Is monetary policy constrained by fiscal policy?

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Abstract

In this paper we analyse how fiscal policy has affected monetary policy in the emerging market economies (EMEs). We find that most EMEs have pursued countercyclical fiscal and monetary policy over the past decade, with little evidence of fiscal dominance, in contrast to earlier periods. Our results also suggest that stronger fiscal positions are weakly associated with lower equilibrium real interest rates, and smaller deficits with lower inflation. Overall, improvements in fiscal policy in EMEs appear to have increased the effectiveness of monetary policy.

Keywords: Fiscal policy, monetary policy, Taylor rule

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1. Introduction

Fiscal policy and public debt matter for monetary policy. Not only can they influence interest rates and the level of aggregate demand, but they may also affect monetary authorities' ability to control inflation. During the 1980s and 1990s, public debt levels in many emerging market economies (EMEs) remained high, constraining monetary policy. However, over the past decade fiscal positions in EMEs have generally improved. Public debt levels have fallen or moderated and governments in several economies have accumulated large holdings of financial assets. Many economies have adopted formal fiscal rules and most have abolished direct central bank financing of deficits, reducing the threat of fiscal dominance.

Notwithstanding their strong medium-term growth prospects, EMEs' fiscal positions are still exposed to financial and external demand shocks. In addition, many EMEs are likely to face significant fiscal pressures from ageing populations over the long term. Furthermore, contingent liabilities from government-owned corporations and the financial sector require careful monitoring.

What are the implications of fiscal developments for monetary policy? In this note, we discuss three key aspects of this question. First, have EMEs left behind the era of fiscal dominance? Do they consistently pursue countercyclical monetary and fiscal policies? We argue that the ability of EME policymakers to conduct countercyclical economic policies represents a major advance, and one that contributes to global economic stability. But of course, countercyclical monetary and fiscal policies are not sufficient by themselves for good macroeconomic outcomes – in fact, many advanced economies facing economic crises today do so in spite of their countercyclical policies in the past. Second, is the long-run real interest rate related to fiscal deficits and the level of government debt? If so, further improvements in fiscal sustainability measures might lower real interest rates. Conversely, poor fiscal performance may have negative implications for long-run growth. Further, a fiscal deterioration could raise the spectre of a return to fiscal dominance and so complicate central banks' efforts to control inflation. And third, what is the relationship between inflation and the government deficit? Are fiscal policies an important determinant of monetary stability?

The rest of the note is organised as follows. In Section 2 we discuss factors influencing the relationship between fiscal and monetary policy. In Section 3 we present some preliminary empirical evidence on the three questions set out above. Using estimated Taylor rules, we show that both monetary and fiscal policy were generally countercyclical in EMEs over the past decade. Furthermore, equilibrium real interest rates are generally lower when fiscal deficits or government debts are lower. Finally, lower fiscal deficits are also associated with lower inflation in EMEs. The final section concludes.

2. Factors influencing the relationship between fiscal and monetary policy

Countercyclicality of fiscal policy

Some components of the budget balance vary with the business cycle, independently of policy decisions. Such automatic stabilisers include many types of tax revenue and social transfers. The structural, or cyclically adjusted, fiscal deficit is a measure of the hypothetical fiscal stance if output were to equal potential.

Table 1 shows general government fiscal deficits and cyclically adjusted deficits as a percentage of GDP in EMEs. For 2011, by the latter measure, the fiscal stance in EMEs appears to be more expansionary than suggested by fiscal deficits, with some exceptions such as China and the Czech Republic. Also, headline fiscal surpluses invert to deficits in

Chile, Hungary and Hong Kong SAR in 2011 after controlling for the effects of the business cycle.

Table 1

General government fiscal and cyclically adjusted deficit[1]

	Fiscal deficit						Cyclically adjusted deficit			
	1990–99[2, 3]	2000–07[2, 4]	2008	2009	2010	2011	2008	2009	2010	2011
Emerging Asia[5]	0.2	1.0	0.0	2.7	1.2	1.2	0.2	2.2	1.4	1.8
China	2.3	1.8	0.4	3.1	2.3	1.2	0.0	2.4	1.5	0.0
Hong Kong SAR	-2.0	0.0	-0.1	-1.6	-4.5	-3.7	-0.2	2.2	1.4	2.2
India	7.7	8.0	7.2	9.8	9.2	8.7	9.3	10.8	9.7	9.1
Indonesia	…	1.0	0.0	1.8	1.2	1.6	0.2	1.7	1.2	1.6
Korea	-2.0	-2.1	-1.6	0.0	-1.7	-2.3	-1.8	-0.7	-1.7	-2.4
Malaysia	-0.1	3.7	3.2	5.3	3.7	5.1	4.9	5.8	6.1	5.4
Philippines	0.5	2.4	0.0	2.7	2.2	0.8	1.7	3.5	3.5	2.1
Singapore	-21.0	-10.1	-5.6	0.5	-5.1	-7.3	-5.3	0.1	-4.8	-7.1
Thailand	2.2	0.4	-0.1	3.2	0.8	1.9	0.8	2.1	0.4	1.8
Latin America[5]	2.2	1.8	0.8	3.6	2.8	2.6	1.2	2.1	2.1	2.9
Argentina	2.7	4.6	0.8	3.6	1.6	3.3	1.1	1.7	0.7	3.3
Brazil	5.9	3.5	1.4	3.1	2.8	2.6	2.2	2.6	3.8	3.2
Chile	-0.6	-2.4	-4.1	4.1	0.3	-1.2	1.1	4.1	2.0	1.2
Colombia	1.6	1.8	0.0	2.5	3.1	2.1	2.1	0.7	2.2	2.5
Mexico	3.1	2.1	1.1	4.7	4.3	3.4	1.3	3.8	3.8	3.2
Peru	…	0.4	-2.2	2.1	0.3	-1.9	-0.8	0.9	1.1	-0.9
Venezuela	1.8	-0.1	2.6	8.1	5.9	5.3	…	…	…	…
CEE[5]	4.8	4.3	2.4	5.8	4.3	0.3	3.9	4.0	3.9	3.1
Czech Republic	5.6	4.0	2.2	5.8	4.8	3.8	3.2	4.5	3.9	3.1
Hungary	3.3	6.6	3.7	4.5	4.3	-4.0	5.2	2.7	4.8	4.6
Poland	4.1	4.3	3.7	7.3	7.8	5.2	4.7	6.9	7.9	5.5
Russia	5.9	-4.6	-4.9	6.3	3.5	-1.6	-3.9	3.4	2.2	-1.6
Turkey	…	5.0	2.4	5.6	2.7	0.3	3.9	4.0	3.2	1.8
Other EMEs[5]	2.5	0.6	0.5	5.3	4.6	4.0	3.2	5.2	4.4	4.2
Israel	…	5.0	3.4	6.0	4.6	4.0	4.0	5.3	4.3	4.2
Saudi Arabia	2.5	-10.8	-34.4	4.6	-6.6	-15.2	…	…	…	…
South Africa	…	0.6	0.5	5.3	4.9	4.6	2.3	5.1	4.5	4.2
EMEs[5]	2.3	1.8	0.4	4.3	2.8	1.7	1.5	3.1	2.7	2.4

[1] Overall fiscal deficit as a percentage of GDP and overall cyclically adjusted deficit as a percentage of potential GDP, respectively. [2] Mean [3] For Hong Kong SAR, 1991–99; for the Philippines, 1994–99; for Korea, Thailand, the Czech Republic, Hungary and Poland, 1995–99; for Brazil and Chile, 1996–99; for Argentina, 1997–99; for Russia, 1998–99; for Saudi Arabia, 1999. [4] For Turkey, 2002–07. [5] Simple median of the economies shown.

Sources: IMF, *World Economic Outlook* and Fiscal Monitor Databases, April 2012.

Even so, there are issues with the accuracy of cyclically adjusted balance measures in EMEs. As discussed in the background paper from the Czech Republic, they can be very sensitive to underlying assumptions about the level of potential output. A second problem relates to the adjustment of budget balances for commodity price changes. To be

meaningful, the structural budget balance must correct for exceptional movements in the terms of trade. This factor is particularly important in economies with a large share of production related to commodities such as mining, energy (including oil) and agricultural products. The methodology for adjusting for commodity prices parallels that used to construct a cyclically adjusted deficit, and amounts to adjusting tax revenues to those that would be received were commodity prices at equilibrium levels.

Some economies already use an estimate of equilibrium commodity prices to estimate structural budget balances. Since 2002, Chile has used a rule-based fiscal policy whereby the structural budget balance is adjusted for cyclical movements in the prices of copper and molybdenum. According to the background paper by the Central Bank of Chile, an escape clause on the fiscal rule was put in place in 2009 to allow more scope for countercyclical fiscal policy during the recent global financial crisis. In 2010, Colombia introduced a targeting rule on the structural primary balance adjusted for the effects of cyclical oil prices. And Peru uses the structural budget balance adjusted for the cyclical effects of mining and energy prices as a guideline for multi-annual macroeconomic planning. According to the IMF (2009b), variation in commodity prices from equilibrium levels reduced the fiscal deficit by 0.7 percentage points of GDP in 2008 and raised it by 1.8 percentage points in 2009 across EMEs.

Fiscal sustainability

Fiscal sustainability is often defined in terms of measures of gross or net debt, as well as the change in debt given by the current and the expected future primary balance. Data for gross debt are more readily available than for net debt, and represent the total stock of outstanding government debt. Net debt is the difference between gross debt and financial assets owned by the government, although precise definitions vary by economy.[2] Gross debt influences interest rates because it represents the total stock of debt that governments need to roll over. However, investors' perceptions could also depend on net debt, especially in economies where the government holds a large stock of financial assets.

In general, central banks regard net debt as the more appropriate measure of underlying government indebtedness since the financial holdings of the government can be liquidated to offset a portion of the gross debt. The difference between gross and net debt widened in many developed economies in the wake of the international financial crisis as a result of government purchases of financial assets, a process that is likely to reverse in the coming years as governments reduce their holdings of such assets.

However, there are limitations to net debt as a measure of fiscal sustainability. In some cases, a portion of the government's financial assets represents the government's future obligations – government debt held by pension funds for government employees, for example. While these holdings may clearly be used to offset debt issued by the government, the future pension obligations that they are intended to finance would then need to be funded from some other source. Also, gross debt may be an important indicator of short-term fiscal vulnerability if there are limits to markets' ability to absorb the sale of financial assets held by the government, especially during times of financial stress. As the government needs to refinance its gross (rather than net) debt as it matures, its ability to refinance its existing debt stock depends not only on the total level of debt but also on its maturity structure.

As Graph 1 shows, gross debt in major EMEs varies widely. The graph also shows that, while net debt is a little lower than gross debt for most economies, in some cases the

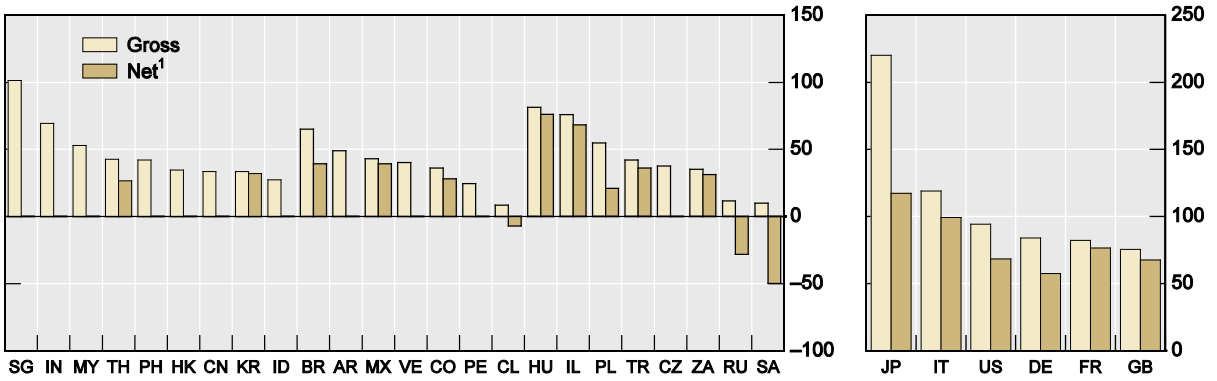
[2] For economy-level data, please refer to Tables A3-A4 in the Appendix.

difference between the two is very large. Poland's net debt is less than half of its gross debt, and in Saudi Arabia gross debt of 10% compares with net debt of –50%.

Graph 1

General government debt 2010

As a percentage of GDP



AR = Argentina; B = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DE = Germany; FR = France; GB = United Kingdom; HK = Hong Kong SAR; HU = Hungary; IL = Israel; ID = Indonesia; IN = India; IT = Italy; JP = Japan; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = Philippines; PL = Poland; RU = Russia; SA = Saudi Arabia; SG = Singapore; TH = Thailand; TR = Turkey; US = United States; VE = Venezuela; ZA = South Africa.

[1] As of 2009 for Russia; net debt data of Argentina, China, Czech Republic, Hong Kong SAR, India, Indonesia, Malaysia, Peru, Philippines, Singapore and Venezuela are not available.

Sources: IMF, *Government Finance Statistics*; IMF, *World Economic Outlook*; CEIC; national data.

Comparable data for the six largest advanced countries (by GDP) is reported in the right-hand panel of the graph. All the advanced economies are more indebted than all but two of the EMEs in net terms. This suggests that the EMEs are currently in much better shape than the major advanced economies in terms of debt sustainability.

As fiscal sustainability is primarily about the expected future path of public debt, it is natural to consider public debt projections as a measure of fiscal sustainability. Current debt levels provide the starting point for such projections. These are then combined with assumptions about the future. The key variables are the economy's expected growth rate, government spending levels and interest rates. Given the inherent uncertainties regarding these variables, any debt projections should be interpreted with caution, and the major underlying assumptions critically examined.

Table A2 in the Appendix contains past and projected levels of public gross debt published by the IMF for EMEs. Debt levels increased in many economies between 2006 and 2010 as a result of the international financial crisis. However, in almost all EMEs gross debt is projected to be lower as a percentage of GDP in 2016 than in 2010. In terms of levels, the projections in the tables suggest some vulnerability. Gross debt is projected to remain close to 60% of GDP in India, Brazil and Israel beyond 2016, and above 70% in Hungary. This leaves fiscal sustainability in these economies somewhat vulnerable to a spike in interest rates, for example. In Singapore, high gross debt is less of a concern due to the large offsetting asset positions held by the government.

Overall, the projections suggest that debt remains sustainable in most EMEs, at least for the next five years. However, ongoing population ageing that is projected to accelerate beyond then (see the discussion in the Annex and Graph A1) may pose a challenge further down the road.

Contingent liabilities of the government

One key factor that all the previous analysis ignores is "invisible" public debt that may not be captured in standard debt statistics and may be very difficult to forecast. This latent debt reflects obligations to public corporations as well as explicit or implicit government guarantees. These contingent liabilities may also reduce balance sheet transparency and increase the risk of negative debt surprises, as the note from Thailand argues.

Large state-owned corporations are a major source of invisible debt. These corporations play an important role in many EMEs, especially in sectors considered to be natural monopolies. For example, Indonesia's state-owned Pertamina is the world's largest exporter of liquefied natural gas, while Indian Railways is the country's largest employer. State-owned entities benefit from the expectation of backing from the fiscal authority, resulting in lower financing costs. PetroChina, which is 87% state-owned, pays a spread of 160 basis points over Chinese sovereigns; by comparison, the private sector ExxonMobil pays 265 basis points over US sovereigns. Lenders have come to expect the government to prevent failures of state-owned firms, implying a potential liability for the fiscal authority. However, the debt of state-owned corporations does not generally appear in government debt statistics.

Banking is another source of invisible public debt. State-owned banks account for a large share of many EME banking systems. China's largest banks are majority-owned by the government. In India, state-owned banks hold over 75% of all deposits, a market share that has been growing since the beginning of the international financial crisis. While the debts of these institutions are not counted as part of public debt, the fiscal authority is likely to bail them out if necessary. As the background note for the case of Hungary shows, foreign currency-denominated private debt can also create challenges.

Even private sector banks may benefit from implicit government guarantees. In India, private sector banks are largely free from the fear of failure as the government guarantees to take over banks' uncovered liabilities if necessary. In late 2008, many governments in advanced economies resorted to significant bailouts of private sector banks, substantially swelling public sector debt. In earlier crises, Turkey's public debt-to-GDP ratio rose from around 30% in 1999 to nearly 70% in 2001, and that of Thailand increased by two thirds as a result of the Asian financial crisis. While it is impossible to predict the potential cost of implicit guarantees to the financial sector in future, clearly a well regulated and well capitalised banking system plays an important part in ensuring fiscal sustainability. More generally, maintaining a precautionary debt buffer below the limit of what is sustainable is prudent in the light of implicit liabilities.

3. Consequences for monetary policy

In this section, we formally analyse the three questions asked at the outset. First, we examine the cyclical properties of fiscal and monetary policies. Second, we examine how fiscal deficits and outstanding debt stocks might affect the real interest rate. Finally, we take a look at how fiscal deficits might affect inflation.

Monetary and fiscal stabilisation

In the past, EMEs often found it difficult to implement countercyclical policies. This was particularly the case for central banks. Monetary policy was frequently subordinated to the requirements of an expansionary fiscal policy, a condition described by Sargent and Wallace (1981) as fiscal dominance. And fiscal expansion during economic upturns left little scope for countercyclical policies during downturns. However, the era of fiscal dominance appears to have ended in most EMEs; monetary and fiscal policies appear to be countercyclical. We now examine this question further with statistical analysis.

One way to measure how far monetary policy is countercyclical is to estimate the correlation between the business cycle and the real policy interest rate, controlling for other relevant factors. The Taylor (1993) rule offers a straightforward way to do so. The policy rate is modelled as responding to several variables:

$$i = p + a(y - y^*) + b(p - p^*) + r^* \quad (1)$$

where i is the nominal policy interest rate, p is the rate of inflation, p^* is the (explicit or implicit) inflation target, y-y^* is the output gap, r^* is the "equilibrium" real interest rate; a and b are parameters that represent the degree to which a central bank responds to output and inflation developments, respectively. The intuition behind the Taylor rule is straightforward: a monetary authority should adjust the policy rate one-for-one for changes in inflation (p) and should respond positively to business cycle fluctuations (y-y^*) and the deviation of inflation from the inflation target (p-p^*). In particular, a larger a captures a more countercyclical monetary policy, while a negative value would imply a procyclical monetary policy.[3]

For fiscal policy, Taylor (2000) provides an analogous approach. The fiscal balance, measured as a percentage of GDP, is split into structural and cyclical factors:

$$b = b^* - g(y - y^*) \quad (2)$$

where b denotes the general government budget balance as a percentage of GDP, b^* the cyclically adjusted deficit, y-y^* the output gap and g the degree of sensitivity of budget balance to the output gap. The coefficient g can be used to measure for the degree of countercyclicality; the larger g becomes, the more countercyclical is fiscal policy. Similarly, as in the case of monetary policy, a negative g would imply procyclical fiscal policies.

The degree to which monetary and fiscal policies are countercyclical is estimated over the 2000–11 period for a subset of EMEs that have adopted inflation targeting. To better match the data in the EMEs under investigation, equation 1 is extended to include an exchange rate term to reflect EME concerns about exchange rates in monetary policy-setting. In addition, an autoregressive term is added representing the preference of policymakers for smoothing interest rates. The two modifications yield the following empirical specification:

$$i = f i_{-1} + (1 - f)\left[p^* + a(y - y^*) + b(p - p^*) + d(e - e_{-1}) + r^*\right] + e \quad (3)$$

where, in addition to the variables defined in equation 1, the subscript (–1) denotes one-quarter lagged variables, f is an autoregressive parameter reflecting the preference of a monetary authority to smooth policy rate adjustments over time, e is the bilateral nominal exchange rate vis-à-vis the US dollar, d is the parameter reflecting the monetary policy response to exchange rate movements, and e is the error term. The time and country subscripts are omitted for ease of representation.[4] Notice that a remains the parameter of interest, because it captures the long-run countercyclicality of monetary policy.

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[3] Furthermore, a larger b might also signal that monetary policy is more countercyclical in responding to output deviations to the extent that these output deviations also appear in the inflation rate (via, for instance, the relationships captured in the Phillips curve).

[4] Potential output (y^*) is estimated on quarterly output data (y) between 1999 Q1 and IMF projections up to Q4 2013 using the Hodrick-Prescott filter.

In an analogous way, equation 2 is also modified to incorporate policy preferences for smoothing:

$$b - b^* = \gamma (b - b^*)_{-1} - (1 - \gamma)\gamma(y - y^*) + \chi \quad (4)$$

where, in addition to the variables defined in equation 2, γ represents the policy-smoothing preference for fiscal policy and χ is the error term. The time and country subscripts are again omitted for ease of representation.[5] As in equation 3, γ remains the parameter of interest because it captures the long-run countercyclicality of fiscal policy.

For each inflation targeting EME, equations 3 and 4 are estimated jointly using the method of seemingly unrelated regression for the 2000–11 period. In order to provide some context, similar estimates – without the exchange rate term in equation 3 – are also obtained for advanced economies.[6] Table A5 in the Appendix shows the estimation details.

Graph 1 presents the point estimates of α and γ and offers a cross-country perspective on the countercyclical characteristics of monetary and fiscal policies during the 2000–11 period. The vertical axis measures α, the degree of countercyclicality for monetary policy, while the horizontal axis measures γ, the degree of countercyclicality for fiscal policy. Consequently, policies which fall into the first quadrant ($\alpha > 0, \gamma > 0$) are countercyclical and policies which fall into the third quadrant ($\alpha < 0, \gamma < 0$) are procyclical. Policies in the second ($\alpha < 0, \gamma > 0$) and fourth ($\alpha > 0, \gamma < 0$) quadrant are ambiguous and their cyclicality depends on the relative strength of monetary and fiscal policies.

The results show that most EMEs were able to pursue countercyclical policies during the decade as the dots representing individual economies are either in the first quadrant or near its border. This impression is confirmed by a more formal statistical analysis. The last column on Table A5 in the Appendix shows the probability that both monetary and fiscal policies were countercyclical (ie $\alpha > 0$ and $\gamma > 0$). The probabilities are close to unity for around half of the EMEs in the sample, and are below one half in only two cases. The evidence suggests that EMEs as a group were able to pursue countercyclical monetary and fiscal policies.

Naturally, the policy mix varies considerably. While most EMEs used both monetary and fiscal policy to lean against the business cycle, some relied more heavily on one policy than the other. For example, Thailand and Turkey relied heavily on fiscal policy while the Czech Republic and Indonesia looked more to monetary policy. The degree of countercyclicality also varied markedly from country to country. For instance, Chile pursued the most countercyclical fiscal policy among EMEs. This may reflect policy preferences for output stabilisation (as laid down by Chile's fiscal responsibility law) and also the need to stabilise output in the face of volatile copper prices. Yet, fiscal policy is not necessarily dictated by commodity prices: Russia pursued a less countercyclical fiscal policy despite its exposure to oil prices. It seems that policy preferences as well as economic and institutional frameworks have all shaped the policy mix applied by EMEs over the past decade.

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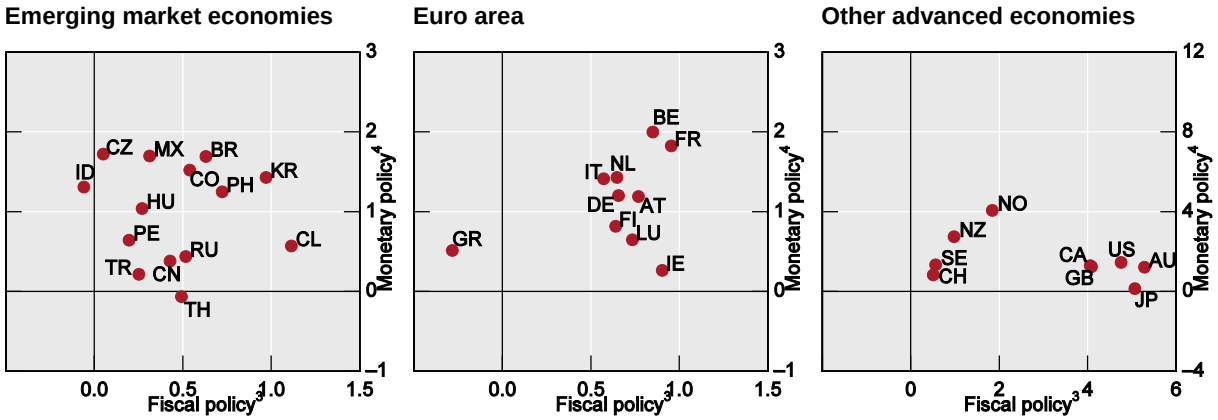
[5] Quarterly budget balances are seasonally adjusted and, where not available, are extrapolated from yearly figures. The structural budget balance (b^*) is estimated on quarterly budget balance data between Q1 1999 and IMF projections up to Q4 2013 using the Hodrick-Prescott filter on quarterly budget balances (b). This estimate of b^* is used because it is available for all countries, allowing a consistent methodology. This choice does not seem to affect the results: using OECD estimates where available instead does not materially affect the estimates of γ.

[6] The exchange rate term is not used for advanced economies, because exchange rate concerns appear to be less relevant for policymakers there. Importantly, this estimation choice does not materially affect the estimates of α and thus our conclusions.

Graph 2

Countercyclical monetary and fiscal policies[1]

2000-2011[2]



AT = Austria; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; DE = Germany; FI = Finland; FR = France; GB = United Kingdom; GR = Greece; HU = Hungary; ID = Indonesia; IE = Ireland; IT = Italy; JP = Japan; KR = Korea; LU = Luxembourg; MX = Mexico; NL = Netherlands; NO = Norway; NZ = New Zealand; PE = Peru; PH = Philippines; RU = Russia; SE = Sweden; TH = Thailand; TR = Turkey; US = United States.

[1] Seemingly unrelated regression estimation of equations (3) and (4). For details, see Appendix Table A5. [2] Years without an (implicit) inflation target were excluded. [3] The horizontal axis shows how countercyclical fiscal policy is in output stabilisation (g of equation (4)). [4] The vertical axis shows how countercyclical monetary policy is in output stabilisation (a of equation (3)).

Sources: IMF, *World Economic Outlook*; OECD, *Economic Outlook*; Bloomberg; Datastream; JPMorgan Chase; national data; BIS calculations.

To put the EME results into perspective, the centre and the right-hand panels show the results for the advanced economies. The centre panel confirms that policies were also countercyclical in the euro area. Not only did the common monetary policy turn out to be countercyclical in all countries for which estimates were possible, but fiscal policy was also countercyclical in all countries except Greece. Interestingly, the estimates show that, on average, countercyclicality in the euro area was similar to that of the EMEs, although slightly stronger. Unfortunately, further interpretation of the euro area results is not straightforward, as euro area countries do not have monetary policy independence.

Policies among other advanced economies were so much more countercyclical that the scales needed to be recalibrated on the right-hand panel. In particular, Japan and some English-speaking economies (Australia, Canada, the United Kingdom and the United States) stand out for their markedly countercyclical fiscal policies. For most of these countries, the phenomenon seems to be explained by the huge scale of the fiscal packages enacted after the Lehman failure. In any case, policy, especially fiscal policy, seems to be substantially more countercyclical in most of these economies than in EMEs.

In sum, both monetary and fiscal policy was countercyclical in most EMEs over the past decade. Although the estimates vary from country to country, the degree of countercyclicality compares with that in many advanced economies.

Fiscal deficits and government debt: effects on interest rates

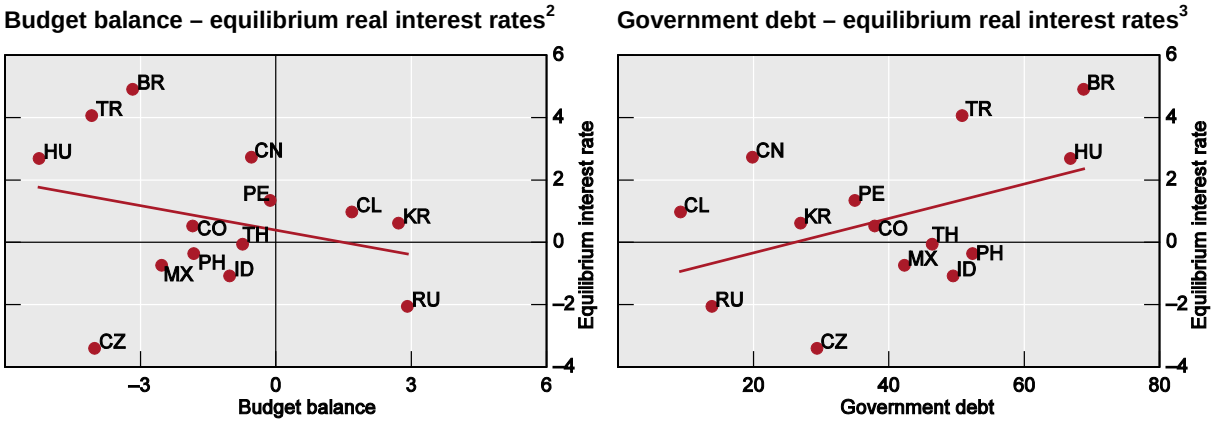
Fiscal policy might have substantial effects on monetary conditions, and thus on monetary policy, beyond its direct countercyclical effects. In particular, sustainability concerns due to large deficits or high debt levels might put upward pressure on long-term interest rates.

The left-hand panel of Graph 3 shows that budget balances display a weak, inverse relationship to estimated equilibrium real interest rates. The horizontal axis shows the estimated structural general government balances as a percentage of GDP (b^* from equation 2) while the vertical axis displays the estimated equilibrium real interest rate (r^* from equation 3). The negative trendline implies that larger surpluses (or smaller deficits) are associated with lower real interest rates, as the crowding out hypothesis would suggest, although the relationship is weak.

Graph 3

Budget balance, government debt and equilibrium real interest rates

2000–11[1]



BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; HU = Hungary; ID = Indonesia; KR = Korea; MX = Mexico; PE = Peru; PH = Philippines; RU = Russia; TH = Thailand; TR = Turkey.

[1] Years without an (implicit) inflation target were excluded. [2] The horizontal axis shows b^* from equation (2), ie the average general government net lending as a percentage of GDP, averages based on annual data. The vertical axis shows equilibrium real interest rates, ie r^* from equation (3), averages based on quarterly data. [3] The horizontal axis shows the average general government debt as a percentage of GDP, averages based on annual data. The vertical axis shows equilibrium real interest rates, ie r^* from equation (3), averages based on quarterly data.

Sources: IMF, *World Economic* Outlook; OECD, *Economic Outlook*; Bloomberg; Datastream; JPMorgan Chase; national data; BIS calculations.

Furthermore, the right-hand panel of Graph 3 shows that equilibrium real interest rates are positively associated with government debt. The horizontal axis displays general government debt as a percentage of GDP while the vertical axis shows the estimated equilibrium real interest rate (r^* from equation 3). Higher government debt is associated with higher real interest rates and vice versa as the crowding-out hypothesis would predict. In a similar vein, the background paper from Colombia finds that lower structural deficits lead to lower risk premia. However, the relationship is weak – and the underlying theory ambiguous. While government debt can crowd out private investment, strong private balance sheets might also enable the government to maintain large debt levels with low interest rates. High UK government debt throughout the 19th century could be one example of this. Again, in spite of some general trends, EMEs display large heterogeneity as both panels of Graph 3 confirm.

The inflation effects of fiscal deficit

Fiscal policy choices may affect the ability of monetary policy to achieve inflation stability. The well known extreme case is fiscal dominance, when fiscal policies force the central bank to abandon its price stability goal. Under a fiscally dominant regime, as defined in Sargent and Wallace (1981), central banks may not be able to counter inflationary pressures effectively. For this reason, Blanchard (2005) argues that inflation targeting would not have

been appropriate in Brazil in the early 2000s. In contrast, in a monetarily dominant regime, fiscal policy accommodates monetary policy, rather than being subsumed by it. The background note from Singapore outlines a special case of this. There, sound fiscal policy allows the central bank to manage the exchange rate, which is its primary monetary policy instrument.

Many EMEs have taken steps to reduce the threat of fiscal dominance, especially in the last 10 years. However, even in the absence of direct monetisation, fiscal policy might still affect inflation. Excessive fiscal deficits can contribute to economic overheating and higher inflation. For instance, spending may be systematically higher in election years, as Drazen (2004) documents. Furthermore, inflation expectations might increase when the medium-term path of public debt is perceived to be unsustainable.

More conservative fiscal policies are indeed weakly associated with lower inflation. Graph 4 shows average fiscal deficits (on the vertical axis) and average inflation (on the horizontal axis) during the 1990s (left-hand panel) and the 2000s (right-hand panel). The positively sloped trend (blue line) shows that a higher fiscal deficit is associated with higher inflation. Interestingly, the relationship is more positive when high-inflation economies such as Venezuela and Russia are excluded from the sample (lower two panels), although there is substantial variation across EMEs.

4. Conclusions

Returning to our three questions: first, can EMEs consistently pursue countercyclical monetary and fiscal policies? Our analysis suggests that, indeed, most EMEs have been able to pursue countercyclical policies over the past decade. Furthermore, EMEs which leaned against the business cycle generally relied on both monetary and fiscal policy to do so. In fact, the degree of countercyclicality is only slightly below that seen in most euro area countries, suggesting that EME policy frameworks have matured substantially – although it must be noted that EMEs vary considerably in their policy preferences, economic structures and institutional frameworks.

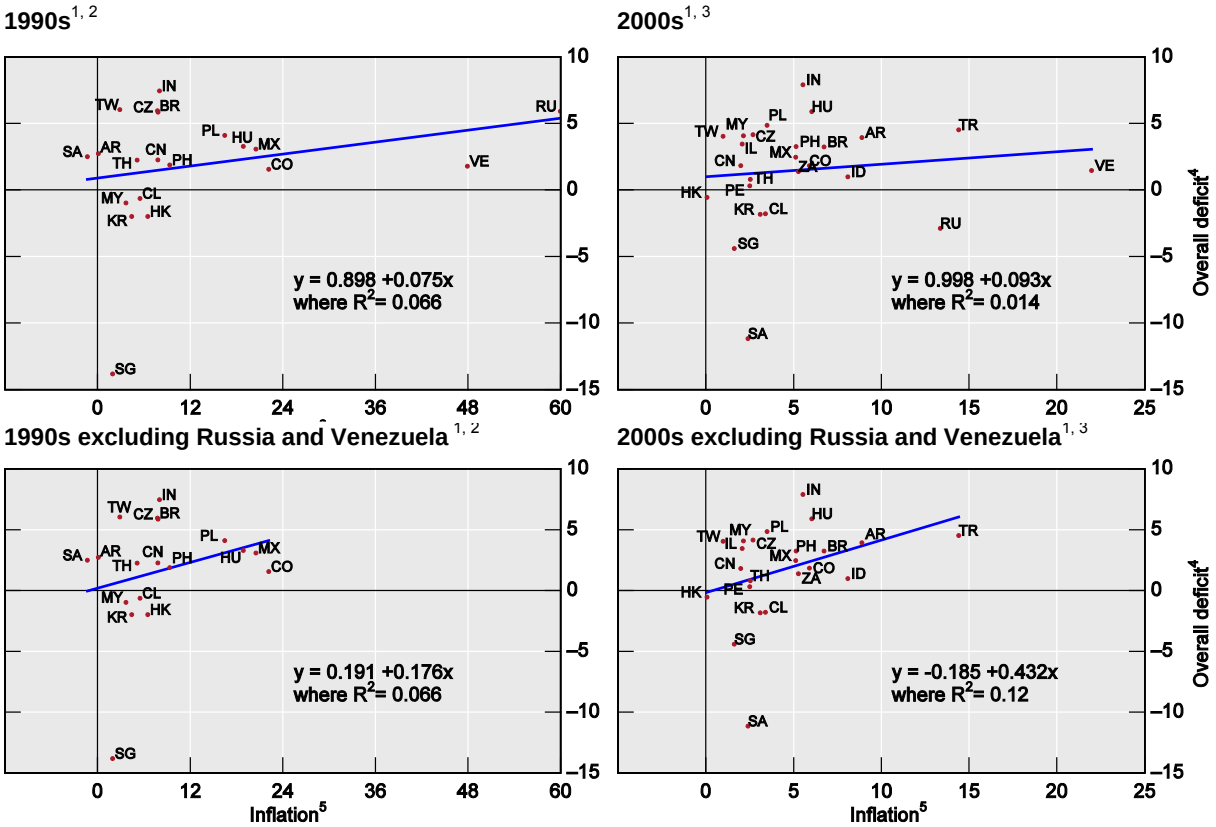
Second, is the long-run real interest rate related to fiscal deficits or the level of government debt? Our results suggest that stronger fiscal positions (lower deficits and lower debt levels) are weakly associated with lower equilibrium real interest rates. This implies that further improvements in fiscal sustainability could also yield lower interest rates. Conversely, deteriorating fiscal outcomes would be likely to have negative implications for long-run growth, as higher interest rates crowd out domestic investment, complicating the stabilisation role of central banks.

And third, is steady-state inflation related to the government deficit? Empirical evidence suggests that conservative fiscal policies are weakly associated with lower inflation, especially once high-inflation outliers are excluded from the sample. This suggests a cautionary interpretation to recent evidence of declining fiscal dominance in EMEs: the apparent decline may simply reflect a run of good fiscal outcomes. The corollary is that deterioration in fiscal performance may see a return to fiscal dominance.

Graph 4

Fiscal and monetary policy interaction

In per cent



AR = Argentina; BR = Brazil; CL = Chile; CN = China; CO = Colombia; CZ = Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IL = Israel; IN = India; KR = Korea; MX = Mexico; MY = Malaysia; PE = Peru; PH = Philippines; PL = Poland; RU = Russia; SA = Saudi Arabia; SG = Singapore; TH = Thailand; TR = Turkey; TW = Chinese Taipei; VE = Venezuela; ZA = South Africa.

[1] Simple average. [2] For Hong Kong SAR, 1991–99; for Korea, Thailand, the Czech Republic, Hungary and Poland, 1995–99; for Brazil and Chile, 1996–99; for Argentina, 1997–99; for Russia, 1998–99; for Saudi Arabia, 1999; 1990–99 otherwise. [3] For Turkey, 2002–10; 2000–10 otherwise. [4] Corresponding to general government; as a percentage of GDP. [5] Annual changes in CPI.

Sources: IMF, *World Economic Outlook Database*, September 2011; national data.

Annex:
Additional fiscal sustainability issues in EMEs

Pension liabilities and demographics

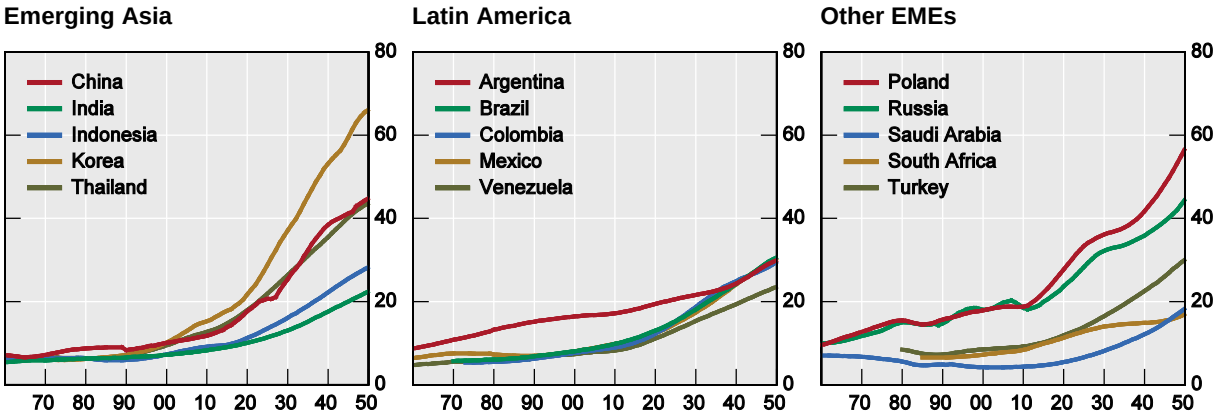
Additional caveats to debt as a measure of fiscal sustainability are pension obligations and changing demographics. In some economies, pension plans operate on a "pay-as-you-go" basis, with contributions used to fund immediate obligations. When underlying demographics were favourable, due to high birth rates or immigration, these appeared to be self-funded for many years. But ageing populations make this pension model unviable, as has been well documented for advanced economies in Cecchetti (2011), for example.

Although many EMEs currently enjoy a relatively favourable demographic situation, populations there are also expected to age rapidly in the coming years (Graph A1). Old-age dependency ratios are expected to increase from an average of 11% in 2011 to 27% in 2040 in the listed economies, and to more than treble in China and Korea.

Graph A1

Old-age dependency ratio[1]

In per cent



[1] Ratio of the population aged 65 years or over to the population aged 15–64.

Sources: US Census Bureau; World Bank.

The effect of ageing populations on debt sustainability will vary widely. In Latin America, the rate of ageing is expected to be relatively low and pensions are generally well funded. The background note from Poland provides another positive example: even though Poland is expected to experience one of the fastest ageing processes in the European Union, age-related expenditure is expected to fall over the next 50 years due to pension reforms enacted in 1999 that provide for a switch from defined benefit to partly defined contribution plans. In contrast, ageing will occur rapidly in emerging Asia over the next two decades and current pension plans are generally too small to provide a secure, sustainable and adequate retirement income for current workers. In addition, underlying demographic developments will translate into increased fiscal demands for health care funding to meet the needs of growing numbers of retired workers, as the note from Hong Kong SAR outlines.

Demographic developments are also likely to put strains on fiscal sustainability due to slower future growth. As the note from China argues, ageing populations will result in lower economic growth rates and therefore a diminished future tax base. Persistent fiscal deficits

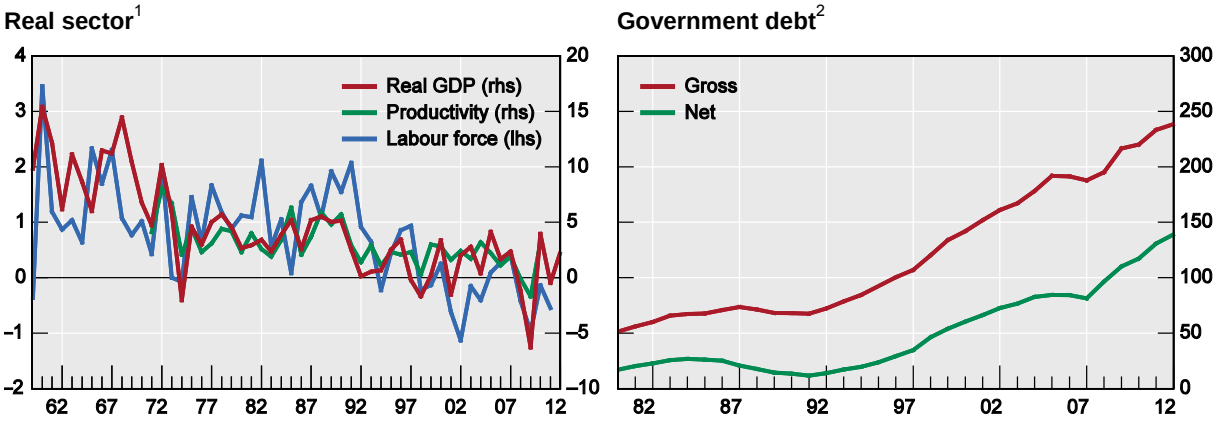
that appeared to be sustainable because debt-to-GDP ratios were stable may become unsustainable.

The case of Japan may be instructive. While productivity growth in Japan has matched or exceeded that of many other advanced economies in recent years, GDP growth has appeared anaemic due to low capital accumulation and a shrinking labour force (Graph A2, left-hand panel). Thus the rapid increase in debt-to-GDP ratios (right-hand panel) reflects not just significant deficits driving up the numerator, but slowing growth in the denominator as well. From the late 1980s, when Japan was growing at around 5% and net debt was a mere 13% of GDP, it took only 20 years to deteriorate to the point where net debt stood at 117% in 2010. Japan may serve as a cautionary tale as to how quickly debt sustainability can erode away when population growth stalls and demographic trends start to work against economic growth.

Graph A2

The case of Japan

In per cent



[1] Year-on-year changes. [2] As a percentage of GDP.

Sources: IMF *World Economic Outlook*; OECD; CEIC; national data.

Sovereign wealth funds

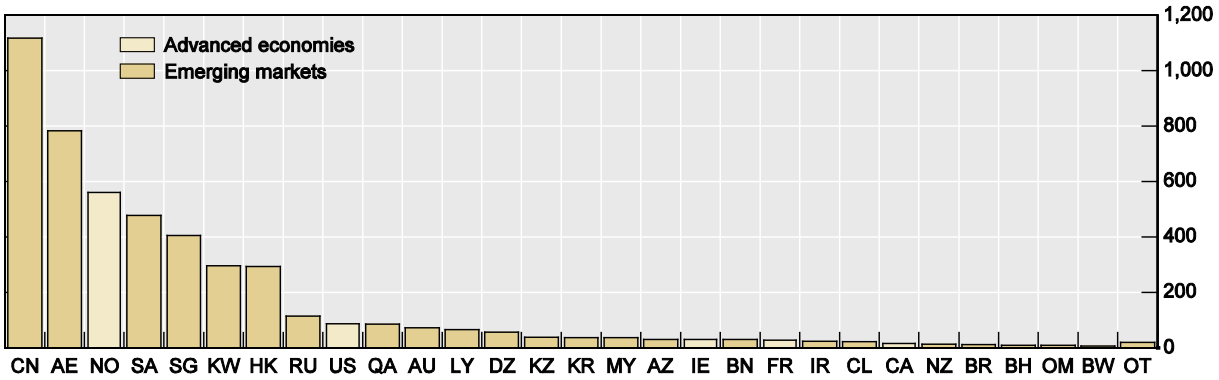
One important variable that is typically excluded from debt sustainability calculations is the sovereign wealth fund (SWF). SWFs are government investment vehicles that are typically funded by foreign exchange assets but managed separately from the official foreign exchange reserves of the monetary authorities. The investment horizon of SWFs is longer than that of the official reserves, mainly because the primary goals of the latter are liquidity and security rather than long-run investment returns.

Graph A3 displays the size of total SWFs, by economy. SWFs play a particular role in fiscal sustainability for non-renewable resource exporters. Any economy where concurrent government spending is supported with such revenues faces sustainability issues as available resources are extracted. Well designed SWFs can provide the mechanism to transform resources into sustainable and stable future income. The background paper from Saudi Arabia outlines how such assets are part of an intergenerational swap, transforming natural resource revenues into monetary reserves for the benefit of future generations. Following this model, Algeria, Russia and Venezuela also have stabilisation funds funded with revenues from oil, while Chile has a stabilisation fund and a pension reserve fund funded with earnings from copper. As noted by the background paper for Chile, the administration of these two funds was delegated to the Central Bank of Chile.

Graph A3

Main sovereign wealth funds (SWFs) by economy and size

December 2011, in billions of US dollars



AE = United Arab Emirates; AU = Australia; AZ = Azerbaijan; BH = Bahrain; BN = Brunei Darussalam; BR = Brazil; BW = Botswana; CA = Canada; CL = Chile; CN = China; DZ = Algeria; FR = France; HK = Hong Kong SAR; IE = Ireland; IR = Iran; KR = Korea; KW = Kuwait; KZ = Kazakhstan; LY = Libya; MY = Malaysia; NO = Norway; NZ = New Zealand; OM = Oman; OT = other economies, including among others (by SWF size) Mexico, Italy, Venezuela and Indonesia; QA = Qatar; RU = Russia; SA = Saudi Arabia; SG = Singapore; US = United States.

Source: Sovereign Wealth Funds Institute.

Fiscal rules

Historically, EMEs have faced debt sustainability issues due to aggressive fiscal policies. However, over the past decade a number of economies have implemented fiscal rules to improve fiscal behaviour by increasing accountability, transparency and the quality of fiscal policies, as Fatás (2005) argues. Table A1 shows that 13 out of the 24 listed EMEs have some type of fiscal rule, and 10 of them have a numerical target for one or more fiscal variables.

Table A1

Fiscal rules

Feature	Number of economies	Economies
Fiscal rules	13	AR, BR, CL, CO, CZ, HK, HU, ID, IL, IN, MX, PE, PL
Numerical target	10	AR, BR, CO, CZ,[1] HU, ID, IL, IN, MX,[2] PE
Escape clause	7	AR, BR, CZ,[3] IL,[4] IN, PE, PL[5]
Sanctions	5	AR, BR, CO, PE, PL[6]
Monetary financing prohibited by law	4	BR, CL, PE,[7] PL

AR = Argentina; BR = Brazil; CL = Chile; CO = Colombia; CZ = Czech Republic; HK = Hong Kong SAR; HU = Hungary; ID = Indonesia; IL = Israel; IN = India; MX = Mexico; PE = Peru; PL = Poland.

[1] Expenditure limits are inserted in a medium-term expenditure framework. [2] Balanced budget on a cash basis [3] The government may change the medium-term expenditure framework only in defined cases. [4] The Defici Reduction Law excludes public investment or other priority items from ceiling. [5] Rules exclude public investmen or other priority items from ceiling at sub-national levels. [6] The Public Finance Act includes triggers for corrective actions when the debt ratio reaches thresholds of 50%, 55% and 60% of GDP. [7] Prohibited from granting credi to the government, except for the purchase, in the secondary market, of securities issued by the Public Treasury these securities cannot exceed 5% of the money base.

Sources: Canales-Kriljenko et al (2010); IMF (2009a); BIS (2009).

However, the empirical evidence for the effectiveness of fiscal rules in enhancing discipline is inconclusive. On the one hand, some studies suggest that fiscal rules have been an important ingredient in successful fiscal consolidation: economies with fiscal rules have managed to reduce their public debt levels more significantly than others (IMF (2009a)). On the other hand, the recent experience of the euro area demonstrates the potential limitations of fiscal rules.

Appendix: graphs and tables

Table A2

General government gross debt

As a percentage of GDP

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Asia[1]	46.8	45.0	45.2	48.5	48.6	46.9	46.1	44.8	43.8	42.9	41.9
China	16.2	19.6	17.0	17.7	33.5	25.8	22.0	19.4	17.1	14.8	12.6
Hong Kong SAR	33.0	32.8	30.6	33.2	34.6	33.9	33.2	30.4	29.7	29.0	28.4
India	78.5	75.4	74.7	75.0	69.4	68.1	67.6	66.8	66.2	65.8	65.3
Indonesia	39.0	35.1	33.2	28.6	27.4	25.0	23.2	21.1	19.2	17.6	16.4
Korea	31.1	30.7	30.1	33.8	33.4	34.1	32.9	30.8	28.7	26.7	24.9
Malaysia	43.2	42.7	42.8	55.4	52.9	52.6	53.1	54.0	54.8	55.6	56.3
Philippines	51.6	44.6	44.2	44.3	42.2	40.5	40.1	38.7	37.2	35.8	34.4
Singapore	86.4	85.8	96.9	103.3	101.2	100.8	98.0	95.7	92.6	90.2	87.6
Thailand	42.0	38.3	37.3	45.2	42.6	41.7	44.4	46.3	49.0	50.3	51.2
Latin America[1]	42.7	39.5	37.7	40.0	37.7	36.7	35.7	35.0	34.2	33.5	32.9
Argentina	76.5	67.1	58.5	58.7	49.1	44.2	43.3	41.9	41.6	40.1	39.4
Brazil	66.7	65.2	63.5	66.9	65.2	66.2	65.1	63.1	61.5	59.9	57.7
Chile	5.0	3.9	4.9	5.8	8.6	9.9	10.1	9.8	8.7	7.6	7.1
Colombia	36.8	32.7	30.8	35.9	36.1	34.7	32.3	32.3	31.4	31.6	31.7
Mexico	38.4	37.8	43.1	44.6	42.9	43.8	42.9	42.9	43.0	43.1	43.1
Peru	33.1	30.4	25.2	28.4	24.6	21.6	20.7	19.8	19.2	18.7	18.3
Central and eastern Europe[1]	37.7	37.1	39.1	44.0	46.4	46.7	46.1	46.1	46.1	45.7	45.4
Czech Republic	28.3	28.0	28.7	34.3	37.6	41.5	43.9	45.4	46.2	46.6	46.9
Hungary	65.9	67.0	72.9	79.7	81.3	80.4	76.3	76.0	75.4	74.3	73.1
Poland	47.7	45.0	47.1	50.9	54.9	55.4	55.7	55.2	53.9	52.2	50.5
Russia	9.0	8.5	7.9	11.0	11.7	9.6	8.4	7.9	9.0	9.7	11.3
Other emerging markets[1]	47.8	41.2	39.4	43.2	40.9	40.0	39.0	38.3	37.6	36.6	35.4
Israel	84.7	78.1	77.0	79.4	76.1	74.3	74.0	72.6	70.8	69.1	67.4
Saudi Arabia	27.3	18.5	13.2	15.9	9.9	7.5	5.9	5.2	4.6	3.9	3.4
South Africa	32.6	28.3	27.4	31.5	35.3	38.8	40.0	40.8	41.5	40.7	38.8
Turkey	46.5	39.9	40.0	46.1	42.2	39.4	36.0	34.6	33.5	32.8	32.1

[1] Simple average of the economies shown.

Source: IMF, *Fiscal Monitor*, April 2012.

Table A3

Gross and net general government debt[1]

As a percentage of GDP

	2000		2005[2]		2010	
	Gross	**Net**	**Gross**	**Net**	**Gross**	**Net**
China	…	…	18.0	…	17.0	…
Hong Kong SAR	…	…	…	…	1.4	–0.1
Korea	18.3	…	28.6	…	33.4	…
Philippines	60.5	…	68.5	…	52.4	…
Singapore	26.6	…	37.4	…	43.6	…
Thailand	14.5	…	26.1	…	29.7	…
Argentina	52.5	…	88.3	…	52.5	…
Brazil	…	…	56.4	46.1	54.7	40.7
Chile	13.6	3.2	7.3	–0.1	9.2	–7.5
Colombia	38.8	36.5	44.2	39.1	40.2	35.7
Mexico	21.5	…	21.8	…	29.9	…
Peru	45.5	46.0	37.7	30.1	23.5	11.6
Czech Republic	17.8	–33.9	28.4	–16.6	37.6	–4.6
Hungary	56.1	50.8	61.7	57.5	81.3	73.5
Israel	84.3	71.6	93.7	83.8	76.1	68.2
Saudi Arabia	87.2	…	38.9	…	9.9	…
South Africa	43.4	42.6	34.7	30.2	35.1	29.6
Turkey	…	…	51.1	…	42.9	…

[1] For China, Philippines, Saudi Arabia, Singapore, Thailand, Turkey and South Africa central government debt. [2] For Brazil, 2006.

Source: Results taken from central bank questionnaire, complemented where necessary with information from IMF, *World Economic Outlook*.

Table A4

Gross and net general government interest payments[1]

As a percentage of GDP

	2000		2005		2010	
	Gross	**Net**[2]	**Gross**	**Net**[3]	**Gross**	**Net**
Hong Kong SAR	…	…	…	…	0.0	–0.1
Korea	…	…	1.2	0.30	1.2	–0.8
Philippines	3.9	…	5.3	…	3.3	…
Thailand	1.1	…	1.2	…	1.1	…
Argentina	3.7	…	2.3	…	1.8	…
Brazil	…	…	…	6.5	5.9	5.7
Chile	1.2	1.1	0.8	0.6	0.5	0.2
Colombia	3.5	…	3.1	…	2.7	…
Peru	2.4	…	1.9	…	1.1	…
Czech Republic	0.8	0.2	1.1	0.7	1.4	1.2
Hungary	6.1	5.3	4.2	3.6	4.4	3.8
Israel	5.3	4.5	4.9	4.2	3.4	3.1
South Africa	5.2	…	3.5	…	2.6	…
Turkey	…	…	7.0	5.7	4.4	4.0

[1] For Philippines, Thailand, Turkey and South Africa central government interest payments. [2] For Chile, 2001. [3] For Brazil, 2006.

Source: Results taken from central bank questionnaire.

Table A5

Countercyclical policy parameter estimates

2000–11

Emerging economies	a	g	standard error (a)	standard error (g)	covariance (a,g)	probability ($g>0,a>0$)
Brazil	1.69	0.63	0.96	0.19	–0.01	0.96
Chile	0.57	1.11	0.20	0.20	0.01	1.00
Colombia	1.52	0.54	0.46	0.16	0.02	1.00
Mexico	1.70	0.31	1.00	0.04	0.00	0.95
Peru	0.64	0.20	0.40	0.32	0.03	0.70
Indonesia	1.31	–0.06	1.69	0.43	0.12	0.37
Korea	1.43	0.97	0.36	0.30	0.00	1.00
Philippines	1.25	0.72	1.37	0.43	0.13	0.79
Thailand	–0.06	0.49	0.12	0.31	0.00	0.28
Czech Republic	1.72	0.05	1.15	0.34	0.06	0.53
Hungary	1.04	0.27	1.21	0.77	0.07	0.52
Turkey	0.21	0.25	0.68	0.18	–0.01	0.57
China	0.38	0.43	0.11	0.22	0.00	0.97
Russia	0.44	0.52	0.28	0.29	0.01	0.91
Advanced economies	a	g	standard error (a)	standard error (g)	covariance (a,g)	probability ($g>0,a>0$)
Australia	1.22	5.29	0.24	1.44	0.12	1.00
Canada	1.30	4.06	0.35	0.54	0.05	1.00
United Kingdom	1.24	4.09	0.21	0.74	0.04	1.00
Norway	4.06	1.85	3.03	0.59	0.19	0.91
New Zealand	2.75	0.98	0.68	0.44	0.07	0.99
Sweden	1.34	0.56	0.52	0.16	0.00	1.00
Austria	1.19	0.77	0.25	0.19	0.01	1.00
Belgium	2.00	0.85	0.32	0.22	0.01	1.00
Germany	1.20	0.66	0.33	0.15	0.01	1.00
Finland	0.82	0.64	0.20	0.06	0.01	1.00
France	1.82	0.95	0.36	0.11	0.01	1.00
Greece	0.51	–0.28	0.37	0.33	0.03	0.18
Ireland	0.26	0.90	0.07	0.84	–0.01	0.86
Italy	1.41	0.57	0.38	0.10	0.01	1.00
Luxembourg	0.65	0.74	0.17	0.19	0.01	1.00
Netherlands	1.43	0.65	0.81	0.27	0.05	0.95
Switzerland	0.82	0.51	0.15	0.06	0.00	1.00
Japan	0.13	5.07	0.05	0.87	0.00	1.00
United States	1.46	4.75	0.50	0.50	0.07	1.00

Note: Seemingly unrelated regression estimation of equation 3 and 4 (without exchange rate adjustment for advanced economies). Estimates excluded where the null hypothesis that $f < 1$ or $y < 1$ could not be rejected. Years without (implicit) inflation target were excluded; for China, CPI inflation target set by the Central Economic Working Conference; for euro area countries, euro area inflation target; for the United States, 2%. Probability is calculated assuming normality of distribution.

Sources: IMF, *World Economic Outlook*; OECD, *Economic Outlook*; Bloomberg; Datastream; JPMorgan Chase; national data; BIS calculations.

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