GERMAN FISCAL AUSTERITY EFFECTS
ON INVESTMENTS AND EXPORTS
IN THE CENTRAL AND EASTERN EUROPEAN COUNTRIES

Victor Shevchuk
Faculty of Physics, Mathematics and Computer Science
Cracow University of Technology, Poland
e-mail: vshevchuk@pk.edu.pl
Roman Kopych
Department of International Economic Relations
Ivan Franko Lviv National University, Ukraine
e-mail: kopych_r@bigmir.net

Abstract: Fiscal austerity in Germany used to be blamed for a stagnant growth in the European countries. However, it seems not to be the case for the Central and Eastern European (CEE) countries. As it is established on the basis of vector error-correction model (VECM) estimates for quarterly series over the 2002–2015 period, a positive non-Keynesian spillover from the fiscal austerity in Germany to output in the CEE countries is realized mainly through an increase in investments, with the export channel being rather ambiguous across countries. Following an improvement in the German budget balance, there is a decrease in exports measured as percent of GDP in 6 out of 10 CEE countries. Depreciation of the real exchange rate (RER) is found for countries with exchange rate flexibility, while the opposite effect of RER appreciation is observed in countries with a fixed exchange rate arrangement. It is possible to argue that spillover effects of German austerity on the CEE countries are dominated by capital flows or confidence measures while foreign demand or relative price channels are rather weak.

Keywords: fiscal spillovers, Germany, Central and Eastern European countries, investments, exports

INTRODUCTION

It is quite common to explain recent economic problems in the European countries by the deficit reduction policy (usually referred to as fiscal "austerity") in Germany, as the budget surplus had been substantial over the 2011−2015 period. For example, Bellofiore [2013] claims that "the German self-defeating obsession for fiscal austerity decisively drove the area into a double-dip recession". For industrial countries, there is an argument that an increasing propensity to save combined with a decline in propensity to invest leads to the so-called secular stagnation, with a declining equilibrium real interest rate, a tendency for lower bounds on interest rates, and a consequent persistence of inadequate demand leading to slow growth, sub-target inflation, and excessive unemployment [Eggertson et al. 2016]. On the other hand, fiscal austerity is justified on the grounds of lowering risk in a public debt-ridden environment [Müller 2014].

Both theoretical and empirical arguments are rather ambiguous. Although the predictions of conventional restrictionary fiscal austerity spillovers seem to prevail in empirical studies for the European countries [Alesina et al. 2015; Beetsma et al. 2006; Ivanova and Weber 2011], there is no evidence that it is attained due to a significant RER appreciation and a crowding out of net exports, as it is implied by the Keynesian concept of a cross-border fiscal spillover. For the CEE countries, Crespo Cuaresma et al. [2011] obtain that the budget deficit in Germany has an expansionary effect on output in Hungary and Poland, while being restrictionary for the Czech Republic, Slovakia and Slovenia. However, Shevchuk and Kopych [2016] find that fiscal austerity in Germany contributes to output growth in seven CEE countries. Both studies do not answer the question of what are the mechanisms of cross-border fiscal spillovers in general and reasons for likely cross-country differences in response to foreign fiscal shocks in particular.

The objective of our paper is to provide empirical evidence on the relative price, investment and export channels for German fiscal austerity spillovers to 10 CEE countries, with a focus on potential differences between exchange rate regimes. The remainder of the paper proceeds as follows. Section 2 provides a brief review of the theoretical issues regarding international fiscal spillovers. In Section 3, data and statistical methodology are presented. Section 4 contains the econometric estimates of the German budget balance effects upon the RER, investments and exports of ten CEE economies. Section 5 concludes.

THEORETICAL ISSUES

Traditional analysis based on a two-country Mundell−Fleming model, for instance McCallum [1996], implies that fiscal austerity at home leads to a decrease in the aggregate demand and a negative fiscal spillover. However, a likely decrease in the interest rate, at least in the short-run, can bring about capital outflows and

influence aggregate demand in the acceptor country through movements in the exchange rate or money supply. As a likely exchange rate appreciation under a floating exchange rate regime is expected to be restrictionary due to the foreign trade channel, monetization of capital inflows under a fixed exchange rate regime can be expansionary abroad. There is empirical evidence that the fiscal multiplier is larger under a fixed exchange rate system [Born et al. 2013]. Boughton [2001] demonstrates that the negative impact of the RER appreciation on output is neutralized if capital inflows contribute directly to investments.

More recent open economy models emphasize the role of expectations, supply-side effects and intertemporal optimization. In the New Keynesian models with forward-looking expectations, fiscal austerity is associated with such a mix of price and wage cuts that increase output abroad despite unfavourable relative price developments in the context of a monetary union [Barbier-Gaucard et al. 2015]. Using a two-good, two-country real business cycle model, Corsetti et al. [2010] find that a decrease in government spending brings about an increase in private consumption, investment, exports and output abroad, but these effects are reversed in the case of anticipated spending reversal. Considering demand- and supply-side effects of fiscal policies in a two-country model with the Phillips curve, Bénassy-Quéré [2006] obtains that fiscal austerity spillovers are generally positive if the central bank does not accommodate the fiscal shock..

Besides investment content of capital inflows or structural effects, fiscal austerity can be justified when public debt and sovereign risk are high [Müller 2014]. Indeed, there is evidence that fiscal multipliers are negative in the high-debt countries [Ilzetzki et al. 2013]. If austerity in Germany reduces uncertainties related to the sovereign debt in the Euro area, it can decrease sovereign borrowing costs and thus stimulate aggregate demand.

Recently, the same contradictory arguments have emerged in respect to the zero lower bound (ZLB) on the nominal interest rates. Within the framework of a New Keynesian model with endogenous capital accumulation, Johannsen [2014] argues that uncertainty about expansionary fiscal policy can cause large declines in consumption, investment, and output under ZLB. It confronts the arguments by Christiano et al. [2011] that the government-spending multiplier can be much larger than one when the ZLB on the nominal interest rate binds.

Using a textbook IS-MP model, Eggertson et al. [2016] demonstrate that secular stagnation resulting from a situation in which the desired savings at full employment outpace desired investment could be transmitted abroad, as capital inflows bring about the RER appreciation and 'crowding out' of exports. A substantial increase in the budget deficit abroad (i.e. in Germany) eliminates the possibility of a secular stagnation through an increase in the interest rate and subsequent reverse in the capital flows thus yielding positive externalities for trading partners. The effect is strengthened by the RER appreciation abroad.

Regardless of risk and ZLB considerations, there is an issue of the balance-of-payments adjustment following changes in the fiscal policy. Bellafiore [2013]

compares present situation in the Eurozone with the neo-mercantilist model of the late 1940s and the persistent German surpluses. It is suggested that the policy of temporary but substantial increases in 'productive' government deficits financed by new money should be implemented in order to achieve a higher level of productivity within the system. However, it is not ruled out that the German trade surpluses would be shrunk by fiscal austerity, not fiscal expansion, as it is implied by a New Keynesian model with endogenous terms of trade and habit persistence in consumption [Cardi and Müller 2011]. If so, it is likely that German fiscal austerity would be associated with a higher demand for imports thus leading to an increase in exports abroad.

DATA AND STATISTICAL METHODOLOGY

Our empirical model is estimated for ten CEE economies, using variables of the cyclically adjusted German budget balance (in percent of GDP), BG_t, the real nominal effective exchange rate (index, 2010=100), RER_t, investments and exports (in percent of GDP), I_t and X_t, respectively. The use of cyclically adjusted budget balance in Germany is motivated by a purpose to filter out effects of the business cycle. A real depreciation means that RER_t goes up, while a real exchange rate appreciation means that RER_t goes down. The crisis dummy, $CRISIS_t$, controls for crisis developments of the 2008–2009 period, taking the value 1 from 2008Q3 to 2009Q4 and 0 otherwise.

All data come from the Eurostat and IMF *International Financial Statistics* online databases. The estimation samples for the individual economies are as follows: 2002Q1 to 2014Q4 for Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, 2002Q1 to 2009Q4 for Slovenia, 2002Q1 to 2011Q4 for Estonia and Lithuania, 2002Q1 to 2013Q4 for Latvia, depending upon availability of time series data on RER. The Czech Republic, Hungary, Poland and Romania can be classified as countries with substantial exchange rate flexibility, while Bulgaria, Slovakia and the Baltic States have been maintaining different kind of fixed exchange rate arrangements.

The augmented Dickey-Fuller (ADF) unit root test is used for checking the orders of integration of the three times series, with a trend being included for all time series and autoregressive lags being chosen according to the Akaike information criterion in the corresponding VAR model. The ADF tests show that all the variables included in the analysis are I(1), although it is only at the 5% significance level for the RER for Bulgaria, Slovakia, Latvia and Lithuania and at the 10% level for Estonia (Table 1). In order to investigate the cointegration rank of two separate autoregressive models, with investments and exports respectively, the Johansen Trace test is used. The hypothesis of at least one cointegration equation cannot be rejected at the 5% level for all countries, while $r = 1$ is likely to be the case in models with either investments, or exports.

Table 1. Test of data characteristics

Country	RER_t		I_t		X_t	
	level	FD	level	FD	level	FD
(a) unit root test (augmented Dickey-Fuller test)						
Czech Republic	−1.90	−4.68***	−1.73	−7.33***	−0.11	−6.84***
Hungary	−0.92	−6.81***	−1.45	−7.33***	−0.18	−6.81***
Poland	0.55	−5.99***	−1.21	−6.18***	−1.81	−6.07***
Romania	−1.80	−6.48***	−1.64	−7.01***	−0.88	−7.81***
Slovenia	0.42	−6.32***	0.06	−5.80***	−2.26	−4.89***
Bulgaria	−2.02	−3.41**	−1.63	−6.78***	−1.64	−5.88***
Slovakia	−0.45	−5.27**	−2.79	−8.54***	−1.76	−5.94***
Estonia	−1.65*	−2.45*	−1.38	−8.65***	−2.30	−7.83***
Latvia	−0.90	−6.20**	−1.60	−6.61***	−1.78	−4.97***
Lithuania	−2.04	−7.25**	−1.37	−7.38***	−1.79	−6.22***
	$r \leq 0$		$r \leq 1$		$r \leq 2$	
(b) test for co-integration (Trace test)						
Czech Republic	56.31** (54.08)		29.66* (35.19)		14.83 (20.26)	
Hungary	61.98*** (54.08)		33.41* (35.19)		13.26 (20.26)	
Poland	80.40*** (63.67)		51.94*** (42.92)		25.05* (25.87)	
Romania	64.85*** (54.08)		30.73 (35.19**)		13.10 (20.26)	
Slovenia	56.35** (54.08)		34.49* (35.19)		18.69* (20.26)	
Bulgaria	48.90*** (40.17)		21.12 (24.28)		4.10 (12.52)	
Slovakia	75.97*** (47.85)		43.50*** (29.79)		20.37*** (16.49)	
Estonia	65.69** (54.08)		35.17* (35.19)		18.74* (20.26)	
Latvia	75.06*** (54.08)		32.20* (35.19)		20.26 (20.26)	
Lithuania	65.99*** (47.85)		29.33* (29.79)		8.42 (16.49)	

Note: numbers in parentheses are critical values for relevant r (rank); *, **, *** imply statistical significance at the 10, 5 and 1% level, respectively; FD is for first differences.
Source: own calculations

In order to account for the cointegration properties of the variables, the VECM with cointegration rank $r < k$ and p lags is used as follows:

$$\Delta \mathbf{y}_t = \alpha \beta' \mathbf{y}_{t-1} + \Gamma_j \Delta \mathbf{y}_{t-p+1} + \mathbf{D}_t + \varepsilon_t, \tag{1}$$

where $\mathbf{y}_t$ is a $k \times 1$ vector of endogenous variables, α is a $k \times r$ matrix of adjustment coefficients, β is a $k \times r$ contegration matrix, Γ_j is a $k \times k$ short run coefficient matrix for $j = 1, ..., p-1$, $\mathbf{D}_t$ is a vector of exogenous variables, ε_t is a white noise error vector.

In the analysis a four variable VECM $y_t = (BG_t, RER_t, I_t, X_t)'$ is used. Assuming that there is a VEC($p-1$) representation for a VAR(p) process containing cointegrated variables, the order p is chosen so that no residual autocorrelation is left in the corresponding VAR model. The resulting lag lengths

amount to 2 in the case of Bulgaria, the Czech Republic, Slovenia and Estonia, to 3 for Hungary, Poland, Lithuania, and to 4 for Slovakia and Latvia. Most of models include a constant and a linear trend as deterministic terms. Besides a dummy *CRISIS$_t$*, the London Interbank Offer Rate (LIBOR) is used as an independent variable to control for the international financial market conditions.

Unlike study of German fiscal shock spillovers by Crespo Cuaresma et al. [2011] that allow for cointegration in a seven variable VAR in levels form, our approach has several advantages by consistent estimation of cointegration relations in a four variable VECM. As demonstrated by Phillips [1998], the VEC specification significantly improves impulse responses even for short horizons. The cointegration relations provide identification restrictions that potentially make it easier to distinguish between permanent and transitory effects.

EMPIRICAL RESULTS

The impulse responses for the VECM regarding dynamic effects of an exogenous increase in the Germany's budget balance upon the RER, investments and exports of ten CEE countries are presented in Figure 2 to 4, respectively (estimation results can be obtained on request from the authors). On the vertical axes, the RER is measured in log-level (Figure 1), while investments (Figure 2) and exports (Figure 3) are measured in percent of GDP. The horizontal axe measures time in quarter units.

The response of relative prices to the German austerity shock is asymmetrical across exchange rate regimes (Figure 1). Depreciation of the RER is found for countries with exchange rate flexibility (or floaters), while the opposite effect of RER appreciation is observed for countries with a fixed exchange rate arrangements (or peggers). Our results for floaters contradict predictions of the Mundell-Fleming model, providing a hint on monetization of capital inflows in efforts to avoid a currency appreciation. Alternative explanations are provided by the New Keynesian models [Barbier-Gaucard et al. 2015]. For a fixed exchange rate regime, an increase in the money supply can lead to higher prices and the RER appreciation, as it is found empirically. The fraction of BG_t in the forecast error variance decomposition (FEVD) of RER is much lower on average for floaters if compared with peggers (Table 2). However, the results for Estonia and Lithuania are comparable to that for the countries with exchange rate flexibility.

Regardless of the exchange rate arrangements, fiscal austerity in Germany unambiguously contributes to investments, although the results seem to be stronger under a fixed exchange rate regime (Figure 2). Improvement of the budget balance in Germany with an initial size of 1% of GDP results in a cumulative expansion in investment between 0.6% and 1.2% of GDP for Bulgaria, Lithuania and Latvia, while being at a lower level of around 0.3% of GDP for Estonia and Slovakia. Under a floating exchange rate regime, the strongest stimulating effect is obtained for Romania on impact at 1.5% of GDP but it is gradually phased out. For other
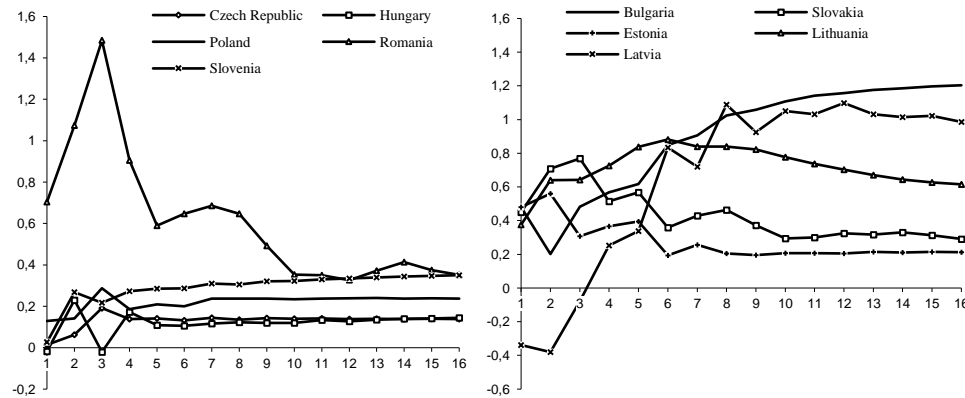
countries in that group, the estimates imply an increase in investments by 0.3% to 0.4% of GDP.

Figure 1. German budget balance effects on the RER
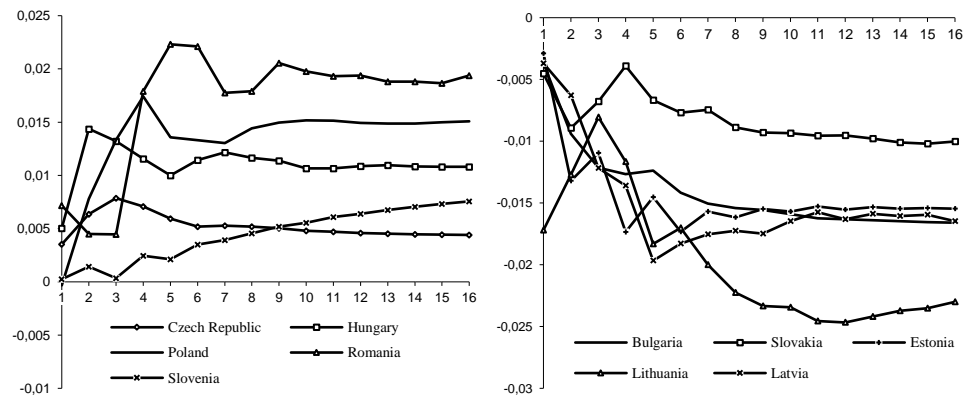
Source: the author's calculations

Figure 2. German budget balance effects on investments

Source: the author's calculations

Except Poland and Estonia, no persistent stimulating effect of German fiscal shock upon exports is found (Figure 3). For the Czech Republic and Lithuania, there is a short-lived positive effect on impact only and this result is further supported by a small fraction of BG_t in the FEVD of exports, especially for the former. Other countries demonstrate a decrease in the fraction of exports in GDP, with no particular exchange rate regime-specific features either. The largest drop in exports is observed in Slovenia and Slovakia, with the fraction of BG_t in changes of exports at its maximum at 20% and 58%, respectively. Impulse responses for Romania and Hungary are similar in the long run and indicate a decrease in the exports/GDP relationship of about 0.6 percentage points in response to a 1%

German fiscal shock, but this effect is not very important according to the FEVD for the latter (Table 2). Results for Bulgaria are similar to those ones found for Hungary. The impulse response negative effect on exports is twice as strong for Latvia, with a fraction of BG_t in the FEVD gradually increasing from 13% to as high as 74%.

Figure 3. German budget balance effects on exports
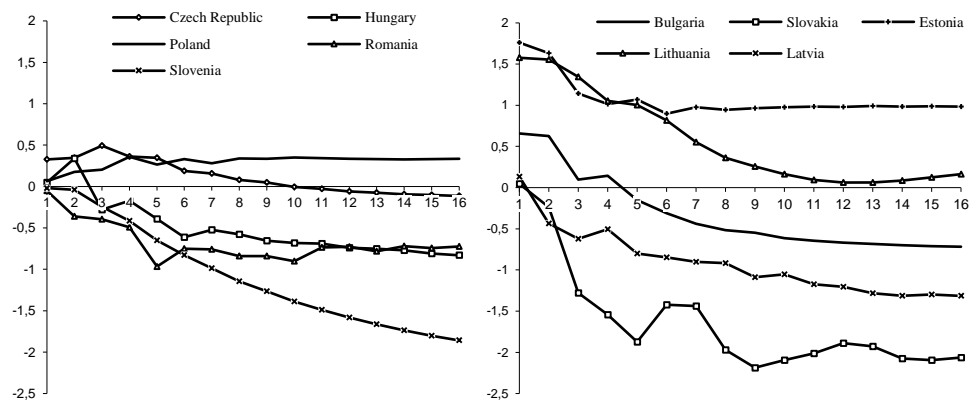
Source: the author's calculations

Our results indicate that the direct trade channel in transmission of a German fiscal shock is quite heterogeneous, although a gradual decline in the share of exports in GDP clearly dominates. As the inverse link between fiscal austerity in Germany and exports abroad can be easily explained by insufficient foreign demand, the positive response of CEE exports to BG_t, as in Poland, Estonia, the Czech Republic and Lithuania to some extent, implies a more complicated interplay of indirect transmission mechanisms. For example, it is likely that a capital inflows-driven increase in investments creates a sort of crowding out effect for the local exporters due to higher returns on the domestic market-oriented activities. Obviously, a further research is needed in order to clarify mechanisms of German fiscal austerity spillovers for the CEE countries.

CONCLUSIONS

There is evidence that the positive link between the German austerity and output growth in the CEE countries, as obtained by Shevchuk and Kopych [2016], is achieved through an increase in investments which is much stronger for peggers, while other channels are not so homogenous across countries. There is a uniform RER depreciation in response to a German austerity shock under floating, while the opposite outcome of RER appreciation is observed for all peggers. For 6 out of 10 CEE countries, there is a negative link between German fiscal austerity and exports, thus confirming presence of a standard trade channel in transmission of the European cross-border fiscal shocks.

Table 2. Forecast error variance decomposition

Responses of	Innovations to	Country	Forecast horizons			
			4	8	12	16
Real exchange rate (*RER*)	*BG*	Czech Republic	4	4	3	2
		Hungary	12	15	16	17
		Poland	8	12	14	15
		Romania	7	14	15	15
		Slovenia	1	3	5	7
		Bulgaria	26	32	35	36
		Slovakia	23	35	40	36
		Estonia	6	7	8	8
		Lithuania	12	13	13	13
		Latvia	47	68	75	77
Investments (*I*)	*BG*	Czech Republic	5	7	8	9
		Hungary	4	4	4	4
		Poland	27	26	24	24
		Romania	22	16	11	9
		Slovenia	7	9	11	11
		Bulgaria	7	16	23	26
		Slovakia	37	33	30	31
		Estonia	20	12	8	7
		Lithuania	9	10	10	9
		Latvia	9	26	32	33
Exports (*X*)	*BG*	Czech Republic	3	2	1	1
		Hungary	1	1	2	3
		Poland	11	12	15	16
		Romania	7	17	22	23
		Slovenia	2	11	17	20
		Bulgaria	2	2	3	4
		Slovakia	20	42	57	58
		Estonia	9	6	5	5
		Lithuania	16	10	9	6
		Latvia	13	51	68	75

Source: the author's calculations

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