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Institutional Quality, Cyclicality of Macroeconomic Policies and the Effects of Macroeconomic Shocks: Evidence from Transition Economies

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Institutional Quality, Cyclicality of Macroeconomic Policies and the Effects of Macroeconomic Shocks: Evidence from Transition Economies[1]

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Abstract

In this paper, we study the role of institutional quality in the cyclicality of macroeconomic policies of transition economies. Using annual data over 1996-2013, we find that the quality of institutions play a significant role in their ability to carry out counter-cyclical macroeconomic policy. This paper also analyzes the effects of monetary and fiscal shocks on output. Dividing the countries into two groups, namely CIS and non-CIS, we find that median impulse response of CIS countries' GDP to monetary shock is negative, while in non-CIS countries this effect is close to zero. However, we find negative effect of fiscal shock on CIS countries' GDP while the median effect of fiscal shock on GDP is very close to zero in non-CIS countries.

Keywords: Institutional quality; transition economies; macroeconomic policies; monetary shocks; fiscal shocks

1. Introduction

Our study is divided into two parts. In the first part we analyze the role of institutions in the cyclicality of macroeconomic policies, i.e. monetary and fiscal policies. And in the second part, we estimate the effects of macroeconomic policy shocks on output.

For many economists, cyclicality of monetary and fiscal policies has been always been an interesting topic. Procyclical monetary policy is defined as increasing money supply in good times and adopting contractionary policy in bad times, while procyclical fiscal policy means raising government expenditure (and cutting tax) during economic booms and decreasing government expenditure (increasing tax) during recessions. The cyclical behavior of monetary and fiscal policies differs among country groups. There is ample evidence that (Melitz (2000), Gali and Perotti (2003), Lane (2003)) advanced countries tend to pursue counter-cyclical macroeconomic policies, while most emerging and developing countries conduct procyclical monetary and fiscal policies (Gavin and Perotti (1997a), Kaminsky *et al.* (2004), Ilzetski and Vegh (2008)). Gali and Perotti (2003) note that the European Union member countries have strengthened the degree of counter-cyclical macroeconomic policies as a consequence of signing the Stability and Growth Pact (SGP). Some studies (Benczur and Ratfai, 2010, Kabashi, 2014) also find that macroeconomic policies in transition economies of Europe are either procyclical or acyclical. Benczur and Ratfai (2010) analyze the cyclicality properties of macroeconomic aggregates and conclude that most variables, such as consumption, government spending, labour market, employment, real wages, private credit, inflation and net capital flows are procyclical in transition economies of Central and Eastern Europe. Kabashi (2014) finds that overall discretionary fiscal policy in Central, Eastern and Southeastern Europe has been procyclical.

Alesina *et al.* (2008) relate procyclical fiscal policy phenomenon to political agency problem. They argue that procyclicality stems from the lack of trust of voters to their government and they demand the government to cut taxes and increase government expending. And this leads to reduction in spending in bad times.

Many authors (Calderon *et al.* (2004), Kaminski *et al.* (2004), Calderon and Schmidt-Hebbel (2008)) stress the importance of strong political and economic institutions for the countries to adopt counter-cyclical macroeconomic policies.

To our best knowledge, there are no papers studying the effects of institutional quality on cyclicality of macroeconomic policies in transition economies. The paper provides a multi-country test to examine the effects of the monetary and fiscal policies on the economic performance of the transition economies. In particular, we intend to examine whether the macroeconomic policy plays an important role in macroeconomic stabilization and economic growth using a sample of transition economies over the seventeen year period 1996-2013. For these reasons, we estimate institutional quality index. We argued that differences in the cyclical

stance of macroeconomic policy may be attributed to differences in their level of institutional quality.

The second goal of our paper is to identify the fiscal and monetary policy shocks and test the response of the GDP growth to monetary and fiscal shocks. Here we assume that the members of the Commonwealth of Independent States (CIS) have common development patterns due to the influential impacts of the Soviet Union, while the rest of the transition economies have followed common type of development path due to their vicinity to advanced countries of Europe. Thus, we divide our sample countries into CIS and non-CIS countries and perform heterogeneous panel VAR due to Pedroni (2013) in order to capture the effects of monetary and fiscal shocks on GDP growth.

Thus, the objective of our paper is twofold: First, we will check the effects of institutional quality on the macroeconomic policies and; second, applying SVAR methodology, we will identify the macroeconomic shocks in transition economies.

The rest of the paper will be structured as follows. In section two we provide a literature review related to our study. The section three will be devoted to data and stylized facts used in the paper, followed by an empirical methodology in section four. The fifth section contains the results of our regression and VAR analysis and finally section six concludes.

2. Literature Review

Institutional quality and procyclicality

There are evidences that the quality of institutions in emerging market economies affects the macroeconomic policy and plays a crucial role in the pro-cyclicality or acyclicality of monetary and fiscal policies. A number of existing studies (Calderon and Schmidt-Hebbel (2008), Calderon *et al.* (2012), Duncan (2014)) have investigated the role of institutions in procyclicality of monetary and fiscal policies in developed and developing countries.

Kaminsky *et al.* (2004) empirically test the monetary and fiscal policy cyclicality properties in a panel of 104 countries and find that in most developing and upper middle income countries fiscal policies and in most OECD and developing countries net capital flows are procyclical.

Frankel *et al.* (2011) state that a number of developing countries have shifted from implementing procyclical fiscal policy to performing counter-cyclical fiscal policy in the first decade of 2000s. However, they argue that improvement in the institutional environment index has been major cause of this transformation. Investigating both industrial and emerging economies, Calderon *et al.* (2012) show that industrial countries have done better in implementing counter-cyclical fiscal and monetary policies, whereas in most developing countries macroeconomic policies tend to be procyclical. They state that this procyclicality is due

to the weak institutions in those countries and argue that macroeconomic policies play a great role to balance business-cycle fluctuations in economies with high quality institutions. They further define a threshold level where macroeconomic policies turn into neutral and above that level become counter-cyclical. Adigozalov (2012) studies cyclicality in the case of oil-rich countries and finds positive relationship between low quality institutions and procyclicality.

Duncan (2014) examines the link between institutional quality index and cyclicality of monetary policy in a group of 56 countries. According to their findings, conditional and unconditional measures of monetary cyclicality are significantly related to an institutional quality index. He also finds the relationship between institutional quality and the volatilities of output and the nominal interest rate, that is, economies with weak institutionality show higher volatility of output and interest rates. He also finds a threshold level of institutional quality index and shows that countries possessing institutional index below that level perform countercyclical monetary policy

McGettigan *et al.* (2013) also suggest that thanks to inflation targeting and strengthened institutions many emerging market economies have shifted from procyclical to countercyclical monetary policy.

Effects of monetary and fiscal policy shocks

A lot of papers have studied the effects of monetary and fiscal policy shocks. Assessing the effects of monetary policy shock on the US economy, Christiano *et a.l* (1996) show that Federal Reserve's holdings of government securities, total reserves and money supply falls in response to contractionary monetary policy shocks in the US. Pina (2014) analyzes the effects of monetary policy in emerging markets and presents that a shock in interest rate lead to a persistent decrease both on output and inflation.

In their paper, Olivei and Tenreyro (2007) investigate monetary policy shocks in the context of timing effects. Employing US quarterly data, they argue that the timing of monetary shocks matters. Their findings show that the output quickly responds to shocks that occurred in the first half of the year, while the response of the economy to the monetary expansion carried out in the second half is little.

More recently Ivrendi and Yildirim (2013) carry out the assessment of impacts of monetary policy shocks on main macroeconomic indicators of BRICS countries and Turkey. According to their findings, a contractionary monetary policy shock leads to appreciation of domestic currencies which is consistent with the mainstream theories. The second implication suggests that in all studied countries, excluding Russia, monetary policy plays a crucial role in controlling inflation.

Applying a mixed SVAR/event study method, Blanchard and Perotti (2002) investigate how the changes in government spending and taxes influence economic activity. Their findings

are consistent with the common wisdom that the GDP is positively correlated with the government expenditure and there is negative correlation between taxes and output. They also show that positive spending shocks leads to increase in private consumption while it crowds out private investment from the economy. Caldara and Kamps (2008) reach the similar conclusion showing that in response to government expenditure shock real GDP, consumption and the real wages go up.

Mirdala (2009) examines the effects of fiscal policy shocks in a group of European transition economies (Czech Republic, Hungary, Poland, the Slovak Republic, Bulgaria and Romania) for the period 2000-2008. Based on the recursive and SVAR approaches, he assesses the effects of government spending and tax shocks on the real GDP, inflation and short-term interest rates and find that the effects vary across the countries. For instance, the government expenditure shock considerably increases the real output in Bulgaria and the Czech Republic, whereas this effect is moderate in Hungary and the Slovak Republic. In all studied countries (except Poland) the real GDP increased after the tax revenue shock. Franta (2012) also concludes that an increase in the government expenditure is observed with increase in GDP and net revenues, and it subsequently raises inflation rate in the Czech Republic.

Using panel data on a sample of 49 developing and developed countries Debrun and Kapoor (2010) reexamine the link between fiscal policy and macroeconomic volatility. Their findings are consistent with the view that "fiscal stabilization operates mainly through automatic stabilizers" (Debrun and Kapoor, 2010: 30). They also show that in terms of monetary policy, the lower volatility is highly correlated with the central bank independence.

3. Data and stylized facts

This section describes the sources and definitions of data[4]. To conduct our estimation on the first part of our research, we use data for nominal interest rate (i.e. monetary policy-related interest rate), real GDP, inflation (CPI), government spending, inflation (CPI) and institutional index. Our study covers 23 transition economies over the period 1996-2013: Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, Tajikistan and Ukraine. Serbia, Turkmenistan and Uzbekistan are intentionally omitted from the study, as there is not reliable data for these countries over this time span.

For monetary stance, we use interest rate relevant for monetary policy. We have obtained data on discount rate, interbank interest rate and money market rate from IMF's International Financial Statistics. Cyclical component of interest rate is obtained from the Hodrick-Prescott (HP) filter.

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[4]Definition and sources of data are presented in Table 1(a).

For fiscal stance we use cyclical component (HP de-trended) of real government spending data (IFS IMF). As a second fiscal stance we also use deviations of the fiscal balance from its long-run level.

As a proxy for institutional quality, we use the Index of Economic Freedom published by the Heritage Foundation. This index is available for full sample period and includes ten institutional and economic features: a) Property Rights; b) Freedom from Corruption; c) Fiscal Freedom; d) Government Spending; e) Business Freedom; f) Labor Freedom; g) Monetary Freedom; h) Trade Freedom; i) Investment Freedom; j) Financial Freedom. Each of indicators ranges from 0 to 100 and we use overall score in our model. Table 2 presents summary statistics for institutional variable. From the table it is apparent that there is large variation across the countries. The sample average for the institutional quality is 58 (very close to Kyrgyz Republic and Bulgaria with 57.8 and 57.5 points, respectively). Estonia enjoys the highest institutional quality with 74.5 points, while Belarus has lowest institutional quality average with 43.2 points. The lowest and highest values have been in Bosnia and Herzegovina with 29.4 (in 1998) and in Estonia with 78 (in 2013). Looking at the minimum and maximum value of the table, we observe that most countries have considerably improved their institutional quality over the period 1996-2013.

In figure 1, the relation between cyclical properties of monetary policy and institutional index is depicted. As it is seen from the figure, the countries with better institutions (higher institutional quality index) tend to perform counter-cyclical monetary policy. In figure 2, the link between the government spending-output correlation and institutional quality index is depicted. This plot also reveals that as institutions gets stronger the correlation between cyclical component of government expenditure and GDP gap decreases. As an alternative fiscal policy stance, in figure 3, we test the relationship between fiscal balance-output correlation and institutional quality index. The graph illustrates that as the institutional quality improves in the transition economies, they tend to adopt counter-cyclical fiscal policy.

As it is seen in figures, the scatter plot graphs support our hypothesis; however it is not conclusive evidence. Therefore, we have to apply different estimation techniques in order to test our hypothesis.

To identify monetary and fiscal policy shocks we use annual balanced panel data over 1996-2013 on GDP growth, government expenditure, LIBOR rate, UIP condition and oil price[5].

4. Empirical methodology

At first step, we estimate cyclicality of monetary and fiscal policies in transition economies. In order to estimate cyclicality properties of macroeconomic policy and the role of

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[5] Definition and the sources of data are presented in Table 1(b).

institutional quality, we apply methodology applied by César Calderón, Roberto Duncan, Klaus Schmidt-Hebbel (2004 and 2012). This methodology is the extended form of Taylor rule (Taylor, 1993). According to this rule, monetary policy-related interest rate depends on the deviation of the actual inflation from targeted inflation rate and actual GDP from potential GDP (output gap). To verify institutional quality hypothesis, an interaction term is included between the output gap and the proxy of the quality of institutions. Following Kaminsky *et al.* (2004), we specify the similar model for fiscal policy cyclicality. We construct two models for our fiscal policy: 1) we use the cyclical component of government spending as dependent variable; 2) we use deviation of fiscal balance as our dependent variable. Because we assume that fiscal shock might arise not only from government expenditure, but also from tax policy. At high levels of institutional quality we expect fiscal and monetary policy to be counter-cyclical. Thus, cyclical stance for monetary and fiscal policy structural equation is presented as follows:

$$\tilde{r}_{i,t} = \alpha_0 + \alpha_1 * \tilde{r}_{i,t-1} + \alpha_2 * \tilde{\pi}_{i,t} + \alpha_3 * \tilde{y}_{i,t} + \alpha_4 * \tilde{y}_{i,t} * Q_{i,t} + u_{i,t} \qquad (1)$$

$$\tilde{g}_{i,t} = \beta_0 + \beta_1 * \tilde{g}_{i,t-1} + \beta_2 * \tilde{y}_{i,t} + \beta_3 * \tilde{y}_{i,t} * Q_{i,t} + v_{i,t} \qquad (2)$$

$$\tilde{f}_{i,t} = \gamma_0 + \gamma_1 * \tilde{f}_{i,t-1} + \gamma_2 * \tilde{y}_{i,t} + \gamma_3 * \tilde{y}_{i,t} * Q_{i,t} + v_{i,t} \qquad (3)$$

Where,

- i and t denotes country and time, respectively;
- $\tilde{r}_{i,t}$ is the deviation of the nominal interest rate (monetary policy rate from its long-time trend;
- $\tilde{y}_{i,t}$ is business cycle, defined as the deviation of log of real GDP from its long-run trend;
- Q represents the quality of institutions;
- $\tilde{\pi}_{i,t}$ is the deviation of the inflation (CPI) rate from its long-run level;
- $\tilde{g}_{i,t}$ is government spending (defined as the deviation of real consumption from its long-run trend);
- $\tilde{f}_{i,t}$ is the deviation of the fiscal balance from its long-run level (defined as tax revenue minus government expenditure);
- $u_{i,t}$ and $v_{i,t}$ are error terms.

The detailed information and sources of these variables is given in the appendix (Table 1(a)).

According to our first model, α_3 and α_4 should be negative and positive, respectively and statistically significant, whereas in model (2) we expect the signs of β_2 and β_3 to be positive and

negative, respectively, and statistically significant. In this regard, we expect γ_2 and γ_3 to be negative and positive, respectively and statistically significant. Regarding control variables, the coefficients of lagged dependent variables (α_1, β_1 and γ_1) should lie between 0 and 1, the coefficient of inflation variable (α_2) should be positive.

By differentiating the equations with respect to business cycle parameters we obtain the threshold level of institutional quality. For the equation (1):

$$\frac{\partial \tilde{r}_{i,t}}{\partial \tilde{y}_{i,t}} = \alpha_3 + \alpha_4 * Q_{i,t} = 0$$

$$\alpha_4 * Q_{i,t} = -\alpha_3$$

$$Q^* = -\frac{\alpha_3}{\alpha_4}$$

Applying the same rule for the equation (2), for fiscal policy stance, we derive the following equation for institutional quality threshold:

$$Q^* = -\frac{\beta_2}{\beta_3}$$

Similarly, we find the threshold level for our third equation:

$$Q^* = -\frac{\gamma_2}{\gamma_3}$$

Thus, by dividing the coefficient of business cycle variable to the coefficient of interaction term of business cycle and institutional quality we calculate the threshold level for each equation. Threshold level determines the countries in which the macroeconomic policies are associated with a-cyclical policy stance, whereas the countries that possess higher institutional quality index than the threshold level conduct counter-cyclical policy. And accordingly, the countries with institutional quality below the threshold level carry out procyclical macroeconomic policies.

Generalized method of moments instrumental variable (IV-GMM) method will be our main estimator. This method allows us to control for potential endogeneity by using lags of both dependent variables and independent variables as our instrumental variables.

In order to assess the impacts of monetary and fiscal policies, we apply a structural VAR model. In the proposed framework, we identify domestic monetary and fiscal policy shocks using variables on oil price, real GDP, fiscal expenditure, LIBOR rate and deviation from UIP condition. In a fixed exchange rate regime, because of Mundell's "Impossible Trinity" principle there is no independent monetary policy under perfect capital mobility. However, Montiel and

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Pedroni (2013) show that domestic monetary policy can be effective even under a fixed exchange rate regime if sufficient deviation from UIP condition is allowed. In this framework, we assume that domestic monetary policy can be effective if there exists deviation from UIP condition. In other words, though domestic monetary policy cannot exercise full control over domestic interest rates, it can affect differences between domestic and foreign interest rates. In fact, Mammadov and Ahmadov (2014) identify domestic monetary policy shock for a country (Azerbaijan) with a peg regime using spread between interest rates on national currency and dollar denominated deposits. Similarly, using a long-run matrix and Cholesky decomposition we will identify monetary and fiscal shocks as follows:

$$
\begin{bmatrix} e_t^{oil} \\ e_t^{GDP} \\ e_t^{Fex} \\ e_t^{Fm} \\ e_t^{UIP} \end{bmatrix} = \begin{bmatrix} a_{11} & 0 & 0 & 0 & 0 \\ a_{21} & a_{22} & 0 & 0 & 0 \\ a_{31} & a_{32} & a_{33} & 0 & 0 \\ a_{41} & a_{42} & a_{43} & a_{44} & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix} \begin{bmatrix} \varepsilon_t^{oil} \\ \varepsilon_t^{supply} \\ \varepsilon_t^{fiscal} \\ \varepsilon_t^{Fmonetary} \\ \varepsilon_t^{Dmonetary} \end{bmatrix}
$$

where, e_t^{oil} is a reduced-form shock to the real oil price, e_t^{GDP} is a reduced-form shock to GDP, e_t^{Fex} is a reduced-form shock to fiscal expenditures, e_t^{Fm} is a reduced-form shock to LIBOR and e_t^{UIP} is a reduced-form shock to deviation from UIP. Here, we assume that in the long run, real oil prices are determined only by oil shocks. The dynamics of GDP is dictated by real oil price shocks and domestic supply shocks. Fiscal spending and deviation from UIP condition will allow us to identify fiscal and domestic monetary policy shocks respectively.

5. Results

Monetary Policy Cyclicality and Institutional Quality

In this section we report the results of our regression analysis. Table 3 presents the empirical results for our monetary policy model. In column (1) we present the results of pooled OLS regressions analysis. The signs and significance level of the coefficients of output gap and the interaction term of output gap and institutional quality are in accordance with our prior. From these coefficients we can determine the threshold level at 57. As an alternative approach, we also create and include the interaction of institutional quality and inflation into the model and present the results in column (2). The regression results show that monetary policy in transition economies is mainly procyclical and at threshold level 57 the monetary policy turns counter-cyclical which proves the role of institutional quality in cyclicality of monetary policy.

Because the OLS regression might be biased, we also perform IV-GMM estimation method and take it as our main regression estimator and include lagged independent variables as instrumental variables into our model. We regress the model and present the results in column (3) and the results show that the effects of output gap and the institutional quality index-output gap interaction are significant. The threshold level is around 60.9 point. We check also the interaction of CPI and institutional quality variables and find that the effects are positive and significant. The neutral policy level is 60.4 which is very close to our main estimator threshold level (60.9). In order to test the validity of our instruments we perform Hansen J-statistics test (Hansen (1982)) and the test verifies the validity of our instruments.

In the 1996-2013 periods, the countries that possessed institutional quality averages below the highest threshold level (60.9 points) were Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Poland, Romania, Russia, Slovenia, Tajikistan and Ukraine.

Fiscal Policy Cyclicality and Institutional Quality

Table 4 shows our empirical results for the cyclical properties of fiscal policy in transition economies. In this section we test the cyclical properties of fiscal policy in terms of both government expenditure and fiscal balance. In column (1) and column (2), we present the pooled OLS and IV-GMM results for the cyclical degree of government spending, respectively. The results confirm our prior expectation that in transition economies fiscal policy is procyclical and at threshold level 59.4 and 62 it becomes counter-cyclical. Hansen J statistics verifies the validity of our instruments at conventional level.

As an alternative test, we check the cyclical degree of fiscal policy in terms of fiscal balance and present our regression results in column (3) and column (4). We present our pooled OLS regression results in column (3) and the threshold level of neutral fiscal policy index is 59.6. Using instrumental variable approach we present our GMM estimation results in column (4). All relevant coefficients are statistically significant and we get expected signs for our variables. The neutral policy threshold level is 61.7. Hansen J statistic confirms validity of our instruments.

In the period our study covers, the countries that exhibits institutional quality averages below the highest acyclical policy threshold (around 62) were Albania, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Kazakhstan, Kyrgyz Republic, Macedonia, Moldova, Poland, Romania, Slovenia, Tajikistan and Ukraine, whereas in the rest of sample countries the fiscal policies are counter-cyclical.

Identification of monetary and fiscal policy shocks

In this part we look at the impulse responses of both CIS and non-CIS countries' GDP to monetary and fiscal policy shocks.

Figure 4 reports the median as well as 15th and 85th percentile responses of CIS countries' GDP to monetary shock. When looking at the impulse-response functions of CIS countries, median response of GDP to monetary shock is negative and this effect lasts up to three years. Furthermore, in the 15th percentile significant negative effect is persistent. This result is economically reasonable implying that an increase in the interest rates leads to decrease in output.

Figure 5 illustrates the impulse responses of non-CIS countries' GDP to monetary shock. The graph suggests that median response of the GDP to monetary shock is close to zero. However, this does not mean that monetary policy has zero effect on the output of non-CIS countries. In the 15th percentile, one standard deviation monetary policy shock leads to 0.4 percent fall in the output the second year after monetary shock occurs and this effect gradually dies out.

Figure (6) and figure (7) report our results for CIS and non-CIS countries' GDP to fiscal shocks, respectively. Median response of CIS countries' GDP to fiscal shock is negative and this is counter-intuitive. In other words, one standard deviation fiscal policy shock (associated with increase in government expenditure) leads to fall in output. In the 15th quantile, shock in the fiscal policy negatively affects output starting in the following year and reduces the GDP by 5% in the second year after the fiscal shock. This negative effect is persistent over the next periods. Conversely, in the 85th percentile the effects of fiscal shocks appear to have no effect on the GDP. The overall negative effect can possibly be explained by "crowding out" effect meaning that as the government expenditure increases, the public sector crowds out private investment spending and this condition ultimately leads to decrease in total output. However, the aggregate response of non-CIS countries' GDP to fiscal policy shock is close to zero while the 85th percentile fiscal policy shock has slightly positive effect on GDP. Whereas, in the 15th percentile this effect is negative, about 1.5 percent drop in GDP right the second year after the shock. Here also we can conclude that patterns of "crowding out" effect play a crucial role.

6. Conclusion

There is ample evidence that most developing and emerging countries fail to conduct counter-cyclical monetary and fiscal policies. On the other hand, some empirical studies show that macroeconomic policies are predominantly counter-cyclical in advanced countries. Some studies suggest that the quality of institutions play a crucial role in ability to conduct counter-cyclical monetary and fiscal policies.

In this study, our first goal was to test whether the institutional quality among transition economies play any role in their ability to conduct counter-cyclical macroeconomic policies. The second objective of our study was to identify the effects of monetary and fiscal shocks on GDP. Using annual data over the period 1996-2013, we conducted our study in a sample of 23 transition economies.

Plotting the relationship between the institutional quality index and monetary policy stance and output gap correlation we found preliminary result that countries exhibiting higher institutional quality index are able to perform counter-cyclical monetary policy. We found the similar evidence for the fiscal policy that as institutional quality index increases, the correlation between the cyclical component of government spending and output gap tends to decrease. Furthermore, as an alternative approach, we plotted the relationship between the fiscal balance-output gap correlations and found that the link is positive. Applying both pooled OLS method and IV-GMM techniques we tested the role of institutions in macroeconomic policies. Our preferred regression results suggest that the threshold level, where the countries conduct a-cyclical monetary policy is 61, whereas this level is 62 and 61.7 for fiscal policies. In sum, adopting a counter-cyclical stance in macroeconomic policy requires a high degree of institutional development.

We also identified monetary and fiscal policy shocks in transition economies. We divided our sample countries into CIS and non-CIS countries and find that the macroeconomic policy shocks have heterogeneous effect on GDP. Our results show that median responses of CIS countries' GDP to monetary shock is negative, whereas in 85th monetary shock has no effect on GDP. However, median response of non-CIS countries' GDP to monetary shock is not statistically different from zero. But in the 15th percentile the effect is negative.

On the other hand, median response of CIS countries' GDP to fiscal shocks is negative. This implies that in those countries possible "crowding out" effect leads to fall in GDP. However, impulse responses of GDP to fiscal shock vary in the non-CIS countries. The graph (figure 7) illustrates that although the median response of GDP to fiscal shock is zero, in the 85th percentile GDP positively responds to positive fiscal shock, but there is also "crowding out" effect in the 15th percentile of the sample countries.

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Appendix

Table 1 (a)

Institutional Quality and Cyclicality

Variable:	Description	Source
Interest rate (r)	Nominal lending rate	IFS IMF
Real GDP (y)	Real GDP per capita	WDI
Quality of Institutions (Q)	Monetary and Fiscal Freedom Index (0-100 points)	HF
Inflation (π)	Consumer Price Index (CPI) change Base year: 1996 = 100	IFS IMF
Government spending (g)	Government spending per capita	IFS IMF
Fiscal balance (f)	Difference between tax revenue as a share of GDP and government spending as a share of GDP	IFS IMF and National statistics committees

*WDI denotes World Development Indicators of the World Bank, HF is the Heritage Foundation and IFS is International Financial Statistics of IMF.

**For three oil-producing countries – Azerbaijan, Kazakhstan and Russia – we use non-oil revenue data.

Table 1 (b)

Identification of shocks

Variable:	Description	Source
Oil price	GDP deflator adjusted real oil price	IMF
GDP growth	Real annual growth rate	WDI
Fiscal expenditure	Real government spending	IMF
LIBOR rate	3 month LIBOR rate	IFS IMF
UIP	Interest rate – LIBOR rate – exchange rate	IFS IMF and WDI

Figure 1: Interest rate-Outputgap correlation and Institutional Quality
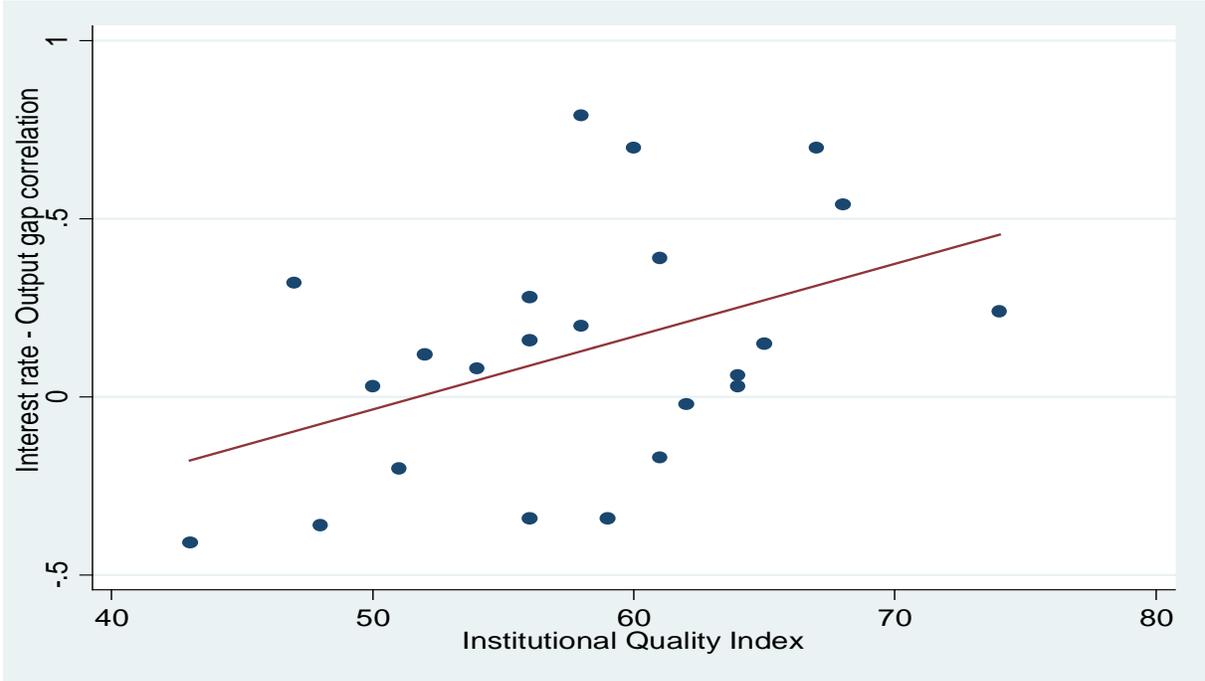

Figure 2: Government expenditure – Output gap correlation and Institutional Quality
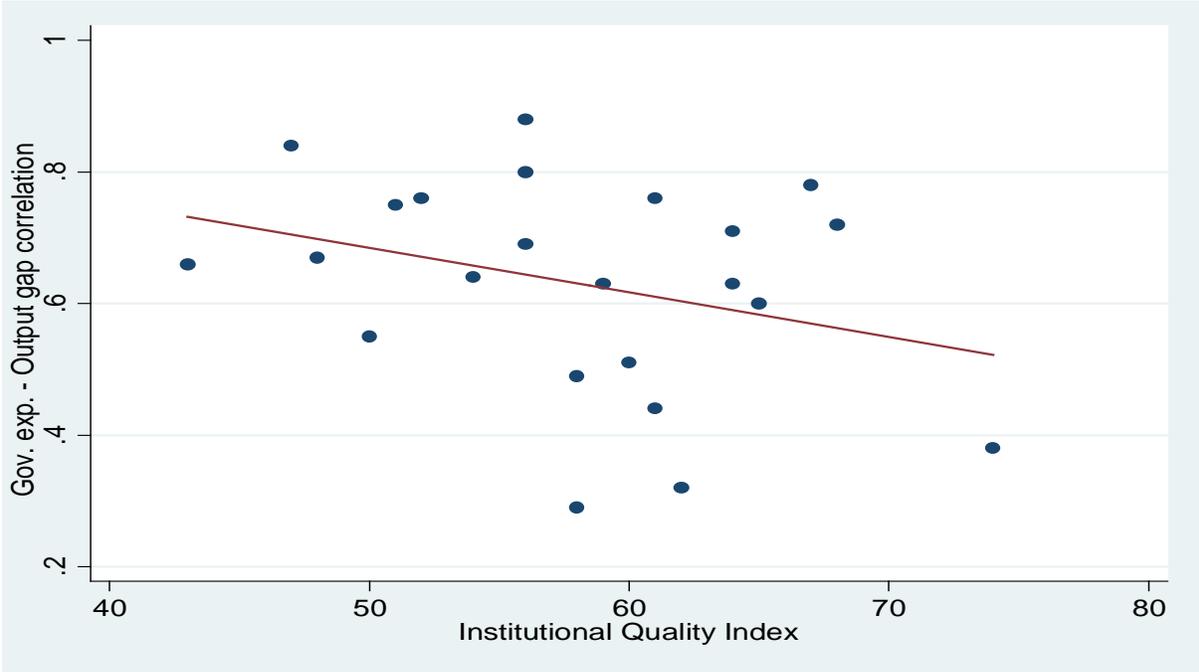
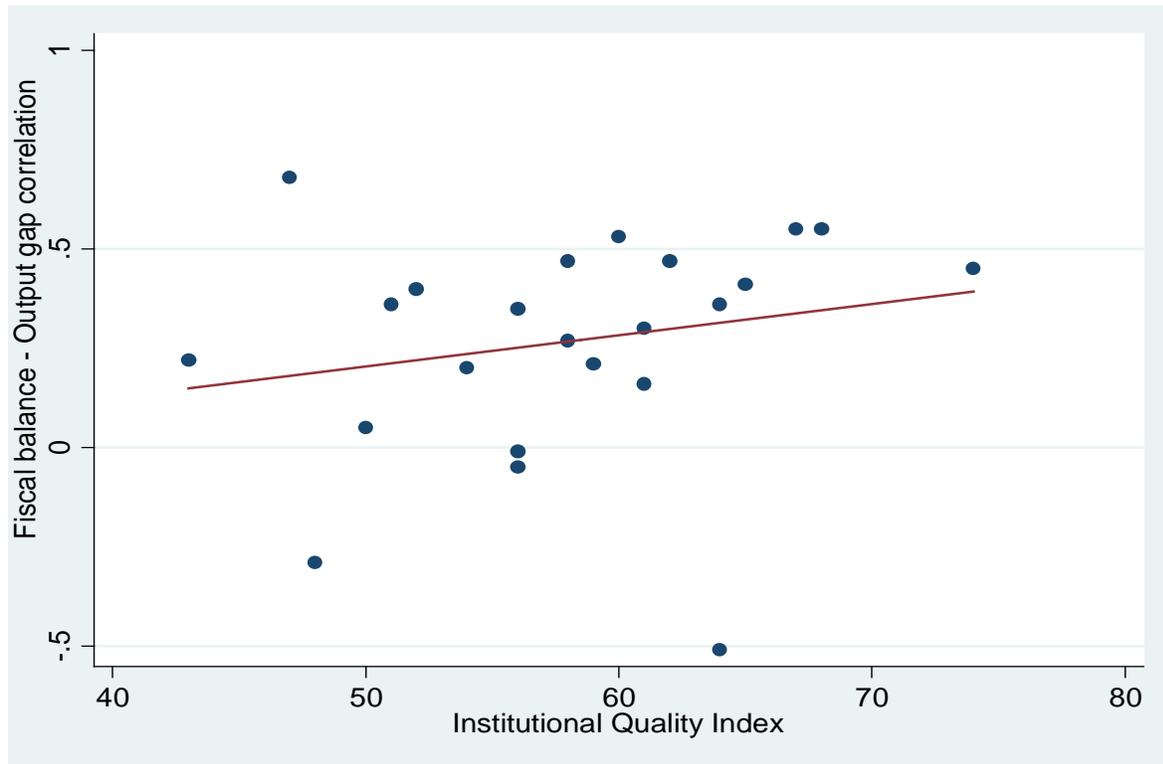**Figure 3: Fiscal balance – Output gap correlation and Institutional Quality**

Table 2: Descriptive statistics (Institutional Quality)

Country	Mean	Median	Minimum	Maximum	Standard Deviation	Obs.
Albania	59.1	58.2	53.4	66.0	4.5	18
Azerbaijan	51.6	53.7.	30.0	59.7	8.4	18
Belarus	43.2	44.0	35.4	49.0	4.5	18
Bosnia and Herzegovina	47.3	50.9	29.4	57.5	10.0	16
Bulgaria	57.5	60.7	45.7	65.0	7.5	18
Croatia	54.0	53.3	46.7	61.3	4.2	18
Czech Republic	68.4	68.5	64.6	71.0	1.7	18

Estonia	74.5	75.2	65.4	78.0	3.4	18
Georgia	60.6	58.7	44.1	72.2	9.2	18
Hungary	63.6	64.6	55.3	67.6	3.9	18
Kazakhstan	55.6	56.7	41.7	63.6	6.5	16
Kyrgyz Republic	57.8	58.8	51.7	61.8	3.5	16
Latvia	65.2	66.1	55.0	68.3	3.0	18
Lithuania	66.9	70.2	49.7	72.4	6.4	18
Macedonia	61.8	60.8	56.1	68.5	4.3	12
Moldova	55.9	55.9	48.9	60.0	2.7	18
Poland	60.1	60.1	56.8	66.0	2.7	18
Romania	56.0	53.2	46.2	65.1	6.7	18
Russia	51.1	50.9	48.6	54.5	1.5	18
Slovakia	63.4	65.7	53.8	70.0	6.2	18
Slovenia	60.1	60.4	50.4	64.7	3.4	18
Tajikistan	49.7	51.5	41.1	54.6	4.6	16
Ukraine	48.0	48	40.4	55.8	4.4	18

Table 3: Cyclical degree of monetary policy
Dependent variable: Nominal Interest Rate (r)

Variables	(1) Pooled OLS	(2) Pooled OLS (CPI*IQ)	(3) IV-GMM	(3) IV-GMM (CPI*IQ)
Lagged interest rate	0.203 (0.051)***	0.178 (0.051)***	0.094 (0.264)*	-0.035 (0.321)*
CPI	0.071 (0.020)**	-0.047 (0.014)**	0.092 (0.007)**	-0.022 (0.013)**
CPI * Institutional Quality		0.001 (0.0003)**		0.0003 (0.0004)**
Output gap	-0.057 (0.025)*	-0.0572 (0.024)*	-0.134 (0.051)**	-0.145 (0.050)**
Output gap * Institutional quality	0.001 (0.001)**	0.001 (0.0004)**	0.0022 (0.001)***	0.0024 (0.001) ***
Constant	-0.012 (0.019)	-0.009 (0.019)	-0.025 (0.020)	-0.014 (0.021)
Observations	374	374	359	359
R-squared	0.14	0.16	0.11	0.12
J-statistics			5.376 (0.0909)	4.523 (0.1162)
Acylical Monetary Policy level	57	57	60.9	60.4

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Cyclical degree of fiscal policy

Dependent variables: Government expenditure (g) and fiscal balance (f)

Variables	Dependent variable: Government expenditure		Dependent variable: Fiscal balance	
	(1) Pooled OLS	(2) IV-GMM	(3) Pooled OLS	(3) IV-GMM
Lagged dependent variable	0.420 (0.034)***	0.173 (0.072)*	0.503 (0.045)***	0.515 (0.151)***
Output gap	2.198 (0.807)***	4.278 (1.448)***	-0.298 (0.157)**	-0.432 (0.186)**
Out gap*Inst Quality Index	-0.037 (0.013)**	-0.069 (0.029)**	0.005 (0.003)*	0.007 (0.002)**
Constant	-0.241 (0.626)	-0.275 (0.678)	0.072 (0.127)	0.121 (0.137)
Number of observations	389	382	397	390
R-squared	0.57	0.48	0.31	0.22
J-statistics (p value)		0.152 (0.6966)		2.246 (0.2437)
Acyclical Fiscal Policy level	59.4	62	59.6	61.7

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

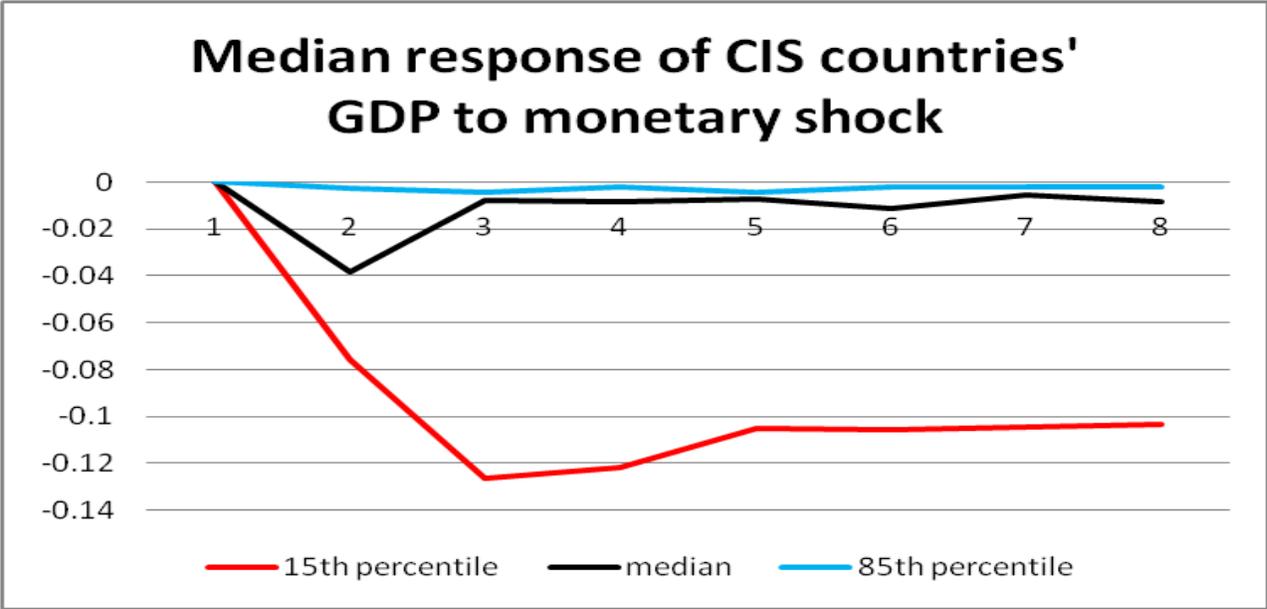**Figure 4: Median impulse response of CIS countries' GDP to monetary shock**

Median response of CIS countries' GDP to monetary shock

Figure 5: Median impulse response of non-CIS countries' GDP to monetary shock

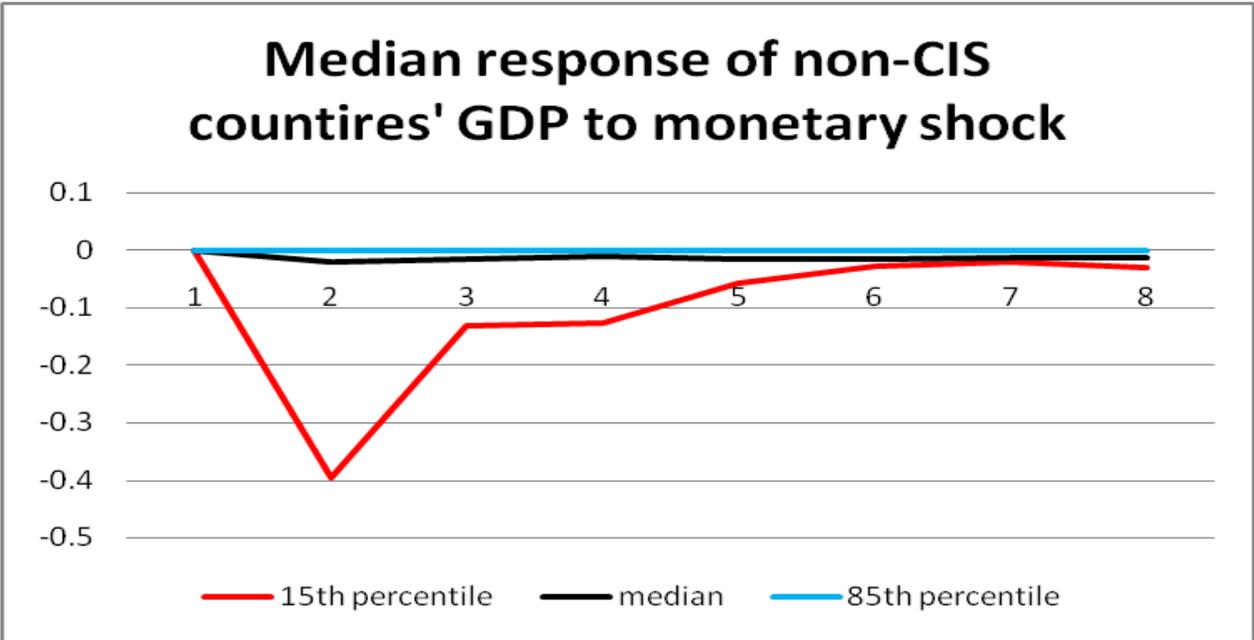Median response of non-CIS countires' GDP to monetary shock

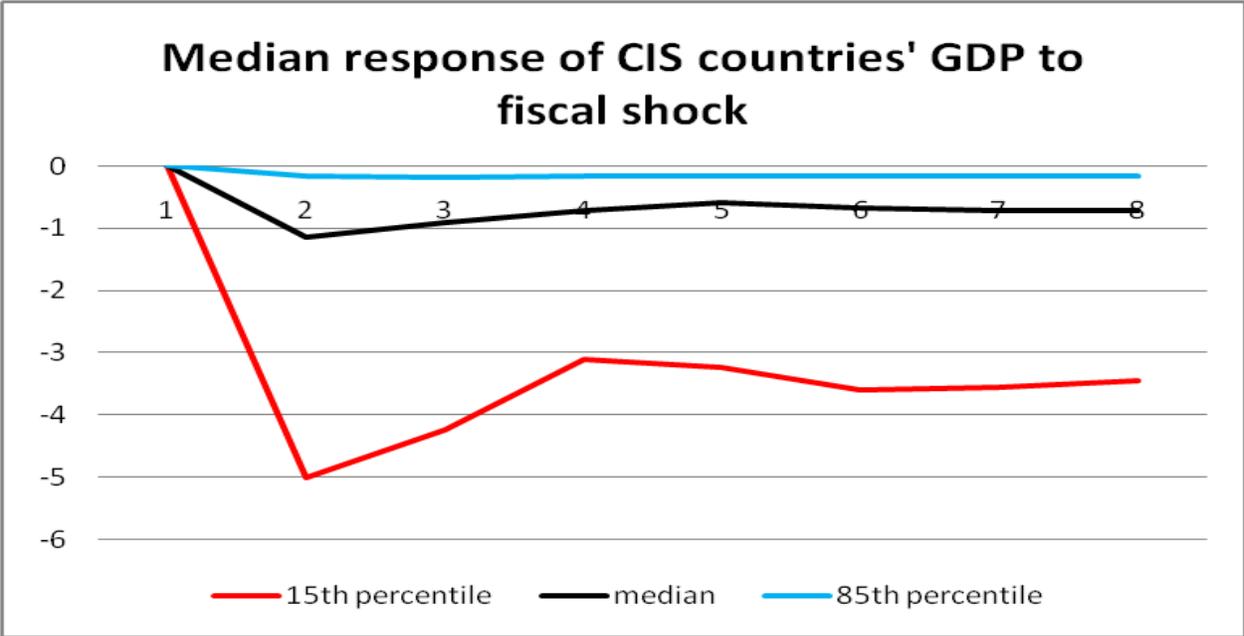**Figure 6: Median impulse response of CIS countries' GDP to fiscal shock**

Figure 7: Median impulse response of non-CIS countries' GDP to fiscal shock