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Bad Luck or Bad Decisions?

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Fiscal Procyclicality and Output Forecast Errors: Bad Luck or Bad Decisions?*

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February 16, 2015

Abstract

Government spending in the developing world has historically been procyclical. Traditional explanations for this have mostly revolved around the explicit or implicit notion that fiscal procyclicality is the deliberate result of political economy distortions and weak institutions. Because of revisions in output growth forecasts around the world since the global financial crisis, two recent explanations in the literature have gained increasing support: (i) over-optimism in output forecasts as a cause of procyclicality, and (ii) real-time data, as opposed to ex-post data, as an explanation for policymakers' intended responses to output fluctuations, which in practice tend to deliver less procyclical "intentions" than reliance on ex-post data. This study revisits the implications of output forecast errors on fiscal procyclicality in light of these two recent strands in the literature. For this study, a simple conceptual framework was developed and empirical evidence presented using output forecasts for 101 countries. The results showed that: (i) over-optimism is neither necessary nor sufficient to explain fiscal procyclicality, and (ii) there is no reason to accept the interpretation that forecast errors have "unfortunate" systematic effects on fiscal procyclicality. Traditional political economy arguments help explain how governments handle unanticipated output fluctuations.

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1 Introduction

It is well known that government spending has historically been procyclical in the developing world.[1,2] Government spending has typically increased during periods of expansion and decreased during periods of recession. This procyclical fiscal behavior reinforces output fluctuations, exacerbating booms and aggravating busts.

Traditional explanations for this undesired procyclical fiscal behavior have revolved around two main arguments. The first argument points to political distortions and weak institutions.[3] Policymakers' short-sightedness and political pressure to spend when resources are available, among many other varieties of political economy-based reasons, encourage "excessive" public spending during boom periods, leaving few resources to spend in bad times. The second argument emphasizes the effect of limited access to international credit markets, particularly in bad times.[4] While one could think of several countries that have governments which are isolated from international credit markets on a constant basis, contemporary history suggests that, in most cases, countries lose access to international credit markets or undergo high sovereign spreads in bad times as a consequence of excessive fiscal profligacy and indebtedness during good times. Consequently, most of the procyclicality literature has developed around the explicit or implicit notion that fiscal procyclicality is the deliberate result of political economy drivers and weak institutions.

More recently, and driven by important revisions in output growth forecasts around the world since the global financial crisis, two strands of the procyclicality literature related to output forecast errors have been increasingly gaining support:

1. Over-optimism and fiscal procyclicality literature: This literature focuses on the

[1] See Gavin and Perotti (1997), Tornell and Lane (1999), Kaminsky, Reinhart, and Vegh (2004), Talvi and Vegh (2005), Alesina, Campante and Tabellini (2008), and Frankel, Vegh, and Vuletin (2013).

[2] Focusing on taxation policy (i.e., using tax rate data), Vegh and Vuletin (2012) also found that procyclicality has also been the historic norm in the developing world.

[3] See Velasco (1997), Tornell and Lane (1999), and Talvi and Vegh (2005).

[4] See Gavin, Hausmann, Perotti, and Talvi (1996), Gavin and Perotti (1997), Riascos and Vegh (2003), Frankel, Vegh, and Vuletin (2013).

relevance of over-optimism in output growth forecasts on fiscal policy procyclicality (Frankel, 2011a; Frankel, 2011b; Frankel and Schreger, 2013). Defining the forecast error of output growth (Δy^{FE}) as the difference between ex-post (Δy) and predicted (Δy^{PRED}) changes in output (i.e., $\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED}$), these articles argue that over-optimism (defined as a systematic pattern where $\Delta y^{PRED} > \Delta y$) leads to procyclicality. Over-optimism in forecasts, especially during booms, can help explain excessive fiscal spending and deficits and the failure to run surpluses during periods of high output. Given this view, a growing concern has focused on how to reduce the over-optimism bias as a mechanism to ameliorate fiscal procyclicality.

2. Political economy versus misinformation literature: This literature argues that fiscal policymakers' response to output fluctuations should be evaluated using information about the state of the economy available at the time policy decisions are made, the so-called real-time data (i.e., Δy^{PRED}), as opposed to commonly used ex-post output data (i.e., Δy), which is available *after* policy decisions have already been made (Forni and Momigliano, 2004; Golinelli and Momigliano, 2006 and 2008 ; Bernoth, Hughes Hallett, and Lewis, 2008; Cimadomo, 2012; Croushore and van Norden, 2013). Using this strategy for OECD countries, researchers have found that fiscal policy reaction function estimates are more countercyclical/less procyclical when using real-time data than when using ex-post data. Given this view, the procyclical bias resulting from using ex-post data is, to some extent, due to policymakers' misinformation regarding output forecast (i.e., Δy^{FE}) and not driven by political economy arguments.

This paper revisits the implications of output forecast errors on fiscal procyclicality, viewing the two recent strands in the literature. The paper shows that over-optimism in output forecasts is neither necessary nor sufficient to explain fiscal procyclicality. Moreover, over-optimism is not relevant from an empirical point of view. Fiscal procyclicality

is the consequence of the systematic response of policymakers to predicted (via Δy^{PRED}) –and unanticipated (via Δy^{FE})– fluctuations in output. These systematic patterns can be explained with traditional political economy and institutional arguments. Thus, one should not so readily accept the interpretation that forecast errors have "unfortunate" effects on fiscal procyclicality. What seems to be key in driving fiscal procyclicality is not the inherent presence of forecast errors, as the political economy versus misinformation literature suggests, but rather how governments handle them. In the presence of political economy distortions and weak institutions, both bad and good shocks are poorly managed. However, governments with strong institutions and a high degree of accountability can handle unanticipated developments in their economies in a way that is perfectly consistent with macroeconomic stabilization objectives.

The rest of the paper proceeds as follows. Section 2 presents a simple conceptual framework to elaborate the contribution made here. Section 3 analyzes the extent to which output growth forecasts are over-optimistic worldwide, across industrial and developing countries, and at the individual country level. Section 4 revisits some important stylized facts about the procyclicality literature using, as has typically been the case, ex-post output data Δy. This discussion also shows some suggestive evidence arguing that over-optimism in output forecasts seems not to be an important determinant of fiscal procyclicality. Section 5 analyzes in more detail how spending policy responds to predicted (via Δy^{PRED}) and unanticipated (via Δy^{FE}) developments in the economy and the importance of political economy and institutional arguments in determining fiscal procyclicality. Concluding remarks can be found in Section 6.

2 Conceptual Framework

To organize ideas and elaborate the contribution for this study, we use a simple conceptual framework based on the correlation between the change in government expenditure

(Δg) and ex-post change in output Δy, which we denote as $corr\,(\Delta g, \Delta y)$. This type of metric has been typically used to rationalize the cyclicality of spending policy: (i) $corr\,(\Delta g, \Delta y) > 0$ suggests procyclicality, (ii) $corr\,(\Delta g, \Delta y) = 0$ implies acyclicality, and (iii) $corr\,(\Delta g, \Delta y) < 0$ points to countercyclicality. Using the definition of correlation and the fact that $\Delta y \equiv \Delta y^{PRED} + \Delta y^{FE}$, we could rewrite $corr\,(\Delta g, \Delta y)$ as follows:

$$corr\,(\Delta g, \Delta y) \equiv \frac{cov\,(\Delta g, \Delta y)}{sd\,(\Delta g)\;\; sd\,(\Delta y)} = \frac{cov\left(\Delta g, \Delta y^{PRED}\right) + cov\left(\Delta g, \Delta y^{FE}\right)}{sd\,(\Delta g)\;\; sd\,(\Delta y)}, \qquad (1)$$

which shows that the ex-post observed degree of cyclicality (based on Δy) can be decomposed into (i) a predicted component related to Δy^{PRED} which is recommended by the political economy versus misinformation literature as "fairly" representing policymakers' intentions, and (ii) an unanticipated driver related to Δy^{FE}. Taking into account this simple conceptual framework, the main arguments presented are as follows:

1. Regarding the over-optimism and fiscal procyclicality literature: Over-optimism in forecasts (systematic pattern where $\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED} < 0$) is neither necessary nor sufficient to explain fiscal procyclicality. Through the eyes of output forecast errors, equation (1) shows that what truly matters for fiscal procyclicality is *not* whether countries are over-optimistic, but rather whether there is a systematic pattern of correlation between spending policy Δg and forecast errors Δy^{FE}. A positive association points to procyclicality; spending increases ($\Delta g > 0$) when $\Delta y > \Delta y^{PRED}$ and/or spending decreases ($\Delta g < 0$) when $\Delta y^{PRED} > \Delta y$. On the contrary, a negative relationship between Δg and Δy^{FE} suggests countercyclicality. As a corollary, even countries showing no output forecast bias (i.e., on average $\Delta y^{FE} = 0$) could still show a systematic pattern of correlation between Δg and Δy^{FE}.

   Sections 3, 4, and 5 establish that decoupling over-optimism in output forecasts from

fiscal procyclicality helps reconcile, for example, the fact that while industrial and developing countries show the same degree of over-optimism, industrialized countries pursue countercyclical (or acyclical) fiscal policies, and developing economies behave procyclically. This difference in fiscal behavior still holds across groups of countries when decomposing Δy into Δy^{PRED} and Δy^{FE}. Moreover, when differentiating across countries showing a bias in Δy^{FE} from those with no bias, we find that procyclicality is found to be pervasive in both groups.

2. Regarding the political economy versus misinformation literature: This literature pushes toward the use of real-time data (i.e., Δy^{PRED}), as opposed to ex-post data (i.e., Δy), to properly evaluate policymakers' intentions, excluding the impact of unanticipated misinformation (i.e., Δy^{FE}). The fact that policymakers exhibit more countercyclical/less procyclical profiles when using predicted data (based on Δy^{PRED}) than when measured by ex-post data (based on Δy) would indicate that, to some extent, the traditional use of ex-post data unfairly sentences policymakers. Taken at face value, the insight of this literature seems to be important and conceptually reasonable. However, this view of the world has two key related, yet in principle orthogonal, limitations which make this intuitive idea intrinsically flawed. First, a key underlying premise of this approach is that fiscal policy is determined at a certain point in time and is not revisited as new information about the actual state of the economy emerges. While one may argue that, for example, budgets are approved by congress every fiscal year, in reality fiscal policy is modified, for good or for bad, as the state of the economy changes. Second, and more crucially, relying on equation (1), the only way in which real-time (based on Δy^{PRED}) and ex-post (based on Δy) fiscal cyclicality analysis may differ is if there is a systematic relationship between Δg and Δy^{FE}. In particular, for ex-post cyclicality to be less countercyclical/more procyclical than when using ex-ante data, it should be the case

that Δg and Δy^{FE} are positively associated. While mathematically possible, statistically speaking, $cov\left(\Delta g, \Delta y^{FE}\right)$ should be zero if Δg is a predetermined variable. In other words, it is not evident how and why a fiscal variable Δg allegedly determined using real-time data should be systematically related with a forecast error Δy^{FE} occurring afterwards.

On the contrary, we argue that it is easier to rationalize a positive association between Δg and Δy^{FE} via traditional political economy arguments in which spending increases ($\Delta g > 0$) when there is "manna from heaven," so to speak, ($\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED} > 0$) and/or spending decreases ($\Delta g < 0$) as policymakers realize that output growth (and most likely fiscal revenues) were overestimated ($\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED} < 0$). In Section 5, we show that the systematic association between Δg and Δy^{FE} is actually explained by traditional political economy and institutional arguments.

3 Over-optimism in Output Forecasts: International Evidence

This section analyzes whether countries show an over-optimistic profile in output growth forecasts. IMF/WEO output growth forecast data covering 101 countries –80 developing and 21 industrialized– for 1995-2013 are used.[5] This well-balanced data allows decomposition of ex-post changes in output Δy into its predicted component Δy^{PRED} at different time horizons and its forecast error Δy^{FE}.

Panel A in Table 1 shows that output forecast errors for the full sample of 101 countries, on average, are over-optimistic in all time horizons. Moreover, Panel B shows that such over-optimism is present in longer time horizons where there is more space for wishful

[5] See Appendix 7.1 for the list of countries.

thinking about future growth prospects. This evidence coincides with that of previous papers (e.g., Frankel, 2011a; Ho and Mauro, 2014).

Table 2 shows whether over-optimism is more prevalent in the developing world than in industrialized countries. Although one may speculate that important fluctuations in commodity prices and capital flows could make over-optimism worse in developing countries, as discussed by Frankel (2011a), this suspicion does not seem to be supported.

Table 3 shows the average forecast error and its statistical significance for each country at a one-year time horizon. About two-thirds (or 68 out of 101) of countries show no systematic bias in forecast errors. Out of the one-third of countries showing a systematic bias, a clear majority of about 75 percent (25 out of 33) show an over-optimistic profile.[6] Indeed, we cannot reject the null hypothesis that the average forecast error of countries showing a systematic bias is negative at a 1 percent level of confidence.

In summary, both developing and industrialized countries show similar over-optimistic profiles. Interestingly, when analyzing individual country profiles, about two-thirds of countries show no systematic bias in forecast errors. In other words, while over-optimism is an important phenomenon affecting both the developing and industrial world, it does not seem to be as pervasive as one may think when looking at aggregate figures. Only about 25 percent of countries show an over-optimistic profile.

4 Fiscal Policy Cyclicality: Evidence from Ex-post Data

Before analyzing in more detail how spending policy responds to predicted (via Δy^{PRED}) and unanticipated (via Δy^{FE}) developments in the economy, in this section, some key stylized facts are revisited from the procyclicality literature using, as has typically been the case, ex-post output data Δy. Even when relying on ex-post output data, we show

[6] Similar results are obtained using alternative time horizons. Individual country results are not shown for brevity. For example, using a two-year horizon framework, the number of countries showing no systematic bias in forecast errors declines from 68 to 61.

that some interesting puzzles emerge that make it difficult to reconcile the over-optimistic and procyclicality literature with the empirical evidence.

Columns (1) to (8) in Table 4 summarize the key stylized facts in the procyclicality literature. Column (1) shows that, on average, fiscal policy is procyclical. Columns (2) and (3) show that while industrialized countries follow an acyclical fiscal policy, developing countries behave procyclically. Recall that both groups of countries display a similar degree of over-optimism in output forecasts. Without providing definitive proof, because these are simple regressions, if over-optimism were an important driver of procyclicality, one would expect that over-optimism would be more prevalent in developing economies than in industrialized countries. Alternatively, for a similar degree of over-optimism, one might observe similar degrees of procyclicality across these groups of countries.

Columns (4) to (7) in Table 4 include three one-at-a-time sets of control variables aimed at capturing alternative theories regarding cyclicality of fiscal policy.[7] First, column (4) controls for the degree of financial integration. Among others, Gavin, Hausmann, Perotti, and Talvi (1996), Gavin and Perotti (1997), and Riascos and Vegh (2003) have argued that limited access to international capital markets, particularly in bad times, may limit the ability of governments to pursue countercyclical policies. Here financial integration is measured using the Chinn-Ito capital account openness index (Chinn and Ito, 2006). For practical purposes, we normalized this index between 0 (lowest capital account openness) and 1 (highest capital account openness). While the negative sign of the interaction term supports this type of argument, indicating that more financial integration is associated with more countercyclicality/less procyclicality, it is statistically not different from zero.

Column (5) tests whether larger debt-to-GDP ratios create severe difficulty for governments to conduct countercyclical fiscal policies. While the positive sign of the interaction term supports this type of argument, indicating that larger indebtedness is associated with

[7] See Appendix 7.2 for details regarding the definition and source of variables.

less countercyclicality/more procyclicality, it is statistically not different from zero.

Last but not least, we evaluate the importance of political economy arguments that stress common pool problems and fragmented policymaking (Tornell and Lane, 1999; Velasco, 1997) and the strength of institutions (Calderon and Schmidt-Hebbel, 2008; Frankel, Vegh, and Vuletin, 2013). To account for political economy arguments, we use a measure of political checks and balances from the World Bank's Database on Political Institutions. Stronger checks and balances constrain politicians in their policy space. Politicians are also held accountable to the public to a greater degree than in an autocratic regime. In a more democratic regime, the expected returns to rent-seeking activities are lower. Column (6) shows that stronger checks and balances increase countercyclicality/decrease procyclicality of fiscal policy. To account for institutional quality, we calculate an index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality) based upon the average of four normalized components: regulatory quality, government effectiveness, control of corruption, and rule of law was calculated. Column (7) shows that better institutional quality increases countercyclicality/decreases procyclicality of fiscal policy. In column (8), we account for all standard determinants of fiscal cyclicality at once; political economy and institutional quality remain as the most robust drivers of fiscal policy response to output fluctuations.

Before turning to how spending policy responds to predicted (via Δy^{PRED}) and unanticipated (via Δy^{FE}) output fluctuations, columns (9) to (12) analyze, using ex-post output data, whether fiscal procyclicality and its determinants depend upon the degree of over-optimism in output forecasts. For this purpose, columns (9) and (10) replicate columns (1) (i.e., no control variables) and (8) (i.e., all controls), focusing only on countries that show no systematic bias in forecast errors as determined in Section 3. Similarly, columns (11) and (12) focus on countries showing a systematic bias. Our findings show that the presence of procyclicality and political economy and institutional argu-

ments dominates both groups of countries; this supports notion that over-optimism is not an important determinant of procyclicality.

5 Fiscal Policy Cyclicality: Evidence from Predicted and Unanticipated Output Fluctuations

5.1 Unconditional Evidence

This section analyzes in more detail how spending policy responds to predicted (via Δy^{PRED}) and unanticipated (via Δy^{FE}) developments in the economy without analyzing its determinants. Column (1) in Table 5 is similar to column (1) in Table 4, the key difference being that in Table 5 Δy is decomposed into Δy^{PRED} and Δy^{FE}. Column (1) in Table 5 shows that fiscal policy is procyclical to predicted fluctuations in output and to unanticipated developments. As a consequence of this, and as conceptually articulated by equation (1), ex-post procyclicality (based on Δy) is about 30 percent higher than real-time data procyclicality (based on Δy^{PRED}). This 30 percent higher procyclicality is the result of comparing the 0.70 of column (1) in Table 4 with the 0.54 of column (1) in Table 5. These findings are in line with the political economy versus misinformation literature. In this literature, policymakers end up being ex-post more procyclical than originally intended because of misinformation in forecasting output.

However, it is not clear why one should expect a systematic pattern of correlation between the fiscal policy variable allegedly determined using real-time data and the output forecast error which occurs afterwards. When splitting the sample between industrial and developing countries (columns (2) and (3) in Table 5) an interesting, yet not surprising, pattern emerges. While industrialized countries are acyclical regarding both predicted (via Δy^{PRED}) and unanticipated (via Δy^{FE}) fluctuations in output, developing countries are systematically procyclical in both dimensions. This occurs even though both groups of

countries have the same degree of over-optimism. This asymmetric response to predicted and unanticipated output fluctuations across industrialized and developing countries suggests that it might be easier to rationalize a positive association between Δg and Δy^{FE} via traditional political economy arguments in which spending increases ($\Delta g > 0$) when there is so-called manna from heaven ($\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED} > 0$) and/or spending decreases ($\Delta g < 0$) as policymakers realize that output growth, and most likely fiscal revenues, were overestimated ($\Delta y^{FE} \equiv \Delta y - \Delta y^{PRED} < 0$). Section 5.2 directly tests this by further investigating the determinants behind this systematic pattern of association between Δg and Δy^{FE}.

Columns (4) and (5) in Table 5 show that, in line with findings in Section 4, over-optimism is not an important determinant of procyclicality, now differentiating between Δy^{PRED} and Δy^{FE}.

5.2 Transmission Mechanisms

The previous section suggested that (i) the fact that it is difficult to explain why one should expect a systematic pattern of correlation between government expenditure, a variable allegedly determined using real-time data, and the forecast error that occurs afterward, (ii) coupled with the fact that such an association is zero for industrialized countries and positive for developing economies, indicates that traditional political economy and institutional drivers might be at the core of such asymmetry.

This section analyzes this hypothesis by interacting Δy^{PRED} and Δy^{FE} with variables proxing for alternative theories regarding cyclicality of fiscal policy, similar to the type of exercise performed in Section 4 using ex-post output data Δy. Table 6 shows the results. Column (1) in Table 6 replicates for ease of comparison with subsequent columns the unconditional effects reported in column (1) in Table 5. Columns (2) to (5) include three one-at-a-time sets of control variables aimed at capturing alternative theories regarding

cyclicality of fiscal policy. In column (8), we account for all standard determinants of fiscal cyclicality at once. Our empirical findings show that the observed fiscal procyclicality regarding both Δy^{PRED} and Δy^{FE} are indeed driven by political economy and institutional quality arguments. For the predicted component Δy^{PRED} it seems that the degree of indebtedness is also an important factor driving a procyclical response.

Thus, one need not accept the interpretation that forecast errors have "unfortunate" effects on fiscal procyclicality. What appears to be important in inducing procyclicality is not the inherent presence of forecast errors but rather how governments handle them. In the presence of political economy distortions and weak institutions, bad as well as good shocks are poorly managed. On the contrary, governments characterized by strong institutions that have a high degree of accountability can handle unanticipated developments in the economy in a way that is perfectly consistent with the objectives of macroeconomic stabilization.

6 Conclusions

Traditional explanations for the typical fiscal procyclicality observed in developing countries have mostly revolved around the explicit or implicit notion that fiscal procyclicality is the deliberate result of political economy distortions and weak institutions.

Since the global financial crisis, important and frequent revisions in output growth forecasts around the world have become a new norm. This, in turn, has triggered heated debates in both policy and academic circles and the media about how governments should handle these frequent reassessments.

As a consequence of this debate, some researchers have emphasized the importance of reducing the over-optimism and wishful thinking bias because of their pervasive implications for fiscal procyclicality. While appealing at first glance, over-optimism does not seem to be the most important piece of the procyclicality puzzle.

Also motivated by output forecast errors, another group of researchers has advanced the position that, in fairness to policymakers, their actions should be judged based on the fiscal response using the information available to them at the time when they make policy decisions. They argue that using ex-post data available only after policy decisions have been made unfairly incorporates the influence of the misinformation that the policymakers had at the time they made the decision. Moreover, they point out that such a distinction has important practical implications because policymakers have better intentions, based on real-time data, than final outcomes, based on ex-post data. In this context, naturally, misinformation existing at the time that policy decisions are made is to blame. While there is no doubt that larger forecast errors are expected to create difficulty for the process of fiscal planning, it is not obvious why such misinformation should, in and on itself, have a systematic relationship with allegedly previously decided fiscal policy. If fiscal policy decisions are taken using real-time data, why should such policies have a systematic relationship with ex-post misinformation? As suggested in this paper, if fiscal policy is somewhat determined using real-time data and also by considering new developments in the economy, then what truly matters are the underlying forces behind policy behavior (which one would expect are always present). The fact that policymakers' responses to predicted and unanticipated fluctuations are symmetric and determined by the same political economy arguments seems to indicate that what truly matters is the fundamental quality of governments and their political distortions. One need not be so tolerant of interpretations that forecast errors have unfortunate effects on fiscal procyclicality. When making spending decisions, policymakers may be hopeful, but they should not be naive.

In other words, while improving the ability to forecast output and reducing over-optimism seem to be absolutely crucial, especially in terms of long-term fiscal sustainability, efforts aimed at improving government effectiveness, increasing the quality of bureaucracy, the independence of governmental branches, and the design of a political structure

that will reduce the inherited "voracity effect" tendencies seem to be at the core of solving the procyclicality puzzle.

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7 Appendix of data

7.1 List of countries

Developing (80 countries): Algeria, Angola, Argentina, Bangladesh, Benin, Bolivia, Botswana, Brazil, Cambodia, Cameroon, Cape Verde, Central African Rep., Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Gabon, Gambia, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Korea, Lao People's Dem. Rep, Lebanon, Madagascar, Malaysia, Mali, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Rwanda, Saudi Arabia, Senegal, Seychelles, Sierra Leone, South Africa, Sri Lanka,

Sudan, Swaziland, Syrian Arab Republic, Tanzania, Thailand, Togo, Tunisia, Turkey, Uganda, Uruguay, Venezuela, Vietnam, Yemen, and Zambia.

Industrial (21 countries): Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

7.2 Definition of variables and sources

Real gross Domestic Product

World Economic Outlook (WEO/IMF). Data period covers 1995-2013.

Real GDP growth rate (ex-post data): Annual percentage change of real gross domestic product (i.e., constant prices). Since real GDP growth rates are (ex-post) revised several times, we use the latest available data point. Using several editions of WEO/IMF database one observes that ex-post revisions "converge" after two or three years.

Real GDP growth rate (predicted at different time horizons): We use WEO/IMF Spring vintages' to infer output growth forecast.

Real general government expenditure

World Economic Outlook (WEO/IMF). Data period covers 1995-2013.

Financial integration

Measured with the Chinn-Ito financial openness index; Chinn and Ito (2006). Such index measures a country's degree of capital account openness. Data period covers 1995-2013.

Debt-GDP ratio

World Economic Outlook (WEO-IMF), World Development Indicators (WDI-World Bank), and Reinhart and Rogoff (2011) were the main data sources. Measured as total central government debt over GDP at the beginning of year. Data period covers 1995-2013.

Checks and balances

Database on Political Institutions (DPI). Beck, Clarke, Groff, Keefer, and Walsh (2001). An 18-category scale, from 1 to 18, with a higher score indicating more political checks and balances. Data period covers 1995-2013.

Institutional quality

The Worldwide Governance Indicators (WGI). Institutional quality is an index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). The index was calculated by the authors as the average of four normalized components: regulatory quality, government effectiveness, control of corruption, and rule of law. Data period covers 1995-2013.

Table 1. Over-optimism at different time horizons. Mean tests that average forecast error equals zero at different time horizons

Panel A. Full sample

1-year horizon	-0.24***
2-year horizon	-0.39***
3-year horizon	-0.40***
4-year horizon	-0.39***
5-year horizon	-0.35***

Panel B. Difference across time horizons (shorter minus longer time horizon). Full sample

	1-year horizon	2-year horizon	3-year horizon	4-year horizon	5-year horizon
1-year horizon					
2-year horizon	0.15***				
3-year horizon	0.16***	0.01			
4-year horizon	0.15***	0	-0.01		
5-year horizon	0.11+	-0.04	0	0.01	

Notes: Full sample includes 101 countries (3215 observations). ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.

Table 2. Over-optimism at different time horizons. Developing versus industrial countries. Mean tests that average forecast error equals zero at different time horizons

	Developing	Industrial	Difference
	(1)	(2)	(1) - (2)
1-year horizon	-0.21***	-0.36***	0.15
2-year horizon	-0.35***	-0.65***	0.30
3-year horizon	-0.36***	-0.70***	0.34
4-year horizon	-0.35***	-0.69***	0.34
5-year horizon	-0.29**	-0.67***	0.38

Notes: Full sample includes 101 countries (3215 observations). Industrial and developing groups include 21 countries (444 observations) and 80 countries (2771 observations), respectively. ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.

Table 3. Over-optimism at 1-year time horizon by country. Mean tests that average forecast error equals zero at different time horizons

Country	Δy^{FE}	Country	Δy^{FE}
Algeria	-0.85*	Lebanon	-0.09
Angola	-1.98+	Madagascar	-2.22*
Argentina	-0.56	Malaysia	-0.63
Australia	0.02	Mali	-0.95
Austria	-0.27	Mauritius	-0.68
Bangladesh	0.28*	Mexico	-1.39+
Belgium	-0.42	Mongolia	1.12
Benin	-0.92**	Morocco	-0.51
Bolivia	-0.68+	Mozambique	0.84
Botswana	0.36	Myanmar	5.01***
Brazil	-0.71	Nepal	-0.49
Cambodia	1.86**	Netherlands	-0.22
Cameroon	-0.69**	New Zealand	-0.15
Canada	-0.27	Nicaragua	-0.29
Cape Verde	0.63	Niger	-0.63
Central African Rep.	-4.68**	Nigeria	3.55**
Chad	-1.51	Norway	0.01
Chile	-0.72	Oman	-0.24
China	1.35***	Pakistan	-0.99*
Colombia	-0.53	Panama	1.55*
Comoros	-1.09**	Paraguay	-0.86
Congo, Republic of	-1.73**	Peru	-0.15
Costa Rica	1.02	Philippines	-0.01
Côte d'Ivoire	-2.29**	Portugal	-0.89**
Denmark	-0.71+	Rwanda	3.01**
Dominican Republic	0.42	Saudi Arabia	1.37**
Ecuador	0.05	Senegal	-0.99**
Egypt	-0.01	Seychelles	1.13
El Salvador	-1.26**	Sierra Leone	-2.68
Finland	-0.37	South Africa	-0.22
France	-0.64*	Spain	-0.32
Gabon	-0.29	Sri Lanka	-0.52
Gambia	-1.38	Sudan	4.39
Germany	-0.74	Swaziland	0.35
Ghana	-0.41	Sweden	0.13
Greece	-1.15+	Switzerland	-0.17
Guatemala	-0.33	Syrian Arab Republic	-0.55
Haiti	-2.01**	Tanzania	-0.25
Honduras	-0.35	Thailand	-1.82
India	0.35	Togo	-1.82**
Indonesia	-0.95	Tunisia	-1.59***
Iran, I.R. of	-0.53	Turkey	0.18
Ireland	0.29	Uganda	0.59
Italy	-1.21***	United Kingdom	-0.09
Jamaica	-1.57***	United States	-0.04
Japan	-0.91+	Uruguay	-0.51
Jordan	-0.18	Venezuela	-0.05
Kenya	-0.73	Vietnam	-0.06
Korea	-0.45	Yemen	-0.79
Lao People's Dem.Rep	0.26	Zambia	0.14

Notes: ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.

Table 4. Panel regressions. Dependent variable is the change in real general government expenditure (Δg)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Δy	0.70***	0.01	0.76***	0.79***	0.42**	1.04***	1.35***	2.05***	0.66***	1.94***	0.81***	2.73***
	[9.7]	[0.2]	[9.2]	[6.6]	[2.4]	[7.3]	[8.0]	[6.2]	[9.1]	[5.5]	[4.6]	[3.2]
Δy x financial openness				-0.26				0.20		0.39		0.62
				[-1.1]				[0.6]		[1.2]		[0.5]
Δy x debt-GDP ratio					0.26			0.11		0.19		0.22
					[1.1]			[0.5]		[0.8]		[0.3]
Δy x checks and balances						-0.15***		-0.09+		-0.03		-0.47*
						[-3.2]		[-1.5]		[-0.6]		[-2.0]
Δy x instutional quality							-1.65***	-2.83***		-3.16***		-3.08
							[-4.2]	[-4.1]		[-4.9]		[-1.3]
Sample	all	industrial	developing	all	all	all	all	all	countries with Av.(Δy^{FE})=0	countries with Av.(Δy^{FE})=0	countries with Av.(Δy^{FE})≠0	countries with Av.(Δy^{FE})≠0
R^2	0.05	0.00	0.06	0.05	0.03	0.05	0.06	0.06	0.09	0.08	0.04	0.05
Observations	1883	399	1484	1780	1244	1729	1880	1222	1277	886	600	336
Countries	101	21	80	101	87	100	101	87	68	59	32	28

Notes: Estimations are performed using country fixed-effects. t-statistics are in square brackets. R^2 corresponds to within-R^2. Constant, less KA openness, debt-GDP ratio, checks and balances, and institutional quality terms are not reported. ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.

Table 5. Panel regressions. Dependent variable is the change in real general government expenditure (Δg)

	(1)	(2)	(3)	(4)	(5)
Δy^{PRED}	0.54***	0.26	0.59***	0.44***	0.84**
	[3.4]	[1.3]	[3.3]	[2.8]	[2.1]
Δy^{FE}	0.72***	-0.04	0.78***	0.68***	0.81***
	[9.8]	[-0.4]	[9.2]	[9.3]	[4.4]
Sample	all	industrial	developing	countries with Av.(Δy^{FE})=0	countries with Av.(Δy^{FE})≠0
R^2	0.05	0.00	0.06	0.07	0.04
Observations	1883	399	1484	1277	600
Countries	101	21	80	68	32

Notes: Estimations are performed using country fixed-effects. t-statistics are in square brackets. R^2 corresponds to within-R^2. Constant term is not reported. ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.

Table 6. Panel regressions. Dependent variable is the change in real general government expenditure (Δg)

	(1)	(2)	(3)	(4)	(5)	(6)
Δy^{PRED}	0.54***	0.34+	0.81**	0.76**	0.54	2.57***
	[3.4]	[1.5]	[2.1]	[2.1]	[1.4]	[3.7]
Δy^{PRED} x financial openness		0.54				-1.02
		[1.1]				[-1.1]
Δy^{PRED} x debt-GDP ratio			0.72			1.20**
			[1.2]			[2.0]
Δy^{PRED} x checks and balances				-0.11		-0.08
				[-1.0]		[-0.6]
Δy^{PRED} x institutional quality					0.05	-2.53+
					[0.1]	[-1.5]
ΔY^{FE}	0.72***	0.86***	0.36**	1.06***	1.44***	1.88***
	[9.8]	[7.0]	[2.0]	[7.4]	[8.4]	[5.3]
Δy^{FE} x financial openness		-0.38+				0.24
		[-1.6]				[0.7]
Δy^{FE} x debt-GDP ratio			0.29			0.17
			[1.2]			[0.7]
Δy^{FE} x checks and balances				-0.15***		-0.06
				[-3.2]		[-1.0]
Δy^{FE} x institutional quality					-1.84***	-2.84***
					[-4.6]	[-4.1]
Sample	all	all	all	all	all	all
R^2	0.05	0.05	0.04	0.05	0.06	0.07
Observations	1883	1780	1244	1729	1880	1222
Countries	101	101	87	100	101	87

Notes: Estimations are performed using country fixed-effects. t-statistics are in square brackets. R^2 corresponds to within-R^2. Constant, less KA openness, debt-GDP ratio, checks and balances, and institutional quality terms are not reported. ***, **, *, and + indicate statistically significant at the 1%, 5%, 10%, and 15% levels, respectively.