



# FINANCING PATTERNS OF FARMS AND FINANCIAL SYSTEM DEVELOPMENT: EVIDENCE FROM UKRAINE AND POLAND

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# Outline

- **Introduction**
- **Material and methods**
- **Results and discussion**
- **Conclusion**

# Introduction: Motivation and main goals

- In this paper, we investigate whether the financing patterns of firms depends on the level of the development of the country's financial system, similar to the focus of prior literature. A direct implication of previous studies is that in countries with weak financial systems, firms obtain less external financing resulting in lower growth.

## **Material and methods:**

- We build the simplified model of integral indicator of financial system development, which is associated with the generalization of the three type's indicators: 1) scale (extensity development); 2) resources; 3) efficiency.
- We divide the financial system into two components: banking sector and financial markets. We propose to call the model of the integral indicator of the relative level of the financial development as «3+3», which allows simplicity and affordability, but adequately, provides a comparative analysis of the financial system of individual countries and identifies their type (bank-based or market-based).

# The indicators of the simplified model of the integral indicator

The integral indicator	Components of integral indicator		
	Scale (extensity development)	The resources	The efficiency
<b>Banking sector</b>	Commercial bank branches (per 100,000 adults)	Bank deposits to GDP (%)	Domestic credit to private sector (% of GDP)
<b>Financial markets</b>	Listed domestic companies (per 1,000,000 adults)	Stock market capitalization to GDP (%)	Stocks traded, total value (% of GDP)

## **Material and methods:**

- We consider the significance of each indicator as equal. It avoids result distortion, associated with subjective judgments, regarding the ranking of each indicator.
- The integral indicator of development level is calculated as an area of the geometric figure (triangle is for banking sector and financial markets, hexagon for financial system), with the tops in a coordinate system of 3 or 6 axes. Each axis corresponds to one of the indicators listed in previous the table. On each of the three or six axes, we plot the relative values, which are defined as a share of the maximum (or reference) value of the indicator.

## Material and methods: The integral indicator of the relative level of the financial system development

$$II_{FS} = \frac{1}{2} \times [(I_1 \times I_2) + (I_2 \times I_3) + \dots + (I_6 \times I_1)] \times \sin 60^\circ$$

where  $II_{FS}$  – integral indicator of the relative level of the financial system development;

$I_1, I_2, \dots, I_6$  – relative values of indicators used in the model "3 + 3" (6 indicators):  $I_1, I_2, I_3$  – relative values of banking sector indicators,  $I_4, I_5, I_6$  – relative values of the financial markets indicators.

## Material and methods: The integral indicator of the banking sector and financial markets development

$$II_{EG} = \frac{1}{2} \times [(I_1 \times I_2) + (I_2 \times I_3) + (I_3 \times I_1)] \times \sin 120^\circ$$

where  $II_{EG}$  – the integral indicator of the banking sector and financial markets;

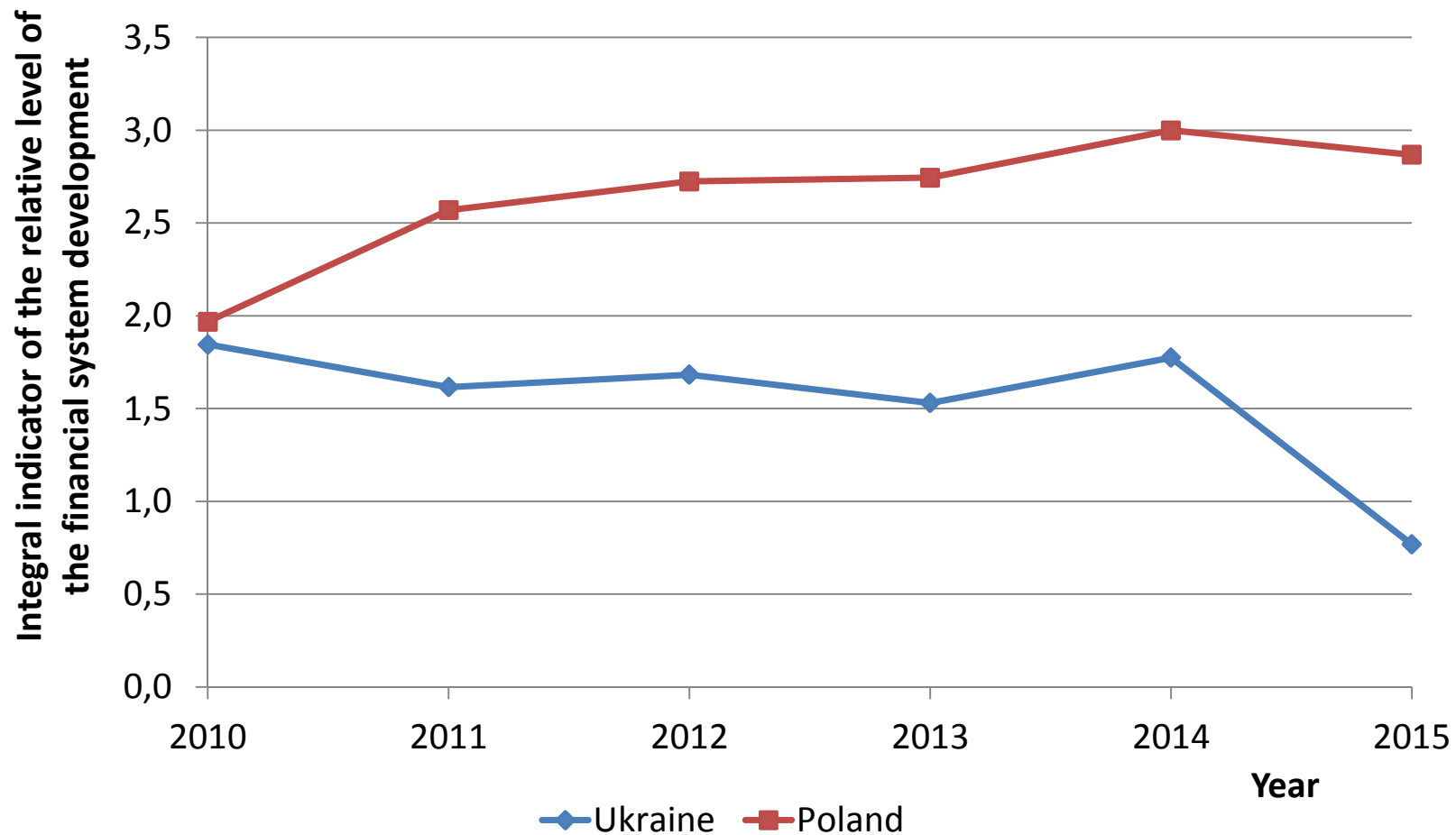
$I_1, I_2, I_3$  – relative values of indicators of scale, resources and efficiency.



## **Material and methods:**

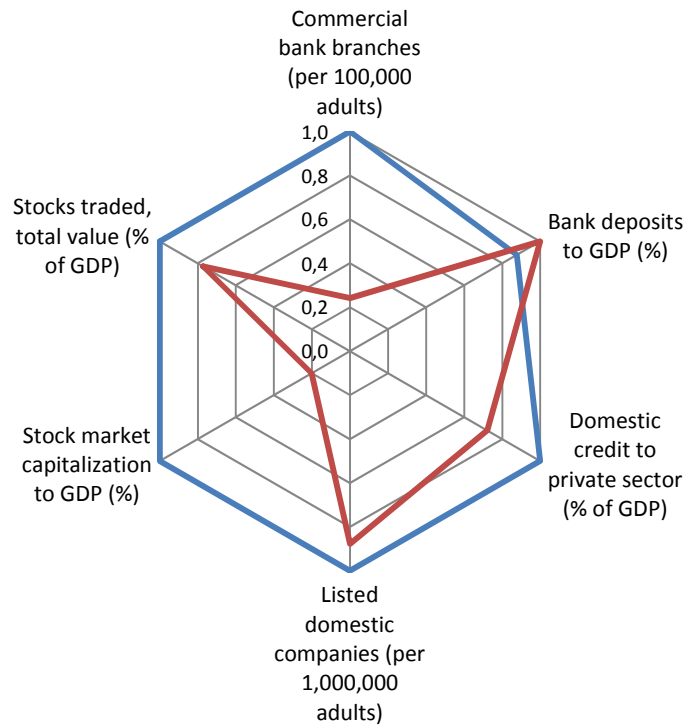
- Comparisons of equity and debt financing models for agricultural enterprises in Ukraine and Poland used the coefficient of financial leverage. The coefficient of financial leverage is calculated as the ratio of total liabilities to equity, and it indicates the reliability of a business on its debts in order to operate.

## Dynamics of financial system development of Ukraine and Poland according to the model "3 + 3", 2010 - 2015



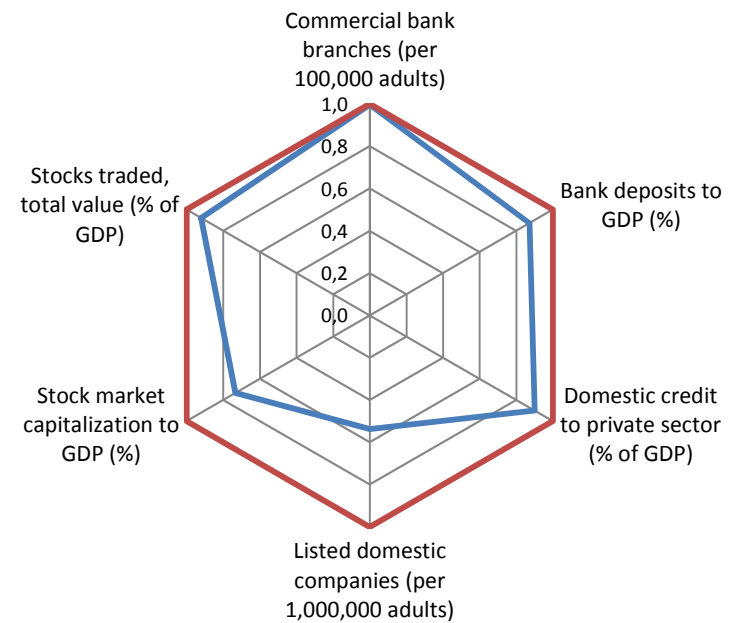
# Relative level of financial system development of Ukraine and Poland in 2010 and 2015 by the model "3 + 3"

## Ukraine



— 2010 — 2015

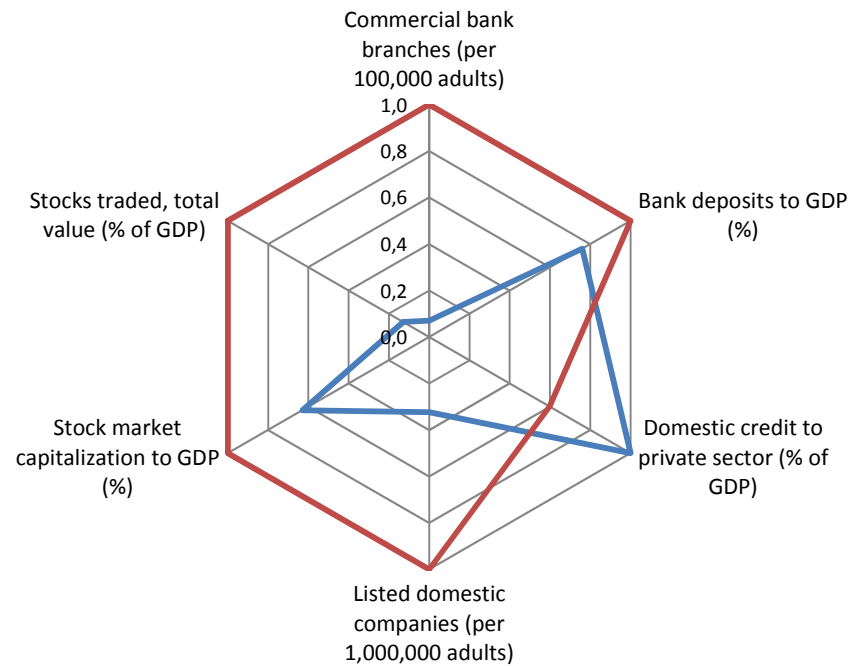
## Poland



— 2010 — 2015

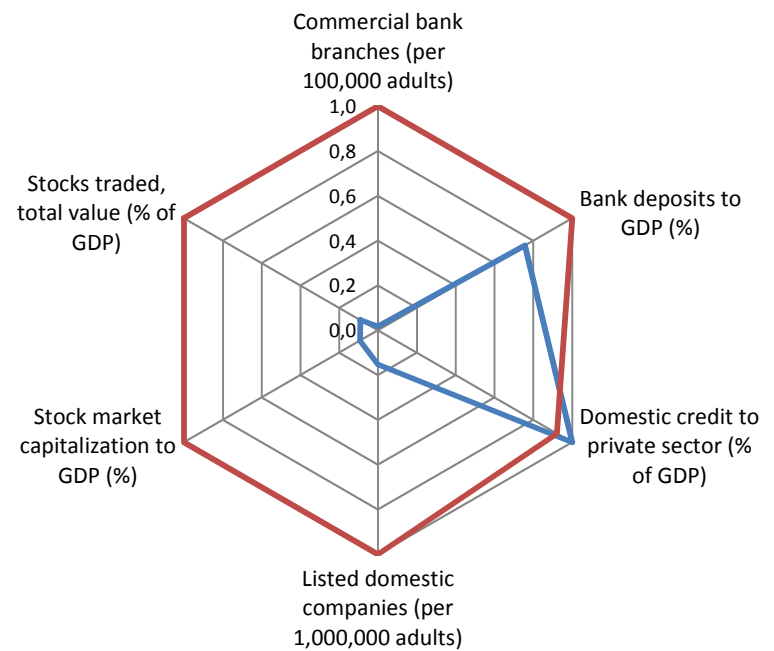
# Relationship between the level of financial system development of Ukraine and Poland in 2010 and 2015

2010



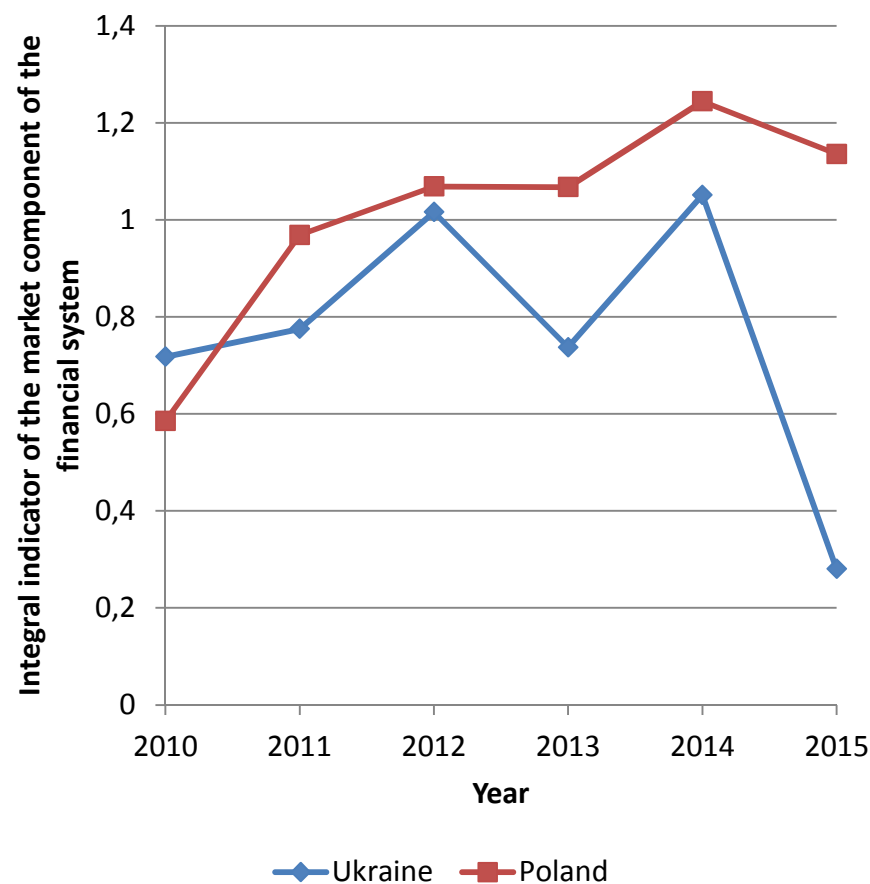
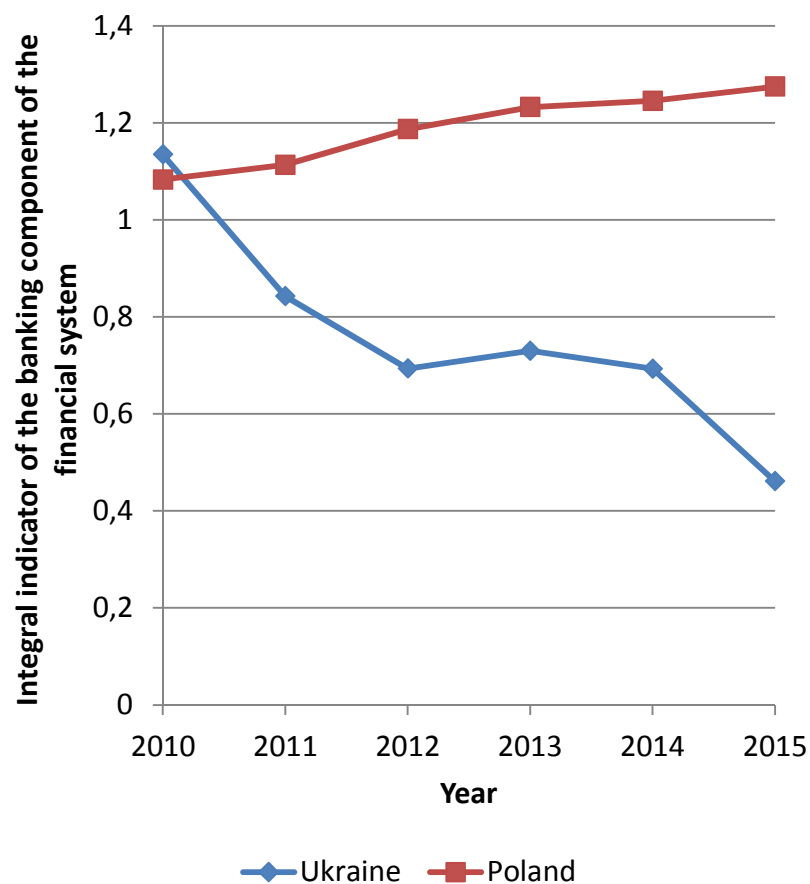
— Ukraine — Poland

2015



— Ukraine — Poland

## Dynamics of development of banking and market components of the financial system of Ukraine and Poland according to the model "3 + 3", 2010 - 2015



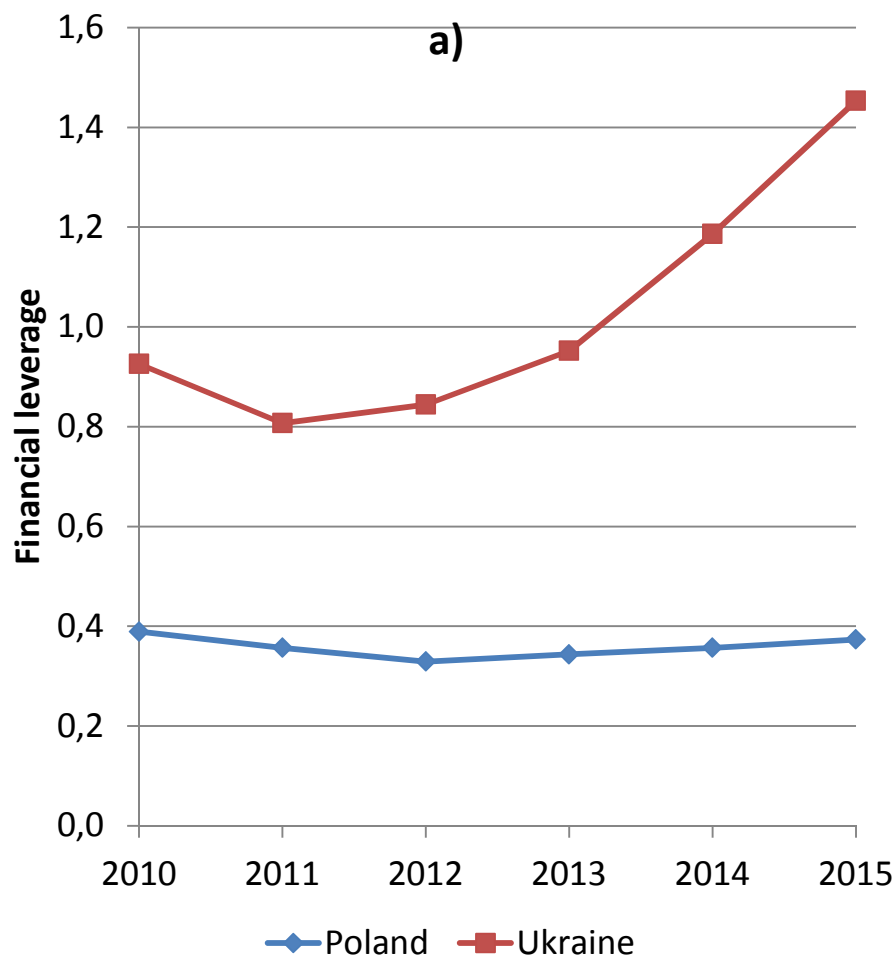
## **Volatility of the financial system of Ukraine and Poland for 2010-2015 %**

<b>Coefficient of variation of the integral indicator</b>	<b>Ukraine</b>	<b>Poland</b>
<b>Financial System</b>	<b>23.3</b>	<b>12.5</b>
<b>Bank Component of Financial System</b>	<b>26.7</b>	<b>5.9</b>
<b>Market Component of Financial System</b>	<b>33.1</b>	<b>20.6</b>

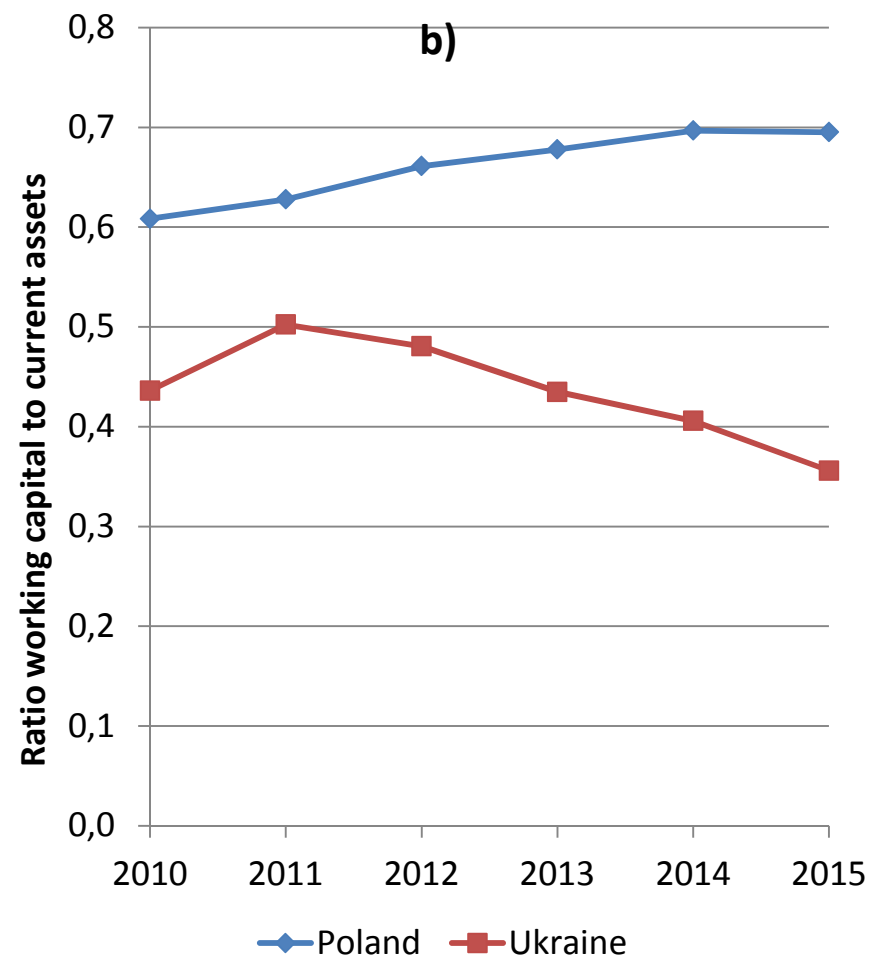
## Indicators which characterize the financing patterns of agricultural enterprises in Ukraine and Poland, 2010 - 2015

Indicator	Ukraine		Poland	
	2010	2015	2010	2015
Financial leverage	0,926	1,453	0,389	0,373
Ratio working capital to current assets	0,436	0,356	0,608	0,695
Ratio accounts payable to current assets	0,452	0,266	0,266	0,191
The share of current liabilities in the total amount of liabilities, %	67,5	79,7	55,6	48,5
Share of short-term bank loans in current liabilities, %	16,4	10,8	17,9	22,1
Share of other types of current liabilities (except bank loans and accounts payable) in the total current liabilities,%	3,4	48,0	14,3	15,3

**a) Dynamics of financial leverage of agricultural enterprises in Ukraine and Poland, 2010-2015**



**b) The dynamics of the share of working assets financed by working capital of agricultural enterprises of Ukraine and Poland, 2010-2015**

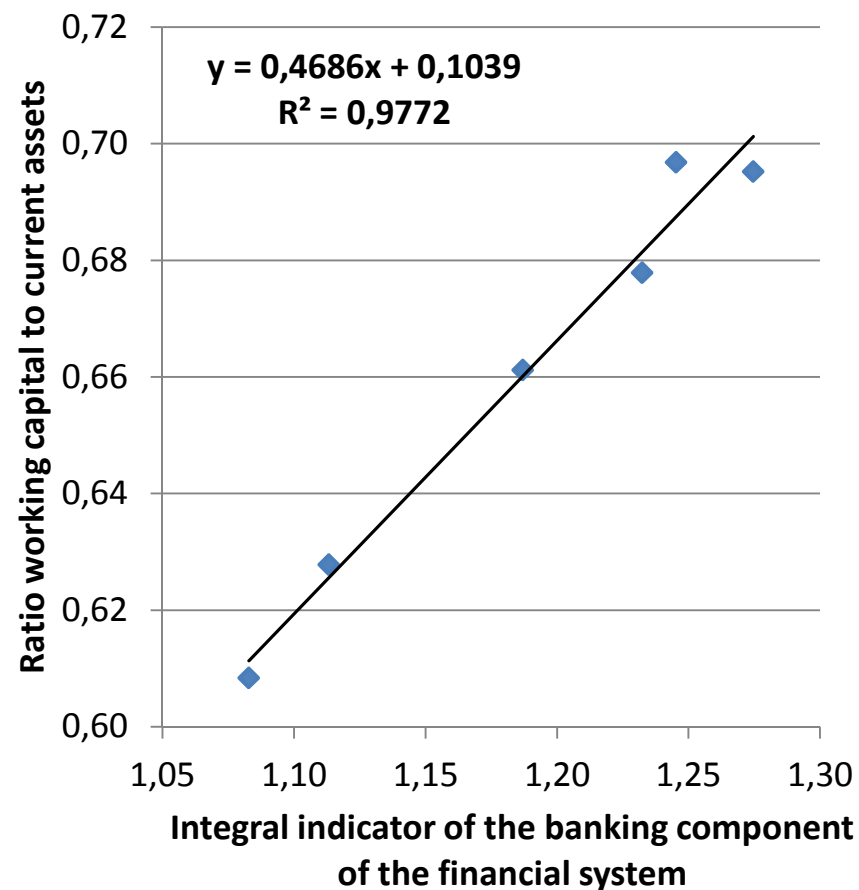
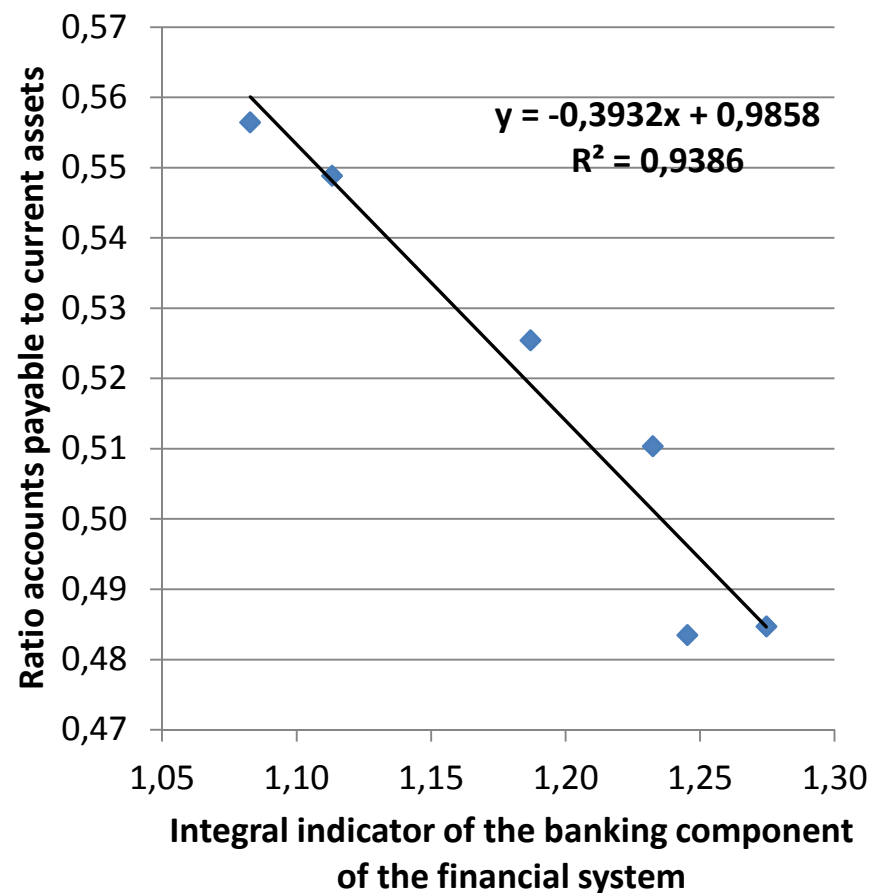




## Correlation coefficients between the integral indicators of the development level of the financial system and the indicators characterizing the development of financing patterns of agricultural enterprises in Ukraine and Poland, 2010-2015

Indicator	Ukraine			Poland		
	Financial System	Banking Sector	Financial Markets	Financial System	Banking Sector	Financial Markets
Financial leverage	-0,752	-0,656	-0,592	-0,568	-0,314	-0,585
Ratio working capital to current assets	0,644	0,491	0,581	0,914	0,989	0,903
Ratio accounts payable to current assets	0,538	0,719	0,223	-0,947	-0,973	-0,939
The share of current liabilities in the total amount of liabilities, %	-0,854	-0,849	-0,587	-0,855	-0,969	-0,843
Share of short-term bank loans in current liabilities, %	0,871	0,480	0,840	0,806	0,923	0,793
Share of other types of current liabilities (except bank loans and accounts payable) in the total current liabilities, %	-0,653	-0,691	-0,415	0,563	0,299	0,580

## Regression models that illustrate the statistical dependence between the integral indicator of the banking component of the financial system and the key indicators of financing patterns of agricultural enterprises in Poland, 2010-2015

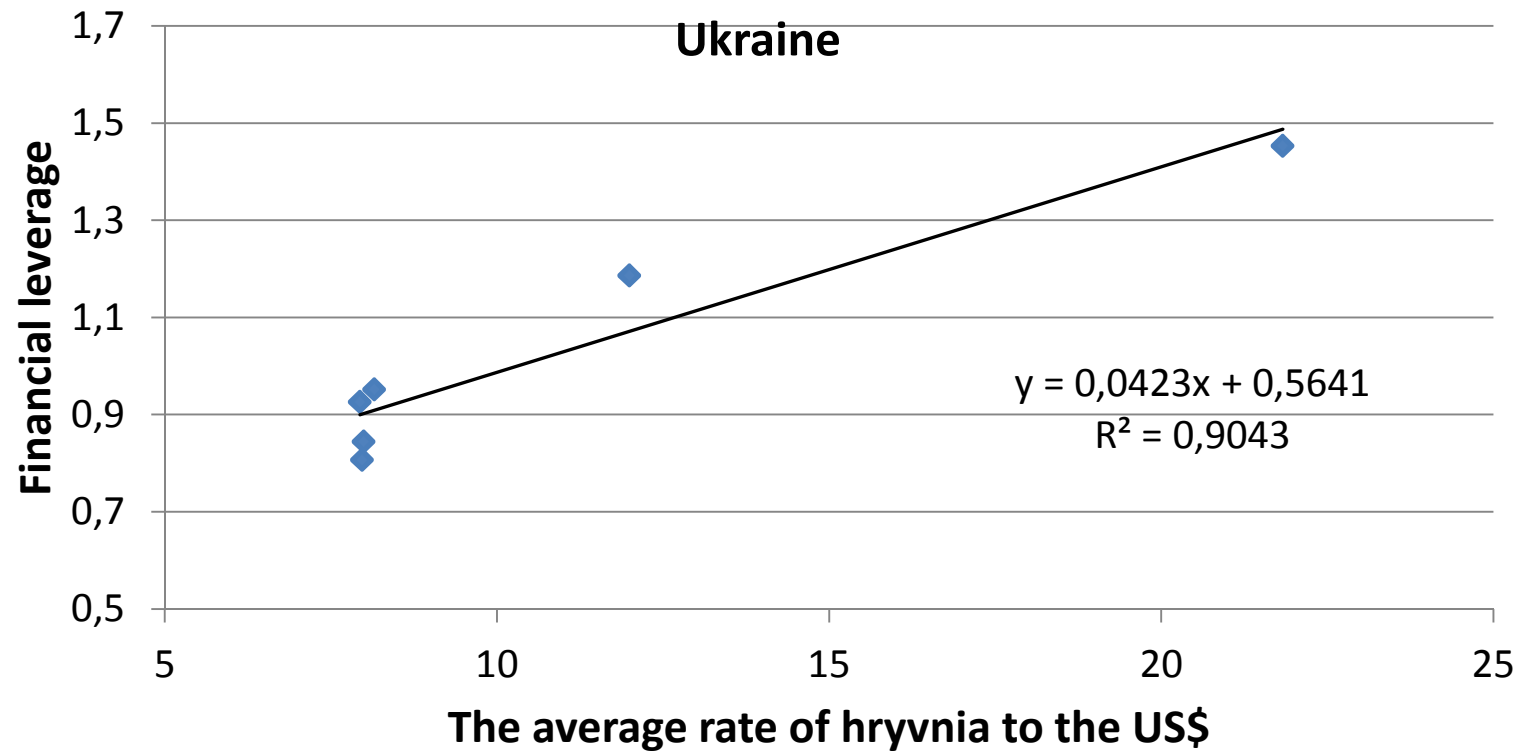


**Coefficients of the pair correlation between indicators which characterize the financing patterns of agricultural enterprises and the indicators considered by the potential factors of influence on the financing patterns in Ukraine and Poland, 2010-2015**

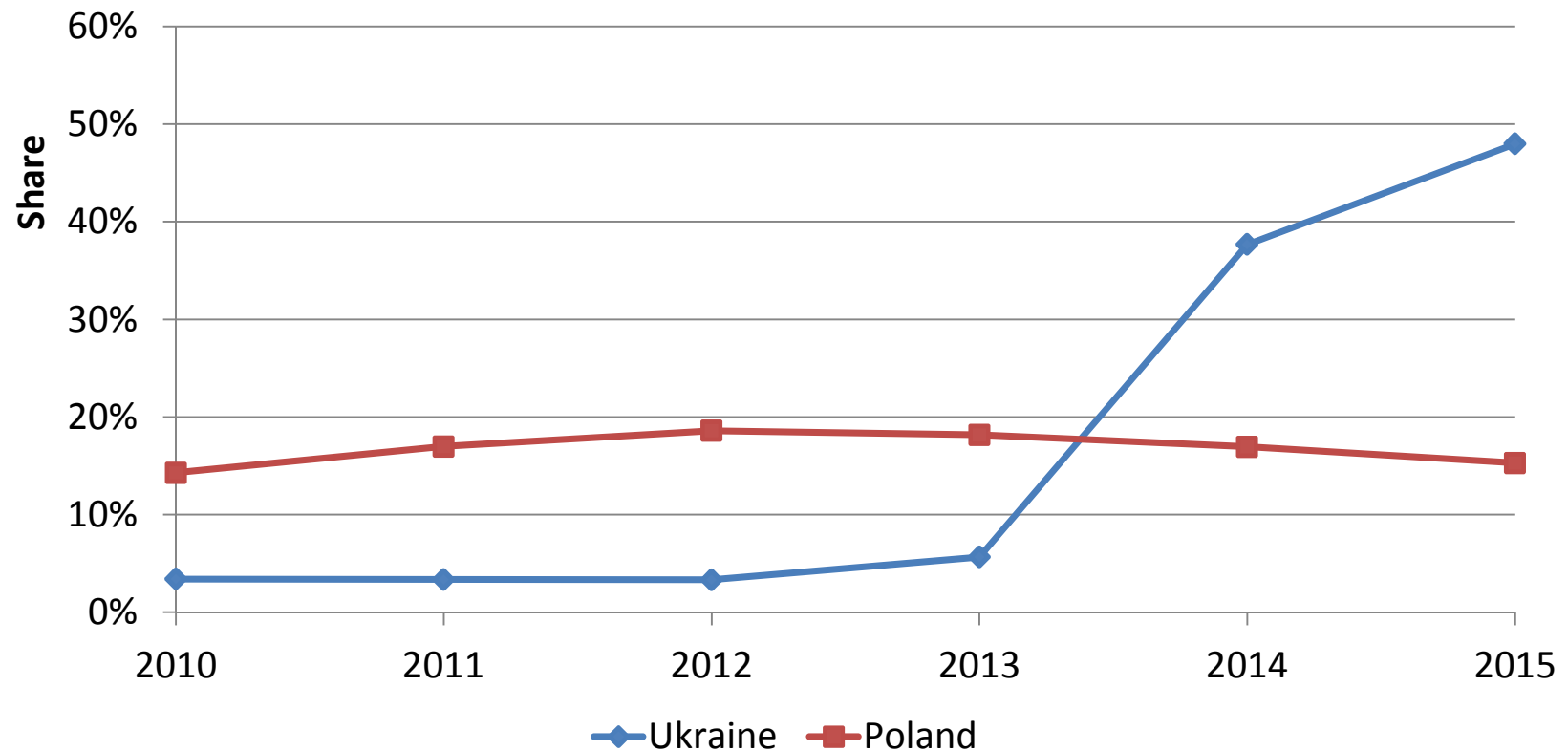
Indicator	Index Political Stability and Absence of Violence/Terrorism	The Global Competitiveness Index	GDP per capita (current US\$)	Agricultural products (in comparative prices)	The average rate of national currency to the US\$
Financial leverage	<u>-0,905</u>	<u>0,139</u>	<u>-0,827</u>	<u>0,443</u>	<u>0,951</u>
	-0,228	0,904	-0,487	-0,816	0,073
Ratio working capital to current assets	<u>0,842</u>	<u>-0,018</u>	<u>0,775</u>	<u>-0,412</u>	<u>-0,846</u>
	-0,797	-0,242	0,281	0,714	0,661
Ratio accounts payable to current assets	<u>0,931</u>	<u>-0,454</u>	<u>0,650</u>	<u>-0,533</u>	<u>-0,805</u>
	0,725	0,354	-0,344	-0,787	-0,609
The share of current liabilities in the total amount of liabilities, %	<u>-0,804</u>	<u>0,329</u>	<u>-0,566</u>	<u>0,569</u>	<u>0,889</u>
	0,895	0,066	-0,221	-0,586	-0,690
Share of short-term bank loans in current liabilities, %	<u>0,400</u>	<u>0,224</u>	<u>0,851</u>	<u>0,103</u>	<u>-0,880</u>
	-0,922	0,057	0,134	0,465	0,736
Share of other types of current liabilities in the total current liabilities, %	<u>-0,951</u>	<u>0,295</u>	<u>-0,779</u>	<u>0,487</u>	<u>0,907</u>
	0,220	-0,931	0,588	0,851	-0,160

Ukraine - in the numerator, Poland - in the denominator

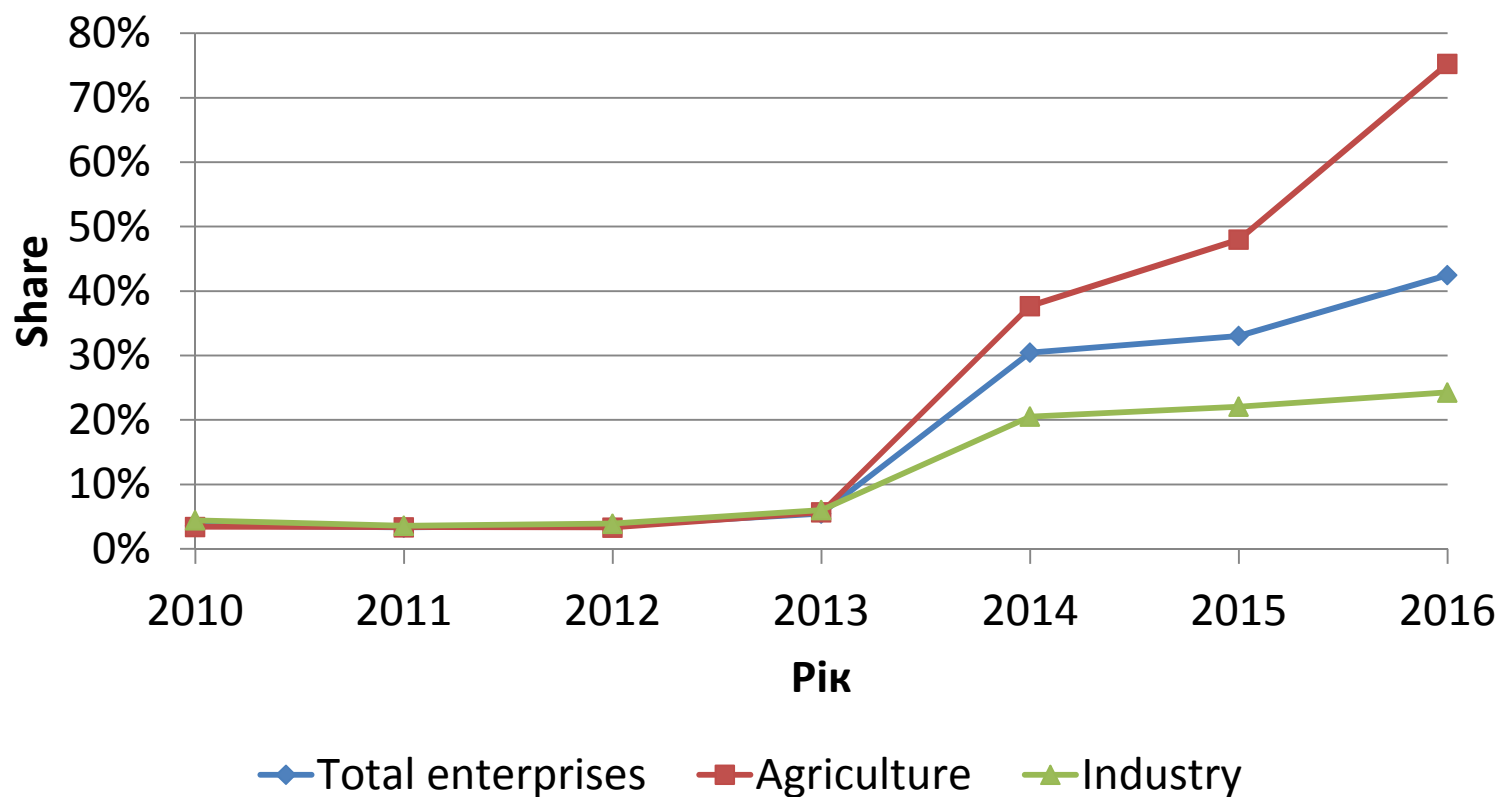
## Regression model for the financial leverage of agricultural enterprises of Ukraine, 2010-2015



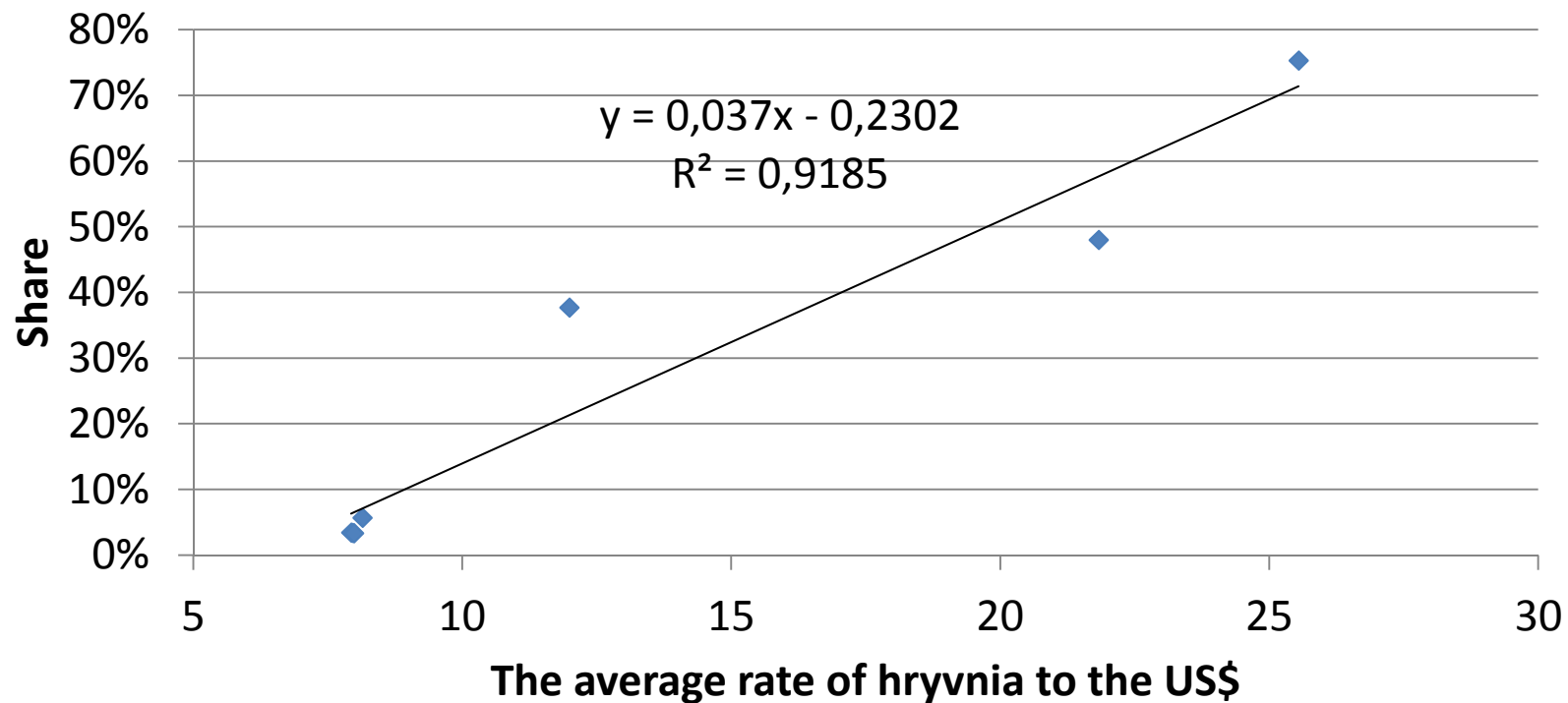
## Dynamics of the share "Other current liabilities" in the total annual average volume of current liabilities of agricultural enterprises in Ukraine and Poland, 2010-2015



## Dynamics of the share "Other current liabilities" in the total annual average volume of current liabilities of enterprises in Ukraine, 2010-2016



## A simple linear regression model between the average rate of hryvnia to the US\$ and the share of other current liabilities in the total current liabilities for agricultural enterprises in Ukraine, 2010 - 2016



## CONCLUSIONS (Ukraine)

- After a slight recovery in 2014, there was a rapid decline in the development of Ukraine's financial system during 2015.
- General negative changes are also observed in the development of the two main components of the financial system of Ukraine: banking sector and financial markets.
- The declining tendency of the development of the financial system and its components was related to the overall socio-political and economic situation in Ukraine, in particular, the military conflict in the Donbas, which began in 2014, the loss of Russian markets and the devaluation of the national currency.
- During the study period, significant changes were also observed in the indicators characterizing the financing patterns of Ukrainian enterprises.



## CONCLUSIONS (Ukraine)

- Despite the general negative changes in the integral indicators of the financial system and indicators characterizing the financing patterns of enterprises, we could not find a strong statistical relationship between them using the correlation analysis process.
- In general, there is an average degree of influence of the financial system on the financing patterns of Ukrainian enterprises, which can be considered quite logical given the significant growth of other current liabilities. This process became possible due to changes in the Tax Code of Ukraine, which allowed the provision of turn-around interest-free financial assistance without the use of traditional financial instruments. As a result, the impact of the financial system's development on changes in financing patterns of Ukrainian enterprises has become somewhat weaker, compared with the situation observed before 2014.

# CONCLUSIONS (Poland)

- Unlike the situation in Ukraine, most of the indicators characterizing the financing patterns of agricultural enterprises in Poland show a significant correlation with the integral indicators of the financial system development and its separate components.
- Statistical patterns found in Poland give some arguments in favor of the confirmation of the hypothesis that the stable development of the financial system in advanced economies, generates a gradual increase in the role of long-term debt and perpetuates own source financing of agricultural enterprises, thus creating conditions for reducing financial risks of these enterprises.
- The final scientific confirmation of this hypothesis requires further research.



Thank you for your  
attention!