

Trade openness and financial development: Granger causality analysis for new EU member states

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Abstract

Traditional approach to trade and finance linkage indicates their complementarity. However, causalities between these two variables are ambiguous. The purpose of this paper is to investigate Granger causality between trade openness and financial development in 11 new EU member states. The annual data for the period 1995-2016 comes from WDI database. Openness is measured as the ratio of country's total trade (exports plus imports) to the country's GDP, or of exports to GDP, and of imports to GDP, separately. Financial development is proxied by domestic credit to private sector and domestic credit provided by financial sector (both measures as a percentage of GDP). The results show statistically significant causalities running from trade openness to financial development in half of the analysed countries with the estimated coefficients being negative. In the majority of countries, the linkages from finance to trade were statistically insignificant regardless the proxies considered. The empirical findings are related to theoretical arguments, both traditional and new ones, formulated mainly in the post-crisis era. We find the obtained results consistent with the empirical work of Bordo and Rousseau (2012), who found that finance and trade reinforced each other before 1930, but these effects do not persist after the Second World War. While Bordo and Rousseau analysed the OECD countries, our paper contributes to the finance-trade nexus literature by focusing on emerging markets.

Keywords: trade openness, financial development, finance-trade nexus, Granger causality

JEL Classification: F10, O16, C33, C53

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1 Introduction

Since the beginning of the 1990s Eastern European countries started to transform and liberalize their economies. Important part of free-market-oriented reforms covered financial sector and foreign trade. Under socialist system most of the countries performed low level of financial development, as well as international openness which was largely limited to other socialist economies. In the aftermath of transition reforms, both variables increased significantly. For example, in the Baltic economies financialization measured as domestic

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credit to GDP increased ninefold in Latvia, nearly fivefold in Estonia, and threefold in Lithuania. Levels of financialization also tripled in the Polish and Romanian economies. Twenty years after launching transition reforms, trade openness measured as exports and imports to GDP doubled in the case of Poland and Hungary, whereas in the rest of the examined countries the indexes increased at least by half.

Simple approach to the above-mentioned changes suggests positive correlation of both variables, i.e. trade openness and financial development. This would be consistent with traditional theoretical approach which predicts that trade openness and financial development are complementary. However, as causalities between trade openness and finance are ambiguous, it is worth to examine nexus between these two categories. Another reason for undertaking our research stemmed from the prevailing empirical evidence on the importance of exports, imports and finance for economic development and growth (Frankel and Romer, 1999; King and Levine, 1993; Beck et al., 2000). Understanding the determinants of trade flows or financial development is important, especially for emerging market economies. The trade-finance nexus also raised our concerns in the context of the recent hypothesis that too much finance or excessive openness no longer contribute to growth (Arcand et al., 2015; Rodrik et al., 2004). As theoretical literature suggests that international trade and finance have both direct as well as indirect impact on economic growth, we test for Granger causality between the two determinants to examine channels of these interactions in 11 new EU member states (NMSs).

The paper contains 6 sections. We start with the review of the relevant literature and theoretical approach to the trade-finance nexus. Next we describe research methodology. Sections 4 and 5 include our empirical results and their interpretation. Conclusions are presented in Section 6.

2 Review of literature

The causal linkages between trade openness and finance are relatively rarely discussed in the literature. The prevailing empirical studies in this field focus mainly on testing trade-growth and finance-growth nexus. Although the global financial crisis and permanent external imbalances characteristic for two decades preceding the outset of the crisis triggered off an ongoing debate on finance-trade causal relationship, the results are still inconclusive (Cecchetti and Kharroubi, 2015; Arcand et al., 2015; Rousseau and Wachtel, 2011).

There are two strands of the studies testing the trade-finance nexus. The first one refers to a demand-following hypothesis, which contends that trade creates demand for financial

services. The explanation that trade openness drives financial development is related to investments in tradeable goods and services, as well as direct trade payments and hedging instruments. Rajan and Zingales (2003) delivered interesting argumentation related to political economy which supports for positive correlation between openness and financial development. Baltagi et al. (2009) confirm that trade openness, as well as economic institutions, can explain financial development and a large part of its variations over the period 1980-2003.

The second strand of studies tests supply-leading hypothesis, which suggests that well developed financial markets may constitute a source of comparative advantages for foreign traders. For instance, Beck (2002) explored that mature financial markets not only induce higher volume of trade but also influence its structure. His results from 30-year panel of 65 countries show that sectors with high scale economies profit more from a higher level of financial development than other sectors. There is also a feedback hypothesis which states that international trade and financial development interact with each other. Bordo and Rousseau (2012) used historical data from 1880 for 17 high-income economies to examine the trade-finance nexus. They explored that bidirectional causalities occurred before 1930, but after 1945 these linkages do not persist.

Having reviewed the relevant literature we conclude that the empirical studies provide with ambiguous results on predominance of any of the above-mentioned hypotheses. Some economists confirm that financially developed countries trade more (Beck, 2002), whereas the others emphasize weak or conditioned causality from finance to trade (Chang et al., 2009). There is also evidence for links from international openness to finance, which is conditioned with economic or political institutions (Rajan and Zingales, 2003; Baltagi et al., 2009).

3 Methodology

In order to determine the direction of causality between the variables of interest, we use the panel data framework due to the well-known fact that panel data methods increase the power of statistical tests. In examining causal linkages within the panel framework, two key issues have to be addressed. The first one is to control for cross-sectional dependence across the members of panel, because a shock affecting one country may also affect other countries through the high degree of globalization as well as of international trade and financial integration. Pesaran (2006) shows the importance of testing for cross-sectional dependence in a panel data study. The second issue is to consider whether the data can be pooled across

countries and whether panel estimates account for country-specific heterogeneity (Pesaran and Yamagata, 2008).

Table 1. Results of cross-section dependence and homogeneity tests.

Model ⁵	LM	LM _{adj}	CD	$\tilde{\Delta}$	$\tilde{\Delta}_{adj}$
FDPRIV =	94.95 ***	6.62 ***	4.93 ***	7.90 ***	9.27 ***
L.FDPRIV+L.TO+L.GDPpc	p=0.001	p=0.000	p=0.000	p=0.000	p=0.000
FDPRIV =	72.91 *	1.95 *	3.04 ***	10.59 ***	12.42 ***
L.FDPRIV+L.EX+L.GDPpc	p=0.053	p=0.052	p=0.002	p=0.000	p=0.000
FDPRIV =	113.90 ***	10.67 ***	6.01 ***	4.87 ***	5.71 ***
L.FDPRIV+L.IM+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.000	p=0.000
FD =	80.02 **	3.51 ***	1.96 *	13.91 ***	16.31 ***
L.FD+L.TO+L.GDPpc	p=0.0154	p=0.000	p=0.051	p=0.000	p=0.000
FD =	72.34 *	1.86 *	0.95	17.91 ***	21.00 ***
L.FD+L.EX+L.GDPpc	p=0.058	p=0.063	p=0.343	p=0.000	p=0.000
FD =	101.40 ***	8.10 ***	3.44 ***	9.05 ***	10.61 ***
L.FD+L.IM+L.GDPpc	p=0.000	p=0.000	p=0.001	p=0.000	p=0.000
TO =	241.00 ***	37.50 ***	13.77 ***	2.40 **	2.82 ***
L.TO+L.FD+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.016	p=0.005
TO =	271.70 ***	43.93 ***	14.77 ***	3.14 ***	3.68 ***
L.TO+L.FDPRIV+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.002	p=0.000
IM =	308.30 ***	52.01 ***	15.68 ***	3.09 ***	3.63 ***
L.IM+L.FD+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.002	p=0.000
IM =	327.60 ***	56.01 ***	16.74 ***	2.64 ***	3.10 ***
L.IM+L.FDPRIV+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.008	p=0.002
EX =	163.30 ***	20.95 ***	10.08 ***	1.82 *	2.14 **
L.EX+L.FD+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.068	P=0.033
EX =	173.80 ***	23.16 ***	10.68 ***	3.52 ***	4.13 ***
L.EX+L.FDPRIV+L.GDPpc	p=0.000	p=0.000	p=0.000	p=0.000	p=0.000

Notation: *LM* – Breusch and Pagan test (1980), *LM_{adj}* and *CD=LM CD** are modified versions (Pesaran et al., 2008) of the *LM* test, $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ denote Pesaran and Yamagata

⁵ Models are given in simplified notation, where L denotes lagged operator.

(2008) tests for slope homogeneity. *** Denotes statistical significance at 1%, **denotes statistical significance at 5%, * denotes statistical significance at 10%.

We start by investigating whether or not there is cross-sectional dependence and heterogeneity across the countries under study. The results reported in Table 1 indicate that the null hypotheses of no cross-sectional dependence for almost all considered models are rejected at the 1% level of significance (only for two of them cross-sectional dependence tests rejected the null hypothesis at 10%). This finding implies that a shock that occurs in one NMS may be transmitted to others. Table 1 also shows that the results from the slope homogeneity tests reject the null hypothesis of slope homogeneity, therefore supporting country-specific heterogeneity.

The variables in models specifications mean: EX – exports as a percentage of GDP; IM – imports as a percentage of GDP; TO – trade openness defined as the ratio of country's total trade (exports plus imports) to the country's GDP; FD – domestic credit provided by the financial sector (it includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations e.g. finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies); FDPRIV – domestic credit to private sector (it refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment); GDP_{pc} – GDP per capita.

In order to test the panel Granger causality we use the bootstrap panel causality method proposed by Kónya (2006), which accounts for both cross-sectional dependence and slope heterogeneity. This method is based on seemingly unrelated regression (SUR). This approach is also robust to the unit root and cointegration properties of the variables. Therefore the testing procedure does not require any pretesting for unit root and cointegration, and the variables are therefore used in their levels. The first step of the bootstrap panel causality approach requires estimating the equation system specified below:

$$\begin{aligned}
 X_{1t} &= \alpha_{11} + \sum_{l=1}^{p_1} \beta_{11l} X_{1t-l} + \sum_{l=1}^{p_2} \delta_{11l} Y_{1t-l} + \sum_{l=1}^{p_3} \varphi_{11l} Z_{1t-l} + \varepsilon_{11t} \\
 &\quad \vdots \\
 X_{Nt} &= \alpha_{1N} + \sum_{l=1}^{p_1} \beta_{1Nl} X_{Nt-l} + \sum_{l=1}^{p_2} \delta_{1Nl} Y_{Nt-l} + \sum_{l=1}^{p_3} \varphi_{1Nl} Z_{Nt-l} + \varepsilon_{1Nt}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
Y_{1t} &= \alpha_{21} + \sum_{l=1}^{p_4} \beta_{21l} X_{1t-l} + \sum_{l=1}^{p_5} \delta_{21l} Y_{1t-l} + \sum_{l=1}^{p_6} \varphi_{21l} Z_{1t-l} + \varepsilon_{21t} \\
&\quad \vdots \\
Y_{Nt} &= \alpha_{2N} + \sum_{l=1}^{p_4} \beta_{2Nl} X_{Nt-l} + \sum_{l=1}^{p_5} \delta_{2Nl} Y_{Nt-l} + \sum_{l=1}^{p_6} \varphi_{2Nl} Z_{Nt-l} + \varepsilon_{2Nt}
\end{aligned} \tag{2}$$

where⁶ X is the trade openness (measured as a sum of exports and imports to GDP, or exports to GDP, or imports to GDP), Y is the financial development (which is proxied by domestic credit to private sector and domestic credit provided by financial sector (both measures as a percentage of GDP)), Z is GDP *per capita*, N is the number of countries of panel ($i = 1, \dots, N$), t is the time period ($t = 1, \dots, T$), and l is the lag length.

In testing for Granger causality, alternative causal relations for a country are likely to be found. For example, there is one-way Granger causality from Y to X if not all $\delta_{1,i}$ are zero, but all $\beta_{2,i}$ are zero; there is one-way Granger causality from X to Y if all $\delta_{1,i}$ are zero, but not all $\beta_{2,i}$ are zero; there is two-way Granger causality between Y and X if neither $\delta_{1,i}$ nor $\beta_{2,i}$ is zero; there is no Granger causality between Y and X if all $\delta_{1,i}$ and $\beta_{2,i}$ are zero. To determine the direction of causality, the Wald statistics for Granger causality are compared with the country-specific critical values that are obtained from the bootstrap sampling procedure.

4 Empirical results

Demand-following hypothesis implies positive signs of the regression coefficients in the causality tests. It means that trade and finance are expected to be complementary. Our results show statistically significant causalities (with the bootstrap probability less than 0.05) from exports to finance development in the case of six countries, when the latter was proxied by domestic credit provided by financial sector (FD), and in four countries, when it was measured as domestic credit to private sector (FDPRIV) (Table 2). In both of these cases the estimated coefficients revealed to be negative, which does not support the demand-following hypothesis. Positive causal nexus between trade openness and finance was confirmed only in Bulgaria when openness was measured as imports to GDP and finance was proxied by FD.

Causality from finance development to trade openness was found to be weak (Table 2). The supply-leading hypothesis was proved as valid only in Lithuania and Croatia, when finance was proxied with FDPRIV, and Latvia when we tested FD. Robust results were also

⁶ p_i (for $i = 1, \dots, 6$) in formulas (1) and (2) denotes number of lags.

explored for Poland, regardless of measures used for openness or finance development. In this case, however, negative regression coefficients indicated the reverse of supply-leading hypothesis. In the majority of NMSs causalities from finance to trade openness were statistically insignificant. This means that supply-leading hypothesis was not confirmed for most of the countries under consideration.

Table 2. Panel Granger causality test results $FDPRIV \leftarrow EX$ and $EX \leftarrow FDPRIV$.

COUNTRY	FDPRIV \leftarrow EX				EX \leftarrow FDPRIV			
	Coef. Wald	Stat	boot 95%	<i>p</i> boot	Coef. Wald	Stat	boot 95%	<i>p</i> boot
Bulgaria	-0.48	2.79	11.49	0.3250	0.09	1.46	11.30	0.4850
Croatia	-0.15	0.98	13.80	0.5990	0.22	29.33	13.38	0.0064
Czech Republic	0.06	0.15	9.73	0.8130	-0.13	7.49	12.99	0.1440
Estonia	-0.32	4.84	10.92	0.1680	0.20	7.86	11.40	0.0970
Hungary	-0.36	17.80	12.99	0.0264	0.10	1.62	23.16	0.5900
Latvia	-1.05	27.81	16.50	0.0144	0.10	8.64	12.93	0.1003
Lithuania	-0.51	20.16	16.10	0.0305	0.30	12.53	11.62	0.0430
Poland	1.05	4.19	10.78	0.1950	-0.28	61.70	15.59	0.0012
Romania	-0.09	0.59	12.73	0.6490	0.12	0.60	14.13	0.6710
Slovak Republic	0.10	0.28	10.22	0.7350	-0.24	7.89	13.93	0.1220
Slovenia	-0.61	38.13	11.99	0.0018	0.03	0.83	15.60	0.6520

5 Interpretation of empirical results

Several explanations can be given to explain why the results we obtained show in the majority of the examined countries no statistical significance of the finance-trade nexus or a significance with (in most cases) negative coefficients. The explanations can be derived from theoretical point of view, but may also follow from empirical shortcomings.

Financial development reflects a notion that is probably too complex to determine its linkages with trade openness when using aggregated categories (like whole domestic credit without dividing it into consumer and investment credit). The composition of credit may have a crucial importance for explaining the finance-trade links. Credit to firms removes financing constraints that exporters could tackle with, thus leading to greater investment and potentially greater export. On the contrary, credit to households can increase domestic consumption (e.g. housing) and even weaken trade related sectors. As the NMSs tried to aspire to consumption

patterns characteristic for Western European economies, the increased credit availability could have been channelled mainly to reach the consumption convergence, while trade sectors remained relatively unaffected by an easy access to credit.

Financial system can generate positive, neutral or negative trade links with time-varying intensity depending mainly on the type of financial market and the variable specifications that are used as proxies. With an increase in GDP per capita, faster growth of domestic private bond markets and stock markets relative to the banking system can be observed, as well as proliferation of mutual funds and pension funds. Therefore, relying only on bank credit measures may not cover all channels of finance-trade links. While in recent 20 years the size of such defined financial sector remained largely stable or grew gradually, the share of shadow banking system (assets of nonbanks) increased significantly. The diversity of financial markets and instruments across countries implies the need to reassess the adequacy of financial development measures.

A large financial sector or its incommensurable high dynamics may lead to increasing volatility and to a suboptimal allocation of resources. The social returns of the financial sector may be lower than its private returns, and a large financial sector may “steal” talents from trade-oriented sectors of the economy and therefore be inefficient from trade point of view. Cecchetti and Kharroubi (2015) emphasize the “crowding out” of human capital away from the real sector to the financial sector when a rapid financialization occurs. When taking into account the data from sector level, it is apparent that before the 2008 financial crisis, resources were shifted from more productive sectors towards financial sector.

A new strand in literature and empirical analysis suggests also that there could be a threshold (reflecting the “too much finance” concept developed by Arcand et al., 2015) above which financial development brings on negative returns. In fact, the countries we analysed have financial markets depth well below the levels reached in advanced economies and significantly below a threshold above which the financial sector is supposed to harm trade (Arcand et al., 2015) suggest the threshold of about 80-100% of credit to GDP, and Gächter and Gkrintzalis (2017) estimate the vertex of the parabola at 115%-120% of credit to GDP ratio as critical for exports and import, respectively). However, the threshold is not universal for all countries at all times. Assuming that the relationship between finance and trade is actually characterized by an inverse U-shape, it should be remembered that the location of the parabola may depend on specific country’s characteristics like income level, institutions, and regulatory and supervisory quality. It means that countries with weak institutions, below average quality of regulations and not satisfactory supervision arrangements may have this

threshold below the estimates given. It might be the case of NMSs.

The results we obtained are basically coherent with recent literature suggesting that after 1990 the conventional positive linkages between finance and real side of economy have weakened. The increased frequency of banking crises⁷ has also contributed to “disappearing” empirical links which included finance as one of variables (Rousseau and Wachtel, 2011).

Conclusions

Argumentation for negative causality from trade openness to financial development is not evident. We interpret our findings taking into consideration specific features of NMSs, as well as changes in global economy. First, the examined countries should be considered not only as new members of the EU, but also as relatively new market economies. Both statuses imply important structural changes and adjustments in the field of economic openness and financial sector. Second, as transformation launched dynamic effects, the final results seem not to be completed, especially when euro adoption consequences are considered. Third, NMSs are still catching-up economies as their GDP per capita is lower than the EU average. Moreover, they are classified as emerging markets. These features are important for interpretation of reversed causalities explored between trade openness and financial development.

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⁷ In countries we analysed the banking crisis started: Bulgaria in 1996, Croatia in 1998, the Czech Republic in 1996, Estonia in 1992, Hungary in 1991 and 2008, Latvia in 1995 and 2008, Lithuania in 1995, Poland in 1992, Romania in 1990, the Slovak Republic in 1998, and Slovenia in 1992 and 2008.

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