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Roberto Duncan
Klaus Schmidt-Hebbel*

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*kschmidt-hebbel@faceapuc.cl

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Institutions and Cyclical Properties of Macroeconomic Policies in the Global Economy*

César Calderón **
The World Bank

Roberto Duncan ***
University of Wisconsin

Klaus Schmidt-Hebbel ****
Catholic University of Chile

April 2010

Abstract

Sharp fluctuations in cyclical conditions observed in industrial and developing countries alike have renewed the debate on the scope and the effectiveness of stabilization policies. Traditionally it has been argued that developing countries are unable to adopt counter-cyclical monetary and fiscal policies due to financial imperfections and unfavorable political-economy conditions. We claim that developing countries with institutional features similar to those of industrial countries are able to conduct counter-cyclical policies. Using a world sample of 115 industrial and developing countries for 1984-2008, we find that the level of institutional quality plays a key role in countries' ability to implement counter-cyclical macroeconomic policies. The results show that countries with strong (weak) institutions adopt counter- (pro-) cyclical macroeconomic policies, reflected in extended monetary policy and fiscal policy rules. The threshold level of institutional quality at which macroeconomic policy is neutral to the business cycle is higher for fiscal policy than for monetary policy. The sensitivity of fiscal policy cyclicality to institutional quality is larger than is the case of monetary policy.

Key Words: *Counter-cyclical macroeconomic policies, institutions, fiscal policy, monetary policy.*

JEL Classification: *E43, E52, E62*

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** email: ccalderon@worldbank.org *** email: duncantaraba@wisc.edu
**** email: kschmidt-hebbel@faceapuc.cl

1. Introduction

Macroeconomic policies are geared in principle toward stabilizing business-cycle fluctuations. There is evidence of the ability of industrial economies to conduct counter-cyclical fiscal policies (Lane, 2003a, b; Kaminsky, Reinhart, and Végh, 2004; Alesina, Campante, and Tabellini, 2008; Ilzetzki, 2007). Fiscal policies have been found to be counter-cyclical in Europe (Melitz, 2000) and their degree of counter-cyclicality has strengthened after signing of the Maastricht Treaty and the Stability and Growth Pact by European Union members (Gali and Perotti, 2002). Central banks in OECD economies usually implement counter-cyclical monetary policies, as documented widely by estimations of different versions of monetary policy or Taylor rules (e.g., Sack and Wieland, 2007; Lubik and Schorfheide, 2007). The fiscal and monetary policy response in most OECD countries to the 2008-09 global financial crisis and recession has been exceptionally strong, combining large discretionary fiscal packages, very low interest rates, and unorthodox monetary and credit easing (IMF 2009, OECD 2009).

However, in contrast to industrial economies, the cyclical properties of macroeconomic policies in developing economies are more disputed. In fact, it has often been argued that developing countries are unable to adopt counter-cyclical macroeconomic policies. Earlier research suggests that monetary and fiscal policies are predominantly pro-cyclical, both in Latin America and other developing regions (Hausmann and Stein, 1996; Gavin and Perotti, 1997a; Gavin and Hausmann, 1998; Talvi and Végh, 2005; Lane, 2003a; Kaminsky, Reinhart, and Végh, 2004).

Pro-cyclical policies are conducted by governments that cut taxes and increase spending and by central banks that relax monetary policy during booms, while both governments and central banks adopt contractionary policies during busts. What drives this de-stabilizing policy behavior?

It has been argued that the ability of developing countries to adopt optimal (counter-cyclical) stabilization policies is hampered by external borrowing constraints (Gavin and Perotti, 1997b; Calvo and Reinhart, 2000), fragile domestic financial systems and high levels of foreign-currency denominated liabilities (Riascos and Végh, 2003; Lane, 2003a), interactions between domestic and external financial imperfections (*á la* Caballero, 2002,

and Caballero and Krishnamurty, 2001a, b), and lack of financial integration (Yakhin, 2008).

Further hindrances to adopt stabilizing policies are attributed to political-economy constraints. Pro-cyclical stop-and-go policies are intensified when fiscal and monetary institutions are weak, resulting in pro-cyclical policy rules and low policy credibility (Lane, 2003a; Calderón and Schmidt-Hebbel, 2003). Pro-cyclical fiscal policies are more intense in countries with political systems with multiple fiscal veto points and high macroeconomic volatility (Stein *et al*., 1998; Talvi and Végh, 2005; Braun, 2001). Pro-cyclical monetary policies are pursued when central banks lack credibility (Calvo and Reinhart, 2002; Mendoza, 2002).

Recent theoretical research has provided further insights on the pro-cyclicality of fiscal policies. Alesina, Campante, and Tabellini (2008) develop a model in which democratic governments extract rents through direct appropriation of tax revenues or the servicing of special interest groups, and voters are unable to observe government borrowing. The interaction between the agency problem and voters' imperfect information leads to demands for lower taxes or more public goods by voters during expansions, thus forcing authorities to pursue pro-cyclical, myopic fiscal policies. Hence fiscal pro-cyclicality is a second-best solution to distortions caused by corruption and imperfect information. Ilzetzki (2007) extends the latter model to all types of governments (including non-democracies), combining rent-extracting governments, counter-cyclical spending on public goods, and an inverse correlation between rent seeking and public-goods spending. Hence pro-cyclical government spending (or pro-cyclical fiscal policy) results whenever rent-seeking motivations are sufficiently strong.

The two latter studies also provide international evidence on fiscal policy cyclicality for a large number of countries, roughly spanning from the 1960s through 2000. Alesina, Campante, and Tabellini's panel correlations between the output gap and government expenditure are negative (positive) for OECD (non-OECD) economies, and between the output gap and the government surplus are positive (negative) for OECD (non-OECD) economies. Ilzetzki's simple cross-section correlation between government expenditure cyclicality and GDP per capita reflects counter-cyclical (pro-cyclical) expenditure levels in high-income (low and middle-income) economies, and between government surplus

cyclicality and GDP per capita reflects pro-cyclical (counter-cyclical) surpluses in high-income (low-income) countries. Using multivariate econometric estimations, both studies find evidence that corruption (as proxy for rent-seeking behavior) contributes significantly to fiscal pro-cyclicality in the world.

Analytical underpinnings of monetary policy pro-cyclicality are developed by Duncan (2010). In a model with foreign investors that face a probability of partial confiscation, which works as a proxy of institutional quality, a lower level of institutional quality reduces the country's foreign demand for external liabilities. This implies that, when there is a positive external demand shock, the reduction in the value of foreign debt caused by the real exchange-rate appreciation is smaller. Given this low wealth effect, the real appreciation leads to lower consumption and higher labor supply. Wages drop and inflation declines. The central bank reacts by cutting its policy rate to stabilize inflation, thus adopting a pro-cyclical policy stance. The net result is a negative link between the policy rate and output or, more generally, a lower correlation between the latter variables compared to countries with high-quality institutions.

Taylor (2000) extends his monetary-policy rule to assess the cyclicality of fiscal policy, specifying a simple fiscal rule in which the budget surplus is driven by the output gap. Chadha and Nolan (2007) derive optimal simple monetary and fiscal rules from a general-equilibrium model. Taylor (2000) and Chadha and Nolan (2007) show that simple policy rules match quite well U.S. monetary and fiscal policies during the last decades, and the latter authors also provide similar evidence for the United Kingdom.

In contrast to most of the views presented above on fiscal and monetary pro-cyclicality in developing economies, our prior —to be tested here— is that macroeconomic policies play a key role in stabilizing business-cycle fluctuations in any economies— industrial or developing— where institutions are stronger. Among developing economies, for example Chile, Malaysia, and Thailand adopted expansionary policies during 2001-2003, a period of cyclical weakness in these economies. More recently, Brazil, Chile, China, India, and Mexico were among many developing countries that adopted expansionary policies in response to the 2008-2009 global financial crisis and subsequent domestic cyclical weakness.

We argue that differences in the cyclical stance of macroeconomic policy in the global economy – hence across both industrial and developing countries – may be attributed to differences in their levels of institutional quality. Developing economies comprise a highly heterogeneous country group that exhibits large differences in government stability, socioeconomic conditions, law and order, bureaucratic quality, and corruption, among other measures of institutional quality, which may explain cyclical properties of their macroeconomic policies.

The main goal of this paper is to test this proposition by using measures of institutional quality as key determinants of the cyclicality of both fiscal and monetary policies in industrial and developing economies. We expect that countries with weak institutions will not be able to pursue counter-cyclical policies. On the other hand, we anticipate that countries with strong institutions apply contractionary policies during booms and expansionary policies during recessions —*i.e.*, they are able to pursue counter-cyclical macroeconomic policies. We will test empirically our hypothesis using large panel data sets of up to 112 countries with annual data for 25 years.

This paper extends previous empirical work (discussed above), which has been mainly on fiscal policy, by focusing symmetrically on both fiscal and monetary policy. Moreover, our specification for fiscal and monetary policy cyclicality is based on extending standard policy rules found in the literature on monetary policy or Taylor rules (Taylor, 1993a, b; 1995; 2000), fiscal policy rules (Braun, 2001; Lane, 2003b; Taylor 2000) or both (Taylor, 2000; Chadha and Nolan 2007), by considering the interaction between the cycle and institutional development. The focus of this paper is on the role of a broad measure of institutional quality —that includes corruption among many other components— as a key determinant of policy makers' abilities to adopt counter-cyclical fiscal and monetary policies. We also extend significantly previous work on the role of fiscal policy credibility (proxied by country-risk premiums on sovereign debt) in the cyclical properties of policies in 10 developing economies (Calderón and Schmidt-Hebbel, 2003, and Calderón, Duncan, and Schmidt-Hebbel, 2004).

The empirical research in this paper is conducted over a large panel sample ranging from 1420 (for monetary policy) up to 2381 country-year observations (for fiscal policy).

Our robustness tests comprise empirical searches over alternative measures of dependent and independent variables, and different estimation techniques.

The paper is organized as follows. In the next section we describe the data to be used and stylized facts about the cross-country relation between policy cyclicality and institutional quality. Then we present a model for extended monetary and fiscal policy rules and discuss our empirical strategy to assess the relationship between the quality of institutions and the cyclical stance of their macroeconomic policies. We report the panel data evidence for our world sample in section 4. Section 5 concludes.

2. Data and Stylized Facts

This section describes briefly the definition and sources of the data used in our empirical analysis.[1] Then, as a first step in our empirical assessment, we report some stylized facts on the relationship between macroeconomic policies and institutions found in the world sample. A more detailed description of data sources and construction is provided in the Data Appendix.

We have collected annual data of measures of monetary policy, fiscal policy, real output, exchange rates, and institutions for a world sample of industrial and developing countries. The lack of reliability or availability of data for at least 10 consecutive years restricts our country samples to: (a) 84 countries for the 1984-2007 period, for our monetary policy regressions, and (b) 112 countries for the 1984-2008 period, for our fiscal policy regressions.[2] [3] Table 1 reports the list of 115 countries used at least once in our two sets of regressions.

The monetary policy variable in this paper is the interest rate relevant for monetary policy. For most countries we use the central bank's discount rate. When the latter is not available, we use the money market or interbank interest rate. The dependent variable in

[1] Our data base and estimation output are available on request.

[2] For the monetary (fiscal) policy equation, the country distribution is 23 (23) industrial and 61 (89) developing countries. The regional distribution of developing countries is 18 (22) from Latin America and the Caribbean, 10 (11) from East Asia and the Pacific, 4 (4) from South Asia, 11 (13) from Eastern Europe and Central Asia, 8 (16) from the Middle East and North Africa, and 10 (23) from Sub-Saharan Africa.

[3] The sample size for our monetary policy regressions is significantly smaller because we exclude those country-years where monetary independence is fully absent because countries have relinquished use of a national or common currency. For identifying hard-peg country-years, we follow Ilzetzky, Reinhart, and Rogoff (2009), who identify unilateral currency unions (e.g., official dollarizations in Ecuador or El Salvador) and currency boards (e.g., Estonia and Hong Kong).

our estimations is our estimate of the cyclical component of monetary policy, defined as the log deviation of the gross nominal interest rate from its gross estimated long-run value. The fiscal policy indicator in this paper is real government expenditure, as suggested by Kaminsky, Reinhart, and Végh (2004).[4] The dependent variable in our estimations is our estimate of the cyclical component of fiscal policy, defined as the log deviation of real public expenditure from its estimated long-run value.

Our real output measure is GDP and its cyclical component is the output gap defined as the log deviation of real GDP from its estimated long-run value. Domestic inflation is the log of the ratio of the current to the lagged consumer price index and its deviation is defined from its estimated long-run value. Domestic currency depreciation is the log of the ratio of the current to the lagged nominal exchange rate and its deviation is defined from its estimated long-run value. Long-run estimates for all relevant variables are obtained by de-trending the corresponding series using either the Hodrick-Prescott filter or the first-difference filter.

Institutional quality is measured by the index of the International Country Risk Guide (which we denote as the ICRG index), published by the Political Risk Services (PRS) Group. The ICRG index, available for our full sample period, considers a wide array of institutional features, of which only one is corruption (used by Alesina, Campante, and Tabellini, 2008 and by Ilzetzki 2007 as their main political-economy determinant of fiscal-policy pro-cyclicality). The aggregate ICRG index is the sum of 12 partial measures of institutional quality: (a) Government Stability (with a maximum of 12 points), (b) Socioeconomic Conditions (12 points), (c) Investment Profile (12 points), (d) Internal Conflict (12 points), (e) External Conflict (12 points), (f) Corruption (6 points), (g) Military in Politics (6 points), (h) Religious Tensions (6 points), (i) Law and Order (6 points), (j) Ethnic Tensions (6 points), (k) Democratic Accountability (6 points), and (l) Bureaucracy Quality (4 points). Therefore, the ICRG index ranges from 0 (lowest level of institutional quality) to 100 (highest level).

[4] Considering that the automatic stabilizing component of government revenue (taxes) is much more significant than that of government expenditure, we follow the latter authors in using government expenditure as our fiscal policy indicator, as it is a better indicator of discretionary fiscal policy than the government surplus.

Table 1 reports summary statistics for each country's ICRG index. For our panel, the full panel sample average is 65.8 points, a value close to the time-series sample mean of Brazil (65.9), China (66.0), Mongolia (66.1), or Uruguay (67.7). The highest country-year score is 97 (Switzerland, 1984) and the lowest is 21.8 (Ethiopia, 1992).

We depict the unconditional cross-country relationship between the cyclical behavior of macroeconomic policies and the quality of institutions in Figures 1 and 2. Figure 1 shows the statistically significant link between the degree of cyclicality of monetary policy —the correlation between the cyclical stance of monetary policy (measured by the interest rate deviation from its long-run value) and the output gap[5]— and the average quality of institutions measured by the ICRG Index.[6] According to this cross-country evidence, there is a positive link between countries with better institutions (a higher average ICRG index) and their ability to perform counter-cyclical monetary policy (a higher correlation between the interest rate deviation and the output gap).

Figure 2 illustrates a similar link between the degree of fiscal policy cyclicality and institutional quality in our cross-country sample. This relationship is also statistically significant. As expected, the correlation between the cyclical component of government spending and the output gap tends to fall as the quality of institutions rises. Therefore the ability of governments to use spending as a counter-cyclical fiscal tool is enhanced as the quality of institutions improves.

In sum, our cross-country scatter plots provides preliminary suggestive evidence in support of our hypotheses. However, the latter unconditional correlations do not represent conclusive evidence due to several specification and estimation problems that can only be addressed in a full multivariate specification subject to formal testing. This is our next task.

3. Model and Empirical Strategy

We begin by introducing the empirical model and the strategy to test for the cyclical properties of monetary and fiscal policies in the panel sample. Monetary policy is specified as an extension of the standard policy or Taylor rule. In addition to standard monetary rule determinants (the lagged dependent variable, the inflation deviation, and the output gap),

[5] This is the correlation for the full sample period covering 1984-2007. The output gap is the cyclical component of actual output obtained from de-trended real GDP based on the Hodrick and Prescott (1997) filter.

we include the exchange-rate depreciation as an additional regressor, as validated in empirical studies for several developing and industrial countries.[7] Fiscal policy follows a similar specification but omitting the inflation deviation and exchange-rate depreciation terms (similar to Taylor 2000).

Regarding our main hypothesis, we introduce an interaction term between the business-cycle variable (the output gap) and the measure institutional quality in both policy equations. At high levels of institutional quality (i.e. higher values of the ICRG index), we expect fiscal and monetary policy to be counter-cyclical. Therefore we specify the following structural equations for the cyclical stance of monetary and fiscal policy:

$$\tilde{r}_{i,t} = \alpha_0 + \alpha_1 \tilde{r}_{i,t-1} + \alpha_2 \tilde{\pi}_{i,t} + \alpha_3 \tilde{e}_{i,t} + \alpha_4 \tilde{y}_{i,t} + \alpha_5 \tilde{y}_{i,t} Q_{i,t} + u_{i,t} \quad (1)$$

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

where $\tilde{r}$ is the deviation of the nominal interest rate from its long-run level, $\tilde{\pi}$ is the deviation of domestic inflation from its long-run level, $\tilde{e}$ is the deviation of currency depreciation from its long-run level, $\tilde{y}$ is the output gap or business cycle measure, defined as the deviation of real GDP from its long-run level, $\tilde{g}$ is the deviation of real government spending from its long-run level, and Q is the ICRG measure of institutional quality. The terms *u* and *v* are stochastic disturbances and subscripts *i* and *t* denote the country and the time period, respectively.

Regarding our control variables, we expect the (absolute value of) coefficients of the lagged dependent variables, α_1 and β_1, to lie between 0 and 1, and both coefficients α_2 (for the inflation rate) and α_3 (for the currency depreciation rate) in the monetary policy equation to be positive. The latter coefficient reflects central bank attempts to smoothen exchange-rate fluctuations by using their monetary policy instrument, a practice often observed in developing countries but infrequently in industrial economies. Hence we will exclude the exchange-rate depreciation deviation in our base regressions but include it in an alternative set of regressions to test for robustness of our base results.

[6] Newey-West HAC corrected standard errors are reported below each coefficient value of figures 1 and 2.
[7] For industrial countries, Lubik and Schorfheide (2007) find that monetary policy in Canada and the UK reacts in response to exchange-rate movements while it does not in Australia and New Zealand.

We reported in section 2 unconditional estimates of cross-country correlations between policy cyclicality and the quality of institutions, shown in Figures 1 and 2. The model introduced in this section allows for estimation of conditional measures of policy cyclicality in full panel samples, controlling for other policy determinants in the context of behavioral equations. The latter measures are the coefficient estimates that reflect our main hypothesis. For monetary policy (equation 1), coefficients α_4 and α_5 should be negative and positive, respectively, and statistically significant. At high (low) levels of institutional quality –a high (low) value of the ICRG index– we anticipate monetary policy to be counter- (pro-) cyclical. For fiscal policy, β_2 and β_3 should be positive and negative, respectively, and statistically significant. At high (low) levels of quality of institutions, we expect fiscal policy to be counter- (pro-) cyclical.

The specification also allows for calculation of the threshold level of institutional quality that is associated with a neutral or a-cyclical policy stance —*i.e.* a threshold level at which policy is neither counter- nor pro-cyclical.[8] The threshold level is obtained simply by dividing the negative of the output gap coefficient by the interaction term coefficient, a result of setting the partial derivative of the policy rule to the output gap to zero. In the case of monetary policy equation (1), the institutional quality threshold, *Q**, is given by the following condition:

$$\frac{\partial \tilde{r}_{i,t}}{\partial \tilde{y}_{i,t}} = \alpha_4 + \alpha_5 Q^*_{i,t} = 0 \qquad (3)$$

Our estimate of Q* is the threshold value of institutional quality that countries would exceed when they adopt counter-cyclical policies; otherwise they would engage in pro-cyclical policies. It is straightforward to infer the cyclical position of monetary policy, dependent on the observed level of the institutional quality index *Q*, from the latter expression:

[8] If α_4 and α_5 are not statistically significant we can also conclude that monetary policy is a-cyclical. A similar argument applies to β_2 and β_3.

$$
\begin{aligned}
&if \quad Q > Q^* \equiv -\frac{\alpha_3}{\alpha_4} \quad \Rightarrow \quad \frac{\partial \tilde{r}_{i,t}}{\partial \tilde{y}_{i,t}} > 0 \quad \Rightarrow \quad counter-cyclical\ policy \\
&if \quad Q < Q^* \equiv -\frac{\alpha_3}{\alpha_4} \quad \Rightarrow \quad \frac{\partial \tilde{r}_{i,t}}{\partial \tilde{y}_{i,t}} < 0 \quad \Rightarrow \quad pro-cyclical\ policy \qquad (4) \\
&if \quad Q = Q^* \equiv -\frac{\alpha_3}{\alpha_4} \quad \Rightarrow \quad \frac{\partial \tilde{r}_{i,t}}{\partial \tilde{y}_{i,t}} = 0 \quad \Rightarrow \quad a-cyclical\ or\ neutral\ policy
\end{aligned}
$$

As shown in equation (3), Q* is determined by the coefficient estimates of our monetary policy equation. Therefore the latter estimates —and hence Q*— are sample-specific. Below we will compare the difference between our Q* estimates and actual country Q levels in order to infer about the cyclical properties of macroeconomic policies at the country level. We will derive an analogous threshold level Q* value from coefficient estimates of equation (2) for fiscal policy.

We use the GMM-IV estimator for dynamic panel data models (Arellano and Bond, 1991) as our main estimation method. This estimator controls for possible endogeneity of regressors and avoids biased and inconsistent estimators.[9] To verify the validity of the moment conditions specified by our GMM-IV estimator, we perform the Sargan test of over-identifying restrictions, which tests the overall validity of instruments by analyzing the sample analog of the moment conditions used in the estimation process. If we fail to reject the null hypothesis that the conditions hold, we validate our specified regression model.

We test the sensitivity of our results by performing alternative estimations along the following dimensions. First, we report OLS pooled estimation results before turning to our main results based on the GMM-IV estimator.

Second, we use alternative measures for our dependent variables in the monetary policy and fiscal policy equations. We derive two different measures for the policy deviations from their long-run levels. The first measure is based on the deviation of the interest rate (or government spending) from its stochastic trend obtained by using the Hodrick-Prescott (HP) filter. The second is derived by applying first differences to the interest rate (or government spending).

[9] We use lags of the dependent variable and the regressors as instruments.

Third, we use three alternative sets of instrumental variables (IV) for both monetary and fiscal policy equations. IV sets are comprised by lagged regressors such that IV Set 1 is a subset of IV Set 2, and the latter is a subset of IV Set 3 (see also Table 1). For example, for our fiscal policy rule, set 1 includes (differenced) $\tilde{g}_{t-2}, \tilde{y}_{t-1}, \tilde{y}_{t-1}Q_{t-1}$, and $\tilde{y}_{t-2}Q_{t-2}$; set 2 contains set 1 and also (differenced) $\tilde{y}_{t-3}Q_{t-3}$; and set 3 includes set 2 and also (differenced) $\tilde{y}_{t-4}Q_{t-4}$. In a similar way, we define the sets of instruments for our monetary policy rule.

Finally, we report monetary policy regression results that include the cyclical component of nominal exchange-rate changes, reflecting potential policy reactions of central banks to large domestic currency shocks.

4. Results

This section reports estimation results for our monetary and fiscal policy equations (1) and (2), based on the world sample of industrial and developing countries for 1984-2008. We use the regression results for calculating the threshold values of institutional quality at which policies are neutral and depict the conditional relationships between policy cyclicality and institutional quality.

4.1. Monetary Policy Cyclicality and Institutional Quality

Table 2 reports ten estimation results for our monetary policy equation. We conduct a broad search across different estimation techniques (two pooled OLS and eight GMM-IV results), specifications (with and without the currency-depreciation term), and instrument sets. Coefficient estimates display expected signs and are statistically significant at standard levels. The Sargan test statistic for GMM-IV results confirms that the specification adopted cannot be rejected at conventional levels of significance. OLS results are probably affected by bias and exhibit generally less significant and robust coefficient estimations than GMM-IV results. Hence we focus only on the latter.

Regarding our controls, monetary policy follows an oscillatory annual pattern, reflected by negative coefficients of the lagged dependent variable. As expected, inflation deviations induce monetary policy reactions of the same sign, with coefficient estimates

ranging from 0.30 to 0.38. Inclusion of exchange-rate deviations as an additional regressor (columns 9 and 10, Table 2) suggests that central banks also respond to exchange-rate shocks, although the latter reaction is one order of magnitude smaller than their reaction to inflation shocks. It should also be noted that inclusion of exchange-rate depreciation deviations lower the size of inflation coefficients but raise the size of output-gap coefficients.

Consistent with this paper's main prior, the monetary policy regression results confirm strongly the existence of a significant relation between monetary policy stance, business-cycle conditions (measured by the output gap), and the latter's interaction with the measure of institutional quality. The findings show that monetary policy is significantly counter-cyclical in countries that exhibit high levels of institutional quality while policy is pro-cyclical where institutions exhibit low quality. This result is robustly reflected by all GMM-IV results, with a negative and significant coefficient for the output gap and a positive and significant coefficient for the interaction term between output gap and institutional quality. The latter results allow to calculate our threshold levels at which monetary policy is a-cyclical (Q^*), which are close to 74 points when using the HP filter for estimating deviations (columns 3-5, Table 2) and close to 65 points when using the first-difference filter (columns 6-8, Table 2). The GMM-IV estimates for the monetary rule that includes exchange-rate shocks (Table 2, columns 9-10) imply obtaining Q^* estimates that are only slightly smaller than those obtained when exchange arte deviations are excluded.

The empirical results based on the HP filter (columns 3-6, Table 2) are our preferred estimations for three reasons: they are based on a filter which is likely to reflect business cycles more properly, they are based on a larger sample, and coefficients for inflation deviations, the output gap, and the interaction term are estimated very precisely. Their range of estimates for Q* is very narrow, lying between 73.6 and 74.8 points.

In the 2004-2007 period, the latest expansionary cycle in the world economy, developing countries that exhibited institutional quality above the latter threshold range include Chile (80.5), Croatia (75.0), Korea (75.6), Malaysia (76.2), and the Slovak Republic (77.0). On the other hand, among the countries that were below the threshold or neutral-policy range were Colombia (57.0), Indonesia (56.4), Israel (63.9), and Peru (63.5).

4.2. Fiscal Policy Cyclicality and Institutional Quality

Table 3 summarizes eight empirical results for our fiscal policy specification. As in the case of the monetary policy equation, we report results for both OLS and GMM-IV estimations, and for different instrument sets. As above, we discuss only the GMM-IV results. The Sargan test verifies that the specification cannot be statistically rejected. Coefficient estimates display expected signs and are statistically significant at standard levels. The coefficient of the lagged dependent variable is positive and close to 0.17 when using the HP filter, and negative and close to -0.10 when using the first-difference filter.

As in the case of our monetary policy results, and consistent with this paper's main hypothesis, the fiscal policy regression results confirm strongly the existence of a significant relation between fiscal policy stance, the output gap, and the latter's interaction with institutional quality. The findings show that fiscal policy is significantly counter-cyclical in countries that exhibit high levels of institutional quality while policy is pro-cyclical where institutions exhibit low quality. This result is robustly reflected by all GMM-IV results, with a positive and significant coefficient for the output gap and a negative and significant coefficient for the interaction term between output gap and institutional quality. The corresponding threshold levels of institutional quality (Q^*) are close to 83 points when using the HP filter for estimating deviations (columns 3-5, Table 3) and close to 86 points when using the first-difference filter (columns 6-8, Table 3). For our preferred results based on the HP filter the estimated range for Q* narrows down to 82.1-83.5 points.

During the 2004-2008 period, developing countries that exhibited institutional quality index averages above the latter threshold range include only The Bahamas (85.1). In contrast, many industrial countries are in this group, including Australia (87.3), Iceland (90.1), and Ireland (89.6). Almost all developing countries fall below the fiscal-policy Q* range, including Chile (80.1), Panama (74.3), and Uruguay (71.1).

4.3. Macroeconomic Policy Cyclicality and the Quality of Institutions

We note that the threshold or neutral policy levels Q* obtained from our GMM-IV fiscal policy estimations based on the HP filter (columns 3-5, Table 3), close to 83 points, is about 9 points above that obtained from the analogous monetary policy estimations (columns 3-5, Table 2), which are close to 74 points. Therefore institutional quality is a

much more stringent constraint in the case of fiscal policy. In other words, to adopt a counter-cyclical stance requires a higher degree of institutional development for the conduct of fiscal policy than in the case of monetary policy.

Figures 3 and 4 illustrate the response of the stance of macroeconomic policies to institutional quality, conditional on the influence of other determinants included in the policy equations. Using the GMM-IV results reported in columns (3) and (6) of tables 2 and 3 for the monetary and fiscal policy equations, respectively, we calculate the response of macroeconomic policies to the output gap at different levels of institutional quality. For a range of institutional quality that spans from the minimum average country value to 100 points, we set a grid of levels of institutional quality. Then we calculate the cyclical degree of macroeconomic policies, conditional on the values of the grid. The corresponding results are depicted in figures 3 and 4 for monetary and fiscal policy, respectively. We note three comparative results. First, while the relations between policy cyclicality and institutional quality based on the HP and first-difference filters differ somewhat for monetary policy, they are very close for fiscal policy. Second, as noted above, the Q* threshold level (at which the corresponding schedule crosses the horizontal line that marks an a-cyclical policy stance in figures 3 and 4) based on HP-filter equation (3), is 75 points for monetary policy, well below the 83 points for fiscal policy. Finally, the sensitivity of monetary policy cyclicality to institutional quality – reflected by the absolute value of the first derivative of the policy schedules – is much smaller than is the case of fiscal policy.

5. Conclusions

There is ample evidence on the ability of industrial economies to conduct counter-cyclical fiscal and monetary policies. In contrast to industrial economies, developing countries have been found to be unable to adopt counter-cyclical macroeconomic policies. It has been argued that the ability of developing countries to adopt optimal (counter-cyclical) stabilization policies is hampered by external borrowing constraints, fragile domestic financial systems, high levels of foreign-currency denominated liabilities, interactions between domestic and external financial imperfections, political-economy constraints, lack of policy credibility, corruption, and imperfect information about government programs.

In contrast to most of the views presented before on fiscal and monetary pro-cyclicality in developing economies, this paper's prior is that macroeconomic policies are counter-cyclical in any economy – industrial or developing – where institutions are strong. This paper has extended previous empirical work, which has been mainly on fiscal policy, by focusing symmetrically on both fiscal and monetary policy. Our specification for fiscal and monetary policy cyclicality is based on extending standard policy rules found in the literature by considering the interaction between the cycle and institutional development. The focus of this paper is on the role of a broad measure of institutional quality —that includes corruption among many other components— as a key determinant of policy makers' abilities to adopt counter-cyclical fiscal and monetary policies.

We have tested empirically our hypothesis using large panel data sets of up to 112 countries, with annual data for the last quarter century (1984-2008). Our GMM-IV estimation results are very supportive of our priors. Sargan test statistics confirm that specifications cannot be rejected at conventional levels of significance while individual coefficient estimates display expected signs and are statistically significant at standard levels. Our robustness tests have included empirical searches over alternative measures of dependent and independent variables, and different estimation techniques.

Both our monetary policy and fiscal policy regression results confirm strongly the existence of a significant relation between monetary policy stance, business-cycle conditions (measured by the output gap), and the latter's interaction with the measure of institutional quality. The findings show that both macroeconomic policies are significantly counter-cyclical in countries that exhibit high levels of institutional quality while policies are pro-cyclical where institutions exhibit low quality.

We have also found that the threshold level of institutional quality at which macroeconomic policies are neutral to the business cycle differs for monetary and fiscal policies. From our preferred regression results we have calculated a threshold value of institutional quality at 83 points for fiscal policy, which is about 9 points higher than that obtained for monetary policy. Hence to adopt a counter-cyclical stance requires a higher degree of institutional development for the conduct of fiscal policy than in the case of monetary policy. Finally, the sensitivity of monetary policy cyclicality to institutional quality is found to be much smaller than is the case of fiscal policy.

Data Appendix

Deviation of the nominal interest rate from its long-run level ($\tilde{r}$): Cyclical component of the log of gross nominal central bank's discount rate. When the discount rate is not available, money market or interbank rates are used. Source: International Financial Statistics (IFS), International Monetary Fund (IMF).

Deviation of real government spending from its long-run level ($\tilde{g}$): Cyclical component of the log of real government spending. Source: national accounts, IFS (IMF).

Output gap ($\tilde{y}$): Cyclical component of the log of real GDP. Source: IFS (IMF).

Deviation of domestic inflation rate from its long-run level ($\tilde{\pi}$): Cyclical component of the log of the gross CPI inflation rate. Source: IFS (IMF).

Deviation of currency depreciation rate from its long-run level ($\tilde{e}$): Cyclical component of the log of the gross nominal exchange-rate depreciation rate. Nominal exchange rate expressed as the value of the domestic currency per US dollar. For the United States, an index constructed on a basket of currencies is used. Source: IFS (IMF).

The **cyclical components** are obtained from de-trending the variables using the Hodrick-Prescott (HP) first and the first-difference filter. We set the smoothing parameter value of the HP filter using the frequency power rule of Ravn and Uhlig (2002).

Institutional Quality: level of the International Country Risk Guide (ICRG). The ICRG index ranges from 0 (the lowest level of institutional quality) to 100 (the highest level) and has 12 components: (a) Government Stability (with a maximum of 12 points), (b) Socioeconomic Conditions (12 points), (c) Investment Profile (12 points), (d) Internal Conflict (12 points), (e) External Conflict (12 points), (f) Corruption (6 points), (g) Military in Politics (6 points), (h) Religious Tensions (6 points), (i) Law and Order (6 points), (j) Ethnic Tensions (6 points), (k) Democratic Accountability (6 points), and (l) Bureaucracy Quality (4 points). Source: Political Risk Service (PRS) Group. The ICRG index is reported at monthly frequency; thus we compute the annual average for the corresponding year.

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Figure 1. Output - Interest Rate Correlation and ICRG Average

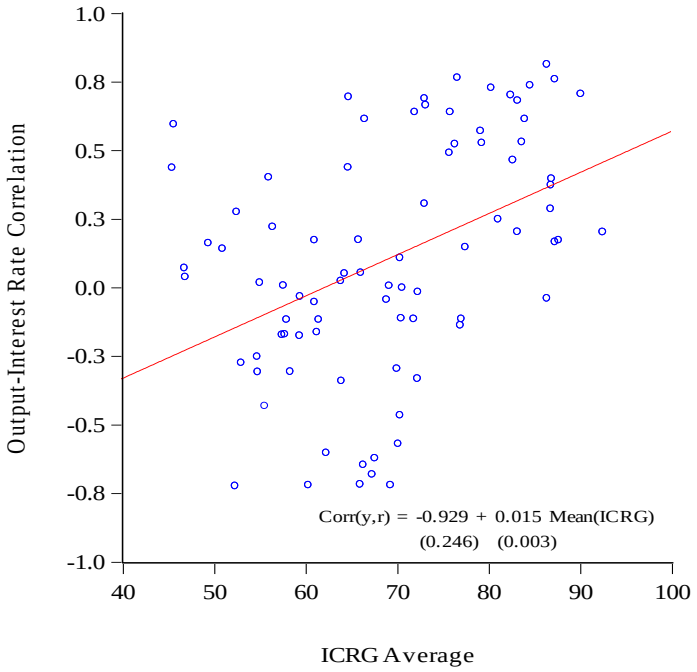

Figure 2. Output - Government Spending Correlation and ICRG Average

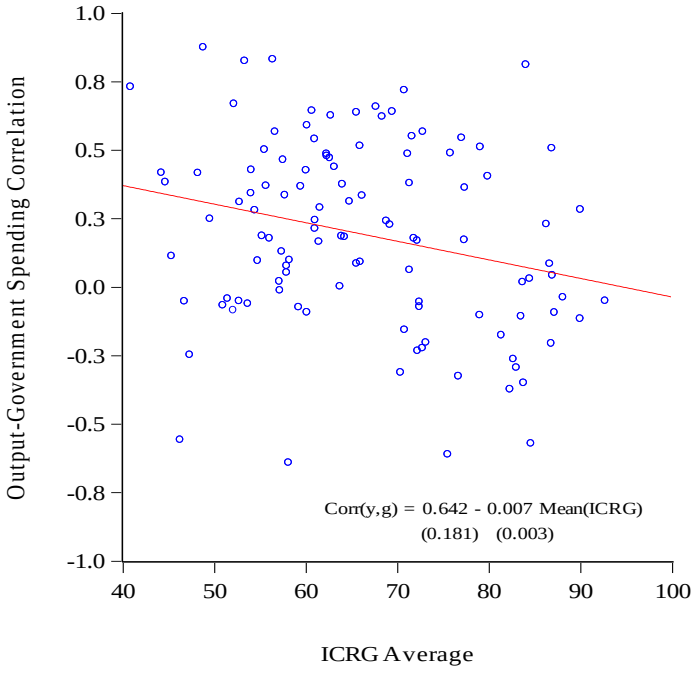

Figure 3. Cyclical Behavior of Monetary Policies

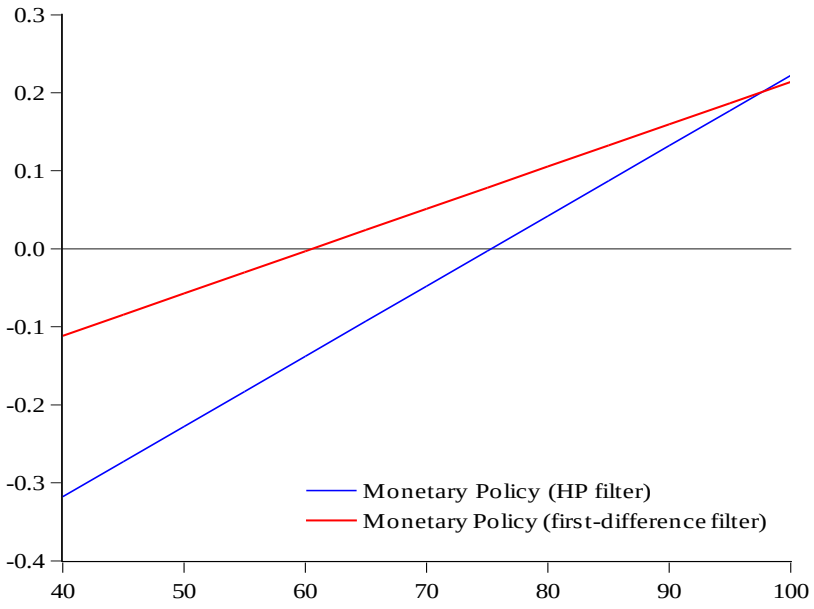

Figure 4. Cyclical Behavior of Fiscal Policies

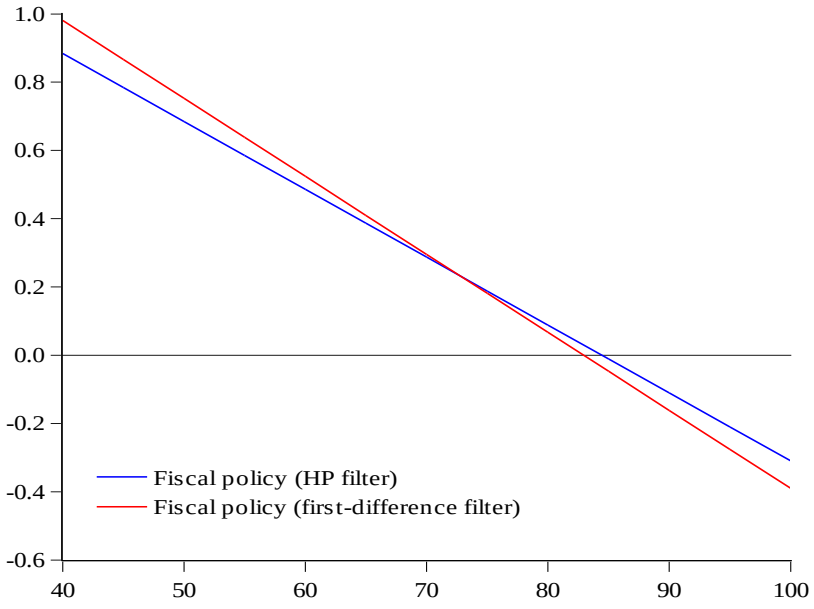

Table 1. Summary Statistics of Institutional Quality by Countries (ICRG Index, different periods from 1984 to 2008)/a

Country	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Albania	60.3	60.1	68.3	51.2	5.1	10
Argentina	70.7	72.1	76.4	59.2	5.3	16
Australia	83.8	85.2	88.8	75.4	4.2	25
Austria	86.6	86.8	91.6	80.1	2.5	25
Bahamas, The	83.5	84.0	86.4	79.6	2.0	12
Bahrain	64.2	64.9	77.7	50.0	10.4	25
Bangladesh	46.3	49.6	63.2	28.6	11.4	22
Belarus	61.0	61.3	64.3	57.2	2.0	11
Belgium	81.4	81.3	86.8	76.8	3.0	25
Bolivia	55.7	57.7	69.6	32.8	11.4	25
Botswana	72.4	73.3	78.5	64.5	4.7	25
Brazil	65.9	66.0	69.8	59.8	2.2	25
Bulgaria	71.1	71.6	76.2	62.3	3.0	18
Burkina Faso	55.5	53.8	65.4	42.3	7.1	22
Cameroon	52.7	51.6	64.4	45.3	4.7	23
Canada	84.6	85.8	89.9	79.9	2.9	25
Chile	69.2	73.1	81.8	43.5	12.5	25
China	66.0	67.8	72.3	56.9	4.1	25
Colombia	56.0	57.2	62.9	48.7	4.5	25
Congo, Rep.	50.9	52.4	56.3	41.9	4.7	16
Costa Rica	71.8	72.3	81.7	62.0	5.9	25
Croatia	72.2	74.1	75.5	65.7	3.8	10
Cyprus	70.8	75.3	82.8	49.4	11.6	25
Czech Republic	79.1	78.5	84.3	72.2	3.1	16
Denmark	87.2	86.2	93.3	82.2	3.2	25
Dominican Republic	61.0	63.8	71.5	49.8	7.8	25
Ecuador	58.2	57.8	64.0	54.0	2.6	25
Egypt, Arab Rep.	57.9	62.3	66.4	42.0	8.3	24
El Salvador	62.7	67.1	74.7	35.8	12.0	17
Estonia	75.5	75.0	77.2	74.2	1.0	11
Ethiopia	44.7	45.1	62.9	21.8	14.5	20
Finland	89.9	91.8	94.6	81.3	4.3	25
France	79.0	79.0	81.9	75.3	1.8	25
Germany	84.0	84.4	89.0	74.5	3.3	25
Ghana	54.8	55.5	65.8	38.3	10.1	14
Greece	71.3	74.6	83.2	58.4	8.0	25
Guatemala	54.0	61.5	69.8	30.2	13.8	25
Guinea-Bissau	47.3	46.0	57.0	42.5	4.6	21
Guyana	56.6	63.0	74.3	36.0	14.6	21
Haiti	45.6	45.5	52.8	39.0	4.7	11
Honduras	52.8	55.8	66.4	34.9	9.9	25
Hong Kong, China	72.7	72.5	83.1	54.2	7.4	25
Hungary	77.4	77.7	86.2	70.0	4.3	25
Iceland	86.9	88.3	91.5	79.2	4.1	25
India	55.2	56.3	65.5	34.8	8.5	25
Indonesia	52.2	50.4	66.9	39.8	8.6	25
Iran	53.7	59.8	67.9	28.5	13.8	24
Ireland	84.4	86.2	92.3	74.3	5.3	25
Israel	57.7	61.0	71.5	35.8	10.2	25
Italy	77.3	77.9	84.6	67.8	4.2	25
Jamaica	68.8	70.5	78.9	54.3	6.7	25
Japan	83.7	83.6	92.8	78.3	4.1	25
Jordan	62.3	69.3	74.8	39.2	13.0	25
Kenya	57.4	56.5	67.9	48.7	5.5	23
Korea, Rep.	72.2	74.5	79.8	60.0	6.5	25
Kuwait	72.4	72.7	78.4	63.9	4.1	16
Latvia	73.1	74.7	77.8	65.0	4.3	11
Libya	54.1	58.2	67.2	35.3	10.8	22
Lithuania	72.8	75.5	78.1	65.0	4.9	11
Luxembourg	92.7	93.0	94.7	88.0	1.5	25
Madagascar	59.4	59.3	67.3	46.0	4.4	25
Malawi	58.1	55.2	75.0	49.8	7.6	22
Malaysia	71.3	72.0	79.4	59.8	5.3	25
Mali	44.2	40.6	57.7	36.2	8.6	12
Malta	76.7	84.2	87.6	55.0	12.8	22
Mexico	69.5	69.5	75.5	61.5	3.6	25
Mongolia	66.1	67.7	72.4	58.4	4.8	23
Morocco	62.3	68.8	73.8	40.0	11.6	24
Mozambique	54.4	57.0	69.2	40.4	9.5	24
Myanmar	46.8	48.2	58.6	27.0	8.6	13
Namibia	71.6	76.5	80.9	39.1	12.5	15
Netherlands	88.1	87.0	96.1	82.2	4.1	25
New Zealand	86.3	86.7	90.9	77.8	3.7	25
Nicaragua	60.7	63.0	67.5	43.7	6.7	18
Niger	51.5	53.3	60.9	37.0	7.1	19
Nigeria	46.8	46.9	54.3	38.8	4.9	20
Norway	86.9	87.8	93.3	79.8	3.4	25
Oman	68.3	72.3	77.0	54.0	8.8	24
Pakistan	45.4	44.7	62.9	30.7	7.9	25
Panama	60.1	58.8	75.8	42.7	13.5	24
Papua New Guinea	60.0	60.1	66.4	53.5	4.4	21
Paraguay	59.2	56.9	72.0	46.4	8.0	25
Peru	53.3	59.7	68.3	38.3	10.6	25
Philippines	56.4	63.1	73.6	36.9	12.5	22
Poland	70.4	75.0	86.6	47.2	11.6	25
Portugal	79.9	83.2	90.6	69.9	7.4	25
Qatar	63.1	68.4	77.5	23.2	13.6	23
Romania	63.7	68.3	76.2	45.3	9.0	25
Russian Federation	61.5	64.2	68.3	49.8	6.3	14
Saudi Arabia	62.6	66.3	70.0	49.3	7.4	25
Senegal	57.1	57.7	61.1	52.5	2.8	18
Sierra Leone	40.8	40.8	55.9	25.0	9.3	19
Singapore	82.7	83.8	89.1	76.3	4.4	25
Slovak Republic	77.0	76.7	81.9	71.2	3.0	16
South Africa	64.8	65.1	75.0	49.3	7.4	25
Spain	75.8	76.2	82.7	67.5	4.6	25
Sri Lanka	49.5	53.5	62.2	29.3	10.3	25
Sweden	86.8	87.3	91.6	79.5	3.8	25
Switzerland	90.0	89.3	97.0	84.9	3.5	25
Syrian Arab Republic	57.2	60.0	70.0	31.7	11.9	24
Tanzania	61.4	61.9	68.1	52.5	4.9	19
Thailand	64.0	65.0	75.3	54.5	6.6	25
Togo	48.2	47.0	55.5	36.0	5.4	21
Trinidad and Tobago	65.5	65.0	74.8	55.8	6.2	25
Tunisia	63.9	67.8	75.0	44.3	10.8	22
Turkey	57.5	58.1	69.3	43.5	7.4	22
Uganda	48.8	53.8	60.0	29.3	9.4	25
United Kingdom	83.0	81.8	90.3	76.3	4.4	25
United States	82.3	81.8	91.5	74.9	4.1	25
Uruguay	67.7	67.3	79.0	56.0	6.2	25
Venezuela, RB	61.0	62.8	75.8	48.8	7.3	25
Vietnam	65.6	66.5	71.6	50.6	5.4	18
Yemen, Republic of	60.1	61.3	67.3	49.2	4.8	16
Zambia	57.9	62.5	72.1	43.3	9.7	25
Zimbabwe	52.1	50.3	67.2	34.3	10.6	21
Full sample average	65.8	67.3	75.2	53.2	6.9	22

a. Source: PRS Group. Authors' calculations.

Table 2. Cyclical Degree of Monetary Policy

Dependent Variable: Nominal Interest Rate (NIR) Deviations from its Long-Run Value
Estimation Method: Generalized Method of Moments (GMM) [a] *and Ordinary Least Squares (OLS)* [b]
Sample: 84 countries, 1984-2007

Regressors	(1) OLS HP Filter	(2) OLS First-Diff Filter	(3) GMM HP Filter IV Set 1	(4) GMM HP Filter IV Set 2	(5) GMM HP Filter IV Set 3	(6) GMM First-Diff Filter IV Set 1	(7) GMM First-Diff Filter IV Set 2	(8) GMM First-Diff Filter IV Set 3	(9) GMM HP Filter (w/Depreciation)	(10) GMM First-Diff Filter (w/Depreciation)
Lagged Dependent Variable	-0.072	-0.024	-0.292	-0.280	-0.281	-0.264	-0.275	-0.271	-0.214	-0.252
p-value	0.004	0.445	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inflation Rate Deviation from its Long-run Value	0.267	0.267	0.379	0.365	0.367	0.365	0.339	0.339	0.297	0.348
p-value	0.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Depreciation Rate Deviation from its Long-run Value	...	...	...	...	...	...	...	...	0.057	0.025
p-value	...	...	...	...	...	...	...	...	0.000	0.002
Output Gap	-0.244	-0.052	-0.678	-0.597	-0.632	-0.329	-0.564	-0.559	-0.712	-0.442
p-value	0.000	0.205	0.000	0.001	0.000	0.040	0.002	0.002	0.001	0.014
Output Gap * Institutional Quality Index	0.004	0.001	0.009	0.008	0.009	0.005	0.009	0.009	0.009	0.007
p-value	0.056	0.019	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.011
Statistics										
F-Statistic (p-value)	0.000	0.000	...	...	...	...	...	...	...	...
Sargan statistic (p-value)	...	...	0.148	0.132	0.089	0.231	0.145	0.145	0.274	0.110
N° of observations	1420	1336	1336	1336	1336	1252	1252	1252	1330	1246
Neutral-Policy Index (Q^*)	56.0	36.5	74.8	74.2	73.6	60.6	66.3	65.6	76.0	63.4

Hodrick-Prescott and first-difference filters were used to extract the cyclical components of the dependent variable, inflation, currency depreciation, and output.

a. GMM estimations were performed using Arellano and Bond (1991). White standard errors and covariances were computed. Instrumental variables are sets composed of lagged regressors. Set 1 is composed of differenced values of r(t-2), π(t-2), y(t-1), y(t-2), y(t-1)*Q(t-1), and y(t-2)*Q(t-2). Set 2 contains set 1 and differenced values of y(t-3). Set 3 contains set 1 and differenced values of y(t-3)*Q(t-3). Regressions with currency depreciation use set 1. b. Pooled FGLS (Cross section weights). White standard errors and covariances were computed.

Table 3. Cyclical Degree of Fiscal Policy

Dependent Variable: Government Spending Deviations from its Long-Run Value
Estimation Method: Generalized Method of Moments (GMM) [a] ***and Ordinary Least Squares (OLS)*** [b]
Sample: 112 countries, 1984-2008

Regressors	(1) OLS HP Filter	(2) OLS First-Diff Filter	(3) GMM HP Filter IV Set 1	(4) GMM HP Filter IV Set 2	(5) GMM HP Filter IV Set 3	(6) GMM First-Diff Filter IV Set 1	(7) GMM First-Diff Filter IV Set 2	(8) GMM First-Diff Filter IV Set 3
Lagged Dependent Variable	0.078	0.084	0.192	0.164	0.147	-0.085	-0.093	-0.098
p-value	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Output Gap	1.897	1.170	1.895	1.771	1.649	1.680	1.672	1.546
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Output Gap * Institutional Quality Index	-0.021	-0.009	-0.023	-0.022	-0.020	-0.020	-0.019	-0.017
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Statistics								
F-Statistic (p-value)	0.000	0.000	...	...	...	...	...	...
Sargan statistic (p-value)	...	...	0.121	0.083	0.137	0.203	0.450	0.453
N° of observations	2381	2269	2269	2269	2269	2157	2157	2157
Neutral-Policy Index (*Q)**	88.6	129.0	82.9	82.1	83.5	84.4	86.7	88.4

Hodrick-Prescott and first-difference filters were used to extract the cyclical components of the dependent variable and output.
a. GMM estimations were performed using Arellano and Bond (1991). White standard errors and covariances were computed. Instrumental variables are sets composed of lagged regressors such that IV set 1 is a subset of IV set 2 and this, in turn, a subset of IV set 3. IV set k is composed of differenced values of g(t-2), y(t-1), and y(t-1)*Q(t-1) up to y(t-k)*Q(t-k), for k=1,2,3. b. Pooled FGLS (Cross section weights). White standard errors and covariances were computed.