FISCAL POLICY EFFECTS IN UKRAINE

Abstract

This paper empirically analyzes fiscal policy effects in Ukraine, using different identification strategies within the framework of vector error correction model (VECM). For quarterly data from 2001 to 2016, we find a robust positive impact of both government expenditure and net revenue upon output in Ukraine, which is in close accord with the Mankiw─Summers model for the case of strong demand for money of consumption expenditure combined with significant interest rate elasticity of investments. Otherwise, the fiscal policy transmission mechanism exhibits several standard features (such as an increase in government expenditure after a positive shock to revenue or widening of the budget deficit following an interest rate hike). The results suggest feasibility of revenue-based fiscal consolidation policies in Ukraine, as better tax collection may contribute to economic growth even in the short run. Since there is a robust conventional inverse relationship between interest rate and output, one of the puzzling results is that government expenditure puts a downward pressure on the former, with net revenues being neutral in this respect. The real exchange rate (RER) depreciation is behind a decrease in output in the baseline model but alternative identification schemes suggest that it is likely to be contractionary in the short run while turning expansionary in the long run.

Keywords: fiscal policy, output, interest rate, real exchange rate, Ukraine
JEL Classification: C5,E1, E6, H6.

1. Introduction

Although there is a wide consensus that fiscal consolidation is necessary for restoration of the economic growth in Ukraine, it is not so clear whether the expenditure-reducing policies are preferable to the revenue-based measures. Both theoretical arguments and empirical evidence are mixed, with transformation economies being not an exception. In accordance with policy implications of a standard Keynesian model, expansionary effects of higher government expenditures are found for Croatia (Deskar-Škrbić & Šimović 2015) the Czech Republic (Franta 2013; Klyuev & Swidden 2011), Poland (Haug et al. 2013; Laski et al. 2010; Mirdala 2009) and Slovakia (Mirdala 2009; Zeman 2016). Fiscal multipliers of government expenditure in Serbia may reach 0,5-0,6 in times of recession, but they are almost insignificant in periods of expansion (Petrovič & Brĉerevič 2014). The same weak stimulating effect of government expenditure is found for Romania (Boiciuk 2015) and Bulgaria (Mirdala 2009; Muir & Weber 2013), with a further support of the general view in the literature that fiscal multipliers are higher during periods of economic recession (Benčik 2014;

Karagyozova-Markova et al. 2013). No impact of government expenditure upon output is found for Slovenia and Serbia (Deskar-Škrbić & Šimović 2015). Using a panel VECM, J. Combes, A. Minea, I. Mistea, and T. Yogo (2016) assert that the expenditure multiplier is positive, but low on average, with its sign, significance and magnitude varying across CEE countries. As obtained for a panel of 10 Central and East European countries by P. Petrović, M. Arsić, and A. Nojković (2014), government expenditure multiplier is rather high on impact at 0.6 but it is declining to just 0.2 in the long run (stimulating effect is much stronger under a fixed exchange rate).

Examples of the non-Keynesian effects implying output growth resulting from government expenditure cuts of higher taxation are also visible. For example, G. Tondl (2004) finds negative output effects of government expenditure both in the panel data estimates for 7 CEE countries and in individual country estimates for Hungary, Lithuania, Romania and Poland (to less extent), along with Portugal, Ireland, Greece and Spain (all these euro areas, so-called PIGS countries, were in the epicenter of future debt problems at the beginning of the 2008-2009 world financial crisis). Only Slovakia demonstrates a positive relationship between government expenditure and growth, with Bulgaria being a neutral case. A. Rzonca and P. Cizkovicz (2005) provide evidence that fiscal consolidation in 8 CEE countries contributed substantially to the acceleration of output growth.

A response of the output to a government revenue shock is rather negative for the Czech Republic (Franta 2013; Klyuev & Swidden 2011) and Slovakia (Zeman 2016). The same outcome is found for Croatia and Slovenia, but the opposite positive effect is observed in Serbia (Deskar-Škrbić & Šimović 2015), Bulgaria, Hungary and Romania (Mirdala 2009). The tax multiplier is close to zero for Poland (Haug et al. 2013; Mirdala 2009). In the abovementioned study by G. Tondl (2004), taxation in a broader sense as measured by the government revenue is found to be pro-growth for the CEE countries, while the opposite negative effect is obtained for the PIGS countries. However, P. Petrović, M. Arsić, and A. Nojković (2014) found no effect of net revenues upon output for the former, regardless of the exchange rate regime.

R. Mirdala (2009) finds that for the Czech Republic both the government expenditure and the revenue are expansionary. The same result is obtained for Bulgaria by K. Karagyozova-Markova, G. Deyanov, and V. Iliev (2013), although it is not robust with respect to the choice of estimation method. Calibration of a DSGE for Slovakia demonstrates that a combination of

increases in government transfers as well as taxes can stabilize the economy in the short run and improve longer-term growth prospects following a shock with adverse fiscal implications (Múčka & Horváth 2015). Such findings could be interpreted in favor of the Mankiw–Summers model (Mankiw & Summers 1986), which explains a possible symmetry of expenditure and tax effects by disaggregated demand for money function. Regardless of a particular modelling setting, the interest rate and income elasticities of money demand are considered as important factors behind the fiscal policy effects, besides such structural features as the existence of nominal rigidities in the economy, the elasticity of the labour supply, the interest rate elasticity of investment, the degree of openness of the economy, the exchange-rate regime or the magnitude of the wealth effects (De Castro & de Cos 2008). The Mankiw–Summers model provides a middle stand in the discussion on the architecture of fiscal consolidation programs. While standard Keynesian models imply contractionary effects of higher taxes and government expenditure cuts, the models of so-called non-Keynesian effects provide with positive output responses to both type of fiscal consolidation measures.

Although it is common in empirical studies to prefer government expenditure cuts over revenue-based consolidations (Alesina & Ardagna, 2010; Alesina et al. 2015), including the experience of fiscal consolidations in the CEE countries for the period of 1991-2003 (Afonso et al. 2006), there is evidence is that higher taxes could stimulate private consumption (Giavazzi et al. 2005). Even though it is customary to consider tax multipliers for the CEE countries to be small and short-lived, as implied by contradicting results from VAR models with different identification techniques (Karagyozova-Markova et al. 2013), it is not confirmed that a positive revenue shock could be expansionary.

This paper analyzes fiscal policy effects in Ukraine using a range of VECMs. Similar to other studies, for example Karagyozova-Markova et al. (2013) or Franta (2013), the results of a standard VECM with recursive identification scheme are used as a benchmark for alternative modelling specifications. Section 2 reviews an open economy extension of the Mankiw–Summers model. Data and statistical methodology are presented in Section 3. Estimates of the baseline VECM and its extensions are interpreted in Sections 4 and 5. The paper is concluded by offering policy recommendations.

2. Theoretical framework

Conventional econometric models relate the demand for money to the level of GDP, serving as the scale variable determining the transactions demand for money balances. Referring to portfolio and transaction models of money demand as justification for a disaggregated money equation within the familiar IS–LM framework, G. Mankiw and L. Summers (1986) demonstrate that tax cuts can constraint aggregate demand, holding that money supply is constant. In the open economy version, the model is presented as follows[1]:

$$Y = C(Y - T, r) + I(Y, r) + G + CA(E, Y, Y^*), \tag{1}$$

$$C_Y, I_Y > 0, C_Y, I_Y > 0, CA_E, CA_{Y^*} > 0, CA_Y < 0,$$

$$M / P = L(C, I, G, r), \quad L_C > L_I > L_G > 0, L_r < 0, \tag{2}$$

$$CA(E, Y, Y^*) + k(r - r^*) = 0, \tag{3}$$

where Y and Y^* are domestic and foreign output, C is consumption, I is investment, r and r^* are domestic and foreign interest rate, G and T are government expenditure and government lump-sum taxes, respectively, CA is the current account, M is the money supply, P is the price level, E is a nominal exchange rate.

Equation (1) relates the aggregate demand to private consumption, investments, government expenditure, and price and income effects in foreign trade. Both consumption and investments are proportional to income and inversely related to interest rate. A similar contractionary channel is provided by the relationship between income and imports. Aggregate demand is stimulated by lower taxes, exchange rate depreciation and higher income abroad. In Equation (2), the money supply in real terms is equilibrated with the demand for money, which is an increasing function of disaggregated income and a lower interest rate. For simplicity, there is no difference between nominal and real interest rates in specifications for the goods and money markets. Equation (3) defines the balance-of-payments (BOP) equilibrium. The current account balance is equilibrated with the net capital inflows. It is assumed that capital flows are dependent on the interest rate differential. For the case of capital immobility ($k = 0$), the BOP equilibrium is achieved solely through the relative price adjustment. Under inefficiency of the relative price mechanism, a decline in income is necessary to decrease demand for imports.

[1] A similar open economy extension of the Mankiw–Summers model is used for interpretation of restrictionary fiscal policies by A. Rzonca (2007).

A comparative static analysis yields fiscal policy multipliers as follows:

a) floating exchange rate regime

$$\frac{dY}{dG} = \frac{CA_q\left[(L_G - L_I)I_r + (L_G - L_C)C_r - L_r + kL_G\right]}{\Omega}, \tag{4}$$

$$\frac{dY}{dT} = -\frac{CA_q C_Y\left[(L_C - L_I)I_r - L_r + kL_C\right]}{\Omega}, \tag{5}$$

b) fixed exchange rate regime

$$\frac{dY}{dG} = \frac{k}{k(1-C_Y - I_Y) + CA_Y(C_r + I_r)}, \tag{6}$$

$$\frac{dY}{dT} = -\frac{kC_Y}{k(1-C_Y - I_Y) + CA_Y(C_r + I_r)}, \tag{7}$$

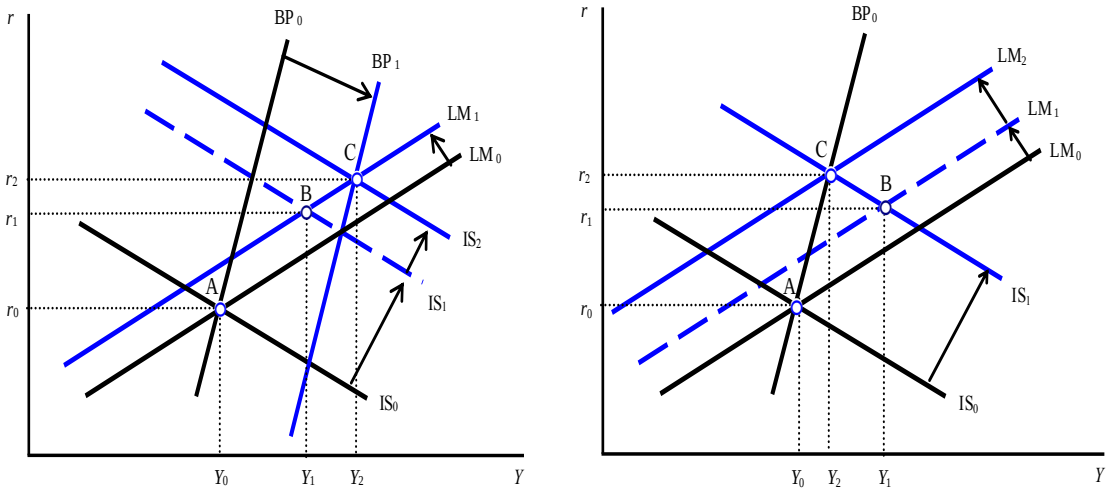
where $\Omega = -CA_q\left[(1-C_Y - I_Y)(L_r + L_C C_r + L_I I_r) + (C_r + I_r)(L_C C_Y + L_I I_Y)\right] - CA_q\left[k(L_C C_Y + L_I I_Y) - CA_Y(L_I I_r + L_C C_r + L_r)\right]$.

Regardless of capital mobility, the determinant Ω is unambiguously negative under standard assumptions that $C_Y, I_Y > 0$, $C_r, I_r < 0$, $L_r < 0$, and $C_Y + I_Y < 1$.

For a closed economy ($k = 0$), the multipliers reduce to those obtained by Mankiw and Summers (1986). A fiscal multiplier for government expenditure is positive if $L_G < (I_r L_I + C_r L_C + I_r)/(I_r + C_r + k)$, as long as government spending generates less money demand than a weighted average of consumption and investments and capital mobility is rather low. As for the tax multiplier, higher taxes positively contribute to income only under condition that the consumption-based demand for money is stronger in comparison to the investment-based demand for money, i.e. $L_C > L_I$, and if the money demand is interest-inelastic relative to high interest rate sensitivity of investments. However, a stimulating effect becomes not sensitive to structural features for the case of perfect capital mobility ($k = \infty$), as the tax multiplier becomes unambiguously positive: $dY/dT = L_C C_Y/(L_C C_Y + L_I I_Y)$.

Graphical interpretation of government expenditure and revenue effects is presented in Fig. 1 and 2, respectively. For a floating exchange rate regime, an increase in the government expenditure is followed by a higher demand for both goods and services ($IS_0 \rightarrow IS_1$) and money ($LM_0 \rightarrow LM_1$). As there is a BOP deficit at the new internal equilibrium (p. B), the nominal exchange rate depreciates. In turn, it brings about a further expansion of aggregate demand ($IS_0 \rightarrow IS_1$) and improvement in the external position ($BP_0 \rightarrow BP_1$). Expansionary effect

on output is combined with an increase in the interest rate. Under a fixed exchange rate system, the BOP adjustment requires a decrease in the money supply ($LM_1 \rightarrow LM_2$), which reinforces an initial money demand shock ($LM_0 \rightarrow LM_1$). In a new equilibrium (p. C), there is still an increase in income, but it is smaller in comparison to a floating exchange rate case.

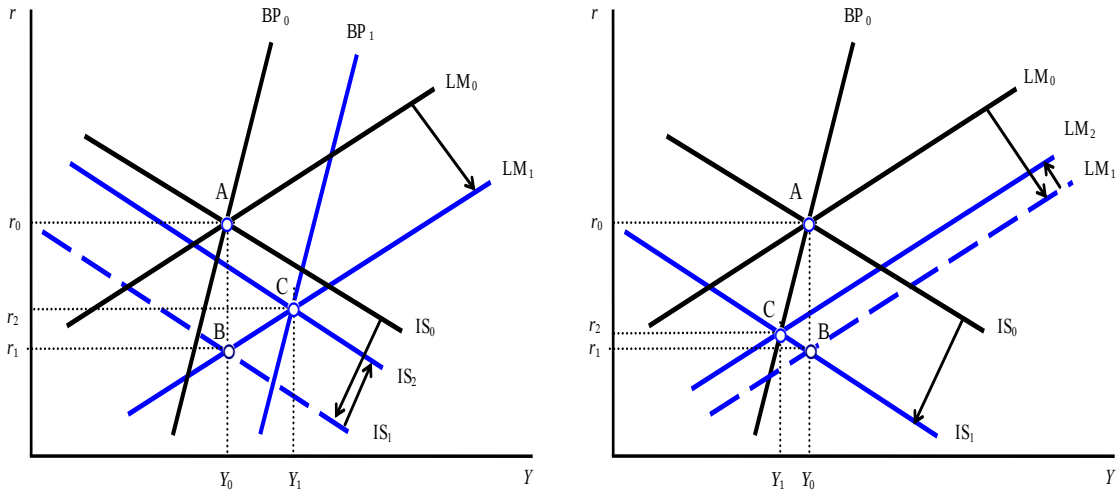


a) floating ER regime b) fixed ER regime

Fig. 1. Effects of higher government expenditure under low capital mobility
Source: authors' own elaboration.

As is apparent from Fig. 2a, an increase in taxes is followed by a decrease in demand on the goods and services market ($IS_0 \rightarrow IS_1$) and a lower demand for money ($LM_0 \rightarrow LM_1$). If condition $L_G < (I_r L_I + C_r L_C + I_r)/(I_r + C_r + k)$ does hold, there is a BOP deficit (p. B) and an exchange rate is set to depreciate in order to restore the external equilibrium. Consequently, a weaker currency brings about a recovery in demand for goods and services ($IS_1 \rightarrow IS_2$) and an improvement in the BOP ($BP_0 \rightarrow BP_1$).

Assuming exchange rate stability (Fig.2b), a stronger decrease in the demand for money ($LM_0 \rightarrow LM_1$) combined with a somewhat weaker fall in demand for goods and services ($IS_0 \rightarrow IS_1$) implies worsening of the BOP position (p. B). Similar to the case of government expenditure (Fig. 1b), there is a loss of international reserves leading to a decrease in the money supply ($LM_1 \rightarrow LM_2$) and necessary macroeconomic adjustment (p. C), but this time the macroeconomic equilibrium is achieved at a lower level of both income and interest rate.



a) floating ER regime b) fixed ER regime

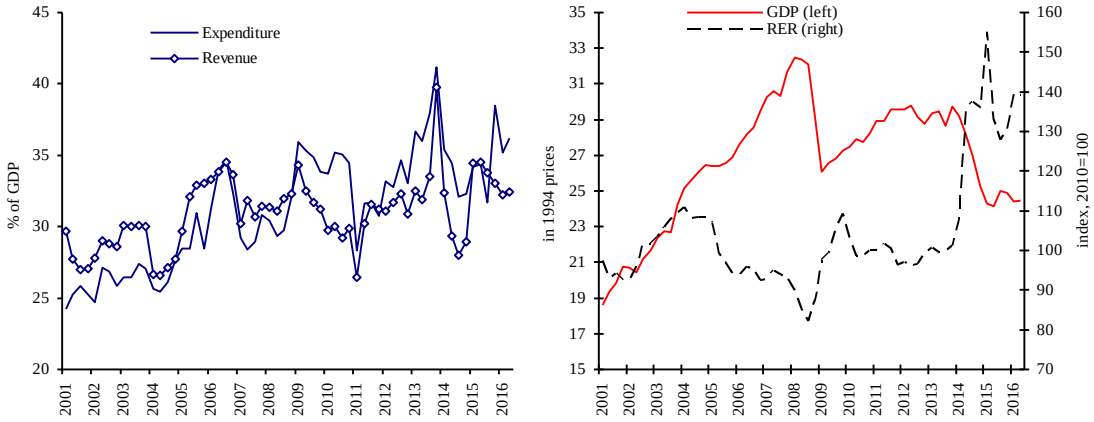
Fig. 2. Effects of higher taxes (low capital mobility)
Source: authors' own elaboration

As for stability of money demand as an important assumption behind viability of the Mamkiw─Summers model, evidence for the stability of long-run demand functions for the M1 money aggregate is obtained for the U.S., Japan, Canada, U.K. and West Germany (Hoffman et al. 1995), as well as for seven East European countries (Bahmani & Kutan 2010) and four South Asian countries (Narayan et al. 2009).

3. Data and statistical methodology

The data are quarterly observations from 2001Q1 to 2016Q2 taken from the Ukraine's Ministry of Finance, which publishes quarterly cash figures since 2000, and the IMF *International Financial Statistics* online database. Seasonally adjusted cash figures (in percent of GDP) for the current government expenditure on goods and services and the net revenue, G_t and REV_t respectively, are plotted in Fig. 1. The government expenditure has unevenly increased over the sample period, with local peaks in 2006, 2009, 2010 and 2013. The net revenue has superseded the expenditure over the 2001–2007 period, but the budget balance deteriorated significantly later in the wake of the world financial crisis of 2008–2009. Fiscal consolidation efforts had taken place in 2011, but the budget deficit widened in the aftermath. Another financial crisis of 2014 brought about a steep decline in the level of both government expenditure and revenue, but the former recovered by the end of 2015 against the backdrop of

a decline in the latter. GDP (Y_t) steadily increased between 2001 and 2008, but financial crises of 2008–2009 and 2014–2015 have brought it to the level of 2004, despite a steep depreciation of the real effective exchange rate (RER_t).



a) fiscal indicators b) GDP and real exchange rate

Fig. 3. Ukraine: selected macroeconomic indicators, 2001–2016

Source: Ukraine's Ministry of Finance, IMF *International Financial Statistics*.

Table 1. Johansen Co-integration Test

Data trend	None (I)	None (II)	Linear (III)	Linear (IV)	Quadratic (V)
Trace	57.87 (0)	93.1** (1)	85.6** (1)	99.7** (1)	89.6* (1)
Max-Eng	27.89 (0)	48.1** (1)	47.58** (1)	49.0** (1)	44.79** (1)

Note: we use test types I (no intercept, no trend), II (intercept, no trend), III (intercept, no trend), IV (intercept, trend), V (intercept, trend); *, ** denote rejection of the null hypothesis at the 10% and 5% level, respectively; number of co-integration vectors are in brackets.

Source: authors' own calculations

As revealed by the augmented Dickey-Fuller (ADF) test (results are available on request), for all the series, the null of unit root cannot be rejected at 1% and 5% statistical significance level for their levels, while it is the case for the first differences. As endogenous variables are found to be integrated of order 1, i.e. I(1), it is necessary to investigate the cointegration relationship between them. The results of the Johansen cointegration test are summarized in Table 1. Both the trace test and the maximum eigenvalue test suggest the cointegration rank r=1 with 5% confidence level.

Since there is a cointegration of endogeneous variables, a VAR system with error correction (VECM) should be used. If endogenous variables are *I*(1) and they are cointegrated with rank *r* ($0 < r < n$), then the VECM representation is as follows:

$$A(L)\Delta z_t = -\alpha\beta z_{t-1} + \delta D_t + u_t, \quad (8)$$

where $z_t = (REV_t, G_t, R_t, RER_t, Y_t)$ is the vector of endogenous variables, with R_t standing for lending rate, $A(L)$ is a matrix polynomial in the lag operator L, D_t is the vector of deterministic variables, u_t is a $k \times 1$ vector of reduced-form disturbances which are assumed to be normally distributed white noise $\mathrm{E}[u_t] = 0$ with a constant covariance matrix $\mathrm{E}[u_t u_t^{'}] = \Sigma_u$ and $\mathrm{E}[u_t u_s^{'}] = 0$ for $s \neq t$, Δ is the operator of the first differences.

The ordering of the variables in the Cholesky decomposition implies that: (a) the net revenue does not react contemporaneously (in the same quarter) to exogenous shocks in the other variables, (b) the government expenditure reacts contemporaneously only to shocks in net revenues, (c) shocks to fiscal variables determine the level of the interest rate, (d) fiscal variables and interest rate are behind the changes in the RER, (e) output is affected in the current period by shocks in all other endogenous variables. Contrasted with a standard identification scheme suggesting causality running from output to revenues, our ordering implies that net revenue is influenced in the contemporaneous period by administrative actions and thus independent of real sector activities, which seems to be an adequate approximation to the Ukraine's realities. In addition to the lagged values of the endogenous variables, the VECM includes the level of external public debt (bn USD), the world metal and crude oil prices (index, 2010=100), and the crisis dummy (1 for 2008Q3-2009Q4, 2013Q4-2016Q2 and 0 otherwise).

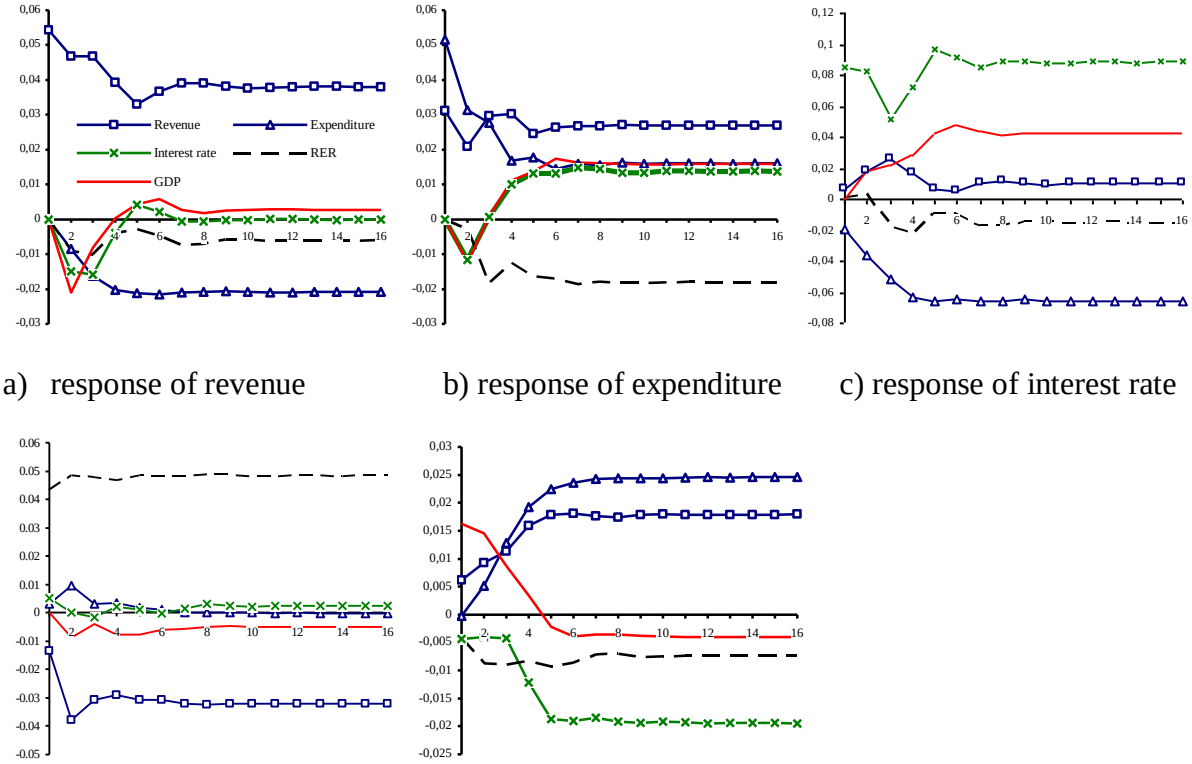
The number of lags is set to two according to LR, FPE, AIC and HD tests. We use a constant and a linear trend in the VECM model, as it brings about better statistical properties of the residuals according to the tests of normality, serial correlation and homoskedasticity.

4. Estimation results

Estimates of the long-run cointegration relationships are as follows (the absolute values of standard deviations of parameter estimates are given in the brackets):

$$REV_t = \underset{(0.69)}{-4.188G_t} \quad \underset{(0.53)}{+2.299R_t} \quad \underset{(0.92)}{+0.183RER_t} \quad \underset{(0.17)}{+7.732Y_t}. \tag{9}$$

The cointegration relationship (9) implies that net revenue decreases in line with higher government expenditures. A direct relationship between the interest rate and REV_t could reflect stronger tax-collection efforts in the high interest rate environment as it is likely that facing difficulties in financing its debt liabilities government authorities reinforce their tax activities. Depreciation of the RER is not a strong factor behind higher net revenue, as statistical significance of the coefficient on RER is rather low. The long-run estimates are in favor of a strong link between GDP and net revenue.



a) response of revenue b) response of expenditure c) response of interest rate

d) response of RER e) response of GDP

Fig. 4. Impulse response functions of endogenous variables

Source: authors' own calculations.

Figure 4 presents the impulse-response functions for endogenous shocks. The horizontal axis indicates quarters after shock. Table 2 reports the portion of the forecast error variance decomposition (FEVD) for endogenous variables.

Table 2. Forecast error variance decomposition

Responses of	Innovations in	Forecast horizons			
		4	8	12	16
REV	*REV*	82	78	77	77
	G	7	14	16	18
	R	4	3	2	2
	RER	2	2	2	2
	Y	5	3	2	2
G	*REV*	35	37	39	39
	G	53	35	30	26
	R	3	6	8	8
	RER	6	11	13	17
	Y	3	8	10	11
R	*REV*	4	2	1	1
	G	25	28	28	29
	R	64	59	57	56
	RER	3	2	2	2
	Y	5	10	11	12
RER	*REV*	27	28	29	29
	G	1	0	0	0
	R	0	0	0	0
	RER	70	70	69	69
	Y	1	1	1	1
Y	*REV*	24	24	24	24
	G	27	38	41	42
	R	10	22	25	26
	RER	12	7	6	5
	Y	27	8	5	4

Source: authors' own calculations

Our main result is that both government expenditure and revenue shocks have positive symmetrical and fairly persistent effects on the output. Impulse responses are consistent with

the predictions of the Mankiw–Summers model. Together fiscal shocks explain more than 50% of the variation in the output. Among other fiscal policy effects, an increase in net revenue contributes to higher government expenditure, which is a standard result in the fiscal policy empirical studies (Franta 2013). Following an increase in net revenue, there is the RER appreciation, without any significant impact upon the interest rate. A positive government expenditure shock brings about a reduction in net revenue and a decrease in the interest rate (a shock to G_t accounts for 25% to 28% of the variation in R_t), both being not conventional outcomes. For example, a positive response of net revenues and interest rate (to less extent) to government expenditure is found for the Czech Republic (Franta 2013). A puzzling inverse relationship between government expenditure and interest rate could result from (1) foreign debt financing or (2) domestic monetary policy accommodation. Shocks to REV_t explain up to 40% of changes in the government expenditure, while the reverse causality is half as strong. The fraction of REV_t in decomposition of RER_t is as high as 29%, while G_t is more influential with respect to changes in the interest rate.

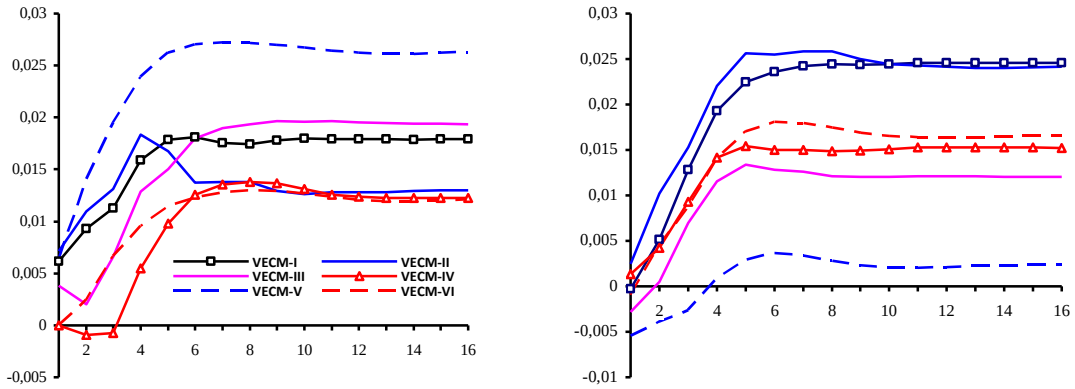
The government expenditure is likely to be pro-cyclical in the long-run, as higher output is associated with an increase in government expenditure on goods and services but importance of this link should not be overstated as the fraction of Y_t in variance decomposition of G_t is below 10%. The response of the net revenue to output shock is negative but small and short-lived. Following the RER depreciation, government expenditure is likely to decrease (the fraction of RER_t in the variance decomposition of G_t gradually increases from 6% to 17% within the sixteen periods horizon analyzed), while net revenue seems to be neutral with respect to changes in the RER.

An increase in the interest rate has no significant effect on the net revenue, while the effects on government expenditure turn positive after three quarters (a shock to R_t explains less than 10% of changes in G_t). As suggested by the impulse response and the variance decomposition, shocks to the interest rate have negligible effects on the RER. However, there is a strong negative impact of the interest rate hikes upon the output. On the other hand, the output shock is a factor behind an increase in the interest rate, with the fraction of Y_t in the variance decomposition of R_t gradually increasing up to 12%. Somewhat surprisingly, the interest rate does not react to the RER shock, as the latter explains a marginal fraction of the changes in the former.

Besides worsening of the fiscal indicators, a depreciation of the RER has contractionary effect on the output, which is consistent with a recent study for the Ukraine's economy (Shevchuk 2016). In the presence of fiscal shocks, the RER does not react to changes in both output and interest rate.

5. **Robustness check**

In addition to the baseline model (VECM-I), we estimate two modified VECMs with the same identification scheme of the government expenditure and revenue ordered before the output (GDP). In the first one (VECM-II), the real exchange rate is replaced with the terms-of-trade variable calculated as the ratio of the world metal prices to crude oil prices. In the second one (VECM-III), we replace interest rate with the money aggregate M2. Then, we use a different identification scheme as follows: $G \Rightarrow R \Rightarrow RER \Rightarrow Y \Rightarrow REV$ (VECM-IV). This is the most popular identification approach in empirical studies implying a contemporaneous period causality running from the output to net revenues. Finally, two small-scale models are estimated with the ordering $R \Rightarrow G \Rightarrow Y$ (VECM-V) and $G \Rightarrow Y \Rightarrow REV$ (VECM-VI), respectively. Fig. 5 presents the impulse responses implied by all six identification schemes, including that of the baseline VECM-I.



a) net revenue b) government expenditure

Fig. 5. Alternative impulse response functions of fiscal policy output effects

Source: authors' own calculations.

Generally, the impulse responses of alternative VECMs are not considerably different from the responses of the baseline VECM-I. The only exception is a three-variable VECM-V, which implies a neutrality of output with respect to the government expenditure. On the other hand, this kind of specification seems to overstate the positive impact of government revenues on the output. Identification with revenue and expenditure preceding GDP seems to imply stronger fiscal policy effects on the output. Using world metal and crude oil prices instead of the RER or money aggregate M2 instead of interest rate does not substantially change the impulse responses for both fiscal variables.

Alternative identification schemes do not alter (several) other results. First, it is confirmed that there is a negative link between the interest rate and the GDP. Second, the government expenditure increases after higher revenues, which is quite a standard outcome in empirical studies. Third, the revenues decrease in the wake of a positive government expenditure shock but this effect becomes weaker in a three-variable model, regardless of recursive sequencing of fiscal shocks in the contemporaneous period. Fourth, an immediate reaction of the net revenues to an output shock is confirmed in VECMs with TOT and money supply variables, but this effect is weaker in an alternative specification with the output preceding net revenues (VECM-IV) and a three-variable VECM-V and VECM-VI, with a more articulated positive long-term link between GDP and net revenues as well.

As there is a robust inverse relationship between the interest rate and the output, it is confirmed that the government expenditure put a downward pressure on the former, with net revenue being neutral in this respect. Similar to the baseline model, depreciation of the RER is likely to induce losses in net revenue (to less extent) and cuts in government expenditure but the latter effect is lost in identification scheme with output preceding net revenue. However, there are important differences in regarding the RER effects on the output. Depreciation of the RER becomes a factor behind higher GDP in the specification with money supply (VECM-III) and under identification scheme with net revenue influenced by output in a contemporaneous period (VECM-IV). The fraction of the RER in variance decomposition of output increases gradually up to 15% in the long run. There is no change in the pattern of response of the interest rate to a RER shock. Also, it is confirmed that the RER is affected by neither the output nor the interest rate.

6. Conclusion

The main results of the study can be summarized as follows. First, there is a robust positive impact of both government expenditure and revenue upon output in Ukraine. A response of GDP to shocks to both fiscal variables is positive and, in most specifications, statistically significant. Such symmetry of fiscal policy effects is in accordance with the prediction of the Mankiw─Summers model for a low capital mobility case under (i) strong demand for money of consumption expenditure in comparison to the investment-based demand for money combined with (ii) significant inverse link between investments and interest rate. Second, there is an increase in government expenditure after a positive shock to government revenue, with the budget deficit widening after an interest rate hike. Third, the RER depreciation brings about a symmetrical decrease in either net revenue or government expenditure, but the latter effect is lost in the identification scheme with the output preceding the net revenue. Fourth, there is a strong inverse relationship between interest rate and output across all identification schemes.

Most of our results are robust to various sensitivity checks. Some sort of uncertainty relates to the RER effects on output. The RER depreciation is behind a decrease in output in the baseline model (VECM-I) but other identification schemes suggest that it is likely to be contractionary in the short run while turning expansionary in the long run.

Contrary to recommedations by Alesina and Ardagna (2010) that spending cuts are more appropriate for stabilizing the sovereign debt than tax increases, our results suggest feasibility of revenue-based fiscal consolidation in Ukraine, as better tax collection as the main source of government revenue may contribute to economic growth even in the short run. At the same time, Ukraine would be better off if the government increased investments in infrastructure, health and education.

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Abstract

EFEKTY MAKROEKONOMICZNE POLITYKI FISKALNEJ NA UKRAINIE

W niniejszym opracowaniu z wykorzystaniem modelu autoregresji wektorowej z korekta bledu (VECM) przeanalizowano empirycznie efekty polityki fiskalnej w gospodarce Ukrainy. Na podstawie danych kwartalnych z okresu lat 2001–2016, otrzymano pozytywny wpływ jak wydatków rządowych, tak i dochodów do budżetu na poziom dochodu na Ukrainie, co odpowiada przewidywaniom modelu Mankiwa─Summersa dla wypadku wysokiego popytu na pieniądz względem wydatków konsumpcyjnych w polaczeniu ze znaczącą elastycznością inwestycji względem stopy procentowej. W innych aspektach, mechanizm transmisyjny polityki fiskalnej demonstruje kilku standardowych cech, jak zwiększenie wydatków rządowych po wzroście przychodów do budżetu albo zwiększenie deficytu budżetowego wskutek wzrostu stopy procentowej. Otrzymane rezultaty świadczą o przewagach konsolidacji fiskalnej w oparciu o zwiększenie przychodów do budżetu na Ukrainie, ponieważ lepsza ściągalność podatków stymuluje wzrost gospodarczy nawet w krótkim okresie czasu. Ponieważ występuje standardowa odwrotna relacja między stopą procentową a dochodem, jeden z niezwykłych wyników polega na tym, że większe wydatki rządowe powodują obniżenie stopy procentowej, w tym jak tez wskaźnik nie reaguje na przychody do budżetu. Deprecjacja kursu walutowego w ujęciu realnym powoduje zmniejszenie dochodu w modelu podstawowym, ale w alternatywne schematy identyfikacji sugerują występowanie efektu restrykcyjnego tylko w krótkim okresie czasu, w tym jak na dłuższą metę efekt jest ekspansywny.

Słowa kluczowe: polityka fiskalna, dochód, stopa procentowa, realny kurs walutowy, Ukraina