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ON GRADUATION FROM FISCAL PROCYCLICALITY

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ABSTRACT

In the past, industrial countries have tended to pursue countercyclical or, at worst, acyclical fiscal policy. In sharp contrast, emerging and developing countries have followed procyclical fiscal policy, thus exacerbating the underlying business cycle. We show that, over the last decade, about a third of the developing world has been able to escape the procyclicality trap and actually become countercyclical. We trace this critical shift in fiscal policy to the quality of institutions. We provide a formal analysis, which controls for the endogeneity of institutions and other determinants of fiscal procyclicality, that strongly suggests that there is a causal link running from stronger institutions to less procyclical or countercyclical fiscal policy.

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1 Introduction

The cyclical behavior of fiscal policy differs across income groups. In the past, while industrial countries have tended to pursue fiscal policy that is countercyclical or at worst acyclical, developing countries have tended to follow procyclical fiscal policy: they have increased spending (or cut taxes) during periods of expansion and cut spending (or raised taxes) during periods of recession. Many authors have documented that fiscal policy has tended to be more procyclical in developing countries, in comparison with industrialized countries.[1] Most studies look at the procyclicality of government spending, because tax receipts are endogenous with respect to the business cycle. Indeed, an important reason for procyclical spending is precisely that government receipts from taxes or mineral royalties rise in booms, and the government cannot resist the temptation or political pressures to increase spending proportionately, or even more than proportionately. A similar procyclical pattern can be found on the tax side by focusing on tax rates rather than revenues, though cross-country evidence is harder to come by. Végh and Vuletin (2011) find that tax rate policy has been mostly procyclical in developing countries and acyclical in industrialized countries.

In terms of government spending, the contrast between the two groups of countries can be clearly seen in Figure 1, which updates evidence presented in Kaminsky, Reinhart, and Végh (2004). The figure depicts the correlation between (the cyclical components of) government spending and GDP for 94 countries (21 developed and 73 developing countries) for the period 1960-2009. Black bars represent industrial countries while yellow (light) bars represent developing countries. A positive (negative) correlation indicates procyclical (countercyclical) government spending.[2] The visual image tells the whole story: yellow bars lie overwhelmingly on the right hand side (positive correlations) while black bars dominate the left hand side (negative correlations). Indeed, more than 90 percent of developing countries (67 out of 73) show procyclical government spending, while around 80 percent of industrial

[1] See Gavin and Perotti (1997), Tornell and Lane (1999), Kaminsky, Reinhart, and Végh (2004), Talvi and Végh (2005), Mendoza and Oviedo (2006), Alesina, Campante and Tabellini (2008), and Ilzetzki and Végh (2008).

[2] Needless to say, correlations do not tell us anything about causality which, in principle, could go in either direction. Ilzetzki and Végh (2008), however, show that, even when properly instrumented, output does cause government spending, as emphasized by the fiscal procyclicality literature.

countries (17 out of 21) show countercyclical government spending.

Why would policymakers pursue procyclical fiscal policy? After all, such policy cannot be optimal since it will tend to reinforce the business cycle, exacerbating booms and aggravating busts. The most convincing explanations in the literature fall in two, not necessarily inconsistent, camps: (i) imperfect access to international credit markets and lack of financial depth (Gavin, Hausmann, Perotti and Talvi, 1996; Gavin and Perotti, 1997; Riascos and Végh, 2003; Caballero and Krishnamurthy, 2004) and (ii) political distortions (Velasco, 1997; Tornell and Lane, 1999; Talvi and Végh, 2005).[3] Lack of access to credit markets in bad times will naturally leave governments with no choice but to cut spending and raise taxes, whereas political pressures for additional spending in good times are hard to resist, particularly when there may exist a genuine need for more government spending in critical social areas. Improving access to credit in bad times (including official financial assistance from multilateral financial institutions such as the IMF) and designing rules and institutions that aim at ensuring that fiscal revenues are saved in good times so that they are available in bad times would go a long way to alleviate the scourge of procyclical fiscal policy.

In fact – and as we will argue in this paper – over the last decade several developing countries have been able to "graduate" in the sense of overcoming the problem of procyclicality and becoming countercyclical.[4] Chile is undoubtedly the poster child of this graduation movement. As discussed in Frankel (2011), since 2001 Chile has followed a fiscal rule that has a structural (i.e., cyclically-adjusted) fiscal balance as its target.[5] By construction, such a rule ensures that temporarily high fiscal revenues are saved rather than spent. But, as we will show below, Chile is not the only country that seems to have escaped the procyclicality trap. The quality of institutions seems to be a key determinant of a country's ability to graduate.

The paper proceeds as follows. Section 2 shows the shift in fiscal policy in many emerging and

[3] Calderon and Schmidt-Hebbel (2008) provide evidence for the empirical relevance of these two channels.

[4] Our work can be viewed as complementing, on the fiscal side, recent work by Reinhart, Rogoff, and Qiang (2010) who study graduation from default, inflation, and banking crises.

[5] The original target was a structural surplus of 1 percent, reflecting the need to repay Central Bank debt associated with the bailout of private banks in the 1980s. As this debt was paid off over time, the targeted structural balance was reduced to 0.5 percent in 2008 and 0 percent in 2009.

developing countries over the last decade. Section 3 traces this shift to the quality of institutions and presents some basic regressions that establish a negative correlation between fiscal procyclicality and the quality of institutions. Moreover, we show that a marked improvement in institutional quality witnessed during the last 25 years in some developing countries is at the root of their "graduation." Sections 4 and 5 go a step further and control for other determinants of procyclicality and address endogeneity concerns. We show that there is a strong case to be made that causality indeed runs from the quality of institutions to less procyclical or countercyclical fiscal policy. Concluding remarks can be found in Section 6.

2 Graduating class

This section documents the important shift in the cyclical behavior of fiscal policy over the last decade in the developing world. To this end, we divided the 1960-2009 sample used in Figure 1 into two subsamples: 1960-1999 and 2000-2009. Figure 2 replicates Figure 1 for the period 1960-1999 and conveys essentially the same message. Figure 3, on the other hand, focuses on the period 2000-2009. Once again, the visual image conveyed by 3 is striking when compared to Figure 2. Specifically, the number of yellow bars on the left-side of the picture (i.e., negative correlations) has greatly increased. In fact, around 35 percent of developing countries (26 out of 73) now show a countercyclical fiscal policy, up from 8 percent (6 out of 73) in Figure 2.

To illustrate the issue of graduation more broadly, Figure 4 presents a scatter plot with the 1960-1999 correlation on the horizontal axis and the 2000-2009 correlation on the vertical axis. By dividing the scatter plot into four quadrants along the zero axes, we can classify countries into four categories:

1. Established graduates (bottom-left): These are countries that have always been countercyclical. Not surprisingly, 87 percent of the countries in this category are industrial countries, including the United States, United Kingdom, and Australia.

2. Still in school (top-right) These are countries that have continued to behave procyclically over

the last decade. Again not surprisingly, 96 percent of these countries are developing countries, including Venezuela, Peru, and India.

3. Back to school (top-left): These are countries that were countercyclical during the 1960-1999 period and turned procyclical over the last decade. This small group of countries is split fairly evenly between developed and developing countries. It includes Greece and Jamaica.

4. Recent graduates (bottom-right): These are countries that used to be procyclical and became countercyclical over the last decade. They are mostly represented by developing countries (24 out of 26, or 96 percent) and include Chile, Brazil, and Botswana.

In sum, the evidence suggests that about a third of the developing world (24 out of 73 countries) has recently "graduated" from procyclicality.

The evidence of countercyclicality among many emerging market and developing countries matches up with other criteria for judging maturity in the conduct of fiscal policy: debt/GDP ratios, rankings by rating agencies, and sovereign spreads. Low income and emerging market countries in the aggregate have achieved debt/GDP levels around 40 percent of GDP over the last four years. The IMF estimates the 2011 ratio at 43 percent among emerging market countries and 35 percent among low-income countries. This is the same period during which debt in advanced countries has risen from about 70 per cent of GDP to 102 percent. The financial markets have ratified the historic turnaround. Spreads are now lower for many emerging markets than for some "advanced countries." As of mid-2011, rating agencies rank Singapore as more creditworthy than Belgium, Korea as more creditworthy than Portugal, Mexico ahead of Iceland, and just about everybody ahead of Greece. Euromoney ranks Chile as less risky than Japan, Korea less risky than Italy, Malaysia less risky than Spain, and Brazil less risky than Portugal.

Largely as a result of their improved fiscal situations during the period 2000-2007, many emerging markets were able to bounce back from the 2008-2009 global financial crisis more quickly than advanced countries.[6]

[6] See, for example, Didier, Hevia, and Schmukler (2011).

3 Graduation and institutional quality

What explains the ability of some countries, particularly emerging market and developing countries, to escape the trap of procyclical fiscal policy? Many researchers have pointed to the importance of institutions in determining various aspects of public policy.[7] In this spirit, this section shows that institutional quality (IQ) explains some of the most recent changes in cyclicality of fiscal policy. To this effect, we construct an index of IQ by calculating the average of four normalized variables from the International Country Risk Guide dataset:

- Investment profile: This is an assessment of factors affecting investment risk that are not covered by other political, economic and financial risk components. The risk rating assigned is the sum of three subcomponents: contract viability/expropriation, profits repatriation, and payment delays.
- Corruption: This is an assessment of corruption within the political system.
- Law and order: This is an assessment of the strength and impartiality of the legal system and the popular observance of the law.
- Bureaucratic quality: This is an assessment of the strength and expertise to govern without drastic changes in policy or interruptions in government services.

The IQ index ranges between 0 (lowest institutional quality) and 1 (highest institutional quality).

We first establish a link between the four way classification in Figure 4 and IQ. To this effect, Column 1 in Table 1 reports the average IQ for each of these groups. As expected, the highest average IQ is for the "established graduates" group. Next is the "back to school" group with an average index of 0.6, followed by the "recent graduates" group with an average index of 0.55. The "still in school" countries have the lowest average institutional quality (0.48). All these IQ differences are statistically significant at the 1 percent level.[8]

[7] In the case of fiscal policy, the importance of institutions has been emphasized by Buchanan (1967), von Hagen and Harden (1995), Alesina and Perotti (1996), Poterba and Von Hagen (1999), Persson and Tabellini (2004), and Calderón and Schmidt-Hebbel (2008), among others.

[8] We should take the findings for the "back to school" group with a grain of salt given the small sample of countries included in such group (8 countries).

We then construct a scatter plot relating IQ and procyclicality, shown in Figure 5. We can see a clear negative relationship between IQ and cyclicality of fiscal policy. The higher (lower) the IQ in a country, the more countercyclical (procyclical) is fiscal policy. Based on the estimated regression, an IQ level of 0.79 supports acyclicality. A higher (lower) level of IQ supports countercyclicality (procyclicality).

Table 1, column 2 shows the average initial (or earliest) IQ for each of these groups. In most cases the value corresponds to the IQ level in 1984.[9] As expected, the highest average initial IQ (0.84) is for the "established graduates" group. However, the "still in school" and "recent graduates" groups had initial IQ values that were statistically indistinguishable from each other. Indeed, column 3 of Table 1 shows that it is really the average change in IQ over the last 25 years that is driving the results observed in column 1. Moreover, the group of "established graduates" has seen a slight decline in IQ in recent times. The latter group shows much more inertial values of IQ during the last 25 years than the "still in school" and "recent graduates" groups.

Although one thinks of institutions as slow-moving, they can change over time. Figure 6 provides some examples of the within-country relation between IQ and cyclicality of fiscal policy by plotting for three different countries the correlation between government spending and GDP computed over a 20-year rolling window and the level of IQ. Panel A shows the case of the Australia, an "established graduate". IQ levels have been consistently around 0.80 and fiscal policy has always been countercyclical. At the other extreme, Panel B shows the case of Venezuela, a "still in school" country. IQ levels have ranged between 0.24 and 0.58 and fiscal policy has been consistently procyclical. Panel C shows the case of Chile, a "recent graduate". The IQ increased remarkably from values close to 0.5 in the early 1980s to more than 0.8 since mid 2000s. In line with our arguments, fiscal policy shifted from being strongly procyclical – with values close to Venezuela's – to countercyclical.

Chile's experience is a good illustration of how a country with good IQ in the general sense of rule of law can help lock in countercyclical fiscal policy through specific budget institutions. Frankel

[9] The only exceptions are Rep. of Congo (1985), Gambia (1985), Niger (1985), Sierra Leone (1985), Yemen (1990), and Azerbaijan (1998).

(2011a) analyzes how Chile did it, with the structural budget reforms of 2000 and 2006. Fiscal rules, such as euroland's Stability and Growth Pact, may accomplish little in themselves, because they are not necessarily enforced and are not necessarily credible. Rules can even worsen the general tendency of governments to make overly optimistic forecasts for economic growth and budget balance.[10] Chile's key innovation was to give responsibility for forecasting to independent expert commissions, insulated from politicians' wishful thinking. Its approach could be emulated by others.

Finally, we use panel data regressions to exploit within-country variability as opposed to cross-country analysis. Table 2, column 1 shows that our results hold strong. In line with our cross-country regression (see Figure 5), we find an IQ threshold of 0.79 for graduation. Columns 2, 3, 4 and 5 report regressions similar to that of column 1 for "established graduates," "still in school", "recent graduates" and "back to school" groups, respectively. The main finding is generally supported. The exception is "established graduates." This result is mainly due to the small sample and, more importantly, to the small within-country variability described before for this set of countries.

In Table 2, columns 6, 7, 8 and 9 decompose IQ into its initial value (i.e., initial IQ, which is constant over time) and ΔIQ which is defined as the difference between current IQ and initial IQ (notice that ΔIQ varies over time). The underlying idea is to find out whether it is the highly inertial/static component of IQ that matters for fiscal policy – à la Acemoglu, Johnson and Robinson (2001) – or the dynamic component of IQ. Not surprisingly, for the whole sample (column 6) both factors, historical as well as more recent changes in IQ, seem to matter. However, what matters differs between "still in school" and "recent graduates." Column 7 indicates that for the "still in school" group, historical factors dominate. This is consistent with very static IQ measures (compared to those of "recent graduates") during the last 25 years. Instead, for the"recent graduates" group, it is the change in IQ (i.e.., ΔIQ) that is driving the results. This suggests that changes in IQ are an important determinant of graduation.

[10] Frankel (2011b).

Our analysis so far has suggested that IQ is an important determinant of procyclical fiscal policy. In particular, we have put forward the notion that about a third of developing countries have graduated from fiscal procyclicality due to important improvements in IQ during the last decades. Our analysis, however, could suffer from both omitted variables and endogeneity problems. The next two sections address these genuine concerns.

4 Other determinants of cyclicality

While it seems natural to think that institutions affect the way in which fiscal policy is conducted, our findings so far could reflect the effect of omitted variables that are related to institutions. To address this concern, we include in our panel regressions three sets of control variables aimed at capturing alternative theories regarding cyclicality of fiscal policy.

First, we control for the degree of financial integration and depth. Among others, Gavin, Hausmann, Perotti and Talvi (1996), Gavin and Perotti (1997), and Riascos and Végh (2003) have argued that limited access to international capital markets (particularly in bad times) may limit the ability of governments to pursue countercyclical policies. In the same spirit, Caballero and Krishnamurthy (2004) have stressed the role of financial depth. We measure financial integration using foreign liabilities over GDP (Lane and Milesi-Ferretti, 2007) and financial depth using liquid liabilities over GDP (Levine, Loayza and Beck, 2000; Loayza and Ranciere, 2006; Levine, Beck and Demirguc-Kunt, 2010).[11] The panel data correlation between foreign liabilities and IQ is 0.13; the panel data correlation between liquid liabilities and IQ is 0.53. Table 3, column 2 shows that, as in Calderón and Schmidt-Hebbel (2008), the degree of financial integration does not seem to be an important determinant of the degree of cyclicality of fiscal policy. More financial depth, however, is indeed associated with more countercyclicality/less procyclicality (Table 3, column 3).

Second, we control for the variability of tax revenues – proxied by output variability – to account for the channel emphasized by Talvi and Végh (2005) who argue that, in the presence of political

[11] Similar results follow if private credit is used instead of liquid liabilities.

distortions, the larger is the variability of tax revenues the more procyclical fiscal policy will be, as policymakers try to reduce the fiscal surplus in good times to prevent wasteful spending. We measure output variability using the square of the cyclical component of real GDP.[12] Table 3, column 4 shows that, as in Lane (2003), higher output volatility does indeed increase the degree of procyclicality of fiscal policy.

Third, we address political economy arguments that stress common pool problems and fragmented policymaking (Velasco, 1997; Tornell and Lane, 1999; Perotti, 2000). For these purposes, we use a measure of political checks and balances from the Database on Political institutions.[13] Stronger checks and balances constrain politicians in their policy space. Politicians are also held more accountable to the public, relative to an autocratic regime. In a more democratic regime the expected returns to rent-seeking activities are lower. Table 3, column 5 shows that stronger checks and balances decrease the degree of procyclicality of fiscal policy.

Table 3, column 6 and 7 show that even after accounting for standard determinants of fiscal cyclicality, institutional quality remains a strong determinant. There is no sign that problems related to omitted variables are driving our results.

5 Addressing endogeneity

This section addresses potential endogeneity problems. One could argue that the observed negative relationship between fiscal policy cyclicality and IQ may reflect the fact that countercyclical (procyclical) fiscal policies that tend to stabilize (destabilize) the economy may in fact improve (worsen) institutional quality. That is to say, the causality may run from cyclicality of fiscal policies to institutional quality and not the other way around. For example, procyclical fiscal policies could increase the chances of governments running into debt sustainability problems during busts. These critical financing needs could then lead to expropriation, repudiation of contracts, and/or intervention in independent branches of governments such as the judiciary system or the central bank. Moreover, the turmoil

[12] The panel data correlation between output variability and IQ is -0.19.
[13] The panel data correlation between checks and balances and IQ is 0.43.

typically associated with debt crises can exacerbate corruption in the political system thus weakening the foundations of an efficient and professional public administration. Similar arguments could also be made regarding the endogeneity of the control variables included in Section 4. For example, one could argue that it is procyclical fiscal policies that ultimately increase output volatility instead of the latter being the cause of procyclical fiscal policies.

We address such endogeneity concerns by instrumenting not only for IQ but also for the other three control variables. The literature on institutions has not found yet time-varying instrumental variables for the quality of institutions. Hence – and as is standard in this literature – we rely on cross-country regressions (Acemoglu, Johnson and Robinson, 2001; Easterly and Levine, 2003; Glaeser, La Porta, Lopez-de-Silanes, and Shleifer, 2004; Rodrik, Subramanian, and Trebbi, 2004; La Porta, Lopez-de-Silanes and Shleifer, 2008).

We follow Acemoglu, Johnson, and Robinson's (2001) approach to instrument average IQ using European settlers' mortality and latitude (absolute value). We instrument financial depth using legal origin (La Porta, Lopez-de-Silanes, Shleifer and Vishny; 1997), output volatility using terms of trade volatility, and checks and balances using constraints on the executive and democracy in 1900. The constraints on the executive in 1900 range from cases in which there are no regular limitations on the executive's actions to situations in which accountability groups have effective authority equal to or greater than the executive in most activities. Democracy in 1900 comprises several dimensions of political competitiveness.

Table 4 shows the cross-country correlations between all pairs of variables used in the analysis. The findings support our panel data regressions results reported above in that higher IQ, financial depth, and checks and balances are associated with countercyclicality, and higher output volatility is related to procyclicality. Instruments are also correlated as expected, both among themselves and with the variables they will be instrumenting for. Interestingly, financial integration is negatively related to average IQ and checks and balances, and positively related to output volatility. This might reflect that the measure reflects not only the degree of financial integration but also the "original sin"

phenomenon initially described by Eichengreen and Hausmann (1999). For this reason, hereafter we rely upon financial depth to measure access to credit channel.[14]

Table 5 shows, as in Lane (2003), OLS cross-country regressions where the dependent variable is the correlation between the cyclical components of real government expenditure and GDP. Columns 1 to 8 analyze the impact of each variable one at a time, both for the sample of 94 countries used so far in the paper as well as for the smaller sample of 52 countries that will be used in our instrumental variables regressions.

Two results are worth noting. First, cross-country regressions support our panel data regression findings. That is to say, higher IQ, financial depth, and checks and balances increase countercyclicality and output volatility increases procyclicality. Second, the results obtained for the sample of 94 countries also hold for the smaller sample of countries that will be used in our instrumental variables regressions. Columns 9 and 10 include all control variables together. As in our panel regressions, institutional quality is strongly significant in all cases.

Next, we address endogeneity problems. Table 6 shows how the proposed instruments relate to all four cyclicality regressors. As shown by Acemoglu, Johnson, and Robinson (2001), European settlers' mortality is positively related to IQ. This is also the case of latitude. Similar results are obtained for financial depth. Moreover, as suggested by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997), countries with British legal origin show higher development of their financial markets. Terms of trade volatility seems to be a good predictor of output volatility, and constraints on the executive and democracy in 1900 is found to be strongly related to recent checks and balances. Indeed, the suggested instruments have very high predicting power overall: the R^2 ranges from 0.39 and 0.40 for output volatility and checks and balances to more than 0.6 for institutional quality and financial depth.

Having checked that the proposed instruments seem to be good predictors for the variables they are instrumenting for, we proceed to estimate instrumental variables regressions. Table 7 shows the corresponding regressions. Columns 1 to 4 only instrument for IQ. Column 1 only includes IQ as

[14] Similar results regarding the role of institutional quality were obtained if financial integration was used.

regressor; column 2 adds financial depth; column 3 adds output volatility; and column 4 finally adds checks and balances. In all cases we cannot reject the overidentification tests. The instruments are valid instruments (i.e., uncorrelated with the error term) and the excluded instruments are correctly excluded from the estimated equation. As suggested in Table 6, all instrumental variable regressions confirm that the excluded instruments are not weak instruments (i.e., they are strongly correlated with the endogenous regressors). We thus conclude that institutional quality remains a critical determinant of procyclicality even after accounting for possible endogeneity problems.

Finally, the regressions shown in Table 7, columns 5 to 7, correct for the endogeneity of the rest of the right-hand variables. In all cases, IQ remains strongly negatively related to the cyclicality of fiscal policy confirming that there is a strong causal link running from better institutions to less procyclical/more countercyclical fiscal policy.

6 Conclusions

We have shown that, over the past decade, a substantial number of emerging and developing countries have "graduated" from fiscal procyclicality in the sense of being able to shift from procyclical to countercyclical fiscal policy. Further, we have argued that a critical determinant of whether a country has been able to graduate or not is institutional quality. We have formally linked the degree of fiscal procyclicality to institutional quality and shown that, even when correcting for endogeneity and other determinants, there is a strong causal link running from better institutions to less procyclical/more countercyclical fiscal policy.

While institutional change is certainly not easy and often occurs only slowly over time, the payoff in terms of enabling countries to escape the fiscal procyclicality trap can be large. Chile is perhaps the best example of a country that has succeeded in developing stronger fiscal institutions over time and, as result, has been able to conduct countercyclical fiscal policy over the last decade. This graduation process, however, is a long and arduous road and does require clear economic leadership and a strong political consensus.

References

[1] Acemoglu, Daron, Simon Johnson, and James A. Robinson, 2001, "The colonial origins of comparative development: An empirical investigation," *American Economic Review*, Vol. 91, No. 5, pp. 1369-1401.

[2] Alesina, Alberto, Filipe Campante, and Guido Tabellini, 2008, "Why is fiscal policy often procyclical?" *Journal of the European Economic Association*, Vol. 6, No. 5, pp. 1006-1036.

[3] Alesina, Alberto, and Roberto Perotti, 1996, "Fiscal discipline and the budget process," *American Economic Review*, Vol. 86, No. 2, pp. 401-407.

[4] Buchanan, James. M., 1967, *Public Finance in Democratic Process*. Chapel Hill: University of North Carolina Press.

[5] Caballero, Ricardo, and Arvind Krishnamurthy, 2004, "Fiscal policy and financial depth," NBER Working Paper No. 10532.

[6] Calderón, César, and Klaus Schmidt-Hebbel, 2008, "Business cycles and fiscal policies: The role of institutions and financial markets," Central Bank of Chile Working Paper No. 481.

[7] Didier, Tatiana, Constantino Hevia, and Sergio Schmukler, 2011, "How resilient were emerging economies to the global crisis?" World Bank Policy Research Working Paper No. 5637.

[8] Easterly, William, and Ross Levine, 2003, "Tropics, germs, and crops: how endowments influence economic development," *Journal of Monetary Economics*, Vol. 50, No. 1, pp. 3-39.

[9] Eichengreen, Barry, and Ricardo Hausmann, 1999, "Exchange rates and financial fragility," NBER Working Paper No. 7418.

[10] Frankel, Jeffrey, 2011a, "A solution to fiscal procyclicality: The structural budget institutions pioneered by Chile," forthcoming, Fiscal Policy and Macroeconomic Performance, edited by Luis Felipe Céspedes and Jordi Galí (Central Bank of Chile). NBER Working Paper No.16945.

[11] Frankel, Jeffrey, 2011b, "Over-optimism in Forecasts by Official Budget Agencies and Its Implications," forthcoming, *Oxford Review of Economic Policy*, Vol. 27, No. 4. NBER Working Paper No.17239.

[12] Gavin, Michael, Ricardo Hausmann, Roberto Perotti, and Ernesto Talvi, 1996, "Gestión de la política fiscal en América Latina y el Caribe: volatilidad, propensión a los ciclos y solvencia limitada," Inter-American Development Bank Working Paper No. 4033.

[13] Gavin, Michael, and Roberto Perotti, 1997, "Fiscal policy in Latin America," NBER Macroeconomics Annual, Vol.12, pp. 11-61.

[14] Glaeser, Edward L., Rafael La Porta, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2004, "Do institutions cause growth?" *Journal of Economic Growth*, Vol. 9, No. 3, pp. 271-303.

[15] von Hagen, Jürgen, and Ian Harden, 1995, "Budget processes and commitment to fiscal discipline," *European Economic Review*, Vol. 39, pp. 771-779.

[16] Ilzetzki, Ethan, and Carlos A. Végh, 2008, "Procyclical fiscal policy in developing countries: Truth or fiction?" NBER Working Paper No. 14191.

[17] Kaminsky, Graciela, Carmen Reinhart, and Carlos A. Végh, 2004, "When it rains, it pours: Procyclical capital flows and macroeconomic policies," NBER Macroeconomics Annual, Vol. 19, pp. 11-82.

[18] Lane, Philip R., and Gian Maria Milesi-Ferretti, 2007, "The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970–2004," *Journal of International Economics*, Vol. 73, pp. 223-250.

[19] Lane, Philip R., 2003, "The cyclical behaviour of fiscal policy: evidence from the OECD," *Journal of Public Economics*, Vol. 87, pp. 2661-2675.

[20] La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny, 1997, "Legal determinants of external finance," *Journal of Finance*, Vol. 52, No. 3, pp. 1131-1150.

[21] La Porta, Rafael, Florencio Lopez-de-Silanes, and Andrei Shleifer, 2008, "The economic consequences of legal origins," *Journal of Economic Literature*, Vol. 46, No. 2, pp. 285-332.

[22] Levine, Ross, Norman Loayza, and Thorsten Beck, 2000, "Financial intermediation and growth: Causality and causes," *Journal of Monetary Economics*, Vol. 46, pp. 31-77.

[23] Levine, Ross, Thorsten Beck, and Asli Demirguc-Kunt, 2010, "Financial institutions and markets across countries and over time: The updated financial development and structure database," *World Bank Economic Review*, Vol. 10, No. 4, pp. 77-92.

[24] Loayza, Norman, and Romain Ranciere, 2006, "Financial development, financial fragility, and growth," *Journal of Money, Credit and Banking*, Vol. 38, pp. 1051-1076.

[25] Mendoza, Enrique, and Marcelo Oviedo, 2006, "Fiscal policy and macroeconomic uncertainty in developing countries: The tale of the tormented insurer," NBER Working Paper No. 12586.

[26] Persson, Torsten, and Guido Tabellini, 2004, "Constitutional rules and fiscal policy outcomes," *American Economic Review*, Vol. 94, No. 1, pp. 25-45.

[27] Poterba, James, and Jürgen von Hagen, 1999, *Fiscal Institutions and Fiscal Performance*. Chicago: University of Chicago Press.

[28] Reinhart, Carmen M., Kenneth Rogoff, and Rong Qiang, 2010, "On graduation from default, inflation and banking crises: Elusive or illusion?," NBER Working Paper No. 16168.

[29] Riascos, Alvaro and Carlos A. Végh, 2003, "Procyclical government spending in developing countries: The role of capital market imperfections." (mimeo, UCLA and Banco Republica, Colombia).

[30] Rodrik, Dani, Francesco Trebbi, and Arvind Subramanian, 2002, "Institutions rule: The primacy of institutions over integration and geography in economic development," IMF Working Paper No. 02/189.

[31] Talvi, Ernesto, and Carlos A. Végh, 2005, "Tax base variability and procyclicality of fiscal policy," *Journal of Development Economics*, Vol. 78, No. 1, pp. 156-190.

[32] Tornell, Aaron, and Philip R. Lane, 1999, "The voracity effect," *American Economic Review*, Vol. 89, No. 1, pp. 22-46.

[33] Végh, Carlos A., and Guillermo Vuletin, 2011, "How is tax policy conducted over the business cycle?," (mimeo, University of Maryland and Colby College).

[34] Velasco, Andrés, 1997, "A model of endogenous fiscal deficits and delayed fiscal reforms," NBER working paper N° 6336.

Appendix 1. Definition of variables and sources

Gross Domestic Product

World Economic Outlook (WEO-IMF) and International Financial Statistics (IFS-IMF) were the main data sources. Series NGDP (gross domestic product, current prices) for WEO and 99B for IFS-IMF. For Azerbaijan, Bahrain, Kuwait, Libya, Qatar, and United Arab Emirates data were provided by Middle East Department at the IMF. Data period covers 1960-2009.

Government expenditure

World Economic Outlook (WEO-IMF) was the main data source, series GCENL (central government, total expenditure and net lending). Due to non availability of central government data, general government data were used for Azerbaijan, Ecuador, Kuwait, Libya, Qatar, and United Arab Emirates. For Azerbaijan, Bahrain, Kuwait, Libya, Qatar, and United Arab Emirates data were provided by Middle East Department at the IMF. For Brazil data was from Instituto de Pesquisa Econômica Aplicada (IPEA). Data period covers 1960-2009.

GDP deflator

World Economic Outlook (WEO-IMF) and International Financial Statistics (IFS-IMF) were the main data sources. Series NGDP_D (gross domestic product deflator) for WEO-IMF and 99BIP for IFS-IMF. For Azerbaijan, Bahrain, Kuwait, Libya, Qatar, and United Arab Emirates data were provided by Middle East Department at the IMF. Data period covers 1960-2009.

Liquid liabilities

Loayza and Ranciere (2006) and Levine et al (2010) were the main data sources. Liquid liabilities. Data period covers 1960-2006.

Private credit

Loayza and Ranciere (2006) and Levine et al (2010) were the main data sources. Private credit by deposit money banks and other financial institutions. Data period covers 1960-2006.

Foreign liabilities

Lane and Milesi-Ferretti (2007). Total foreign liabilities is the sum of FDI liabilities, portfolio equity liabilities, debt liabilities, and derivatives liabilities. Data period covers 1970-2007.

Terms of trade of goods and services

World Economic Outlook (WEO-IMF) was the main data source. Series TT (terms of trade, goods & services) for WEO. Data period covers 1962-2009.

Institutional quality

International Country Risk Guide (ICRG) was the source of data. Institutional quality is a normalized 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 components: investment profile, corruption, law and order, bureaucracy quality. Data period covers 1984-2008.

Checks and balances

Beck, Clarke, Groff, Keefer, and Walsh (2001) was the source of data. An 18-category scale, from 1 to 18, with a higher score indicating more political checks and balances. Data period covers 1975-2009.

European settler mortality

Acemoglu, Johnson and Robinson (2001) was the source of data. Mortality rates of soldiers, bishops, and sailors stationed in the colonies between the seventeenth and nineteenth centuries.

Latitude

Acemoglu, Johnson and Robinson (2001) was the source of data. Absolute value of the latitude of the country (i.e., a measure of distance from the equator), scaled to take values between 0 and 1, where 0 is the equator.

Colonial dummies

Acemoglu, Johnson and Robinson (2001) was the source of data. Dummy indicating whether country was a British, French, German, Spanish, Italian, Belgian, Dutch, or Portuguese colony.

French legal origin dummy

Acemoglu, Johnson and Robinson (2001) was the source of data. Legal origin of the company law or commercial code of each country.

Constraint on executive in 1900

Acemoglu, Johnson and Robinson (2001) was the source of data. Seven-category scale, from 1 to 7, with a higher score indicating more constraints. Score of 1 indicates unlimited authority; score of 3 indicates slight to moderate limitations;

score of 5 indicates substantial limitations; score of 7 indicates executive parity or subordination. Equal to 1 if country was not independent at that date.

Democracy in 1900

An 11-category scale, from 0 to 10, with a higher score indicating more democracy. Points from three dimensions: Competitiveness of Political Participation (from 1 to 3); Competitiveness of Executive Recruitment (from 1 to 2, with a bonus of 1 point if there is an election); and Constraints on Chief Executive (from 1 to 4). Equal to 1 if country not independent at that date.

Appendix 2. Data on cyclicality of fiscal policy and institutions

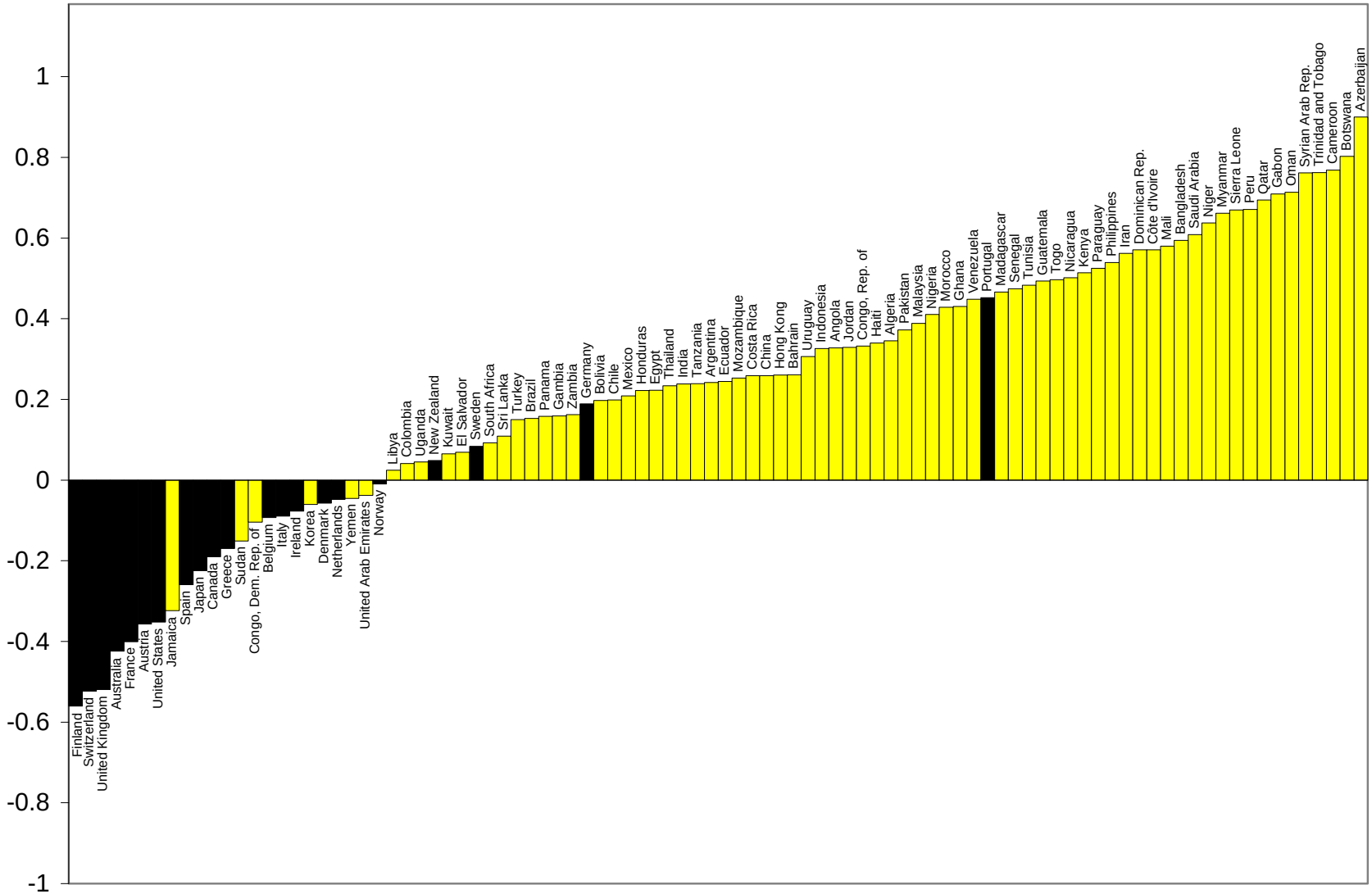
Country	Graduating class	Country correlations between the cyclical components of the real government expenditure and real GDP			Average institutional quality
		Average 1960-2009	Average 1960-1999	Average 2000-2009	1984-2008
Algeria	RG	0.35	0.48	-0.56	0.46
Angola	SS	0.33	0.16	0.67	0.41
Argentina	SS	0.24	0.31	0.01	0.54
Australia*	EG	-0.42	-0.41	-0.79	0.87
Austria*	EG	-0.36	-0.41	-0.21	0.89
Azerbaijan	SS	0.90	0.98	0.65	0.48
Bahrain	RG	0.26	0.63	-0.11	0.64
Bangladesh	SS	0.59	0.60	0.59	0.31
Belgium*	EG	-0.09	-0.09	-0.16	0.85
Bolivia	RG	0.20	0.24	-0.87	0.38
Botswana	RG	0.80	0.92	-0.32	0.66
Brazil	RG	0.15	0.16	-0.18	0.54
Cameroon	SS	0.77	0.80	0.02	0.47
Canada*	EG	-0.19	-0.09	-0.81	0.92
Chile	RG	0.20	0.27	-0.64	0.66
China	SS	0.26	0.18	0.73	0.56
Colombia	SS	0.04	0.00	0.17	0.46
Congo, Dem. Rep. of	BS	-0.10	-0.19	0.85	0.18
Congo, Rep. of	SS	0.33	0.34	0.31	0.39
Costa Rica	RG	0.26	0.35	-0.69	0.61
Côte d'Ivoire	RG	0.57	0.61	-0.16	0.48
Denmark*	EG	-0.06	-0.04	-0.31	0.92
Dominican Rep.	SS	0.57	0.57	0.63	0.49
Ecuador	SS	0.24	0.26	0.12	0.50
Egypt	SS	0.22	0.24	0.02	0.48
El Salvador	RG	0.07	0.04	-0.04	0.39
Finland*	EG	-0.56	-0.56	-0.52	0.93
France*	BS	-0.40	-0.49	0.02	0.81
Gabon	SS	0.71	0.72	0.34	0.45
Gambia	SS	0.16	0.16	0.19	0.54
Germany*	RG	0.19	0.33	-0.33	0.87
Ghana	SS	0.43	0.41	0.68	0.47
Greece*	BS	-0.17	-0.18	0.21	0.65
Guatemala	SS	0.49	0.51	0.29	0.38
Haiti	SS	0.34	0.34	0.47	0.19
Honduras	SS	0.22	0.24	0.19	0.38
Hong Kong	RG	0.26	0.41	-0.52	0.74
India	SS	0.24	0.15	0.51	0.57
Indonesia	RG	0.33	0.40	-0.24	0.40
Iran	SS	0.56	0.57	0.77	0.49
Ireland*	EG	-0.08	-0.01	-0.32	0.82
Italy*	EG	-0.09	-0.08	-0.14	0.70
Jamaica	BS	-0.32	-0.38	0.51	0.49
Japan*	EG	-0.22	-0.11	-0.56	0.82

Notes: The abbreviations EG, SS, RG, and BS stand for established graduate, still in school, recent graduate, and back to school graduating classes, respectively. * identifies industrial countries.

Country	Graduating class	Country correlations between the cyclical components of the real government expenditure and real GDP			Average institutional quality
		Average 1960-2009	Average 1960-1999	Average 2000-2009	1984-2008
Jordan	SS	0.33	0.31	0.71	0.56
Kenya	SS	0.51	0.48	0.74	0.52
Korea	EG	-0.06	-0.01	-0.52	0.65
Kuwait	BS	0.07	-0.14	0.29	0.57
Libya	RG	0.02	0.45	-0.26	0.48
Madagascar	SS	0.47	0.53	0.29	0.50
Malaysia	RG	0.39	0.48	-0.74	0.63
Mali	SS	0.58	0.62	0.36	0.31
Mexico	SS	0.21	0.14	0.84	0.54
Morocco	RG	0.43	0.46	-0.10	0.58
Mozambique	SS	0.25	0.26	0.25	0.45
Myanmar	SS	0.66	0.65	0.73	0.29
Netherlands*	EG	-0.05	-0.03	-0.21	0.93
New Zealand*	SS	0.05	0.01	0.55	0.91
Nicaragua	SS	0.50	0.50	0.58	0.47
Niger	SS	0.64	0.65	0.36	0.41
Nigeria	RG	0.41	0.59	-0.75	0.34
Norway*	RG	-0.01	0.18	-0.88	0.89
Oman	RG	0.71	0.76	-0.06	0.61
Pakistan	SS	0.37	0.37	0.42	0.42
Panama	SS	0.16	0.10	0.85	0.41
Paraguay	RG	0.53	0.63	-0.14	0.38
Peru	SS	0.67	0.65	0.87	0.43
Philippines	RG	0.54	0.56	-0.19	0.44
Portugal*	SS	0.45	0.48	0.12	0.74
Qatar	SS	0.69	0.58	0.68	0.54
Saudi Arabia	RG	0.61	0.68	-0.62	0.60
Senegal	SS	0.47	0.46	0.75	0.46
Sierra Leone	SS	0.67	0.75	0.43	0.33
South Africa	SS	0.09	0.06	0.28	0.62
Spain*	EG	-0.26	-0.13	-0.62	0.76
Sri Lanka	SS	0.11	0.01	0.67	0.48
Sudan	BS	-0.15	-0.17	0.18	0.29
Sweden*	BS	0.08	-0.28	0.27	0.91
Switzerland*	BS	-0.52	-0.65	0.20	0.90
Syrian Arab Rep.	RG	0.76	0.79	-0.34	0.45
Tanzania	SS	0.24	0.14	0.87	0.47
Thailand	SS	0.23	0.22	0.35	0.58
Togo	SS	0.50	0.51	0.83	0.35
Trinidad and Tobago	SS	0.76	0.77	0.73	0.58
Tunisia	SS	0.48	0.48	0.73	0.55
Turkey	RG	0.15	0.47	-0.70	0.54
Uganda	RG	0.04	0.05	-0.02	0.42
United Arab Emirates	RG	-0.04	0.05	-0.12	0.57
United Kingdom*	EG	-0.52	-0.53	-0.43	0.87
United States*	EG	-0.35	-0.16	-0.94	0.87
Uruguay	SS	0.31	0.27	0.81	0.50
Venezuela	SS	0.45	0.40	0.68	0.44
Yemen	EG	-0.05	-0.04	-0.10	0.44
Zambia	RG	0.16	0.18	-0.37	0.43

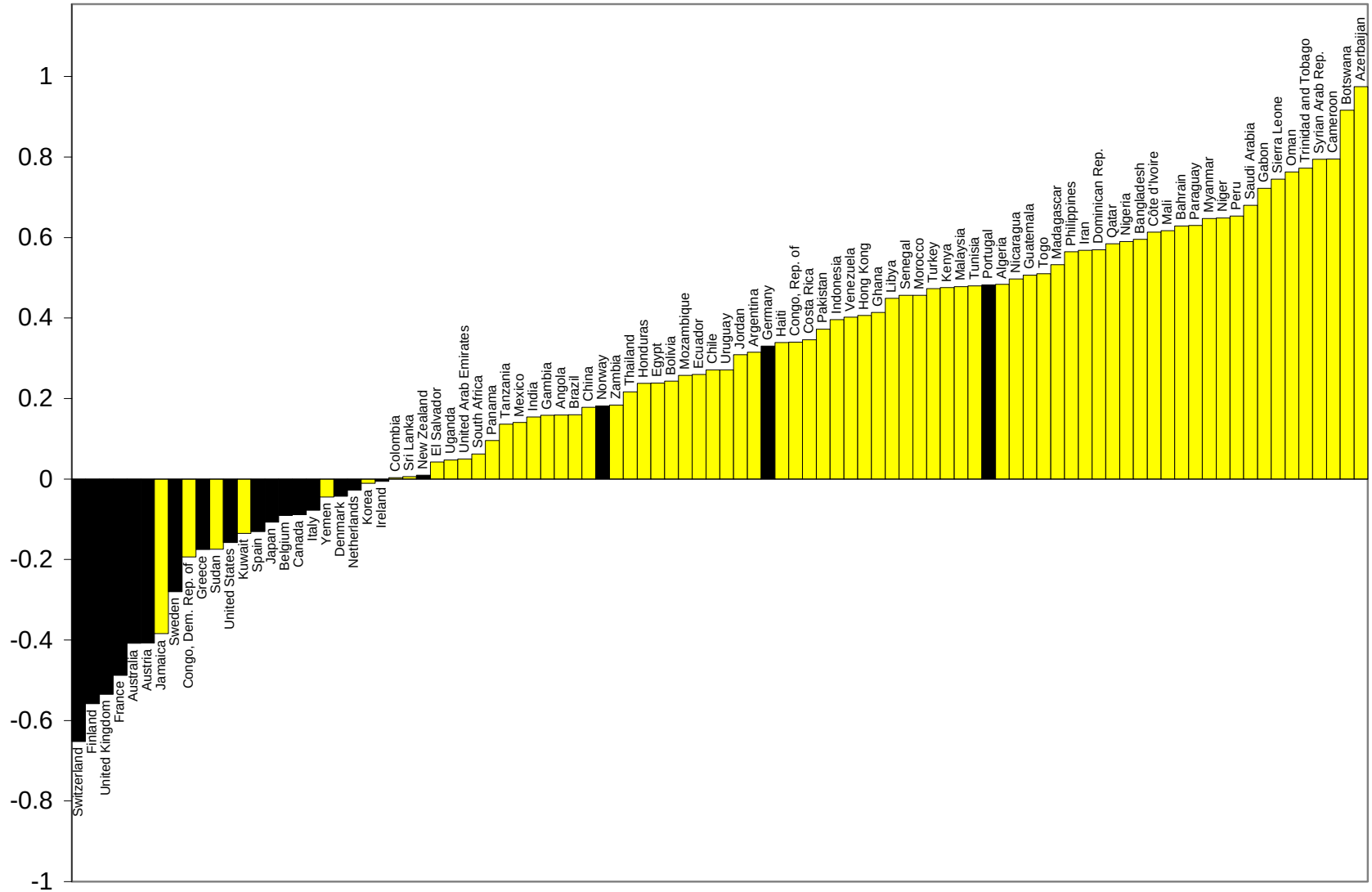
Notes: The abbreviations EG, SS, RG, and BS stand for established graduate, still in school, recent graduate, and back to school graduating classes, respectively. * identifies industrial countries.

Figure 1. Country correlations between the cyclical components of the real government expenditure and real GDP. 1960-2009



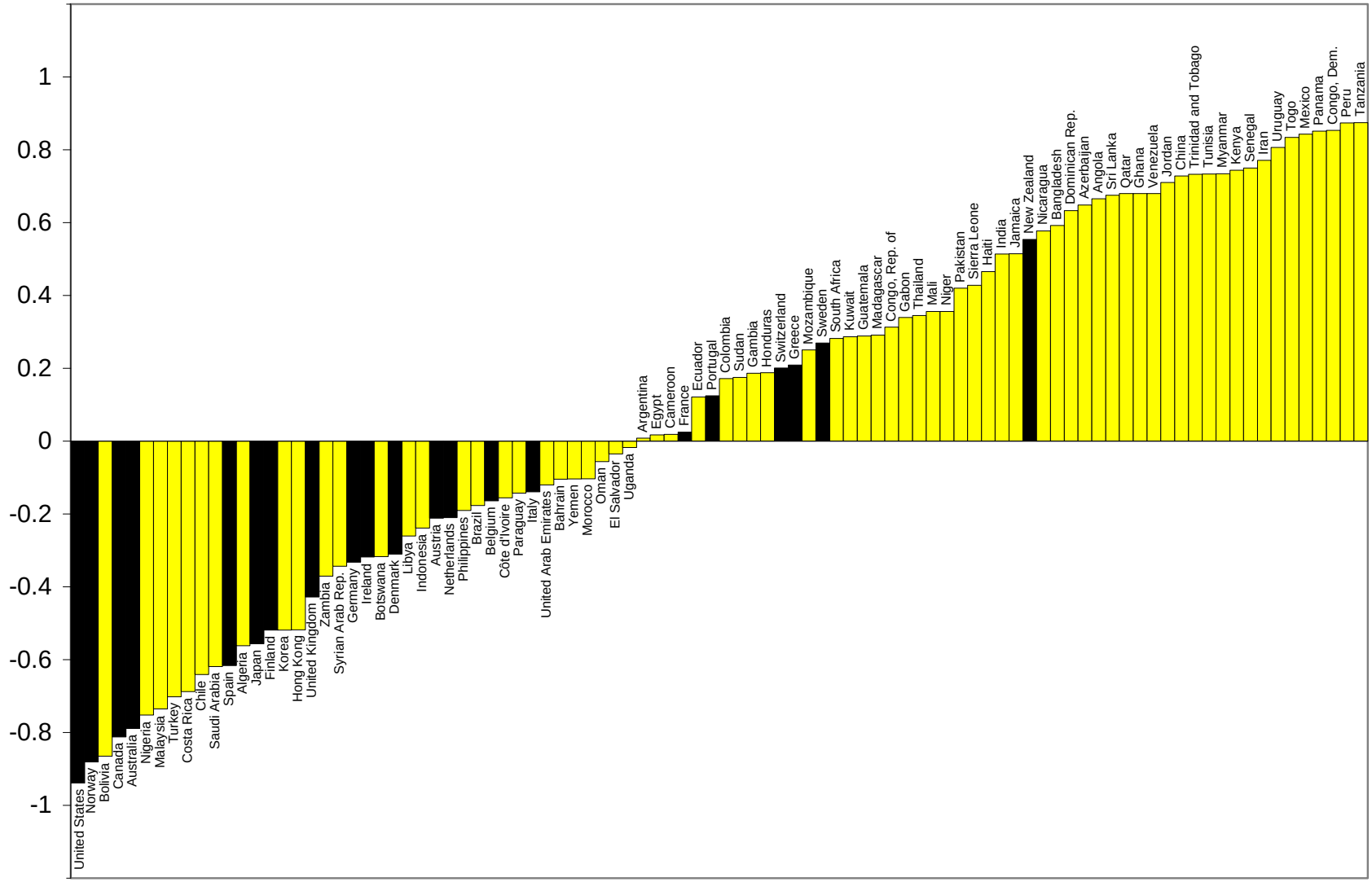
Notes: Dark bars are industrial countries and light ones are developing countries. The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. See Appendix 2 for correlation value for each country.
Source: World Economic Outlook and International Financial Statistics (IMF).

Figure 2. Country correlations between the cyclical components of the real government expenditure and real GDP. 1960-1999



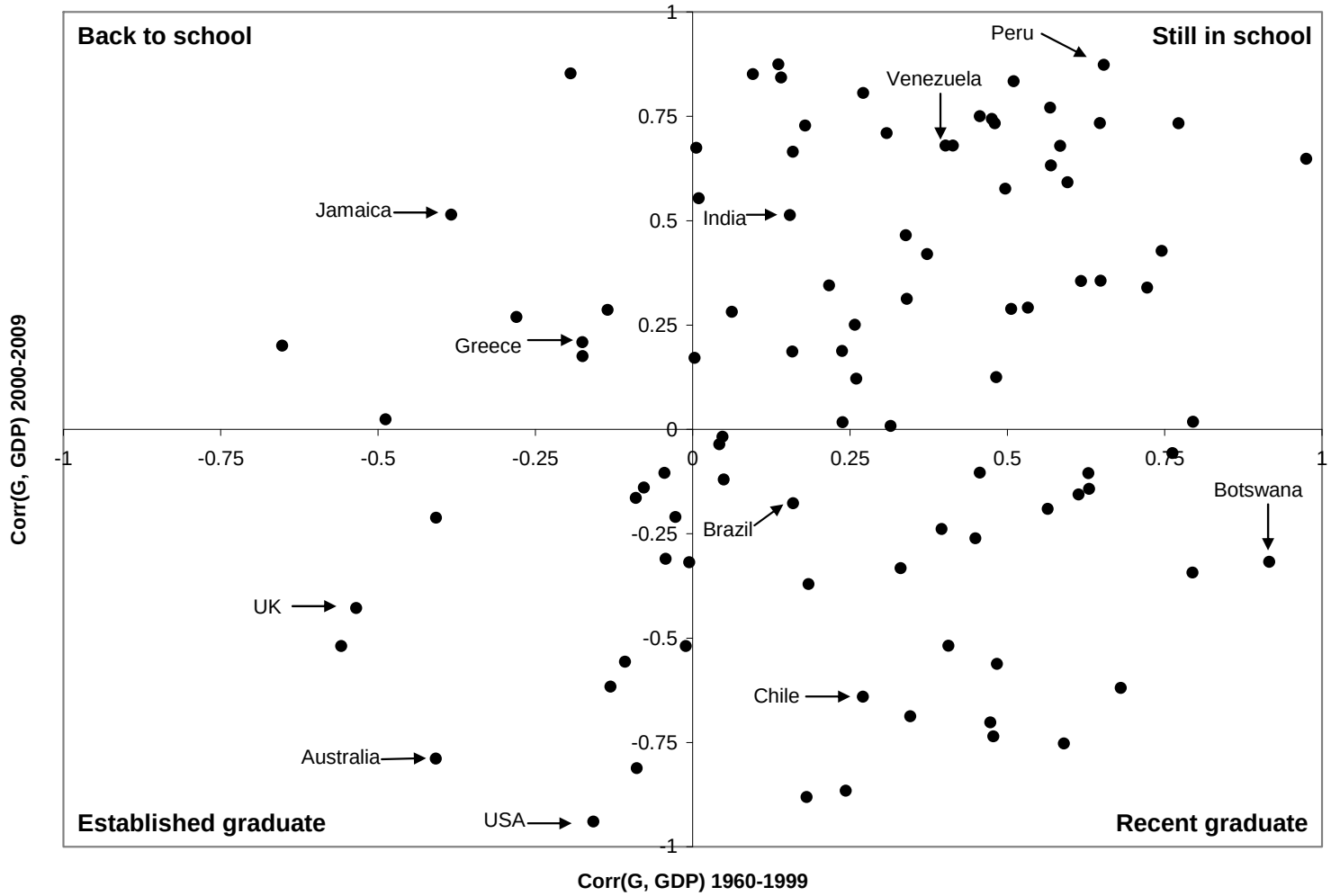
Notes: Dark bars are industrial countries and light ones are developing countries. The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. See Appendix 2 for correlation value for each country.
Source: World Economic Outlook and International Financial Statistics (IMF).

Figure 3. Country correlations between the cyclical components of the real government expenditure and real GDP. 2000-2009



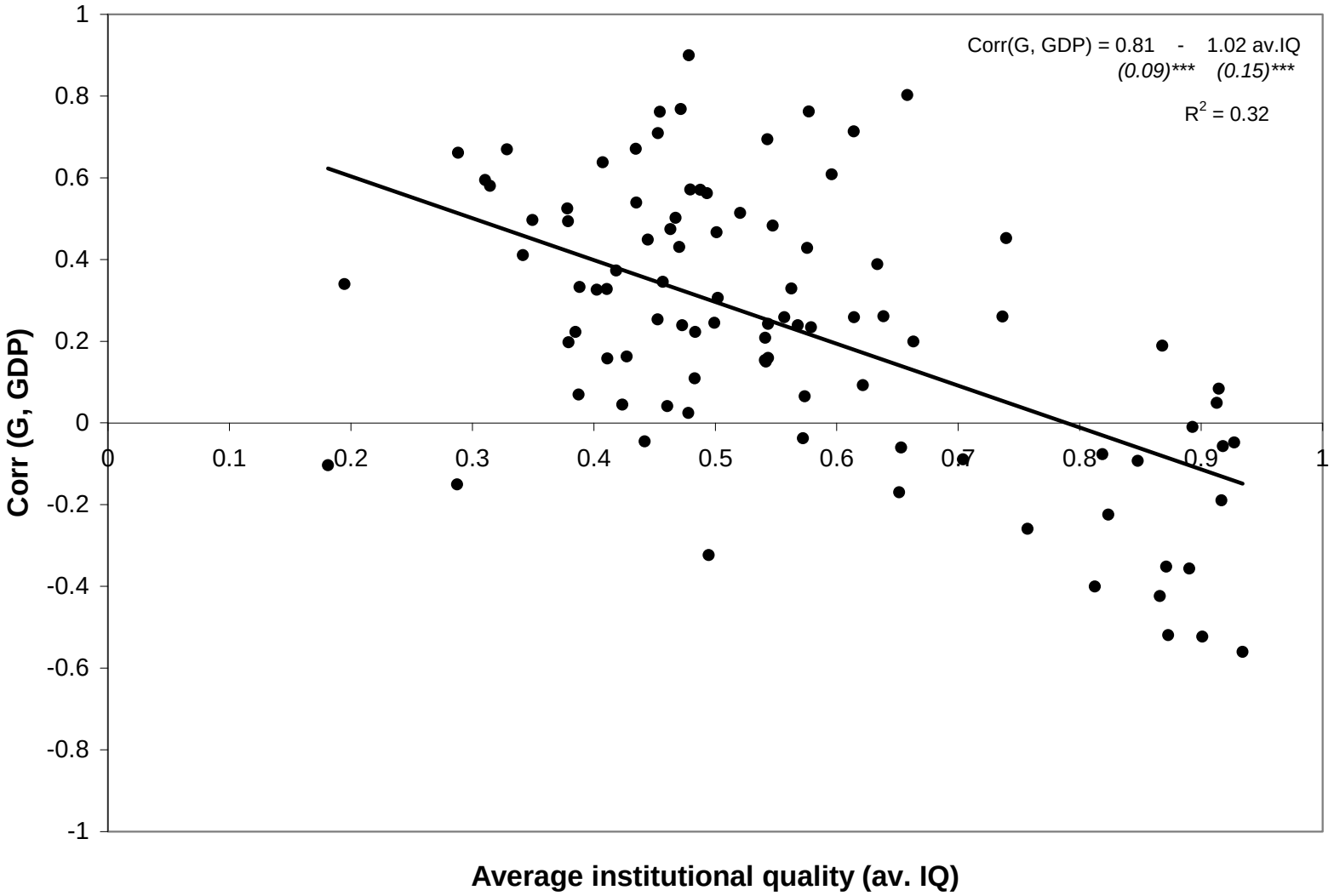
Notes: Dark bars are industrial countries and light ones are developing countries. The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. See Appendix 2 for correlation value for each country.
Source: World Economic Outlook and International Financial Statistics (IMF).

Figure 4. Country correlations between the cyclical components of the real government expenditure and real GDP. 1960-1999 vs. 2000-2009



Notes: The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. See Appendix 2 for correlation values for each country.
Established graduates: Australia, Austria, Belgium, Canada, Denmark, Finland, Ireland, Italy, Japan, Korea, Netherlands, Spain, United Kingdom, United States, and Yemen.
Never graduated: Angola, Argentina, Azerbaijan, Bangladesh, Cameroon, China, Colombia, Rep. of Congo, Dominican Rep., Ecuador, Egypt, Gabon, Gambia, Ghana, Guatemala, Haiti, Honduras, India, Iran, Jordan, Kenya, Madagascar, Mali, Mexico, Mozambique, Myanmar, New Zealand, Nicaragua, Niger, Pakistan, Panama, Peru, Portugal, Qatar, Senegal, Sierra Leone, South Africa, Sri Lanka, Tanzania, Thailand, Togo, Trinidad and Tobago, Tunisia, Uruguay, and Venezuela.
Back to school: Dem. Rep. of Congo, France, Greece, Jamaica, Kuwait, Sudan, Sweden, and Switzerland.
Recent graduates: Algeria, Bahrain, Bolivia, Botswana, Brazil, Chile, Costa Rica, Côte d'Ivoire, El Salvador, Germany, Hong Kong, Indonesia, Libya, Malaysia, Morocco, Nigeria, Norway, Oman, Paraguay, Philippines, Saudi Arabia, Syrian Arab Rep., Turkey, Uganda, United Arab Emirates, and Zambia.
Source: World Economic Outlook and International Financial Statistics (IMF).

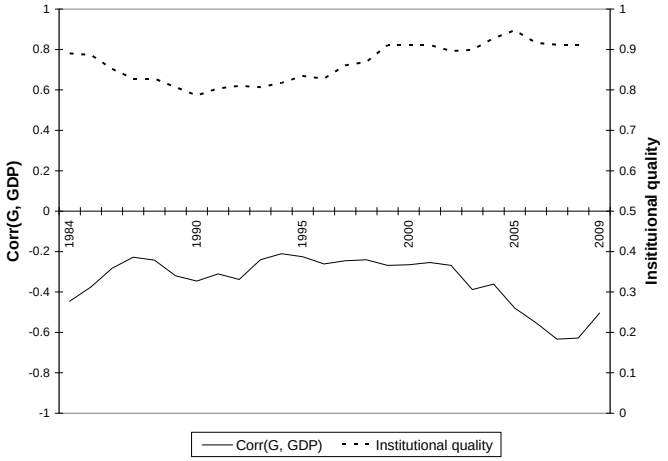
Figure 5. Country correlations between the cyclical components of the real government expenditure and real GDP (1960-2009) vs. average institutional quality (1984-2008)



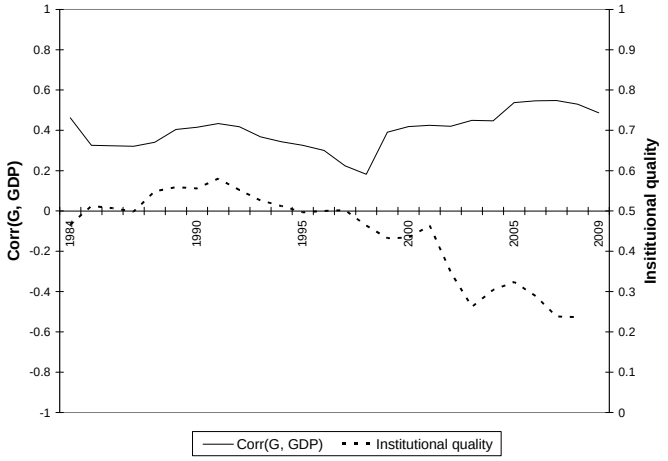
Notes: The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. Country correlations between the cyclical components of the real government expenditure and real GDP (i.e., Corr(G, GDP)) are calculated for the period 1960-2009. Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). The index is calculated as the average of four components: investment profile, corruption, law and order, bureaucracy quality. Country average institutional quality (i.e., av. IQ) is calculated for each country for the period 1984-2008. See Appendix 2 for correlation value and average institutional quality for each country.
Source: International Country Risk Guide (ICRG), World Economic Outlook and International Financial Statistics (IMF).

Figure 6. Graduation examples. Country correlations between the cyclical components of the real government expenditure and real GDP (20 years rolling windows) vs. institutional quality

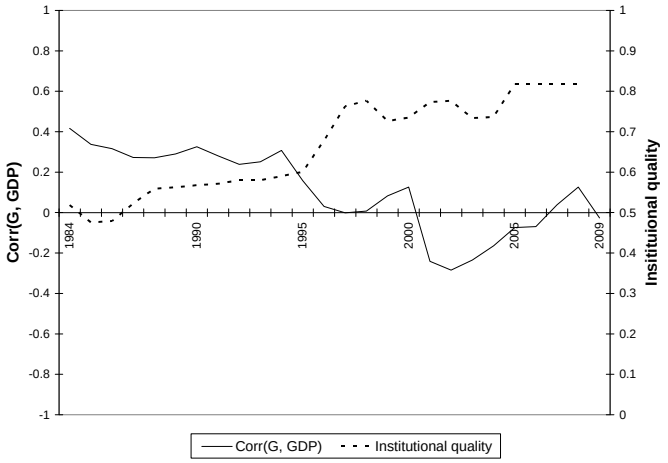
Panel A. Australia (established graduate)



Panel B. Venezuela (still in school)



Panel C. Chile (recent graduate)



Notes: The cyclical components have been estimated using the Hodrick-Prescott Filter. A positive (negative) correlation indicates procyclical (countercyclical) fiscal policy. Real government expenditure is defined as central government expenditure and net lending deflated by the GDP deflator. Country correlations between the cyclical components of the real government expenditure and real GDP (i.e., Corr(G, GDP)) are calculated as 20 years rolling windows for the period 1960-2009.

Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). The index is calculated as the average of four components: investment profile, corruption, law and order, bureaucracy quality. Actual institutional quality (i.e., for each year) is used.

Source: International Country Risk Guide (ICRG), World Economic Outlook and International Financial Statistics (IMF).

Table 1. Institutional quality statistics by graduating class

Dependent variable is:	IQ	IQ(initial)	ΔIQ
	(1)	(2)	(3)
Group means			
Established graduates (EG)	0.82	0.84	-0.02
Still in school (SS)	0.48	0.43	0.05
Recent graduate (RG)	0.55	0.47	0.07
Back to School (BS)	0.60	0.56	0.04
Mean tests (p-value)			
EG vs. SS	1.9×10^{-251}	1.8×10^{-12}	2.3×10^{-25}
EG vs. RG	2.1×10^{-120}	1.5×10^{-6}	7.7×10^{-33}
EG vs. BS	1.6×10^{-35}	0.01	5.9×10^{-20}
SS vs. RG	3.1×10^{-19}	0.35	1×10^{-4}
SS vs. BS	5×10^{-22}	0.08	0.60
RG vs. BS	4.5×10^{-4}	0.40	0.01

Notes: Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). The index is calculated as the average of four components: investment profile, corruption, law and order, bureaucracy quality. IQ refers to the actual institutional quality (i.e., for each year). IQ(initial) refers to earliest IQ value available for each country; in most cases it correspond to 1984's IQ value. The only exceptions are Rep. of Congo (1985), Gambia (1985), Niger (1985), Sierra Leone (1985), Yemen (1990), and Azerbaijan (1998). ΔIQ≡IQ-IQ(initial). The mean test is a t-test on the equality of means for two groups; the null hypothesis is that both groups have the same mean.
Source: International Country Risk Guide (ICRG).

Table 2. Panel regressions. Dependent variable is the cyclical component of the real government expenditure.

	All	Established graduates (EG)	Still in school (SS)	Recent graduate (RG)	Back to school (BS)	All	Still in school (SS)	Recent graduate (RG)	Back to school (BS)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RGDP cycle	1.99***	-1.84*	1.55***	1.04**	2.95***	2.11***	2.43***	1.26***	3.33***
	[11.9]	[-1.9]	[6.6]	[2.2]	[4.6]	[12.1]	[7.7]	[2.6	[4.7]
RGDP cycle ˣ IQ	-2.51***	1.49	-1.19**	-1.34ˣ	-4.36***				
	[-7.4]	[1.3]	[-2.3]	[-1.6]	[-3.2]				
RGDP cycle ˣ IQ(initial)						-2.81***	-3.25***	-1.41ˣ	-4.43***
						[-7.7]	[-4.5]	[-1.64]	[-3.3]
RGDP cycle ˣ ΔIQ						-1.70***	0.05	-3.67***	-10.91**
						[-3.4]	[0.1]	[2.6]	[-2.1]
R^2	0.10	0.09	0.17	0.02	0.13	0.11	0.18	0.03	0.13
Observations	2273	369	1101	621	182	2273	1101	621	182
Countries	94	15	45	26	8	94	45	26	8

Notes: Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). IQ refers to the current IQ value. IQ(initial) refers to earliest IQ value available for each country; in most cases it correspond to 1984's IQ value. ΔIQ≡IQ-IQ(initial). Estimations are performed using country-fixed-effects. t-statistics are in square brackets. R^2 corresponds to within- R^2. Constant, IQ, IQ(initial), and ΔIQ terms are not reported.
ˣ, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 3. Panel regressions. Dependent variable is the cyclical component of the real government expenditure.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
RGDP cycle	1.99***	0.87***	1.26***	0.79***	1.11***	2.12***	2.25***
	[11.9]	[12.7]	[13.4]	[13.6]	[12.4]	[9.1]	[8.6]
RGDP cycle ˣ IQ	-2.51***					-2.54***	-1.95***
	[-7.4]					[-6.0]	[-3.4]
RGDP cycle ˣ Financial integration		0.01				0.15***	
		[0.2]				[3.0]	
RGDP cycle ˣ Financial depth			-1.10***				-0.54*
			[-4.7]				[-1.7]
RGDP cycle ˣ Output volatility				0.0004***		-0.0004	-0.0003
				[2.9]		[-0.9]	[-0.5]
RGDP cycle ˣ Checks and balances					-0.12***	-0.08*	-0.07
					[-3.2]	[-1.9]	[-1.4]
R^2	0.10	0.08	0.09	0.08	0.09	0.11	0.11
Observations	2273	3294	2930	4089	3044	2130	1691
Countries	94	94	94	94	93	93	93

Notes: Institutional quality is a normalized index that ranges between 0 (lowest institutional quality) and 1 (highest institutional quality). IQ refers to the current IQ value. Estimations are performed using country-fixed-effects. t-statistics are in square brackets. R^2 corresponds to within- R^2. Constant, IQ, financial integration, output volatility, and checks and balances terms are not reported.
ˣ, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 4. Cross-country correlations between economic, institutional, demographic and geography variables.

	Corr(G, GDP)	Av. IQ	Financial integration	Financial depth	Output volatility	Checks and balances	Log european settler mortality	Latitude	British colonial dummy	French colonial dummy	French legal origin dummy	Democracy in 1900	Constraint on executive in 190	Terms of trade volatility
Corr(G, GDP)	1													
Av. IQ	-0.49	1												
Financial integration	-0.08	-0.12	1											
Financial depth	-0.34	0.60	-0.05	1										
Output volatility	0.49	-0.37	0.25	-0.44	1									
Checks and balances	-0.35	0.49	-0.18	0.33	-0.31	1								
Log european settler mortality	0.47	-0.61	0.21	-0.63	0.53	-0.46	1							
Latitude	-0.36	0.54	-0.16	0.50	-0.32	0.20	-0.52	1						
British colonial dummy	-0.43	0.36	-0.13	0.47	-0.33	0.34	-0.27	0.19	1					
French colonial dummy	0.41	-0.25	-0.01	-0.15	0.19	-0.41	0.38	-0.02	-0.44	1				
French legal origin dummy	0.43	-0.36	0.11	-0.36	0.34	-0.32	0.23	-0.13	-0.92	0.44	1			
Democracy in 1900	-0.53	0.70	-0.11	0.42	-0.34	0.36	-0.58	0.52	0.20	-0.30	-0.11	1		
Constraint on executive in 1900	-0.52	0.65	-0.16	0.38	-0.31	0.36	-0.56	0.46	0.14	-0.31	-0.03	0.95	1	
Terms of trade volatility	0.20	-0.40	0.08	-0.47	0.37	-0.40	0.43	-0.42	0.00	0.03	-0.06	-0.34	-0.32	1

Notes: See Appendix 1 for definition and source of variables.

Table 5. Cross-country regressions. Dependent variable is the correlation between the cyclical components of the real government expenditure and GDP.

	Whole sample	IV sample	Whole sample	IV sample	Whole sample	IV sample	Whole sample	IV sample	Whole sample	IV sample
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Av. IQ	-1.02*** [-6.6]	-0.90*** [-4.0]							-0.50** [-2.3]	-0.65** [-2.2]
Financial depth			-0.43*** [-4.0]	-0.59** [-2.6]					-0.16 [-1.2]	0.10 [0.4]
Output volatility					0.08*** [6.9]	0.08*** [3.9]			0.05*** [4.1]	0.05** [2.7]
Checks and balances							-0.12*** [-5.5]	-0.09** [-2.7]	-0.02 [-0.9]	-0.02 [-0.6]
R^2	0.32	0.24	0.15	0.12	0.34	0.24	0.25	0.12	0.48	0.36
Observations	94	52	94	52	94	52	93	52	93	52

Notes: See Appendix 1 for definition and source of variables. t-statistics are in square brackets. Constant term is not reported.
×, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 6. Cross-country regressions. Dependent variables are Av. IQ, Financial integration, Output volatility, and Checks and balances.

PANEL A

	Dependent variable is Av. IQ							Dependent variable is Financial depth						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log european settler mortality	-0.07*** [-5.5]						-0.02 [-1.4]	-0.08*** [-5.7]						-0.06*** [-3.3]
Latitude		0.59*** [4.6]					0.13 [1.0]		0.57*** [4.1]					0.09 [0.6]
British colonial dummy			0.06 [0.5]				-0.09 [-1.3]			0.29*** [2.9]				0.21** [2.6]
French colonial dummy			-0.04 [-0.7]				0.04 [1.1]			0.02 [0.4]				0.07* [1.7]
French legal origin dummy			-0.04 [-0.4]				-0.19** [-2.6]			0.14 [1.4]				0.08 [1.0]
Democracy in 1900				0.03*** [6.9]			0.01 [0.8]				0.02*** [3.3]			0.01 [0.3]
Constraint on executive in 1900					0.05*** [6.1]		0.02 [0.9]					0.03*** [2.9]		-0.01 [-0.3]
Terms of trade volatility						-0.01*** [-3.1]	-0.01 [-1.3]						-0.02*** [-3.7]	-0.01** [-2.1]
R^2	0.38	0.30	0.15	0.49	0.43	0.16	0.67	0.40	0.25	0.25	0.18	0.14	0.22	0.61
Observations	52	52	52	52	52	52	52	52	52	52	52	52	52	52

Notes: See Appendix 1 for definition and source of variables. t-statistics are in square brackets. Constant term is not reported.
×, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 6 cont. Cross-country regressions. Dependent variables are Av. IQ, Financial integration, Output volatility, and Checks and balances.

PANEL B

	Dependent variable is Output volatility							Dependent variable is Checks and balances						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log european settler mortality	0.74*** [4.4]						0.56** [2.3]	-0.41*** [-3.7]						-0.16 [-1.1]
Latitude		-4.15** [-2.4]					0.48 [0.2]		1.61 [1.4]					-1.14 [-0.9]
British colonial dummy			-0.43 [-0.3]				0.45 [0.4]			0.40 [0.5]				-0.09 [-0.1]
French colonial dummy			0.17 [0.3]				-0.54 [-0.9]			-0.82** [-2.2]				-0.45 [-1.2]
French legal origin dummy			0.75 [0.6]				1.60 [1.4]			-0.06 [-0.1]				-0.66 [-0.9]
Democracy in 1900				-0.19** [-2.6]			0.03 [0.2]				0.13*** [2.8]			-0.04 [-0.3]
Constraint on executive in 1900					-0.26** [-2.3]		-0.12 [-0.4]					0.19*** [2.7]		0.13 [0.6]
Terms of trade volatility						0.17*** [2.8]	0.10 [1.6]						-0.12*** [-3.1]	-0.10** [-2.6]
R^2	0.28	0.10	0.12	0.12	0.10	0.14	0.39	0.21	0.04	0.20	0.13	0.13	0.16	0.40
Observations	52	52	52	52	52	52	52	52	52	52	52	52	52	52

Notes: See Appendix 1 for definition and source of variables. t-statistics are in square brackets. Constant term is not reported.
ˣ, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.

Table 7. Instrumental variable cross-country regressions. Dependent variable is the correlation between the cyclical components of the real government expenditure and GDP.

	Instrumenting only for Av. IQ				Instrumenting for Av. IQ and FD	Instrumenting for Av. IQ, FD, and OV	Instrumenting for all right-hand-side variables
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Av. IQ	-1.44*** [-6.1]	-1.63*** [-5.1]	-1.30*** [-4.6]	-1.29*** [-4.2]	-1.26*** [-4.2]	-1.57*** [-3.5]	-1.42** [-2.5]
Financial development (FD)		0.32 [1.4]	0.40** [2.1]	0.37* [1.9]	0.25 [1.0]	0.13 [0.5]	0.09 [0.1]
Output volatility (OV)			0.06*** [3.5]	0.06*** [3.5]	0.06*** [3.3]	-0.00 [-0.0]	-0.05 [-0.5]
Checks and balances (CB)				0.001 [0.1]	0.006 [0.2]	0.001 [0.04]	-0.11 [-1.1]
Overidentification test (p-value)	0.73	0.76	0.56	0.54	0.38	0.38	0.76
Weak identification tests (p-value):							
For Av. IQ	1.7×10^{-12}	5×10^{-8}	1.2×10^{-8}	1.6×10^{-6}	9.8×10^{-9}	1.3×10^{-8}	1.7×10^{-12}
For Financial development					1.8×10^{-5}	8×10^{-8}	2.7×10^{-10}
For Output volatility						7.3×10^{-5}	2.6×10^{-5}
For Checks and balances							1.6×10^{-7}
Observations	52	52	52	52	52	52	52

Notes: See Appendix 1 for definition and source of variables. t-statistics are in square brackets. The weak-identification test is the first-stage F test of excluded instruments; the null hypothesis is that the model is weakly identified (i.e., the excluded instruments have a nonzero correlation with the endogenous regressors but small). The over-identification test is the Hansen's J statistic; the null hypothesis is that the instruments are exogenous (i.e., uncorrelated with the error term). Constant term is not reported.
ˣ, *, ** and *** indicate statistically significant at the 15%, 10%, 5% and 1% levels, respectively.