warrants and built-in options) or corporate bonds, become entities and objects of merger and takeover processes, leveraged buyouts and other ownership transformations or consolidation trends – with considered adaptation of examples from the US, Canada and Australia. To make such changes possible on the Polish market, free trade on means of agricultural production is necessary, including “unlocking” the land market.



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## WPŁYW ZMIAN POLITYKI WSPARCIA DOCHODÓW NA KONDYCJĘ FINANSOWĄ GOSPODARSTW ROLNYCH W KANADZIE I USA (NA POZIOMIE ZAGREGOWANYM)

### Abstrakt

*Polityka rolna jest kluczową determinantą kondycji całego sektora rolnego i pojedynczych gospodarstw rolnych na poziomie mikro. W dotychczasowych publikacjach koncentrowano się na wpływie narzędzi polityki rolnej na gospodarstwa i ich otoczenie rynkowe, a efekty kwantyfikowano na poziomie makroekonomicznym gospodarki za pomocą wskaźnika wsparcia producenta (PSE). Brakowało szczegółowych badań na poziomie bilansu oraz rachunku zysków i strat przedsiębiorstw z sektora, w tym pogłębionej analizy wskaźników finansowych. Niniejsza publikacja wypełnia tę lukę.*

*Celem publikacji jest przeanalizowanie, w jakim stopniu zmiany w narzędziach polityki rolnej wpływają na kondycję finansową gospodarstw rolnych. Główną metodą badawczą stanowi metoda finansowej analizy wskaźnikowej. Okres badawczy obejmuje lata 2009-2014. Programy pomocowe w Kanadzie i USA mają największy wpływ na płynność i rentowność sektora, a oddziaływanie na zarządzanie kapitałem obrotowym netto oraz aktywami długoterminowymi jest nieznaczne. Podobne zjawisko zaobserwowano, analizując wskaźniki zadłużenia. Zarówno w Kanadzie, jak i w USA wpływ dochodowych programów pomocowych na zysk netto wykazuje silną tendencję spadkową od czasu kryzysu finansowego w latach 2006-2009. Kanadyjskie dopłaty bezpośrednie odpowiadały za ponad 95% zysku netto gospodarstw w 2009 roku – stanowiły jedyny bufor bezpieczeństwa, który pozwolił zachować rentowność. Przedsiębiorstwa amerykańskie są znacznie mniej zależne od pomocy ze strony państwa – w postkryzysowym 2009 roku dopłaty bezpośrednie stanowiły jedynie około 13% zysku netto i systematycznie spadały do 2014 roku.*

*Omówione instrumenty polityki rolnej w Kanadzie i USA, kwantyfikacja ich wpływu na kondycję finansową sektora rolnego za pomocą narzędzi nauk o finansach przedsiębiorstwa (corporate finance), a także opis adaptacji zastosowanych rozwiązań do rolnictwa w Polsce stanowią punkt wyjścia do oceny mid-term Wspólnej Polityki Rolnej (WPR) w 2017 roku.*

**Słowa kluczowe:** polityka rolna, finanse rolnictwa, finansowa analiza wskaźnikowa.

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