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### **CAUSAL LINK BETWEEN FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH: THE CASE OF TRANSITION COUNTRIES**

**Abstract.** The financial market is an important element of any market economy. The study of the impact of financial development on the country's economic growth is a very important and urgent topic. The financial sector plays a key role both in developed and developing countries. Financial markets play a critical role in the distribution of capital, financial intermediation, the transformation of available funds into investment, the distribution and diversification of risks. A well-functioning financial market increases productivity and significantly affects the country's economic growth.

The main objective of this study is to investigate the causal relationship between financial development, trade openness and economic growth. The empirical analysis of this study consists on panel data of 9 transition countries (Ukraine, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova and Tajikistan) over the period 1998 to 2015. In order to investigate the causal link between financial development and economic growth a three-stage Panel Granger causality test was employed. Firstly stationarity properties of the series are examined with the help of Pesaran (2007) panel unit root test. Then Westerlund (2007) panel cointegration method is applied. In the final stage Panel Granger causality test is performed.

The results obtained suggest that there is evidence of a bidirectional causality between financial development and economic growth in the short-run. Policy makers in transition countries should consider the impact of financial development on economic growth.

**Keywords:** financial development, panel data, economic growth, transition countries, panel Granger causality test, panel cointegration method, Pesaran panel unit root test.

**JEL Classification:** C82, G1, O4, O57

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### **ЗВ'ЯЗОК МІЖ ФІНАНСОВИХ РОЗВИТКОМ І ЕКОНОМІЧНИМ ЗРОСТАННЯМ: НА ПРИКЛАДІ КРАЇН З ПЕРЕХІДНОЮ ЕКОНОМІКОЮ**

**Анотація.** Фінансовий ринок є важливим елементом будь-якої ринкової економіки. Вивчення впливу фінансового розвитку на економічне зростання країни є дуже важливою і актуальною темою. Фінансовий сектор відіграє ключову роль як у розвинених країнах, так і у країнах, що розвиваються. Велика роль фінансових ринків у розподілі капіталу, фінансового посередництва, трансформації вільних коштів в інвестиції, розподіл і диверсифікації ризиків. Добре функціонуючий фінансовий ринок підвищує продуктивність і суттєво впливає на економічне зростання країни.

Основна мета цього дослідження — вивчити причинно-наслідковий зв'язок між фінансовим розвитком та економічним зростанням. Емпіричний аналіз цього дослідження складається з панельних даних дев'яти країн із перехідною економікою (Україна, Вірменія, Азербайджан, Білорусь, Грузія, Казахстан, Киргизстан, Молдова і Таджикистан) у період з 1998 до 2015 рр. Для вивчення причинно-наслідкового зв'язку між фінансовим розвитком та економічним зростанням був застосований триступеневий тест причинності Грейнджера. По-

перше, перевіряли стаціонарні властивості даних за допомогою тесту Pesaran (2007). Потім був застосований метод коінтеграції Westerlund (2007). У заключній стадії за допомогою тесту причинності Грейнджера досліджували наявність зв'язку між фінансовим розвитком та економічним зростанням.

Отримані результати свідчать про наявність двобічного причинно-наслідкового зв'язку між фінансовим розвитком та економічним зростанням у короткостроковому періоді. Директивним органам у країнах із перехідною економікою слід розглянути вплив фінансового розвитку на економічне зростання.

**Ключові слова:** фінансовий розвиток, панельні дані, економічне зростання, країни з перехідною економікою, тест причинності Грейнджера, метод коінтеграції, тест Pesaran.

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### **СВЯЗЬ МЕЖДУ ФИНАНСОВЫМ РАЗВИТИЕМ И ЭКОНОМИЧЕСКИМ РОСТОМ: НА ПРИМЕРЕ СТРАН С ПЕРЕХОДНОЙ ЭКОНОМИКОЙ**

**Аннотация.** Финансовый рынок является важным элементом любой рыночной экономики. Изучение воздействия финансового развития на экономический рост страны является очень важной и актуальной темой. Финансовый сектор играет ключевую роль как в развитых странах, так и в развивающихся странах. Велика роль финансовых рынков в распределении капитала, финансового посредничества, трансформации свободных средств в инвестиции, распределении и диверсификации рисков. Хорошо функционирующий финансовый рынок повышает производительность и существенно влияет на экономический рост страны.

Основная цель этого исследования — изучить причинно-следственную связь между финансовым развитием и экономическим ростом. Эмпирический анализ этого исследования состоит из панельных данных девяти стран с переходной экономикой (Украина, Армения, Азербайджан, Беларусь, Грузия, Казахстан, Кыргызстан, Молдова и Таджикистан) в период с 1998 по 2015 год. Для изучения причинно-следственной связи между финансовым развитием и экономическим ростом был применен трехступенчатый тест причинности Грейнджера. Во-первых, проверялось стационарные свойства данных с помощью теста Pesaran (2007). Затем был применен метод коинтеграции Westerlund (2007). В заключительной стадии с помощью теста причинности Грейнджера исследовалось наличие связи между финансовым развитием и экономическим ростом.

Полученные результаты свидетельствуют о наличии двунаправленной причинно-следственной связи между финансовым развитием и экономическим ростом в краткосрочном периоде. Директивным органам в странах с переходной экономикой следует рассмотреть влияние финансового развития на экономический рост.

**Ключевые слова:** финансовое развитие, панельные данные, экономический рост, страны с переходной экономикой, тест причинности Грейнджера, метод коинтеграции, тест Pesaran.

Формул: 5; рис.: 2; табл.: 5; библи.: 19.

**Introduction.** The role of financial markets in the growth process has received recently significant attention. In this framework, financial development is considered by many economists and researchers to be of utmost importance for economic growth.

Services provided by the financial market are considered to be necessary for economic growth. In other words financial development level variables are also increasingly used in recent

years in the economic growth model. Results indicate that there are four views explaining the finance- growth nexus [1].

The first one is the supply-leading view, which asserts a positive effect of financial development on economic growth [4,10,11,12,17]. The second one is the demand following view, which postulates that finance responds to changes that happen in the real sector. In other words real economic activity leads to financial development [5,7]. According to the third view there is bidirectional relationship between financial development and economic growth [6,9]. Finally, according to the fourth view there is no causal relationship between finance development and economic growth at all. Some researches deny the existence of a nexus between financial development and economic growth, claiming that “economists are overestimating the value of finance in economic growth [14].

Based on the above-mentioned theories, this study aims to explore the linkages between economic growth and financial development. For this purpose panel data analysis have been applied to the annual data of nine transition countries (Ukraine, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova and Tajikistan) over the period 1998 to 2015.

The remainder of this study is structured as follows: A brief overview of financial development and economic growth in transition countries are given in the second part of the study. Information about the data and variables are discussed in the third part. Empirical methodology are evaluated in the fourth part. The results are presented in the fifth part. Conclusions are summarized in the final part.

**Financial development and economic growth in transition countries.** Especially in transition countries, the financial sector is very important for capital accumulation, financial intermediation, transformation of savings into investments, risk sharing and risk diversification. Highly developed financial sector also increase efficiency and notably affect economic growth [13].

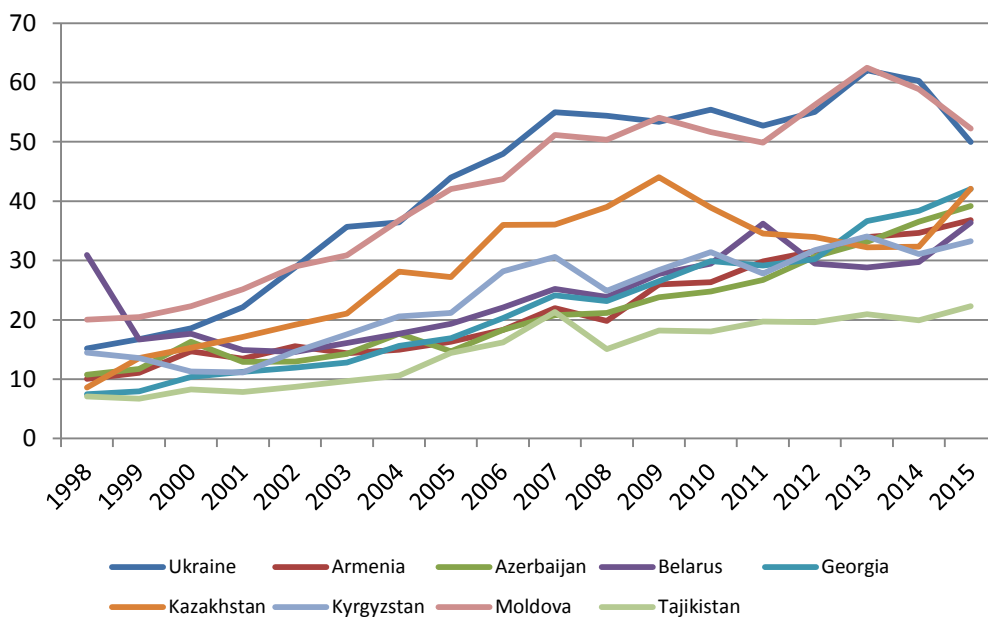


Fig. 1. Financial depth in selected transition countries.

Source:World Bank

As can be observed from Figure 1 the financial sector growth showed upward trend during the period from 1998 to 2015. In most high income countries the ratio of broad money to GDP is at least 60% [8]. Among transition countries financial depth is high in Ukraine, Moldova and Kazakhstan. As can be seen from Figure 1 in Tajikistan financial depth is still relatively low compared to other countries in transition process.

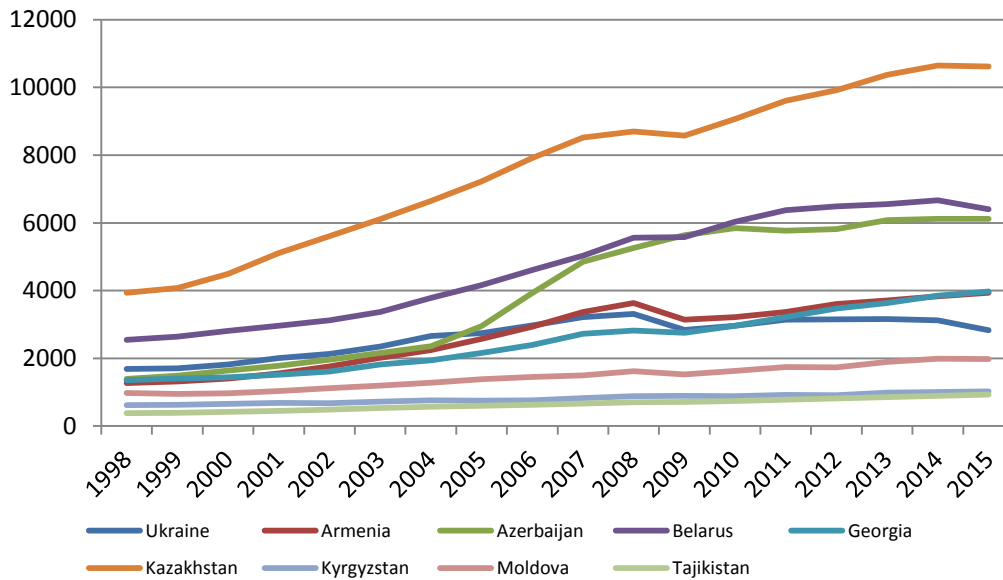


Fig. 2. Economic growth in selected transition countries

Source: World Bank

From Figure 2 it is evident that per capita GDP growth rate is high in Kazakhstan while Tajikistan has the lowest rates of economic growth. It can be inferred from Figure 2 that economic growth rate in selected transition countries are increasing.

**Data and variables.** This study aims to explore the relationship between financial development and economic growth in transition countries<sup>1</sup>. For this purpose annual data for the period of 1998-2015 are used. Data are collected from the World Bank. All variables are transformed into logarithmic form. The detailed information about data are summarized in Table 1.

Table 1

Variables

Variables	Definition	Source
GDP (Economic growth)	GDP per capita (PPP, constant 2011 international \$)	World Bank
FD (Financial development)	Broad money (% of GDP)	World Bank

**Methodology.** To investigate the relationship between economic growth and financial development, the following model was employed:

$$GDP_{it} = \alpha_0 + \alpha_1 FD_{it} + \varepsilon_{it} \tag{1}$$

where  $GDP_{it}$  is real per capita output in country  $i$  and year  $t$ ,  $FD_{it}$  is a measure of financial development and  $\varepsilon_{it}$  is an error term.

In this study a three-stage Panel Granger causality test was employed. Firstly stationarity properties of the series was examined by panel unit root tests. There two types of panel unit root tests: first generation and second generation panel unit root tests. Before applying panel unit root tests it should be investigated whether there is cross-sectional dependency between series. It is well known that not taking into consideration cross-sectional dependence leads to incorrect statistical inference [3]. According to the results obtained it should be decided which type of panel unit root tests are appropriate.

Pesaran (2004) proposes a test (called CD test) for cross-sectional dependence [15]. Test statistics can be calculated as follows:

$$CD = \sqrt{\frac{1}{N(N-1)} \sum_{i=j}^{N-1} \sum_{i=j+1}^N (T \hat{\rho}_{ij}^2 - 1)} \sim N(0,1) \tag{2}$$

<sup>1</sup> Countries examined are: Ukraine, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova and Tajikistan

where  $\rho_{ij}$  is the simple correlation coefficient between residuals obtained from the estimation of each equation by least squares method.

Second generation CADF unit root test suggested by Pesaran (2007) can be estimated as follows [16]:

$$\Delta Y_{it} = a_i + b_i Y_{i,t-1} + c_i \bar{Y}_{t-1} + d_i \Delta \bar{Y}_t + \varepsilon_{it} \quad (3)$$

where  $\Delta Y_{it} = Y_{it} - Y_{i,t-1}$ ;  $\bar{Y}_t = N^{-1} \sum_{i=1}^N Y_{it}$  and  $\Delta \bar{Y}_t = N^{-1} \sum_{i=1}^N \Delta Y_{it}$ .  $\bar{Y}_t$  expresses the time average of all cross-sectional units.

In the second stage Westerlund (2007) panel cointegration test is applied [18]. Cointegration of variables have been analyzed by employing second generation panel cointegration test proposed by Westerlund (2007), which allows for cross-sectional dependence. In the presence of cross-sectional dependence bootstrap p-values should be estimated. Westerlund (2007) developed four panel cointegration test statistics. While two of the four tests are ( $G_\tau$  ve  $G_\alpha$ ) group mean and the other two tests are ( $P_\tau$  ve  $P_\alpha$ ) panel tests. It is important to determine lag/lead length. The tests aim to explore the presence of cointegration by determining whether error correction exists for individual panel units.

If panel co-integration is not found between the series, the standard Granger Causality test is performed:

$$\Delta Y_{it} = \theta_{1i} + \sum_{k=1}^p \theta_{11ik} \Delta Y_{i,t-k} + \sum_{k=1}^p \theta_{12ik} \Delta X_{i,t-k} + u_{1i,t} \quad (4)$$

$$\Delta X_{it} = \theta_{2i} + \sum_{k=1}^p \theta_{21ik} \Delta X_{i,t-k} + \sum_{k=1}^p \theta_{22ik} \Delta Y_{i,t-k} + u_{2i,t} \quad (5)$$

In these hypothesis, if  $\theta_{12ik}$  and/or  $\theta_{21ik}$  are not equal to zero, it can be inferred that there exist the causal relations between the series. If the series are co-integrated in the long-run, a panel-based error correction model is estimated for the panel Granger causality analysis.

**Empirical Results.** To test cross-sectional dependence CD (Cross-Section Dependence) test was implemented, proposed by Pesaran (2004) and the results are given in Table 2.

Table 2

Results of Pesaran (2004) CD test		
Variables	Test Statistics	Probability
LGDP	24.62	0.000
LFD	21.85	0.000

Source: Author's calculation

Results indicate that null hypothesis is rejected at the 1% significance level for all variables. Accordingly, it can be concluded that there is cross-section dependence among variables. In this case the stationarity property of the series should be analyzed by applying second generation CADF (Cross-Sectionally Augmented Dickey Fuller) test suggested by Pesaran (2007), which take into account cross-sectional dependence. The results of Pesaran (2007) CADF unit root tests are reported in Table 3.

Table 3

	Results of Pesaran (2007) CADF test			
	Level ( constant+trend )		First Difference (constant)	
	LGDP	LFD	$\Delta$ LGDP	$\Delta$ LFD
t bar statistic	-2.659	-2.712	-2.401**	-3.005***
z bar statistic	-1.125	-1.282	-1.955**	-3.714***
Probability	(0.130)	(0.100)	(0.025)	(0.000)

Note: \*\*\*and \*\* indicates significance level at 1% and 5% respectively.

Source: Author's calculation

According to the findings obtained it can be concluded that all the variables contain unit roots (at 1% significance level), they are not stationary at level. In other words variables are integrated of order one. The next step will be employing panel cointegration techniques to test for the presence of long-run relationships among integrated variables. For this purpose second generation Panel cointegration test proposed by Westerlund (2007) is implemented. The results of Westerlund (2007) test are presented in Table 3.

Table 4

Results of Westerlund (2007) test				
Statistics	Group Mean		Panel	
	$G_t$	$G_a$	$P_t$	$P_a$
Test statistic	-15.045	-12.398	-5.559	-10.655
Probability	(0.000)	(0.411)	(0.818)	(0.196)

Notes: (i) regression contains intercept and trend terms  
(ii) lag and lead length calculated based on  $4*(T/100)^{2/9}$

Source: Author's calculation

It can be inferred from Table 4 that the null hypothesis of no co-integration cannot be rejected. That is there is no co-integration across the cross sectional units. Thus, Westerlund (2007) tests provide strong evidence against the existence of equilibrium long-run relationship between the variables. In the next stage in order to investigate the short-term causal relationship between the variables Panel Granger causality test is employed. The results are summarized in Table 5.

Table 5

Results of Panel Granger Causality Test			
Direction of causality	$\chi^2$ test statistics	Probabilities	Outcomes
$\Delta LGDP \rightarrow \Delta LFD$	3.958	0.047	Granger causes
$\Delta LFD \rightarrow \Delta LGDP$	0.765	0.000	Granger causes

Source: Author's calculation

Results summarized in Table 5 indicate that there is bidirectional causal relationship between economic growth and financial development ( $LGDP \leftrightarrow LFD$ )

**Conclusion.** This study examines the causal relationship between financial development and economic growth. The study covers the 1998–2015 period and nine transition countries. A three-stage Panel Granger causality analysis is employed to verify the research hypotheses.

According to the results obtained it can be concluded that there is a short-run bidirectional causal relationship between financial development and economic growth during the studied period. In other words it can be inferred that an efficient and effective financial system positively affect GDP dynamics. In turn real economic activity also leads to an improvement in financial sector. Since the relationship between financial development and economic growth is bidirectional, policies implemented to improve one variable inevitably impact the other. Economic growth can be achieved through financial sector improvement and vice versa.

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