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Openness and Growth in Challenging Times: Analysing the trade-growth nexus for Slovakia

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Abstract

In this article, we analyse the trade-growth nexus for Slovakia. This country represents a critical case for such research because, by several measures, it is the most open economy in the EU, with the most Eurocentric trade, and has had one of the best growth performances over the period 1997-2014. In the context of economic crisis and recovery, countries have faced pressures to erect trade barriers. As an EU country, however, Slovakia is part of a trading bloc for which free trade is a *sine qua non* for strong economic performance. The question is – does trade actually help economic growth? Given the openness of Slovakia's economy, and the Eurocentric nature of its trade in the context of the region's sovereign debt crisis, Slovakia is a critical case study. We test six possible causal relationships between Slovakia's imports, exports and growth, using the technique developed by Toda and Yamamoto, on quarterly data from 1997:1 to 2014:4. We find evidence supporting both the export-led-growth hypothesis and the import-led-growth hypothesis. None of the other four relationships were found to be significant. Overall, therefore, trade – imports as well as exports – have enhanced Slovakia's growth and, with it, its economic growth performance.

Keywords

Economic crisis, export-led growth, import-led growth, Slovakia

Introduction

The recent economic crisis has raised important questions around countries' policy responses to the challenges they have faced. In particular, in times of difficult domestic economic circumstances, and in the face of growing pressures to protect firms and jobs, will maintaining openness to trade help or hinder economic growth (and thus recovery)? This is especially important given that, since the crisis began, trade barriers globally have been rising. In this paper, we seek to explore the importance of trade for GDP growth. We focus our attention on Slovakia because it is, by several measures, the most open economy in the EU, with the most Eurocentric trade pattern. EU membership means being part of a trading bloc for which free trade is a fundamental economic principle. Moreover, in recent years, free trade has been taken as a *sine qua non* for recovery. Given Slovakia's unique status amongst EU countries of the degree of openness and eurocentricity, our findings here will have important implications for debates around the general policy thrust of open trade borders, in the EU and generally. These debates, in the EU, are currently linked also to the Europe 2020 agenda for growth and jobs. The focus of the policy discussion has thus been on complementing internal free trade with continued access to non-EU markets (*inter alia*, Commission of the European Communities, 2008; European Commission, 2010a, 2010b; European Commission, 2012; European Commission, 2013).

Our research question is thus, quite simply, does trade promote economic growth in Slovakia? We apply the testing method developed by Toda & Yamamoto (1995) to quarterly data from 1997:1 to 2014:4, in order to analyse six potentially causal relationships: exports to GDP growth, imports to GDP growth, GDP growth to exports, GDP growth to imports, exports to imports, imports to exports. We are therefore testing not only for the most common relationship examined in the literature, export-led growth (ELG); but also for possible reverse

causality (growth-led exports) and for four more possible relationships that have appeared in the literature more recently. As a result, this is one of very few papers that offer analyses of most, let alone all, of these potentially-causal relationships.

The rest of the paper is organised as follows. The next section presents a review of relevant literature on the causal links between exports, imports and growth, in developed, emerging and transition economies. Following that, we describe the data and methodology. We then present the empirical results, before offering our concluding thoughts on the results and their implications for trade as a means of promoting growth and thus recovery.

Literature review

The nature of causal relationships between trade and economic growth has long been the focus of attention in the trade literature, although disagreements still persist regarding the direction of causality and size of the impacts (Awokuse, 2008; Edwards, 1998). Links between exports and growth, in particular the hypothesis that exports promote growth (usually referred to as export-led growth, ELG), have long been explored via empirical investigation. That said, whilst some studies have found evidence for the ELG hypothesis (*inter alia* Awokuse, 2003; Doyle, 1998; Federici & Marconi, 2002; Fountas, 2000; Paul & Chowdhury, 1995; Pomponio, 1996; Serletis, 1992; Sharma, Norris, & Cheung, 1991; Yamada, 1998), evidence has also been found of reverse causality, from GDP growth to exports (*inter alia*, Henriques & Sadorsky, 1996; Jin & Yu, 1995; Oxley, 1993; Shan & Sun, 1998; Sharma et al., 1991). Evidence has also been found for two-way causality between exports and GDP growth (Awokuse, 2006, 2008; Chow, 1987; Hatemi, 2002; Kónya, 2006; Marin, 1992; Ramos, 2001; Thornton, 1997).

Whilst there has been awareness of the potential for import-led growth (ILG) for some time, via the transfer of technology and knowledge (Coe & Helpman, 1995; Grossman & Helpman, 1991), only in recent years has it more regularly been incorporated into studies. Examples include Awokuse (2008) and Ramos (2001), both of whom found evidence of two-way causality between imports and GDP growth in, respectively, Argentina and Portugal. Importantly, introducing imports into the analytical mix also allows for the testing of two-way causal relationships between exports and imports, in addition to tests for ELG, ILG and their reverse causalities.

Studies which have focused on transition economies have found ambiguous results. Awokuse (2007) analysed three countries that are now full EU members, but using data from the time-period when they were going through economic transition (1993-2004). Evidence was found for ELG in Bulgaria and Czechia, although in Bulgaria it was also found that GDP drove both exports and imports. In both Czechia and Poland, however, evidence was found supporting ILG. A wider-ranging analysis by Çetintaş & Barışık (2009) covered thirteen transition economies over the period 1995-2006. Their results revealed a very mixed picture, with GDP growth driving exports, bidirectional causality between imports and GDP growth, and even bidirectional causality between exports and imports. Recent studies by Bilas *et al*. (2015) and Trošt and Bojnec (2016). who have investigated the directions of causality between exports and GDP, respectively, for Croatia over 1996-2012 and Slovenia and Estonia over 2000-2014, found evidence for ELG in these countries. The only studies we are aware of analysing Slovakia are Fitzová & Žídek (2015) and Szkorupova (2014), the first of these analysing both Slovakia and Czechia. Szkorupova finds evidence of ELG, but does not include imports in her analysis. Fitzová & Žídek (2015) find evidence of ELG, and growth-led exports. They also find evidence of ILG and growth-led imports, but only at the 10% significance level.

Our case study is important, first, because our econometric methods – in ways explained further below – improve on the techniques used in many of the earlier studies cited above, including the recent paper on Slovakia by Fitzová & Žídek. Second, Slovakia is an important test-case for the importance of trade and growth because, as we discuss next, Slovakia is an extremely open economy, its trade is highly Eurocentric and is has, over a sustained period of time, recorded one of the best growth performances of all EU member states. It therefore offers important insights into the merits of the EUs pro-trade message for economic growth.

Openness and growth in the Slovakian economy

Following the 'velvet divorce' from Czechia in 1993, the Slovak economy experienced strong growth from the late 1990s through to the economic crisis, supported by the election of a pro EU government in 1998 and accession to the EU in 2004. This performance was affected by the crisis, but by this point Slovakia was working towards adoption of the euro, which it did in 2009. Nominal GDP grew at 14.3 percent annually from 1999 to 2008, although since the crisis this figure has dropped down to 2.3 percent. That said, Eurostat data show that, relative to a base index of 100 in 2000, by 2013 real GDP was the second highest in the EU (169.0), only slightly behind Lithuania (171.2).

Over the period 1999 to 2008, Slovakia's exports grew at 21.1 percent annually, despite experiencing the largest appreciation in real effective exchange rate of any EU country (European Commission, 2010a), with imports growing at 20.4 percent annually. Notwithstanding the rapid GDP growth prior to the crisis, Slovakia became an even more open economy during this period. Importantly in this, Slovakia's position is helped by having a highly deregulated domestic market: OECD data show that, in 2013, it had the (joint)

eighth-lowest PMR (product market regulation) score.[1] Moreover, despite the crisis, it has remained a very open economy since. Eurostat data indicate that, in 2015, Slovakia was the fourth most open EU economy for goods and services (93.8% for exports, 91.4% for imports). That said, since 2004 Slovakia has had the highest share of trade in goods as a percentage of goods and services of all EU member states. In 2015, the figures were 90.2% on exports, 90.0% on imports. Not surprisingly, therefore, both exports and imports as a percentage of GDP have also been higher in Slovakia than in any other EU member state (84.6% and 82.8%, respectively, in 2015).

Slovakian GDP has grown strongly in this very open economy. Moreover, notwithstanding the consequences of the economic crisis globally, and sovereign debt crisis in particular EU countries, growth has been strong (in nominal and real terms) despite the very highly Eurocentric nature of trade. Again using 2015 data derived from Eurostat, Slovakia has the third highest degree of eurocentricity on merchandise exports (78.7%), the highest on exports (85.5%), and the highest on exports and imports in total (82.1%). That said, Slovakia's reliance on exports has been perceived in the past as having dangers, with more recent assessments highlighting the extent to which Slovak exports are concentrated in just a few industries, notably automotive and electrical machinery & equipment (European Commission, 2016, p. 8).[2] This follows an observation by the Ministry of Finance of the Slovak Republic (2015, p. 22) that in 2014, stronger 'domestic demand pulled import growth, which increased more speedily than export, and thus, for the first time in five years, foreign trade contributed

[1]http://www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm#indicators (last accessed 23 October 2016).

[2]http://www.bbc.co.uk/news/10388576.

slightly negatively to GDP development.' The purpose of the analysis, next, is to determine whether Slovakia's recovery has indeed been trade-led.

Data and methodology

In this study, the casual relationship between national income and trade (both exports and imports) is analysed by using the Granger no-causality test developed by Toda & Yamamoto (1995), for reasons set out below. The size of the VAR model requires quarterly rather than annual data to generate enough degrees of freedom for estimation. Following the existing literature, the long-run multivariate relationships between national income and trade are set as follows:

$$ly_t = \alpha_0 + \sum_{i=1}^{k} \beta_{1i} ly_{t-i} + \sum_{j=k+1}^{d_{max}} \beta_{2i} ly_{t-i} + \sum_{i=1}^{k} \beta_{3i} lz_{t-i} + \sum_{j=k+1}^{d_{max}} \beta_{4i} lz_{t-i} + \varepsilon_{1t} \quad (1)$$

$$lz_t = \alpha_1 + \sum_{i=1}^{k} \lambda_{1i} lz_{t-i} + \sum_{j=k+1}^{d_{max}} \lambda_{2i} lz_{t-i} + \sum_{i=1}^{k} \lambda_{3i} ly_{t-i} + \sum_{j=k+1}^{d_{max}} \lambda_{4i} ly_{t-i} + \varepsilon_{2t} \quad (2)$$

where ly is the logarithm of real GDP; lz represents the logarithms of real export and real import, respectively; k is the optimal lag length which is determined by the Akaike Information Criterion (AIC); d_{max} is the maximal order of integration of the variables in the VAR system; and ε_1 and ε_2 are the error terms. From equation (1), causality implies that 'exports Granger-cause GDP' and 'imports Granger-cause GDP' provided that $\beta_{3i} \neq 0 \forall_i$. Similarly, from equation (2), causality implies that 'GDP Granger-causes exports' and 'GDP Granger-causes imports' provided that $\lambda_{3i} \neq 0 \forall_i$.

Quarterly data on nominal GDP, exports, and imports, for 1997Q1 to 2014Q4 have been collected from the Eurostat website. GDP deflator, export price index and import price index,

also obtained from Eurostat, are then used to convert nominal values of the relevant variables into real values. These three variables are free of seasonal effects.

It has been argued that the traditional F-test is ineffective for determining whether some coefficients in a regression model are jointly zero, when the variables are integrated or cointegrated, and the test statistics do not have a standard distribution (Gujarati, 1995). We avoid these limitations associated with standard Granger causality test by using a modified Wald (MWald) test, developed by Toda & Yamamoto (1995).

The Toda & Yamamoto method involves the estimation of an augmented vector autoregressive model (VAR) in levels (rather than in first differences of the variables, as in the Granger causality test). This reduces the risks associated with the possibility of wrongly identifying the order of integration of the variables (Mavrotas & Kelly, 2001). This test has an asymptotic chi-squared distribution when a VAR model is estimated with the optimum lag order of $(k+d_{max})$, where d_{max} is the maximal order of integration. Zapata & Rambaldi (1997) provide evidence that the MWald test has a comparable performance in size and power to the Likelihood Ratio and standard Wald tests, provided that a sample of 50 or more observations is available. Despite the advantages from using this technique, it is noticeable how many of the papers above, post-dating the paper by Toda & Yamamoto, have not adopted their technique.

Empirical results

Using the augmented Dickey-Fuller (ADF) test, we check whether the univariate processes of export, import, and GDP variables contain unit roots or not. The lag length for the ADF tests was selected based on the AIC with estimation of an initial eleven lags on the first-differenced

dependent variable. The results of the unit root tests are shown in Table 1, indicating that the ADF test statistics cannot reject the null hypothesis of a unit root at the 1% level of significance in the log-level of all variables. When the first differences of the variables are taken, the tests clearly reject the null hypothesis at the 1% significance level, demonstrating that all variables in the system are integrated of order one, *I* (1).

Table 1: Results of Unit Root Tests

Variables		**Level**	**First Difference**	**Results**
ly		-0.69 (0)	-3.17 (4)**	I(1)
lex		-0.39 (0)	-6.72 (0)***	I(1)
lim		-0.74 (1)	-6.45 (0)***	I(1)
Critical Values	1%	-3.53	-3.53	
	5%	-2.90	-2.91	

Note: Figures in parentheses in the first two columns represent the number of lags chosen with respect to the AIC. Superscripts *** and ** denote the rejection of null hypothesis (that variables are non-stationary) at the 1% and 5% significance levels, respectively. The critical values for the ADF tests are obtained from MacKinnon (1996). Estimations are carried out using Eviews econometric software.

After conducting the ADF tests and having determined that $d_{max} = 1$, we then proceed to estimate the lag structure of the VAR models (equations 1 and 2). In order to select the optimum lag length for each VAR model we use the AIC. The results indicate that the optimal lag length based on the AIC is 1, that is k = 1. Thus, the estimated VAR models use 2 lags as the optimum lag length. The results of the Granger no-causality test are presented in Table 2 where the computed F-statistics with their probabilities are reported.

Table 2: Granger no-causality Test Results

	MWald Statistics		
Dependent Variables	ly	lex	lim
ly	-----	1,33 (0,25)	0,43 (0,52)
lex	10.03 (0,002)***	-----	1,77 (0,18)
lim	6.92 (0,01)***	0,38 (0,68)	-----

Note: Modified F-statistics are displayed with the probability values in parentheses. ******* denotes significance at the 1% level. Estimations are conducted using Eviews.

According to the estimation results, the null hypotheses of Granger no-causality from output growth to exports and output growth to imports cannot be rejected, whilst the null hypotheses of Granger no-causality from exports to output growth and imports to output growth can be rejected at the 1% significance level. In other words, we find strong evidence of export-led growth and import-led growth, but we do not find evidence that growth has had a significant impact on exports or imports. Moreover, we find no evidence that there are causal links from exports to imports, or from imports to exports.

Discussion and Conclusions

The economic crisis, and policy responses to it, have raised questions about the importance of preserving free trade in economic performance. This is especially relevant, given that the WTO reported that by mid-2016, trade restrictions implemented by the G20 group of nations (which includes the European Union and, separately, the four largest EU member states) had reached their highest level since the crisis.[3] With free trade at the heart of the EU and the Single European Market (SEM), understanding how this commitment might affect individual

[3] https://www.wto.org/english/news_e/news16_e/trdev_21jun16_e.htm (last accessed November 29, 2016).

countries within the EU and the SEM is of paramount importance. In this paper, we therefore focus our analysis on Slovakia, a country which is the most open in the EU (on trade in goods), and with the most Eurocentric trade of all EU countries. Moreover, Slovakia's real GDP growth since 2000 has been the second highest in the EU. Understanding the role and importance of trade in such a country, in particular establishing whether or not trade has helped Slovakia achieve this impressive growth performance, has important implications for wider debates around trade policies.

Using time series data, we have tested for evidence that there exist causal relationships between exports, imports and economic growth in Slovakia, over the period 1997-2014. Applying the method developed by Toda & Yamamoto (1995), we have found evidence that both exports and imports promote economic growth. We have not, however, found evidence for reverse causality, from growth to exports and imports. Nor have we found evidence of causality between exports and imports. Taken together, these results provide evidence supporting both the export-led growth and import-led growth hypotheses. Moreover, by undertaking the additional tests, we can be confident that the links from exports and imports to growth are unlikely to have been the result of misreading spurious relationships between the other pairs of variables tested here. These findings, as well as providing important evidence on the general importance of trade on growth, also represent an important development beyond the limited existing literature on Slovakia.

There are several policy implications arising from this research. Given the importance of imports and exports for growth, further gains may be possible from enhancing trade liberalisation. The EUs 2015 Single Market Strategy is aimed at further intra-EU

liberalisation.[4] Meanwhile, as part of the EU, Slovakia could see GDP rise by over 4% as a result of a successful conclusion to the Transatlantic Trade and Investment Partnership (TTIP), with Slovakia's government being encouraged to make sure the country's needs are reflected in the EU-US talks.[5] Bohac (2016) explores whether Slovakia could expand its trade links with Asia, given its currently highly Eurocentric trade. Future research can build on this, to explore the potential gains for Slovakia from such policy liberalisation and diversification in trade partners.

To facilitate Slovakia's further development of exports, following the ideas of Akamatsu (1962) export industries should focus increasingly on producing high value added goods involving high-level technologies (see also Pokrivčák & Záhorský, 2016). The car industry has been extremely important for Slovakia (see, e.g., Switzerland Global Enterprise, 2015), but is there scope for diversifying into other sectors? Equally, further research is needed to determine the types of imported goods (such as capital goods and intermediate goods) that contribute most to economic growth. This is especially important for a small country like Slovakia, where such imports could be expected, *a priori*, to be used to boost the manufacture of goods for export.

In summary, Slovakia's trade and growth performance over the last 20 years has been very impressive. Indeed, we have demonstrated in this paper that the two are linked: growth has been driven, separately, by imports and by exports. Beyond this, however, we have shown that these relationships are unidirectional. The travails of the eurozone notwithstanding, being

[4] http://ec.europa.eu/growth/single-market/strategy_en

[5] http://alianciapas.sk/en/ttip-may-increase-slovak-gdp-by-422/ last accessed 29 November 2016.

the most open EU economy, with the most Eurocentric trade of all EU countries, has not appeared to undermine Slovakia's economic growth performance.

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[6] NB on the front cover it says, erroneously, March 2015.

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