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Government spending effectiveness and the quality of fiscal institutions*

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Abstract

The cyclical behaviors of government spending and output are investigated for the time period 1996-2013, in the sample of 45 countries divided between 3 groups of countries – Western European, Eastern European and CIS countries – with each one of these groups representing a different development stage. Panel data fixed effects model was used for estimation purposes. In developed countries the main determinant of government spending effectiveness is found to be institutional quality, but access to financial markets is more pronounced in developing countries.

Key words: fiscal policy, procyclicality, institutional quality, panel data, fixed effects

JEL codes: E62, E32, E02, D73

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1. Introduction

Fiscal and monetary policies together comprise the two main tools used by governments to stabilize economic activity. Economic policy is more effective when these two are used simultaneously in the same direction. But the options for monetary policy to impact the economic activity becomes limited when either there is a fixed exchange rate regime or a country chooses to abandon the opportunity of manipulating national currency by joining a monetary union or the interest rates hit the zero lower bound. Thus, governments mainly turn to fiscal policy to intervene in economic process.

The response of fiscal policy to fluctuations in output can be automatic or discretionary. *Automatic fiscal stabilizers* include such policy variables as taxes and social transfers. These are called automatic, because they are predetermined and automatically adjust to economic stance, i.e. during upturns, tax revenues rise and social transfers fall, but during downturns the opposite occurs. In short, automatic stabilizers induce countercyclical fiscal policy – government expenditure rises when GDP growth falls and falls when GDP growth rises. Saving in good times and spending in bad times reduces volatility in economic activity and lower volatility is associated with higher growth rates (Kormendi and Meguire, 1985; Ramey and Ramey, 1995). So countercyclical fiscal policy stipulates high economic growth.

On the other hand, *discretionary fiscal policy* is when fiscal policy is implemented not according to some predetermined rules, but to the discretion of policymakers. Discretionary fiscal policies are considered to be the main source of destabilizing effect of fiscal policy and the more discretionary the fiscal policy is, the more it tends to be procyclical³. Procyclicality induces high output volatility and undermines economic growth. In this sense, automatic stabilizers are superior to discretionary policy actions. The main advantages of automatic stabilizers include the absence of lag between policy formulation and implementation, as well as the reduction of human factor in policymaking process.

³Procyclicality – government spending rises and falls in the same direction with GDP growth; the opposite of countercyclicality.

In this paper the cyclical nature of public spending has been adopted as a proxy for government spending effectiveness in general, meaning that when fiscal policy is countercyclical, it can be considered as effective. We draw attention to the quality of institutions as a determinant of fiscal policy cyclical nature, following Acemoglu et al. (2002), who claim that macroeconomic policy distortions are not the cause of the volatility in economic growth, as frequently stated, but rather they are a symptom of institutional problems.

In fact, the recognition of the quality of institutions as one of the major driving forces of economic growth dates back to the works by North and Thomas (1973) and North (1990). Since then a number of empirical investigations have been carried out to find out the impact of institutions on economic growth and the channels by which this impact feeds through to the economy. Some examples include Knack and Keefer (1995), Perotti (1996) and Acemoglu et al. (2001). This paper contributes to the strand of literature exploring the impacts of institutional quality on the cyclical nature of government spending. Here we emphasize the following impact mechanism: low institutional quality undermines effectiveness of government expenditures by making them more procyclical (and thus, volatile) and hinders economic growth. Based on the classification of institutions by Acemoglu, we look at the impacts of economic and political institutions on cyclical nature separately. Also the question whether the access to international financial markets and financial depth of a country matters for the cyclical patterns is addressed in this paper.

45 countries divided into 3 different groups are analyzed separately for the time period 1996 – 2013, for each country group to represent a different development stage. The results of the empirical work show that in advanced economies quality of institutions is the main factor affecting cyclical nature, while in emerging and developing countries it is financial openness that matters the most.

The rest of the paper is structured as follows: Section 2 reviews relevant literature, Section 3 explains the methodology and data employed, while Section 4 reports the results. Section 5 concludes.

2. Literature review

Considering the points discussed in the previous section, it is not surprising that automatic fiscal stabilizers dominate the fiscal policy in highly developed countries while in developing countries discretionary fiscal policy is more widespread. A study by IMF covering data on 85 advanced, emerging market and developing economies shows that overall fiscal policy is much more stabilizing in advanced economies compared to emerging market and developing countries⁴. Automatic stabilizers “account for more than one-half of overall fiscal stabilization in about 60 percent of the advanced economies in the sample. In the emerging market and developing economies, automatic stabilizers account for only about 30% of total fiscal stabilization.” (IMF, April 2015, p.26). This suggests that in developing countries fiscal policy is more procyclical compared to highly developed countries. Theoretically this phenomenon cannot be fully explained.

Keynesian theory emphasizes the role of automatic stabilizers and claims that fiscal policy should smooth the business cycle by affecting demand through taxes, government spending and social transfers, i.e. should be countercyclical to reduce the volatility in economic activity. Neoclassical economic theory, on the other hand, takes expenditure side of the fiscal policy as exogenous and focuses mainly on the revenue side. Tax smoothing hypothesis of Barro (1979) states that tax rates should stay constant given that the shocks to tax base are temporary, so there will be a positive correlation between output and tax revenues, which is consistent with the countercyclicity of fiscal balance (Halland and Bleaney, 2009).

Despite lacking theoretical explanations, there exists plenty of empirical evidence confirming the procyclicality of fiscal policy, especially in developing countries, while in advanced economies it tends to be countercyclical, or at least acyclical (Gavin and Perotti, 1997; Kaminsky et al., 2004; Talvi and Vegh, 2005; Alesina et

⁴ The measure of fiscal stabilization used here is *stabilization coefficient*, which equals to average change in overall fiscal balance in percent of GDP associated with a 1 percentage point change in output. See: IMF World Economic and Financial Surveys. (April 2015). Chapter 2. Can fiscal policy stabilize output? In: *Fiscal Monitor – Now is the time: Fiscal policies for sustainable growth*. IMF Publications: Washington, D.C.

al., 2008). Empirical work finding prove for procyclical fiscal policy in advanced economies is not uncommon either (Arreaza et al., 1998; Lane, 2003)

Gavin and Perotti (1997) were among the first to present evidence of procyclical government spending in Latin American countries and this is explained as a result of the voracity effects related to political distortions and also the loss of market access during macroeconomic downturns. Gavin and Perotti were not the only ones to explore fiscal procyclicality in Latin American countries. In fact, a significant part of the literature related to the topic focuses on this region.

Frankel (2011) explores the case of Chile, who was able to transform its fiscal policy from being procyclical to countercyclical during the last two decades. The author gives the main credit for this transition to the improvement in the quality of fiscal institutions in the form of newly established fiscal rules employed to keep the cyclically-adjusted fiscal balance at target.

On the other hand, Caballero and Krishnamurthy (2004) take the case of other two Latin American countries – namely Argentina and Brazil and compare their public debt and budget deficit levels in late 1990's to that of Italy in early 1980's (high public deficit periods). The comparison shows that both the level of debt and deficit in Italy was significantly larger than in Argentina and Brazil, but unlike in these Latin American countries, in Italy the deficit was countercyclical. The authors go further and show that this is not only true for the countries under study, but also for the whole group of developing and advanced economies: in developing countries budget deficit tends to be procyclical, while in advanced economies it is rather countercyclical. The main reason for this is claimed to be the level of financial depth of a country, as the financial system of the country is underdeveloped, government cannot find any other resource for repaying debts other than increasing taxes. Also Caballero and Krishnamurthy (2004) state that more public investment crowds out private investment and that's why expansionary fiscal policies in fact have contractionary effects. But the authors feel the need to also mention the effect of

political distortions namely in Argentina, saying that the inability of political leaders to react to the crisis on time further worsened the situation.

Unlike Caballero and Krishnamurthy, Albuquerque (2012) focuses on advanced EU countries. He finds out significant negative relationship between volatility of discretionary fiscal policy and the quality of fiscal institutions and explains the results as more checks and balances limit the ability of policymakers to use fiscal policy frequently, lowering the fluctuations in spending. But political institutions seem to play an insignificant role in the public spending volatility.

On the contrary, Alesina et al. (2008) explain the problem of procyclicality as a result of political agency problem in corrupt democracies, where voters follow “starve the beast” strategy. Aware of the rent-seeking behavior of government officials, voters demand the resources received during economic upturns to be spent immediately in the form of increased government spending or reduced taxes. Because they know that if these resources are not spent, they will be wasted in the form of rents. The proposition that the underdevelopment of domestic financial markets and lack of access to international financial markets is the reason for procyclicality is criticized by Alesina et al. (2008), on the grounds that, this does not explain why governments, aware that the financial depth and openness is limited in their country, do not accumulate reserves in good times to be used during recessions.

Our main paper of interest here is Frankel et al. (2013), who present evidence that many developing countries were able to “graduate from fiscal procyclicality and become countercyclical” and points out to the increase in the quality of fiscal institutions in the form of fiscal rules as the main driving force behind this. Such factors as financial depth, openness, integration, the level of government debt and foreign reserves are also found to have statistically significant effect on fiscal cyclicity.

But the adoption of fiscal rules does not always lead to less procyclicality. A recent work by Bova, Carcenac and Guerguil (2014) provide evidence that in developing countries the adoption of fiscal rules has increased rapidly especially during the last

two decades, but unlike in advanced economies, this has not caused more countercyclical fiscal policies in these countries. It is suggested that higher quality institutional arrangements and more flexible fiscal rules are required to reduce procyclicality and the main issue is not *de-jure* existence of certain rules, but rather *de-facto* level of compliance with the rules, which is hard to measure.

To sum up, authors investigating the causes of procyclical fiscal policy find two main reasons for it:

1) The quality of fiscal and political institutions – In the presence of low quality institutions governments cannot resist the pressure of spending much during booms. Besides political pressures, the absence of fixed fiscal rules and other fiscal constraints allows policymakers to freely manipulate government spending.

2) Financial constraints – The constraints to the access of governments to credit via domestic and international financial markets make it difficult for them to acquire resources during recessions, so the governments have no other mean of raising revenue other than cutting spending.

Of course, the results obtained from empirical work are very sensitive to the methodology and data employed, also to the chosen country groups and time periods.

3. Methodology and data

To empirically assess the cyclicity of government spending and its determinants, we make use of unbalanced panel data set. We focus on 3 groups of countries separately: 12 post-Soviet Commonwealth of Independent States (CIS), 15 East European and 18 West European countries for the annual time period 1996 – 2013 (for the list of countries included for each country group, *see* Appendix, A1). As it can be seen, the country groups can be matched with 3 different stages of development: CIS countries are at earlier stage of development yet, while East European countries have already achieved a moderate level of development; West European countries represent countries with high and sustainable economic

development. In dividing the countries between such groups the purpose is to find out whether determinants of the effectiveness of government spending differ among countries in different development stages.

To empirically assess the relationship of interest to us fixed effects model is used. Methodology is derived from Frankel et al. (2013) with the estimating equation:

$$(3.1) \quad g_{it}^c = \alpha_0 + \alpha_1 \log(y_{it})^c + \alpha_2 IQ_{it} + \alpha_3 FinAccess_{it} + \alpha_4 [\log(y_{it})^c * IQ_{it}] + \alpha_5 [\log(y_{it})^c * FinAccess_{it}] + \tau_t T_t + u_i + \varepsilon_{it}$$

where g_{it}^c and y_{it}^c illustrate the cyclical components of government expenditure and output respectively, IQ_{it} is the measure of institutional quality, $FinAccess_{it}$ catches the effect of access to financing, T_t here illustrates year dummies included in the regression to account for unobservable time-specific effects, u_i is country specific fixed effects – if there are any, and finally, ε_{it} is the idiosyncratic error term.

Our primary interest here is on the interaction terms. The interaction terms show the marginal change in the cyclical component of government spending (the relationship between cyclical components of output and government spending) associated with a unit change in institutional quality or financial access. For example, a negative coefficient estimate for the interaction term $[\log(y_{it})^c * IQ_{it}]$ shows that an increase in the institutional quality is associated with a less procyclical government spending and its magnitude reflects the decrease in the marginal change in government spending associated with a 1% increase in output, when the institutional quality increases by one unit, holding all other variables constant. Similarly, a negative coefficient estimate for the term $[\log(y_{it})^c * FinAccess_{it}]$ illustrates that an increase in financial access is associated with a more countercyclical (or less procyclical) government spending and the magnitude of the coefficient estimate shows the decline in the marginal change in budget expenditures associated with a 1% rise in output, when access to financial markets increases by one unit, controlling for all other variables. So coefficient estimates on interaction terms need to be negative and significant to prove that an increase in institutional quality and the access of government to financial markets decrease procyclicality.

To estimate the effect of institutional quality on cyclical quality, we look at both the quality of economic and political institutions separately. Access to financing is also differentiated between access to foreign and domestic financing.

Government expenditure data is proxied by general government total expenditure in national currency (constant prices).

The proxy for output is a rather standard one – annual GDP in constant national currency. Both output and government expenditure data are acquired from the IMF World Economic Outlook Database.

After taking natural logarithms, Hodrick-Prescott filter ($\lambda=100$, as default for yearly data) is used to obtain cyclical components of government spending and output, following Kaminsky et al. (2004) and Frankel et al. (2013).

To obtain a measure of the quality of economic institutions we take 6 variables from WB Worldwide Governance Indicators, namely Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption, each of which are estimated in [-2.5; 2.5] interval and calculate simple averages to get a single index for the quality of institutions.

The quality of political institutions is proxied by *polity2* variable from Polity IV index which measures the extent of democracy versus autocracy on a [-10; 10] scale, with lower index indicating less democracy and more autocracy (*see* Appendix, A3).

We make use of Chinn-Ito financial openness index to measure the access to foreign financial markets which is also used by Frankel et al. (2013). To proxy financial depth private credit over GDP is used, a measure which has been employed by Caballero and Krishnamurthy (2004). Data on domestic credit to private sector as percent of GDP⁵ is acquired from the World Bank's WDI.

Incorporating all the discussed variables, we get our main estimating equation:

⁵ Domestic credit to private sector refers to financial resources provided to the private sector by banks and other financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivables that establish a claim for repayment.

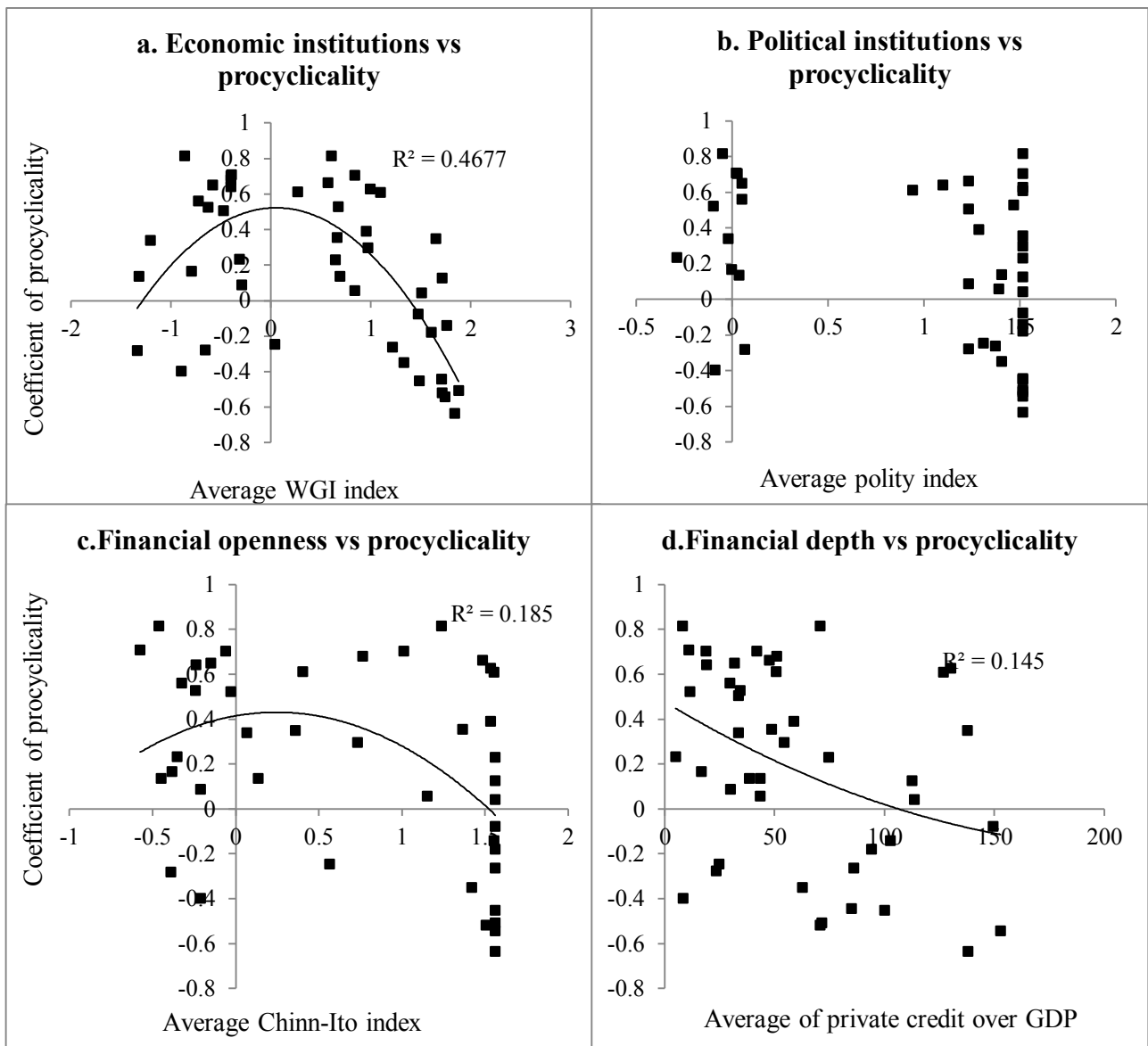
$$(3.2) \quad TotalExp_Cycle = \beta_0 + \beta_1 LogGDP_Cycle + \beta_2 WGI_average + \beta_3 Polity + \beta_4 FinOpen + \beta_5 PrivCredit + \beta_6 [LogGDP_Cycle \# WGI_average] + \beta_7 [LogGDP_Cycle \# Polity] + \beta_8 [LogGDP_Cycle \# FinOpen] + \beta_9 [LogGDP_Cycle \# PrivCredit] + \tau_t T_t + u_i + \varepsilon_{it}$$

All indexes are standardized to facilitate interpretation. Winsorization at 0.5% level is applied to all variables to smooth the data and reduce the effect of outliers if there are any. Full set of year dummies are incorporated into the estimation model.

Replication of graphs presented by Frankel et al. (2013) for our sample of 45 countries for the period 1996-2013 (Appendix, Figure A1, A2) confirms our first predictions about the countercyclicality of government expenditures mainly in developed countries and procyclicality in developing ones.

Looking at the scatter plot of the relationship between the quality of economic institutions and government spending effectiveness, one can spot an inverted-U shaped relationship (Figure 1.a) which means in the first stages of development, when the quality of institutions is low, an increase in the quality leads to an increase in procyclicality, i.e. reduces efficiency. But when the quality of institutions is high enough, further increase in the quality reduces procyclicality, thus increases efficiency. Financial openness and financial depth indicators exhibit slightly noticeable downward slopes, only moderately explaining differences in countries' procyclicality levels (Figure 1. c, d). On the other hand, the quality of political institutions seems to be irrelevant factor of government spending effectiveness.

Figure 1. Correlation between cyclical components of government spending and output vs. explanatory variables.



Note: Cyclical components are calculated using Hodrick-Prescott filter ($\lambda=100$). Correlation between cyclical components of government expenditure and output is their correlation coefficient. Negative correlation shows countercyclicality of government spending and positive correlation shows procyclicality.

4. Empirical results

As our time period is relatively short (18 years), there is no need to test for unit roots and autocorrelation. Panel data fixed effects model is employed for estimation. Modified Wald test for groupwise heteroskedasticity in fixed effects model shows the presence of heteroskedasticity in all 3 groups, so we calculate robust standard errors to account both for heteroskedasticity and autocorrelation.

Table 1 presents the empirical results. For Western European countries quality of economic institutions is the only significant determinant of government spending

effectiveness. For these countries 1 standard deviation⁶ increase in the quality of institutions is associated with 0.76 per cent decrease in procyclicality, thus increases effectiveness. The cyclical components of output (*LogGDP_Cycle*) has negative coefficient estimate as expected, showing that the government spending is countercyclical, though not significant.

Quality of economic institutions appears to be significant determinant of cyclicity for Eastern European countries too. The magnitude of the effect is larger compared to high-income country group: 1 standard deviation increase in the quality of economic institutions leads to 1.4 percent decrease in procyclicality (or increase in countercyclicality). Negative coefficient estimate for *LogGDP_Cycle* implies countercyclicality of government spending, but again not significant.

Another variable of interest for Eastern European country group is the effect of financial openness on cyclicity. The coefficient estimate of the interaction term is strongly significant, but interestingly with positive sign, not quite what we expected. This means that an increase in financial openness reduces government expenditure effectiveness: 1 standard deviation increase in financial openness is associated with 1.17% more procyclical government spending. Increasing financial depth also appears to increase procyclicality, though weakly significant (at 10% confidence level).

For CIS countries none of the included variables show significance in explaining the relationship of interest. Though insignificant, coefficient estimate of *LogGDP_Cycle* is positive confirming our expectations of procyclical government spending in developing countries. The reason for the incapability of our model to find significant determinants of government spending effectiveness for these countries is not merely related to the variable choice. More likely it is the result of the low quality of available data for these countries.

⁶ All indeces are standardized and the coefficient estimates show the changes in output variable caused by a 1 standard deviation change in input variables.

Quality of political institutions fail to significantly explain the differences in cyclicity levels of government spending in all country groups. We suspect that the reason for this is the lack of variability in the quality of political institutions over the years within each country: countries mainly sustained specific to them levels of *polity4* scores with occasional changes and as fixed effects estimation mainly focuses on within group variation, the effect of the political institutions on cyclicity cannot be captured.

Table 1. Panel regression results

Dependent variable	Cyclical components of general government total expenditure		
	Western Europe	Eastern Europe	CIS
LogGDP_Cycle	-0.697 (5.225)	-2.411 (2.120)	2.759 (1.907)
WGI_average	-0.0242 (0.0417)	0.0197 (0.0547)	0.107** (0.0374)
Polity	-0.0238 (0.0181)	-0.0301 (0.0276)	0.0420 (0.0560)
FinOpen	0.00559 (0.0371)	0.0181 (0.0205)	-0.100 (0.0717)
PrivCredit	0.000342 (0.000207)	0.00135*** (0.000379)	-0.00173 (0.00223)
LogGDP_Cycle # WGI_average	-0.759*** (0.104)	-1.420** (0.512)	1.292 (2.003)
LogGDP_Cycle # Polity	0.985 (2.232)	0.890 (1.354)	0.881 (0.864)
LogGDP_Cycle # FinOpen	0.593 (2.404)	1.171*** (0.356)	-1.112 (0.740)
LogGDP_Cycle # PrivCredit	-0.000348 (0.00252)	0.0164* (0.00860)	-0.0571 (0.0417)
Constant	0.0631 (0.0558)	-0.0848*** (0.0215)	-0.319 (0.384)
Observations	219	170	140
R-squared	0.520	0.652	0.236
Number of country	16	12	11

Note: Cyclical components are calculated using Hodrick-Prescott filter ($\lambda=100$). Robust standard errors are given in parentheses. Asterisks indicate relative significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5. Robustness check

For robustness purposes we employ another indicator, namely public consumption expenditure, to proxy for our dependent variable. Government consumption expenditure has been used as a measure of government spending by Alesina et al. (2008), Woo (2009) and Halland and Bleaney (2009). Data on general government final consumption expenditure (% of GDP) is acquired from World Bank World Development Indicators. General government final consumption expenditure is a category of government spending that only includes the acquisition of goods and services by government to satisfy current individual and collective needs of society and does not include government investment expenditures and social transfers. The exclusion of social transfers from government spending provides us with a measure of spending free from the effect of automatic stabilizers.

The output is proxied by natural logarithm of annual GDP (constant 2005 US\$). HP filter ($\lambda=100$) is again used to obtain cyclical components of output and government spending.

On the other hand, we replace our index of economic institutions quality with another index from International Country Risk Guide (ICRG) dataset, as is done by Knack and Keefer (1995) and Frankel et al. (2013). The weighted average of 4 variables from ICRG, namely Law and order, Bureaucracy quality, Corruption and Investment profile is calculated to acquire single index showing institutional quality (*see* Appendix, A2). The index then is standardized to have zero mean and unit standard deviation.

Panel data fixed effects model with robust standard errors is estimated with full set of year dummies included. Table 2 illustrates the results.

Again for Western European countries the quality of economic institutions appears to be significant determinant of the cyclicity of government spending with expected negative sign, meaning that an increase in the quality of economic institutions reduces government spending procyclicality or increases countercyclicality, enhancing effectiveness of government spending. But for Eastern European countries

quality of economic institutions loses significance, though keeping sign. Financial openness index is weakly significant and changes sign from being positive to negative, meaning that an increase in financial openness increases countercyclicality of spending. While for CIS countries, financial openness significantly affects government spending effectiveness and an increase in financial openness is associated with a decrease in procyclicality (or increase in countercyclicality).

Table 2. Robustness results

Dependent variable	Cyclical components of general government final consumption expenditure		
	Western Europe	Eastern Europe	CIS
LgGDP_Cycle	28.05 (28.78)	-21.61 (15.23)	3.005 (4.979)
ICRG_average	-0.286* (0.150)	-0.378 (0.453)	-0.303 (0.833)
Polity	0.761 (0.504)	-0.986*** (0.307)	5.128 (3.307)
FinOpen	-0.197 (0.235)	0.210 (0.128)	-0.392 (1.574)
PrivCredit	0.00307 (0.00178)	-0.000708 (0.00750)	-0.0182 (0.0219)
LgGDP_Cycle # ICRG_average	-7.200** (2.935)	-8.451 (5.445)	9.541 (8.235)
LgGDP_Cycle # Polity	0.903 (18.66)	21.58 (12.35)	6.510 (5.396)
LgGDP_Cycle # FinOpen	-18.51 (21.62)	-6.305* (2.993)	-8.058** (2.209)
LgGDP_Cycle # PrivCredit	0.0399 (0.0482)	0.00506 (0.0944)	-0.315 (0.181)
Constant	-0.411 (0.910)	1.953*** (0.471)	1.156 (0.614)
Observations	197	136	86
R-squared	0.635	0.506	0.369
Number of country	16	11	7

Note: Cyclical components are calculated using Hodrick-Prescott filter ($\lambda=100$). Robust standard errors are given in parentheses. Asterisks indicate relative significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$

6. Conclusion

To summarize the main conclusions from the research, the main determinants of fiscal spending effectiveness differ among country groups: going from high to low developed countries the significance of the determinants shifts from institutional factors to financial factors. The quality of economic institutions is strongly significant determinant of government spending effectiveness for high-income Western European countries and is robust to different specifications. For these countries an increase in economic institutions quality index increases countercyclicality of government spending. Financial openness is significant factor affecting fiscal cyclicality in Eastern European countries, but its effects are not clear-cut. Failure of obtaining robust results for Eastern European and CIS countries is likely to be the consequence of low data quality for these countries.

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APPENDIX

A1. The list of the countries included in empirical analysis

Western European countries	Eastern European countries	CIS countries
Austria	Albania	Armenia
Belgium	Bosnia and Herzegovina	Azerbaijan
Denmark	Croatia	Belarus
Finland	Czech Republic	Georgia*
France	Estonia	Kazakhstan
Germany	Hungary	Kyrgyz Republic
Greece	Kosovo	Moldova
Iceland	Latvia	Russian Federation
Ireland	Lithuania	Tajikistan
Italy	Macedonia, FYR	Turkmenistan
Luxembourg	Poland	Ukraine
Netherlands	Romania	Uzbekistan
Norway	Serbia	
Portugal	Slovak Republic	
Spain	Slovenia	
Sweden		
Switzerland		
United Kingdom		

*Despite the fact that Georgia is not now the member of CIS, we include it in the model, mainly because we are more interested in the development level of countries and the division of countries between country groups here is conventional, secondly our analysis covers the time period 1996 – 2013 and Georgia left the organization in 2009, so during most of this period it was a member of CIS.

A2. Quality of economic institutions – International Country Risk Guide (ICRG) dataset

ICRG is a source of country risk analysis and is produced by Political Risk Services (PRS) Group monthly since 1980 for 140 countries. It assesses such elements as political conditions, currency risks, investment environment, corruption and many other risk factors and quantifies them in 22 variables. This paper employs 4 of these variables to measure the quality of economic institutions in a country:

- 1) *Corruption* variable assesses corruption within the political system and is measured on a 6 point scale.
- 2) *Law and Order* comprises of two subcomponents. Law subcomponent measures strength and impartiality of the legal system on a 3 point scale and Order subcomponent assesses popular observance of the law on a 3 point scale. The values for subcomponents are then added to get a single indicator on a 6 point scale.
- 3) *Investment Profile* measures the risks to investment existing by a reason other than political, economic or financial and comprises of 3 subcomponents: Contract Viability/Expropriation, Profits Repatriation and Payment Delays, each of which varies between 0 and 4. These subcomponents are then summed to get a measure of risk rating on 12 point scale.
- 4) *Bureaucracy quality* is assessed on a 4 point scale and strong bureaucracies are given higher scores due to the fact that these bureaucracies are independent of political pressures and have established operating mechanisms.

To change monthly data to annual we calculate simple averages. Our measure of economic institutions quality is calculated as the weighted average of these 4 annual variables and then standardized to have zero mean and unit standard deviation.

A3. Quality of political institutions – Polity IV dataset

Polity IV dataset assesses qualities of democratic and autocratic authority in governing institutions. It is produced by the Center for Systemic Peace (CSP) and contains annual data for the period 1800-2013. Polity IV project analysis various

authority characteristics of countries such as institutionalized democracy and autocracy, executive recruitment process, restrictions on executives authority and transitions of political regimes. This paper employs polity2 (revised combined polity score) variable from this dataset to proxy political institutions quality. Polity2 is the difference between other 2 variables – democ (institutionalized democracy) and autoc (institutionalized autocracy), each of which vary between zero and ten. Thus polity2 variable is defined on a [-10; 10] scale, with lower values indicating a less democratic and more autocratic political regime. The variable is then standardized to have zero mean and unit standard deviation.

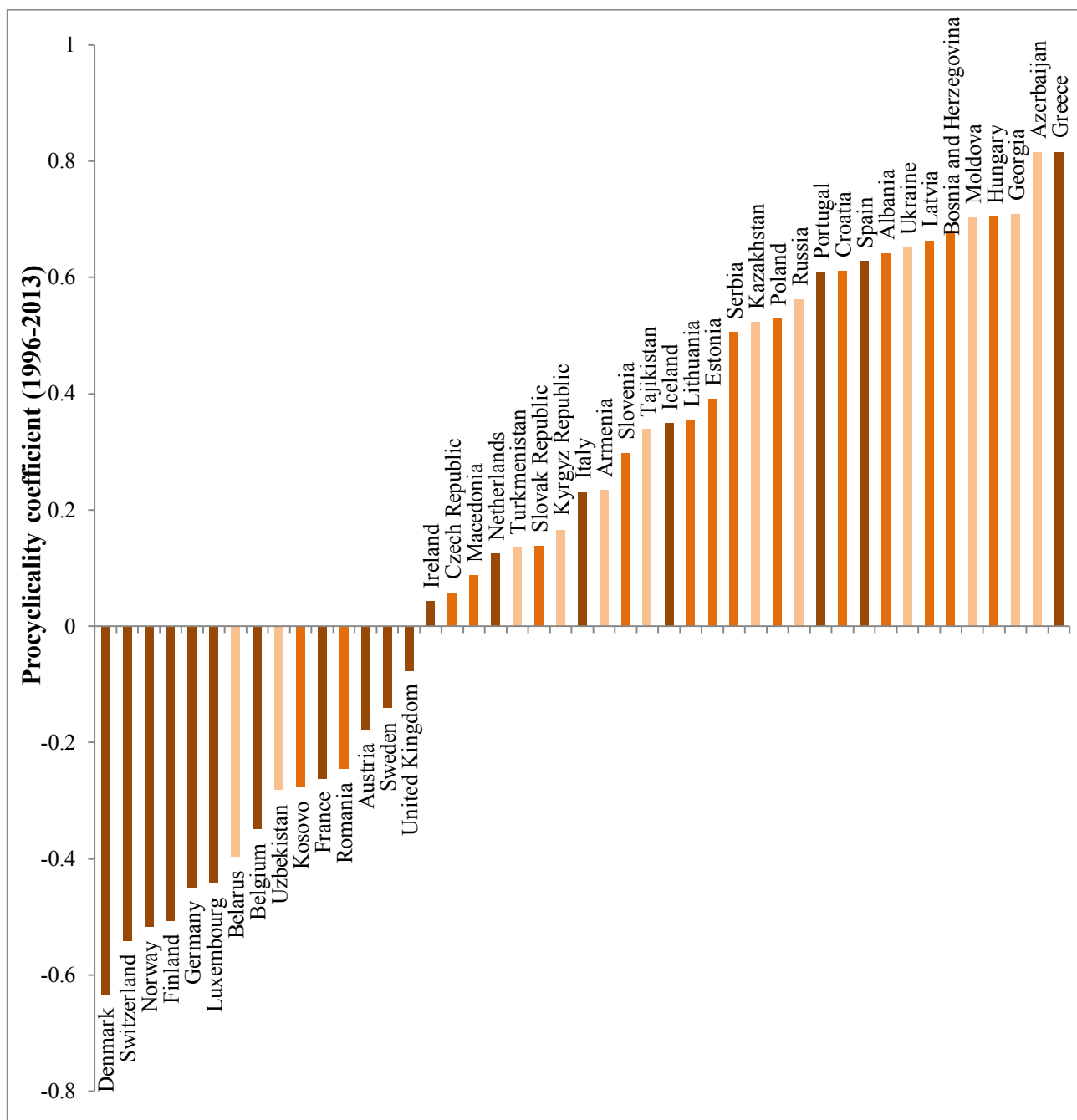
A4. Chinn-Ito financial openness index

Chinn-Ito index measures openness of the capital account, i.e. the degree of capital mobility of a country. It was first introduced by Chinn and Ito (2006). The latest update of the data is available for 182 countries for the time period 1970-2013. Index is constructed on the base of 4 binary variables representing restrictions on the flow of capital. The variables indicate whether there are

- multiple exchange rates (k_1);
- restrictions on current account transactions (k_2);
- restrictions on capital account transactions (k_3);
- requirements to surrender export proceeds (k_4).

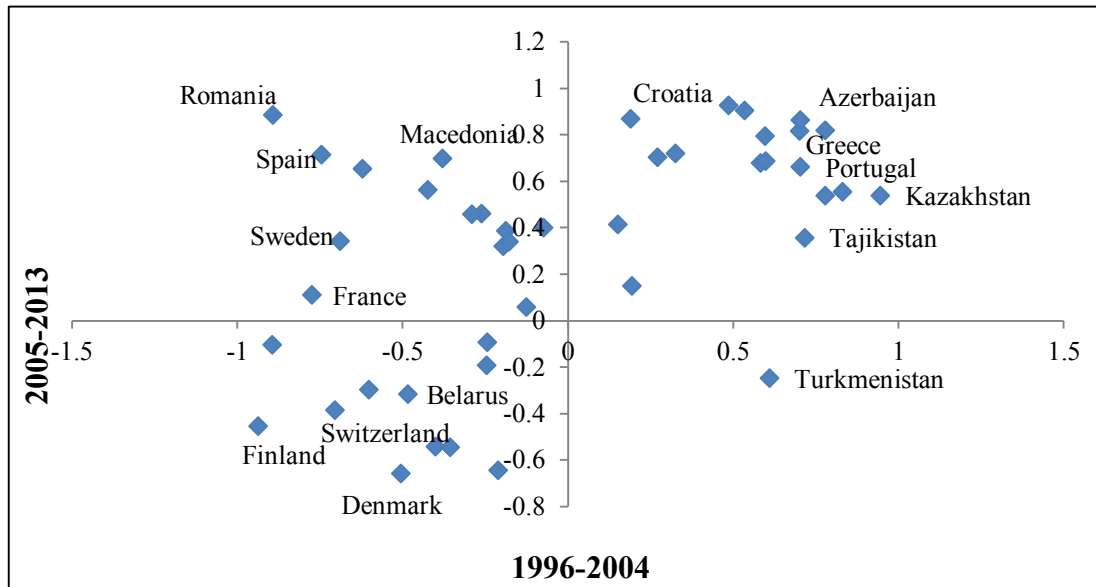
k_3 variable is calculated as the average of 5 consequent years that capital controls were absent. These variables can be further disaggregated. To measure capital account openness rather than capital controls, the variables are reversed so that they equal 1 if there are no capital controls. Then a single index of $KAOPEN_t$ is constructed as the first standardized principal component of the 4 variables. By construction the index has zero mean value and we standardized it to have standard deviation of 1.

Figure A1. Correlation between cyclical components of government expenditure and output by countries, 1996-2013.



Note: Cyclical components are calculated using Hodrick-Prescott filter ($\lambda=100$). Procyclicality coefficient is the correlation coefficient between cyclical components of output and government expenditure. Negative correlation shows countercyclicality of government spending and positive correlation shows procyclicality. Government expenditure is proxied by general government total expenditure (constant national currency) and output is measured as annual GDP (constant national currency). The color of the bars gets lighter as the country moves from high income group to a lower one, thus: dark bars represent Western European countries, lighter ones are for Eastern European countries and the lightest bars show CIS countries.

Figure A2. Correlation between cyclical components of government expenditure and output in 1996-2004 vs. 2005-2013.



Note: Cyclical components are calculated using Hodrick-Prescott filter ($\lambda=100$). Correlation between cyclical components of government expenditure and output is their correlation coefficient. Negative correlation shows countercyclicality of government spending and positive correlation shows procyclicality.