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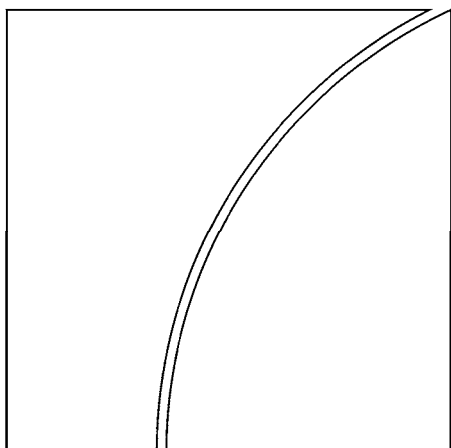
Weathering the financial crisis: good policy or good luck?

by Stephen G Cecchetti, Michael R King and James Yetman

Monetary and Economic Department

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Weathering the financial crisis: good policy or good luck?

Stephen G Cecchetti, Michael R King and James Yetman[1]

Abstract

The macroeconomic performance of individual countries varied markedly during the 2007–09 global financial crisis. While China's growth never dipped below 6% and Australia's worst quarter was no growth, the economies of Japan, Mexico and the United Kingdom suffered annualised GDP contractions of 5–10% per quarter for five to seven quarters in a row. We exploit this cross-country variation to examine whether a country's macroeconomic performance over this period was the result of pre-crisis policy decisions or just good luck. The answer is a bit of both. Better-performing economies featured a better-capitalised banking sector, lower loan-to-deposit ratios, a current account surplus, high foreign exchange reserves and low levels and growth rates of private sector credit-to-GDP. In other words, sound policy decisions and institutions reduced their vulnerability to the financial crisis. But these economies also featured a low level of financial openness and less exposure to US creditors, suggesting that good luck played a part.

Introduction

The global financial crisis of 2007–09 was the result of a cascade of financial shocks that threw many economies off course. The economic damage has been extensive, with few countries spared – even those far from the source of the turmoil. As with many economic events, the impact has varied from country to country, from sector to sector, from firm to firm, and from person to person. China's growth, for example, never dipped below 6% and Australia's worst quarter was one with no growth. The economies of Japan, Mexico and the United Kingdom, however, suffered GDP contractions of 5–10% at an annual rate for up to seven quarters in a row. For a spectator, this varying performance and differential impact surely looks arbitrary. Why were the hard-working, capable citizens of some countries thrown out of work, but others were not? What explains why some have suffered so much, while others barely felt the impact of the crisis?

Fiscal, monetary and regulatory policymakers around the world may be asking the same questions. Why was my country hit so hard by the recent events while others were spared? In this paper we examine whether national authorities in places that suffered severely during the global financial crisis are justified in believing they were innocent victims and that the variation in national outcomes was essentially random. Was the relatively good macroeconomic performance of some countries a consequence of good policy frameworks, institutions and decisions made prior to the crisis? Or was it just good luck?

We address this question in three steps. First, we develop a measure of macroeconomic performance during the crisis for 46 industrial and emerging economies. This measure captures each country's performance relative to the global business cycle, which provides our benchmark. Next, we assemble a broad set of candidate variables that might explain the variation in cross-country experiences. These variables capture key dimensions of different economies, including their trade and financial openness, their monetary and fiscal policy frameworks, and the structure of their banking sectors. In order to avoid any impact of the crisis itself, we measure all these variables at the end of 2007, prior to the onset of the turmoil. Putting together the measured macroeconomic impact of the crisis with the initial conditions, we then look at the relationship between the two and seek to identify what characteristics were associated with a country's positive macroeconomic performance relative to its peers.

Briefly, we construct a measure of relative macroeconomic performance by first identifying the global business cycle using a simple factor model. We calculate seasonally adjusted quarter-over-quarter real GDP growth rates and extract the first principal component across the 46 economies in our sample. This single factor explains around 40 per cent of the variation in the average economy's output, but with wide variation across economies. We then use the residuals from the principal component analysis as the measure of an economy's idiosyncratic performance. For each economy, we sum these residuals from the first quarter of 2008 to the fourth quarter of 2009. This cumulative sum, which captures both the length and depth of the response of output, is our estimate of how well or how poorly each economy weathered the crisis relative to its peers.

With this measure of relative macroeconomic performance as our key dependent variable, we examine factors that might explain its variation across economies. Given the small sample size, we rely on univariate tests of the difference in the median performance between different groups of economies, as well as linear regressions.

This simple analysis generates some surprisingly strong insights. We find that the better-performing economies featured a better capitalised banking sector, low loan-to-deposit ratios, a current account surplus and high levels of foreign exchange reserves. While the degree of trade openness does not distinguish the performance across economies, the level of financial openness appears very important. Economies featuring low levels and growth rates of private sector credit-to-GDP and little dependence on the US for short-term funding

were much less vulnerable to the financial crisis. Neither the exchange rate regime nor the framework guiding monetary policy provides any guide to outcomes. Whether the government had a budget surplus or a low level of government debt are unimportant, but low levels of government revenues and expenditures before the crisis resulted in improved outcomes. This combination of variables suggests that sound policy decisions and institutions pre-crisis reduced an economy's vulnerability to the international financial crisis. In other words, not everything was luck.

Measuring relative macroeconomic performance

In this section, we examine the impact of the global financial crisis on real GDP growth across a range of economies. We first measure the impact on the world economy, highlighting the global nature of the crisis. We then identify each economy's idiosyncratic performance relative to the global business cycle during the crisis, and find considerable variation across economies.

Impact of the crisis on real GDP growth

The US subprime turmoil that first emerged in August 2007 and morphed into an international financial crisis following the bankruptcy of Lehman Brothers in September 2008 was a shock that affected output globally (BIS (2009)). Long before Lehman's failure, fear of counterparty defaults had disrupted interbank funding markets, including both secured and unsecured money markets. The fall in US housing prices that started in 2006 generated large losses during late 2007 and early 2008 on bank holdings of subprime-related assets which were propagated to European banks directly through their subprime investments and indirectly through their counterparty exposures to US banks and currency and funding mismatches. Central banks led by the ECB and the Federal Reserve responded with unconventional policies designed to provide extraordinary liquidity to banks. Despite these interventions, private sector access to credit became constrained as banks reduced corporate lending. Financially constrained corporations cut back on investments or drew down bank credit lines, exacerbating the funding problems for banks.

Outside the US, Europe and Japan, the channels of propagation of the crisis were different. Emerging market economies that had strengthened their banks' capital levels in the aftermath of banking crises in the 1990s experienced no financial crisis per se. There were, however, knock-on effects through other channels. Along with the disruption to global financial markets, for example, came a decline in cross-border financial flows and a collapse in exports.

We start by looking at the growth experience across an array of countries over the period. Figure 1 plots the year-on-year real GDP growth rates for 12 major economies starting in the first quarter of 2006. The vertical line in each panel marks the third quarter of 2008 when Fannie Mae and Freddie Mac were taken into conservatorship, Lehman Brothers filed for bankruptcy and AIG was rescued. From this point onwards, the crisis worsened considerably. The global nature of the crisis is immediately apparent. In the US, Germany, the United Kingdom and Japan, growth turned negative immediately and output continued to shrink through 2009. But the slowdown clearly extended beyond the economies whose banks were directly affected. Countries heavily exposed to the US, such as Canada and Mexico, had dramatic slowdowns. And in emerging market countries far from the epicentre of the crisis, the impact is seen as a slowing of growth in China, Indonesia and India or as negative growth in Brazil and Russia. While the global nature of the slowdown is clear from looking across the panels of the graph, so is the fact that there was widespread variation in performance across economies. We exploit this variation to examine whether an economy's

macroeconomic performance over the crisis period was the result of pre-crisis policy decisions or just good luck.

Measuring macroeconomic performance

Before turning to possible explanations for the variation in crisis-period experience, we need to measure the impact of the crisis itself. This first step is perhaps the most important, and is likely to play an outsized role in driving any conclusions. Ideally, we would like a measure that captures the degree to which social welfare declined as a result of the crisis. Unfortunately, it is impossible to construct a crisis-free counterfactual.

Figure 1

Year-on-year real GDP growth across countries

In per cent
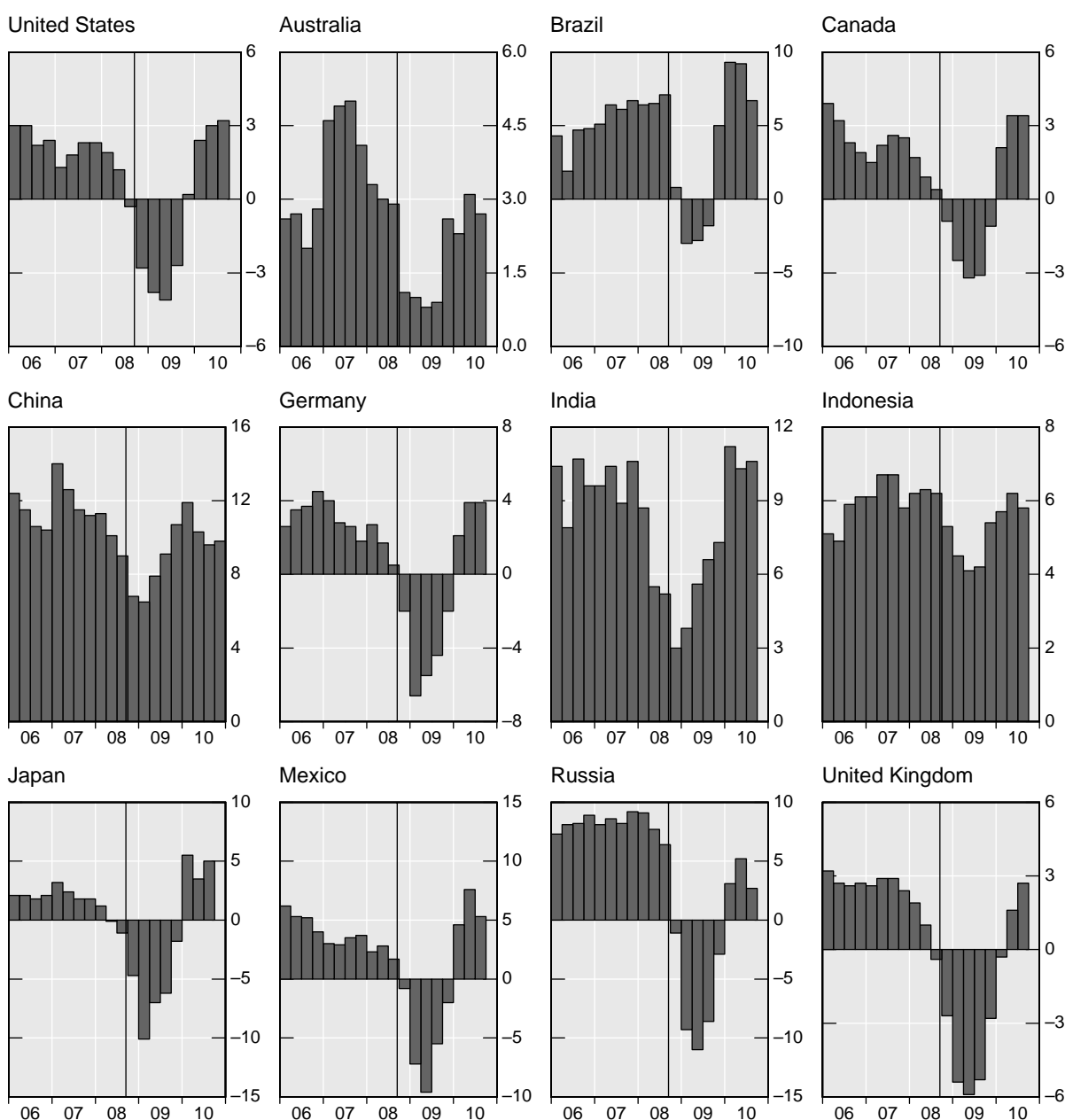
Vertical line marks 15 September 2008, the date on which Lehman Brothers filed for Chapter 11 bankruptcy protection.

Sources: Datastream; IMF IFS; OECD; authors' calculations.

3

That said, a variety of alternatives present themselves. The first is to use data on the difference between growth prior to the crisis and its trough. This measure, however, may be sensitive to the phase of an economy's business cycle during 2007 and does not incorporate the duration of the crisis. Another possibility is to use forecast data and consider downward revisions and disappointments. Such a measure unnecessarily restricts the scope of the exercise, as data are not available for a broad sample of countries. These shortcomings could be addressed by focusing on industrial production, but this measure would downplay important fluctuations in services. Finally, another option is to combine a number of different variables into a composite indicator, but such a measure may be sensitive to exchange rate movements and the requirement that all components of the index be available for all countries.

Keeping these trade-offs in mind, we employ the method employed by Ciccarelli and Mojon (2010) to construct a measure of global inflation. We extract the first principal component of the quarter-on-quarter growth rate in seasonally adjusted real GDP across a sample of 46 economies.[2] This methodology requires a balanced panel, which restricts the sample to the period from the first quarter of 1998 to the last quarter for which data are available for all economies, the third quarter of 2010. The component of real GDP growth for a particular economy that is not explained by this first principal component is then used as a measure of an economy's idiosyncratic macroeconomic performance. Our dependent variable is the sum of these deviations relative to the global trend from the first quarter of 2008 to the fourth quarter of 2009. This cumulative GDP gap (CGAP) measures each country's relative macroeconomic performance over the crisis period. In a second stage, we then examine what variables can explain cross-economy variation in this CGAP measure. We find that the results discussed below are robust to using (i) different end points for the CGAP measure and (ii) a smaller sample of economies that drops the worst performers.

The CGAP measure of relative macroeconomic performance is attractive for a number of reasons. First, it is based on changes in real GDP, a fundamental variable that should be highly correlated with changes in underlying welfare. Second, our measure should not be unduly sensitive to the stage of an economy's business cycle going into the crisis. An economy that was overheating prior to 2008 would tend to have a positive unexplained component at that point in time, but it is only the unexplained component during the crisis itself that is considered in our analysis. Third, this measure should be robust to differences in underlying growth rates, since relative performance is based on a country's deviation from its own trend growth rate that cannot be explained by the first principal component. And fourth, the measure can be taken at each point in time, or summed over time, potentially allowing for an assessment of the explanatory power of different variables and different policy responses during different phases of the crisis.[3]

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[2]   Others have made different choices and examined absolute growth levels, growth forecast revisions, or peak-to-trough changes. See, for example, Berkmen et al (2009), Blanchard et al (2010), Devereux and Yetman (2010), Filardo et al (2010), Giannone et al (2010), Imbs (2010), IMF (2010), Lane and Milesi-Ferretti (2010), Rose (2011), Rose and Spiegel (2009) and Rose and Spiegel (2010).

[3]   We also examined two alternative dependent variables: the sum of residuals for 2008-2009 from a regression of national real GDP growth on US real GDP growth and the change in the average growth rate between 2000-2007 and 2008-2009. The results from these alternative measures are contained in the appendix and are generally similar to those reported here.

Table 1

Countries in the sample

Country	ISO code	EME	Bank crisis 1990–2007	CB supervisor	FX peg	Inflation target	Average bank total capital ratio	Current account / GDP	Debt / GDP	Credit / GDP	Loan / deposit ratio
Argentina	AR	x	x	x	x		8.8	2.3	67.9	12.5	87.1
Australia	AU					x	9.9	−6.2	9.5	117.3	166.6
Austria	AT					x	11.1	3.5	59.2	114.6	139.1
Belgium	BE					x	15.3	1.6	82.8	90.3	118.6
Brazil	BR	X	x	x		x	16.6	0.1	65.2	42.1	105.1
Canada	CA					x	11.5	0.8	65.1	125.2	77.1
Chile	CL	X				x	10.7	4.5	4.1	73.9	114.3
China	CN	X	x		x		10.3	10.6	19.8	107.5	75.0
Croatia	HR	X	x	x	x		13.2	−7.6	33.2	63.1	100.2
Czech Republic	CZ	X	x	x		x	22.4	−3.3	29.0	48.0	74.6
Denmark	DK				x		16.7	1.6	34.1	202.5	325.0
Estonia	EE	X	x		x		.	−17.2	3.7	92.7	184.3
Finland	FI		x			x	15.3	4.3	35.2	79.6	155.5
France	FR			x		x	9.2	−1.0	63.8	103.6	136.4
Germany	DE					x	19	7.6	64.9	103.9	143.7
Greece	GR			x		x	11.9	−14.4	95.6	90.9	111.7
Hong Kong	HK	X		x	x		15.1	12.3	1.4	139.7	54.8
Hungary	HU	X	x			x	13.8	−6.5	65.8	61.8	138.0
India	IN	X	x	x			11.6	−0.7	72.9	45.2	80.0
Indonesia	ID	X	x	x		x	12.9	2.4	36.9	25.5	64.7
Ireland	IE					x	11.6	−5.3	25.0	198.5	160.5
Israel	IL			x		x	10.7	2.9	77.6	87.9	83.8
Italy	IT			x		x	10.8	−2.4	103.5	100.2	164.3
Japan	JP		x				10.1	4.8	187.7	98.2	70.8
Korea	KR	X	x			x	11.8	0.6	29.7	99.6	144.5
Latvia	LV	X	x		x		15.5	−22.3	7.8	88.7	139.4
Lithuania	LT	X	x	x	x		10.4	−14.6	16.9	60.0	149.3
Malaysia	MY	X	x	x			18.6	15.9	42.7	105.3	76.4
Mexico	MX	X	x			x	14.2	−0.8	38.2	17.2	96.6
Netherlands	NL			x		x	10.9	8.6	45.5	184.2	135.1

New Zealand	NZ			x		x	10.1	−8.0	17.4	140.7	145.1
Norway	NO		x			x	22.7	14.1	58.6	.	178.7
Philippines	PH	X	x	x		x	21.1	4.9	47.8	23.8	52.9
Portugal	PT			x		x	9.6	−9.0	62.7	160.7	156.9
Russia	RU	X	x	x	x		.	5.9	8.5	38.2	120.6
Singapore	SG	X		x	x		15	26.7	86.0	89.2	76.7
Slovakia	SK	x	x	x	x		15.7	−5.3	29.3	.	76.3
Slovenia	SI	x	x	x		x	9.6	−4.8	23.3	.	137.0
South Africa	ZA	X		x		x	12.2	−7.2	27.4	77.5	111.6
Spain	ES			x		x	10.9	−10.0	36.1	183.6	174.1
Sweden	SE		x			x	9.3	8.4	40.1	121.5	239.8
Switzerland	CH						16.8	9.0	43.6	173.6	94.2
Thailand	TH	X	x	x		x	12.4	6.3	38.3	91.8	90.3
Turkey	TR	x	x			x	15.9	−5.9	39.4	29.5	66.7
United Kingdom	GB					x	11.9	−2.6	43.9	187.3	126.6
United States	US			x			10.9	−5.1	62.1	60.4	108.7

Table 1 provides an overview of the 46 economies in our sample, as well as key economic characteristics as of end-2007. The sample includes 22 industrial and 24 emerging market economies. The size of the economies varies from very small (the Baltic countries) to very large (China and India). The average ratio of total capital to risk-weighted assets for banks in 2007 was 13.3%. Between 1990 and 2007, 24 economies in our sample experienced a domestic banking crisis (Laeven and Valencia (2008)). The average total capital ratio for banks in these countries was 14.2% in 2007, statistically higher than the average of 12.4% for the remaining countries (p-value 0.08). In 25 of the 46 economies, the central bank had sole responsibility for banking supervision in 2007. Eleven economies had exchange rate pegs while 30 had explicit inflation targets as guides for monetary policy. Around half of the economies featured current account deficits, with a range from a deficit of 22.3% in Latvia to a surplus of 26.7% in Singapore. The average government debt-to-GDP ratio was 46.7%, with the highest in Japan (187.7%) and the lowest in Hong Kong (1.4%). Private credit-to-GDP averaged 96.7%, ranging from 12.5% (Argentina) to 202.5% (Denmark). And the loan-deposit ratio varied widely, from 53% in the Philippines to 325% in Denmark.

Next we examine the relative macroeconomic performance across our sample. As discussed, we extract the first principal component of real GDP growth, which explains 39% of the total variation in growth rates across our sample of 46 economies. Figure 2 graphs the first principal component of global GDP growth, normalised to have a mean of zero and a standard deviation of one. The figure shows the magnitude and timing of the global business cycle from 1998 to 2010. We find that, following the bursting of the dotcom bubble in 2000–01, the global business cycle fell to approximately half of one standard deviation below the mean. By contrast, our estimates show that the response to the recent financial crisis was much more severe, with the global business cycle falling to more than four standard deviations below the mean in the first quarter of 2009, before recovering rapidly.

Figure 2

**Global GDP growth: first principal component**

In per cent
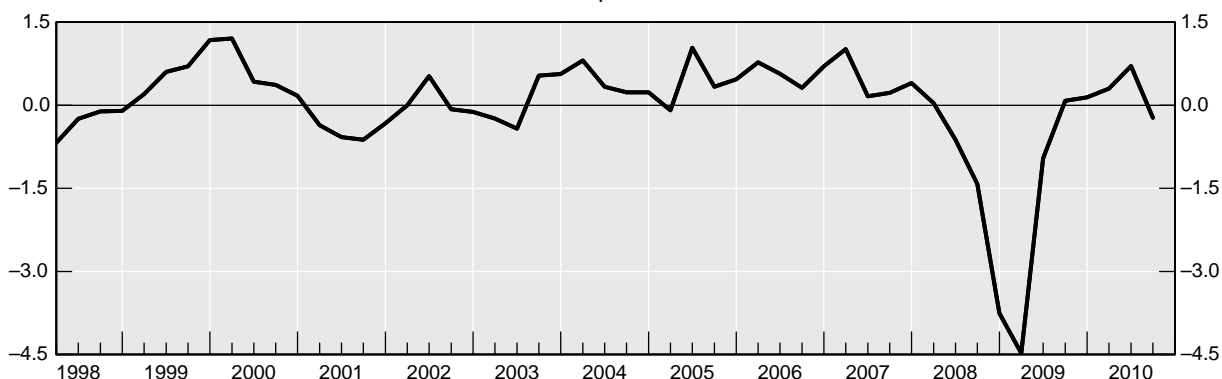
Source: authors' calculations.

The ability of this first principal component to explain the macroeconomic performance of the economies varies considerably across the sample. To see this diversity, we can look at the factor loadings on the first principal component and the percentage of variation in GDP growth rates that are explained by the first principal component.

The factor loadings, normalised to have a mean of 1.0, are given in Figure 3. Industrial economies are shown with darker bars, and emerging market economies with lighter bars. The largest EMEs appear on the left of the figure, indicating that they exhibit highly idiosyncratic business cycles.

Figure 3

Factor loadings
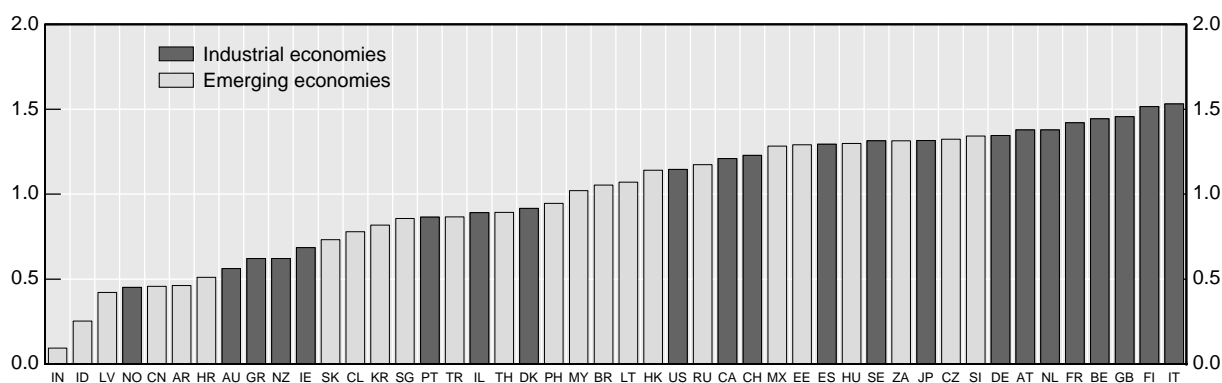
Factor loadings are normalised to have a mean of 1.0. AR = Argentina; AT = Austria; AU = Australia; BE = Belgium; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; ES = Spain; FI = Finland; FR = France; GR = Greece; HK = Hong Kong SAR; HR = Croatia; HU = Hungary; ID = Indonesia; IE = Ireland; IL = Israel; IN = India; IT = Italy; JP = Japan; KR = Korea; LT = Lithuania; LV = Latvia; MX = Mexico; MY = Malaysia; NL = Netherlands; NO = Norway; NZ = New Zealand; PH = Philippines; PT = Portugal; RU = Russia; SE = Sweden; SG = Singapore; SI = Slovenia; SK = Slovakia; TH = Thailand; TR = Turkey; UK = United Kingdom; US = United States; ZA = South Africa;

Source: authors' calculations.

The percentage of variation in GDP growth rates explained by the first principal component is presented in Figure 4, and tells a similar story. Over this 12-year period, India, Indonesia and Latvia were the least correlated with the global business cycle, with the global factor explaining less than 7% of the variation in their GDP growth. A number of industrial economies are highly correlated with the global business cycle and appear on the far right, with Italy (81%), Finland (80%) and the United Kingdom (73%) being the most highly correlated.

7

Figure 4
Variation explained by first principle component

In per cent
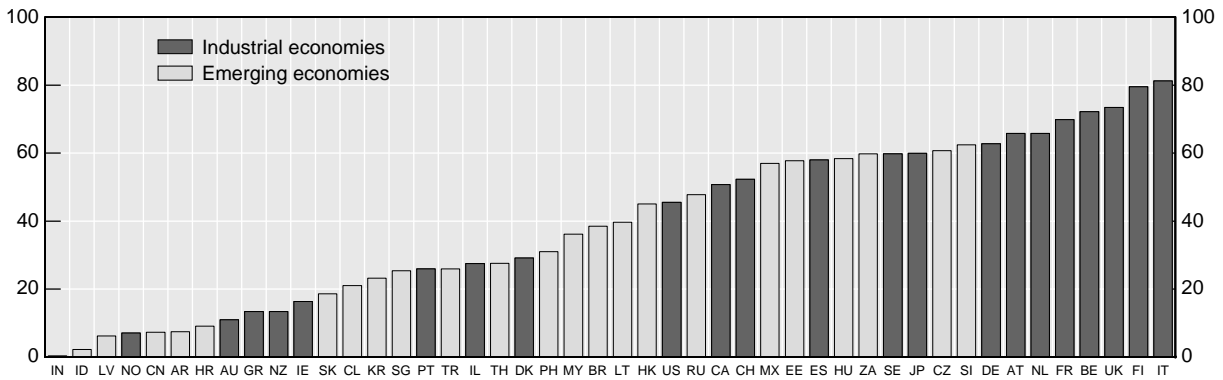
Source: authors' calculations.

Figure 5
Idiosyncratic component of real GDP growth

In per cent

The vertical line in each panel marks 2008, the year when the financial crisis worsened and spread globally. For 2010, residuals are only available for the first three quarters. These are scaled by 4/3 to enable comparison with other years.
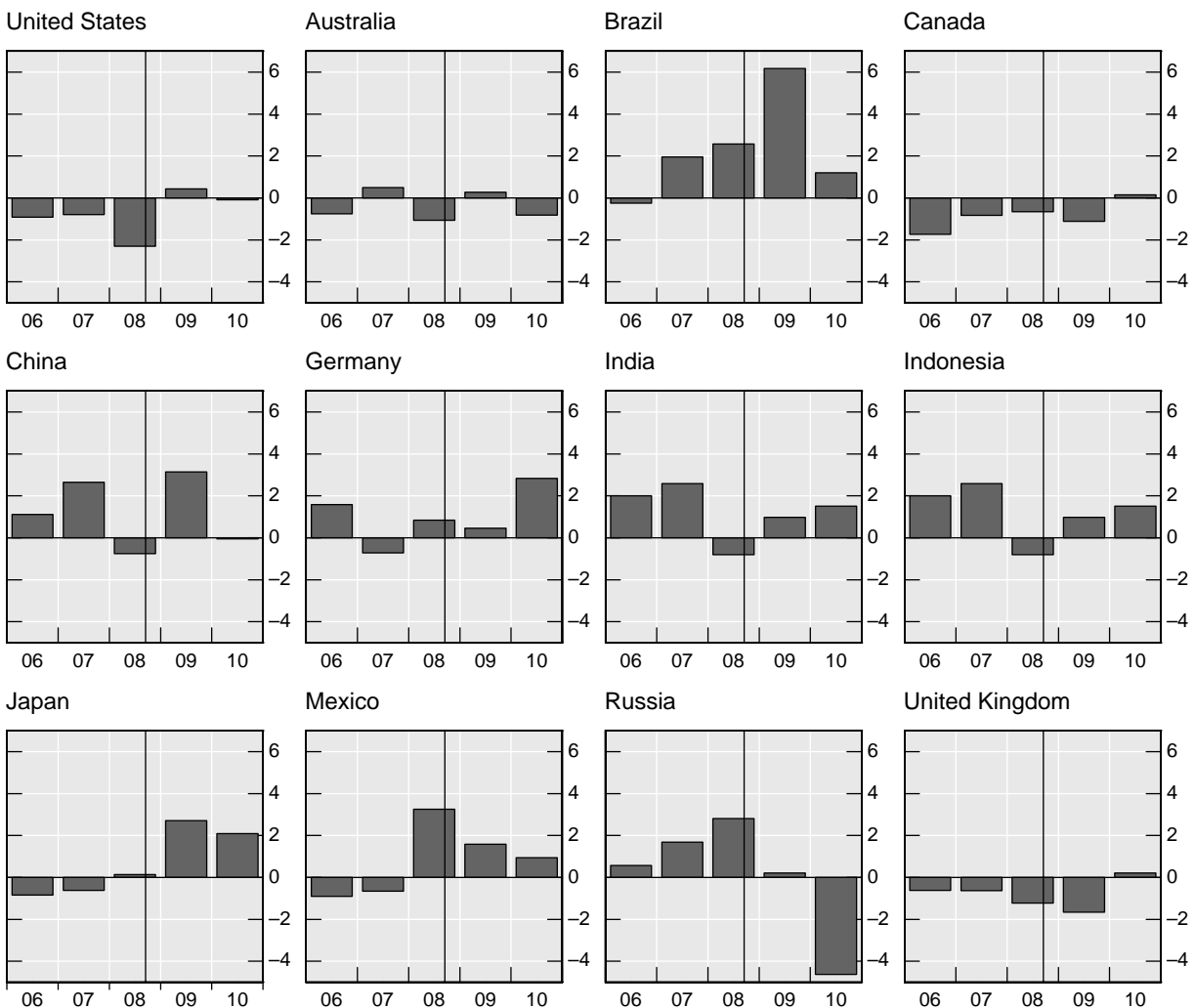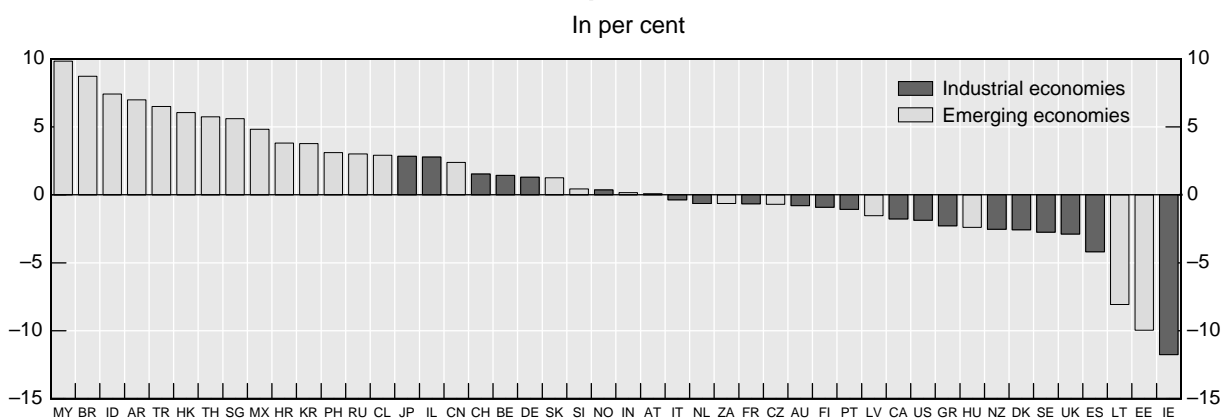
Source: authors' calculations.

Figure 5 plots the deviation between an economy's GDP growth rate and that explained by the global trend, our measure of idiosyncratic growth.[4] The results are shown for 12 major economies, with a common scale across panels to ease comparison. What is striking is the different picture it presents of macroeconomic performance during the crisis compared with Figure 1, which plots absolute real GDP growth. There was wide variation in both the timing and severity of the crisis across different economies. The North American economies, together with Japan, were the poorest performers early on, as seen by their negative deviations from the global trend during 2006–07. Brazil and Indonesia significantly outperformed other economies throughout the crisis period. While Russia performed relatively well in late 2008 (when oil prices peaked at close to $150 per barrel), the country exhibited the weakest relative performance of these 12 economies during 2010. These diverse experiences suggest that a variety of country-specific factors may be important in determining the vulnerability of different economies to the recent crisis.

Figure 6 plots the cumulative sum of the residuals for each economy from the principal components analysis, CGAP. The CGAP is the sum of an economy's idiosyncratic performance over the two years from the first quarter of 2008 to the fourth quarter of 2009. A positive value indicates that an economy outperformed the global economy while a negative value indicates underperformance. A value of 10%, for example, implies that an economy had real GDP growth 10% higher than we would expect, given the path of the global economy, over this two year period. The 2008-2009 period includes the worst stages of the crisis, both for those economies that were severely impacted by the Lehman Brothers collapse in September 2008 and for those economies that were affected later on when global trade contracted significantly. Industrial economies are again shown with darker bars, and emerging economies with lighter bars.

Figure 6

Relative macroeconomic performance, 2008 Q1–2009 Q4

In per cent

Source: authors' calculation.

Malaysia, Brazil and Indonesia are the best performers, with CGAPs of +7% or greater. Latvia, Estonia and Ireland are the worst, with measures below –8%. Since the measure is based on eight quarters of quarterly GDP growth, a CGAP of +7% corresponds to real GDP growth outperformance of 3.5% on an annual basis relative to the global benchmark while a CGAP of -8% corresponds to 4.0% underperformance per year. The sample is evenly split

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[4] We can think of this as the residual from a regression of each economy's quarterly GDP growth rate on a constant and the first principal component. Italy, for example, has a low growth rate but the pattern of growth deviations from trend closely matches the first principal component, up to a scale factor. Hence it has small residuals.

between economies that outperformed and economies that underperformed. The economies in the middle of the figure – Austria, Italy and the Netherlands – followed the global trend most closely over this period and had CGAPs close to zero. The United States does poorly on this measure, finishing 36th out of the 46 economies, behind Japan (15th), China (17th) and Germany (20th) but ahead of the United Kingdom (42nd).

Factors explaining cross-country variation in performance

Having ranked countries by their relative macroeconomic performance during the recent crisis, we explore possible explanations for this cross-economy variation. Table 2 summarises four categories of variables measuring: banking system structure, trade openness, financial openness, and monetary and fiscal policy frameworks. Except where otherwise noted, all of these variables are measured at the end of 2007. We also consider the policy response to the crisis, looking at measures such as monetary policy easing, fiscal stimulus and bank bailouts. The remainder of this section describes each of the variables we consider and explains our rationale for thinking that they may contribute to cross-country differences in macroeconomic performance.

Banking system structure

The recent crisis was the result of a cascade of shocks that originated in the financial sector. It makes sense, therefore, to start by asking how the structure of the banking sector affected outcomes across countries. Deposits are thought to be a relatively stable source of bank funding; economies where banks have relatively low loan-to-deposit ratios before the beginning of the crisis may therefore be relatively robust. Similarly, better capitalised banks should be better able to absorb losses while maintaining the supply of funding to support the real economy. We measure the levels of regulatory capital ratios for the average bank in each country at year-end 2007 using data from Bankscope. Given the different instruments that qualified as regulatory capital under Basel II and the variation across countries, we focus on the broadest measure of capitalisation, namely the ratio of total capital-to-risk weighted assets. Based on Laeven and Valencia (2008), we find that 24 of the countries in our sample experienced banking crises in the 1990s. Such a crisis may have led policymakers to introduce reforms to reduce the financial sector's vulnerability. As mentioned earlier, countries with recent experience of a banking crisis had higher total capital ratios.

The crisis also provides a test of whether the structure of banking supervision matters for outcomes. Our sample can be split between economies where the central bank is responsible for banking supervision (25 economies) and jurisdictions where this responsibility is either shared or falls wholly to another supervisory authority (21 economies). Banking supervision is the responsibility of the central bank in countries such as Israel and New Zealand, but is outside the central bank in Australia, China, Ireland and the UK. The structure of banking supervision is not statistically related to either the degree of banking concentration (measured using a Herfindahl index of bank assets) or past experience with a banking crisis.

Table 2

Variables that may explain cross-country variation in performance

Description	Units	N	Mean	Standard deviation	Median
1. Banking system structure (end-2007)					
Loan / deposit ratio	%	46	122.4	50.6	116.5
Total capital ratio	% of RWA	44	13.3	3.6	11.9
Bank crisis 1990–2007 = 1	dummy	46	0.5	0.5	1
CB bank supervisor = 1	dummy	46	0.5	0.5	1
Banking concentration (Herfindahl)	%	46	22.5	15.0	18.1
2. Trade openness (end-2007)					
Current account	% of GDP	46	0.0	9.1	0.3
Trade openness = exports + imports	% of GDP	42	97.8	66.1	83.6
Commodity exporter	dummy	46	0.2	0.4	0
3. Financial openness (end-2007)					
Net foreign assets	% of GDP	46	–15.4	66.5	–21.5
Financial openness = gross foreign assets + gross foreign liabilities	% of GDP	46	443.3	526.4	245.8
Foreign holdings of US LT debt	% of GDP	45	11.2	17.2	5.9
Foreign holdings of US ST debt	% of GDP	45	1.7	4.8	0.7
Foreign holdings of US equity	% of GDP	45	7.0	12.6	1.2
US holdings of foreign LT debt	% of GDP	45	3.0	4.0	1.4
US holdings of foreign ST debt	% of GDP	45	0.8	2.1	0.1
US holdings of foreign equity	% of GDP	45	12.0	14.0	7.4
Private sector credit	% of GDP	43	96.7	50.6	91.8
Growth in private sector credit, 2005–2007	% of GDP	43	20.8	24.2	17.5
Foreign banks' share of US credit	% of total claims	25	3.8	6.1	0.5
US banks' share of foreign credit	% of total claims	25	8.8	6.9	5.9
4. Monetary and fiscal policy framework (end-2007)					
Exchange rate peg = 1	dummy	46	0.2	0.4	0.0
Foreign exchange reserves	% of GDP	46	16.3	19.5	10.9
Inflation target = 1	dummy	46	0.7	0.5	1
Inflation rate	%	45	4.4	2.6	3.5
Government budget surplus (deficit)	% of GDP	46	0.8	4.2	–0.1
Government revenue	% of GDP	46	36.2	10.3	36.4
Government spending	% of GDP	46	35.4	10.4	35.7
Government debt	% of GDP	46	46.7	32.9	39.8
5. Policy response to crisis (Q1 2007–Q4 2009)					
Monetary policy rate change	Percentage points	46	–2.8	1.9	–3.0
Monetary policy rate cut = 1	dummy	46	1.0	0.2	1

Exchange rate change	%	45	–2.5	10.2	1.9
Exchange rate depreciation = 1	dummy	45	0.4	0.5	0
Discretionary fiscal stimulus = 1	dummy	46	0.8	0.4	1
Change in government debt / GDP	percentage points	46	8.9	9.9	7.1

Finally, it is unclear *a priori* how concentration of the banking sector may affect outcomes. On one hand, distress at one bank may lead to troubles at other domestic counterparties leading more concentrated banking sectors to be more vulnerable. On the other hand, it may be easier for supervisors to effectively monitor the activities of a fewer number of banks, leading to the opposite outcome. The net effect is therefore an empirical question.

Trade openness

An economy's trade patterns create one channel for the cross-border transmission of shocks. While the average economy in our data had a current account very close to zero in 2007, the range is quite large. Trade openness, measured by the ratio of the sum of exports plus imports to GDP, captures the importance of trade. The average in our data is 98% of GDP, but the standard deviation of 66 percentage points implies a wide distribution. Finally, a country's natural endowment may play a role in its macroeconomic performance. Of the 46 economies in our sample, 8 are known as commodity exporters, whether of oil and natural gas (Norway, Russia), precious or base metals (Brazil, Chile, South Africa), agricultural products (New Zealand) or some combination of the above (Australia, Canada).

Financial openness

An economy's integration into the global financial system provides another channel for the transmission of global shocks. We use the updated and extended version of the dataset constructed by Lane and Milesi-Ferretti (2007) that measures the net foreign assets (NFA) for a range of economies. The average economy in our data had a negative NFA position in 2007, with gross foreign liabilities exceeding gross foreign assets. Lane and Milesi-Ferretti (2010) note that these net figures mask even greater variation of gross exposures, which can be seen by summing foreign assets and foreign liabilities to create a measure of financial openness. Gross positions for the average economy at end-2007 represented 443% of GDP, with a standard deviation of 526%. Small economies with large financial centres had very large positions, led by Ireland (2,573% GDP), Hong Kong (2,390%), Switzerland (1,357%) and Singapore (1,039%). At the other extreme, the least open economies on this measure were Mexico (84%), India (85%) and Indonesia (87%).

The investments of foreigners in US securities and the investments of US residents abroad provide another channel for financial (and hence real) contagion. The US Treasury International Capital (TIC) data for 2007 show that the average foreign economy's residents held US equities and debt securities equivalent to 20% of foreign GDP, with a standard deviation of 29%. US residents held securities equivalent to 16% of foreign GDP on average.

Private sector credit to GDP averaged 97% of GDP in our sample, with the highest values for Denmark (202%), Ireland (198%) and the UK (187%) and the lowest for Argentina (12%), Mexico (17%), the Philippines (24%) and Indonesia (25%). Perhaps more importantly, in the three-year period leading up to the crisis, private sector credit grew rapidly in many economies, especially in Turkey and in Central and Eastern Europe.

Finally, the BIS consolidated banking statistics provide data on the exposure of foreign banks to a given economy for 25 of the economies in our sample. Banks resident in the United States accounted for an average 9% of consolidated foreign claims in the other 24 economies (measured on either an immediate borrower or an ultimate risk basis). Foreign

banks, by contrast, accounted for an average 3.8% of consolidated foreign claims on US residents, with the largest claims for banks headquartered in the UK (19.7%), Switzerland (16.7%), Germany (13.9%), Japan (12.2%) and France (11.2%). Together, banks headquartered in these countries accounted for close to three quarters of consolidated foreign claims on US residents at end-2007.

Monetary and fiscal policy framework

Monetary and fiscal policies are powerful tools for responding to shocks to the real economy. Of potential importance is the nature of the framework, which determines the tools policymakers have at their disposal, as well the starting point, which can also influence the nature of actions taken during the crisis.

In terms of the monetary policy framework, 11 out of the 46 economies had some form of fixed exchange rate regime. This group includes countries with currency boards (eg Estonia, Hong Kong), conventional fixed pegs (eg euro area countries) and crawling pegs (eg China). The remaining 35 economies had either a freely floating exchange rate, like Japan and the US, or a managed floating exchange rate, such as Singapore. While Table 2 shows that the average economy had FX reserves equivalent to 16.3% of GDP in 2007, economies with an exchange rate peg had average FX reserves of 34.7% of GDP, significantly higher than the 10.5% average for economies with a floating exchange rate (p-value 0.001). Out of the 35 economies with floating exchange rates, 30 had an explicit inflation targeting framework.[5]

Turning very briefly to fiscal policy, we include information on the size of the fiscal deficit, the share of government revenues and expenditures to GDP and the level of sovereign debt outstanding at year-end 2007. Depending on their size, these variables can limit the capacity of policymakers to react to shocks.

Monetary and fiscal policy responses

Finally, we examine the policy response to the crisis itself. Almost all the economies in our sample responded to the financial crisis by easing monetary policy and introducing some form of fiscal stimulus. Table 2 shows that the average monetary policy rate fell by 2.75 percentage points, from an initial level of 5.40% at end-2007 to 2.65% by the end of 2009. In 17 out of the 45 cases, some monetary easing was provided through exchange rate depreciation. From end-2007 to end-2009, the average exchange rate depreciated by 2.4% against the US dollar, with the biggest declines seen in Korea (–27%), Turkey (–25%) and the UK (–25%). While the average exchange rate depreciated against the US dollar over this two-year period, the exchange rate appreciated in 27 out of 46 economies, notably Japan (+21%), Switzerland (+11%) and China (+8%).

Additionally, 38 economies introduced some form of discretionary fiscal stimulus. Based on estimates from the IMF's October 2009 *World Economic Outlook*, the net impact of fiscal policy was to increase the average economy's gross government debt-to-GDP ratio by 8.9 percentage points, from 46.7% in 2007 to an estimated 55.6% in 2009. Not surprisingly, the biggest increases were seen in Ireland (40.5%) and Japan (30.0%), although debt-to-GDP also increased by more than 20 percentage points in each of Greece, Latvia, Singapore, the UK and the US.

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[5]   In our sample, only India had capital controls in 2007 so this variable is not considered in our analysis.

Empirical results

We now turn to the empirical results. As a first step in addressing the question of why some economies performed better than others, we divide the possible conditioning variables into two sets: those measuring conditions prior to the crisis and those measuring the policy response. As highlighted earlier, the pre-crisis variables are measured as of end-2007. We first look at univariate results, and then at a limited multivariate model.

Univariate results

In this section we examine possible explanations for the varying macroeconomic performance across our sample using two complementary approaches: rank-sum tests and linear regressions.

In the first approach, we divide our sample into two groups, based on each of the explanatory variables in turn, and calculate the median CGAP measure for each group. In some cases the demarcation between the two groups is clear: For example, economies may be classified as either an emerging market economy (EME) or not. For continuous variables, we use the median across the sample to divide the economies into two groups: economies where the explanatory variable exceeds the median are placed in group 1, and the remainder in group 0. We then use a non-parametric rank-sum test to examine whether the medians of each group are statistically different from each other. This non-parametric test is designed for unmatched (or unpaired) data.[6] Our second approach is to run a linear regression of CGAP on each of the explanatory variables in turn, together with a constant.

Table 3 summarises the results for the pre-crisis variables. For each variable, the superscripts ***, ** and * in the final two columns indicate statistical significance at the 1%, 5% and 10% levels respectively.

The first row shows that the sample is split between 24 EMEs and 22 industrial economies. The median CGAP for an EME was 3.2% versus –0.9% for industrial economies. These medians are statistically different from each other at the 1% level. The difference of 3.8 percentage points indicates that emerging market economies outperformed industrial economies by a wide margin over the two years 2008-2009.

The final column contains the coefficient from a linear regression of CGAP on the dummy variable identifying EMEs. We scale the estimated coefficient to show the effect of a one-standard deviation increase in the explanatory variable on the idiosyncratic performance of economies during the crisis. This simple regression confirms that EMEs outperformed other economies, and the difference is statistically significant at the 1% level.

Looking across the four categories of pre-crisis variables, we highlight the following points:

(1)   Economies where banking systems had <u>higher levels of regulatory capital</u> outperformed other economies in our sample, with a median CGAP of +1.5% versus −0.7% for those that had not. These medians are statistically different from each other at the 1% level.

(2)   Economies that <u>experienced a banking crisis between 1990 and 2007</u> fared better, with a median CGAP of +2.6% versus −0.7% for those that had not.

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6   Tests of differences at the mean based on a parametric t-test provide similar results, and are available upon request.

(3)   Economies with a <u>low loan-to-deposit ratio</u> performed better than those with a high loan-to-deposit ratio. A one-standard deviation, or 51 percentage point, decrease in this ratio saw a 2.5% improvement in GDP performance over the crisis period.

(4)   Economies with a <u>current account surplus</u> outperformed those with a deficit. A one-standard deviation increase in the current account as a percent of GDP, equivalent to 9 percentage points, resulted in a 2.4% outperformance in real GDP over the crisis period. Trade openness does not explain cross-country variation, and there was little difference between the median performance of commodity exporters and other economies.

Table 3

Univariate analysis of pre-crisis characteristics

| Description | Rank-sum tests | | | | | Linear regression |
| | Observations | | Median CGAP | | | Coefficient |
	0	1	0	1	Difference [1]	(scaled)[1,2]
Emerging market economy	22	24	−0.9	3.2	4.00***	1.87***
1. Banking system structure						
Total bank capital ratio	23	21	−0.7	1.5	2.17***	1.10
Banking crisis 1990–2007	22	24	−0.7	2.6	3.29**	1.22*
CB bank supervisor	21	25	0.1	0.4	0.39	1.06*
Banking concentration	23	23	1.3	−0.6	−1.89	−0.53
Loan / deposit ratio	23	23	3.1	−0.9	−4.01***	−2.51***
2. Trade openness						
Current account	22	24	−0.8	2.8	3.57***	2.44***
Trade openness	21	21	0.2	0.1	−0.13	0.02
Commodity exporter	38	8	0.3	−0.2	−0.46	0.22
3. Financial openness						
Net foreign assets	23	23	−0.7	1.3	1.96	1.49***
Financial openness	23	23	3.0	−0.9	−3.92***	−1.09
Foreign holdings of US LT debt	23	22	−0.7	2.8	3.48**	−0.09
Foreign holdings of US ST debt	23	22	−0.7	2.8	3.48*	−1.54***
Foreign holdings of US equity	23	22	1.3	−0.2	−1.41	−0.36
US holdings of foreign LT debt	23	22	1.4	−0.7	−2.08	−1.50**
US holdings of foreign ST debt	23	22	3.1	−0.7	−3.82***	−2.18***
US holdings of foreign equity	23	22	0.4	−0.1	−0.58	0.36
Private sector credit / GDP	22	21	2.9	−0.7	−3.54**	−2.12***
Growth in private sector credit / GDP	22	21	2.0	−1.1	−3.03**	−2.13***
Foreign banks' share of US credit	13	12	0.4	−0.7	−1.09**	−0.42
US banks' share of foreign credit	13	12	−0.7	2.2	2.84*	1.64**
4. Monetary and fiscal policy variables						
Foreign exchange peg	35	11	0.1	2.4	2.35	−0.04
Foreign exchange reserves / GDP	23	23	−0.7	2.9	3.52**	2.01***
Inflation target	16	30	2.0	−0.5	−2.46	−0.37

Inflation rate	23	22	0.4	–0.2	–0.61	–0.41
Government budget balance	23	23	1.3	–0.6	–1.89	0.08
Government revenues	23	23	3.1	–0.7	–3.75***	–1.92***
Government expenditures	23	23	3.0	–0.7	–3.70***	–1.93***
Government debt 2007	23	23	0.4	0.2	–0.26	0.72

[1] The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively.   [2] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on CGAP over the two-year period from Q1 2008 to Q4 2009. Significance is based on robust standard errors

(5)   Economies with a <u>low level of financial openness</u> fared better than economies with higher levels of gross foreign assets and liabilities. When dividing the sample at the median level of financial openness, the half that were the most open had a median CGAP of –0.9% versus +3.0% for the half that were the least open.

(6)   Economies dependent on the US for short-term debt financing fared worse. A one-standard deviation increase in <u>US holdings of foreign short-term debt</u>, equivalent to 2 percentage points of GDP, resulted in 2% less growth over the crisis.

(7)   Economies with <u>lower private sector credit</u> did significantly better. When dividing the sample at the median level of private sector credit to GDP, economies in the top half, with higher private sector credit, had a median CGAP of –0.7% versus +2.9% for in the bottom half. The regression coefficient indicates that economies with credit-to-GDP one-standard deviation above the mean underperformed by 2% over the crisis period. Lower <u>growth in private sector credit</u> in the lead-up to the crisis also had a statistically significant effect of a similar magnitude.

(8)   Countries that had a large stock of <u>foreign exchange reserves</u> outperformed. When dividing the sample at the median level of this variable, economies with more than the median foreign exchange reserves had a median CGAP of +2.9% versus –0.7% for economies in the bottom half. This result is not explained by whether an economy had an exchange rate peg or not. Similarly, the framework for monetary policy does not distinguish performance across countries.

(9)   Countries having a small government, both in terms of <u>low government revenues and expenditures to GDP</u>, outperformed. When dividing the sample at the median level of either of these two variables, economies in the bottom half had a median CGAP of +3% versus –1% for economies in the top half. The regression coefficients imply that a year-end 2007 value for either government revenues or expenditures to GDP that was one-standard deviation above the sample mean was associated with lower output growth of 1.9% over the two-year period.

Taken together, these results confirm that economies with better fundamentals were less vulnerable to the crisis. Economies that experienced a banking crisis post-1990 and took steps to increase the capitalisation of their banks had superior macroeconomic performance, suggesting that prudential measures taken in response to crises improved the robustness of the financial system. A current account balance, low levels of financial openness and lower levels and growth rates of private sector credit-to-GDP helped insulate an economy from the crisis. Given that this crisis was triggered by events in the US, it also helped if an economy was not dependent on the US for short-term funding.

Table 4

Policy responses and macroeconomic outcomes

| | Rank-sum tests | | | | | Linear regression |
| Description | Observations | | Median CGAP | | Difference [1] | Coefficient (scaled)[1,2] |
	0	1	0	1		
Financial sector response						
Purchase bank assets	27	19	1.3	−0.7	−1.90	−0.76
Bank debt guarantees	22	24	2.9	−0.9	−3.79***	−1.55**
Bank recapitalisation	23	23	2.8	−0.6	−3.42**	−1.33**
Deposit guarantees	23	23	1.3	−0.6	−1.89	−0.23
Swap line with Fed	20	25	2.9	−0.6	−3.53**	−1.07
Swap line with ECB	30	16	2.8	−1.0	−3.81***	−1.83***
Other swap line	18	28	−0.2	0.3	0.46	0.38
Monetary and fiscal policy response						
Monetary policy rate change	30	16	−0.7	3.4	4.10***	1.21
Monetary policy rate cut	2	44	5.4	0.1	−5.26*	−1.00***
Exchange rate change	31	14	0.1	1.4	1.43	−0.70
Exchange rate depreciation	28	17	−0.5	3.0	3.51	1.11*
Discretionary fiscal stimulus	8	38	−1.2	0.4	1.64	0.92
Change in government debt / GDP	23	23	3.0	−1.1	−4.08***	−2.07***

[1] The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. [2] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on CGAP over the two-year period from Q1 2008 to Q4 2009.

Turning to policy responses during the crisis, Table 4 reports univariate results with a set of clearly endogenous variables. These are consistent with the view that economies that provided the greatest policy stimulus were the worse affected by the crisis. We mention two specific conclusions:

(1)   Economies that were not forced to bail out their banks through some combination of debt guarantees, recapitalisations and swap lines (with the US Federal Reserve or the European Central Bank) were hit less severely by the crisis.

(2)   The best-performing economies experienced the smallest increases in government debt-to-GDP.

While these results are interesting in their own right, we can be fairly sure that the causality runs from the severity of the outcomes to the size of the policy response, and economic outcomes would have been even worse without such drastic policy actions.

Multivariate results

To check the robustness of the univariate analysis, we construct a simple multivariate model based on the same set of variables examined above. With only 46 observations and many candidate regressors (shown in Table 3), we need to be cautious about the degrees of

freedom as well as collinearity.[7] We employ the following mechanical process. Using CGAP as the left-hand side variable, we run univariate regressions on each of the explanatory variables, ordering them from highest to lowest based on economic significance.[8] We retain the variable with the greatest economic significance. We then add each of the remaining explanatory variables in turn, again retaining the one with the greatest economic significance, provided that the estimated coefficient is also statistically significant. We continue until the next most economically significant variable is no longer statistically significant at the 5% level.[9]

Table 5

Multivariate analysis of macroeconomic performance

Dependent variable: CGAP Independent variables:	Coefficient[1]	Standard error	p-value
Loan / deposit ratio (%)	−1.59	0.40	0.00
Current account (% of GDP)	2.70	0.52	0.00
Foreign holdings of US equity (% of GDP)	−1.28	0.36	0.00
US holdings of foreign short term debt (% of GDP)	−1.23	0.23	0.00
Number of observations			45
Adjusted R^2			0.67

[1] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on CGAP over the two-year period from Q1 2008 to Q4 2009.

This process works surprisingly well, in that each subsequent explanatory variable adds to the explanatory power of the regression without substantially reducing the explanatory power of the previously identified variables. We identify four different variables that together explain 67% of the variation in the relative macroeconomic performance of different economies during the crisis. In the order in which they were identified, the relative performance of different economies was superior if:

(1)   The <u>loan-to-deposit ratio</u> was relatively small.

(2)   The <u>current account</u> as a percentage of GDP was relatively large (ie the smaller the deficit or the larger the surplus, the better the outcome).

(3)   <u>Holdings of US equity</u>, as a percentage of GDP, based on TIC data, were relatively small.

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[7]   We exclude foreign bank exposures from the multivariate analysis, as this variable is only available for 25 economies.

[8]   As with the earlier linear regression, we scale the data so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on CGAP. We interpret the estimated coefficients as measures of the economic significance of the variables.

[9]   If we instead test-up based only on statistical significance, we obtain similar results but with the addition of government revenues as a percent of GDP as an explanatory variable. During the crisis, economies with relatively large government sectors, as measured by revenue, under-performed those with small government sectors.

(4)   <u>US holdings of the short term debt</u> of an economy were relatively small as a percentage of GDP, again based on TIC data. Given the important role of the US in short-term funding markets, these economies had fewer difficulties meeting short-term funding needs during the crisis.

Conclusion

The macroeconomic performance of individual countries varied markedly during the 2007–09 global financial crisis. While China's growth never dipped below 6% and Australia's worst quarter was no growth, the economies of Japan, Mexico and the United Kingdom suffered annualised GDP contractions of 5–10% per quarter for five to seven quarters in a row. We exploit this cross-country variation to examine whether a country's macroeconomic performance over this period was the result of pre-crisis policy decisions or just good luck. The answer is a bit of both. Better-performing economies featured low loan-to-deposit ratios, a current account surplus and low levels and growth rates of private sector credit-to-GDP. In other words, sound policy decisions and institutions pre-crisis reduced their vulnerability to the financial crisis. But these economies also featured low levels of financial openness and less dependence on the US for short-term funding, suggesting that good luck too played a part.

Some caveats are important in drawing policy implications from these results, however. First, we have focused on the benefits of different measures during a specific crisis episode. Determining optimal policy would instead depend on a careful analysis of the costs and benefits of policy measures under the full range of possible outcomes. For example, limiting financial openness increases the resilience of the economy during a crisis, but is also likely to lower growth rates during more normal times. Second, it is infeasible for all countries to simultaneously improve their resilience along some dimensions due to adding up restrictions. If some countries were to improve their current account positions, this would imply a worsening of the positions of other countries, for example.

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Appendix: robustness analysis

We repeated the estimation in the paper with two alternative left hand side variables: the sum of residuals for 2008-2009 from a regression of national real GDP growth on US real GDP growth and the change in the average growth rate between 2000-2007 and 2008-2009. While both of these measures may be inferior to our preferred measure for the reasons discussed in section 2, they provide a sense of the robustness of our results to different measures of relative macroeconomic performance during the crisis.

Table A1

Dependent variable: sum of residuals for 2008-2009 from a regression of national real GDP growth on US real GDP growth; univariate analysis

	Rank-sum tests					Linear regression
	Observations		Median CGAP			Coefficient
Description	0	1	0	1	Difference[1]	(scaled)[1,2]
Emerging market economy	21	24	−3.0	−1.1	1.92	0.18
1. Banking system structure						
Total bank capital ratio	22	21	−2.5	−1.1	1.46	0.31
Banking crisis 1990–2007	21	24	−2.3	−2.4	−0.13	−0.25
CB bank supervisor	21	24	−2.2	−2.9	−0.65	0.40
Banking concentration	22	23	−2.0	−3.6	−1.66	−0.37
Loan / deposit ratio	22	23	−0.7	−4.6	−3.93***	−2.04***
2. Trade openness						
Current account	22	23	−4.2	−1.1	3.11**	2.52***
Trade openness	20	21	−1.9	−3.1	−1.18*	−0.73
Commodity exporter	37	8	−2.3	−2.9	−0.63	0.37
3. Financial openness						
Net foreign assets	23	22	−3.6	−2.0	1.96	1.52***
Financial openness	23	22	−0.8	−3.8	−3.00**	−0.76
Foreign holdings of US LT debt	23	22	−4.1	−0.9	3.13***	0.25
Foreign holdings of US ST debt	23	22	−3.6	−1.1	2.57*	−1.18***
Foreign holdings of US equity	23	22	−3.1	−2.1	0.97	0.09
US holdings of foreign LT debt	23	22	−2.8	−2.3	0.52	−0.33
US holdings of foreign ST debt	23	22	−1.1	−2.9	−1.80	−1.36***
US holdings of foreign equity	23	22	−3.1	−2.0	1.11	0.83
Private sector credit / GDP	21	21	−1.0	−2.3	−1.26	−0.97
Growth in private sector credit / GDP	21	21	−1.1	−4.8	−3.69***	−2.99***
Foreign banks' share of US credit	13	12	−1.9	−2.6	−0.76	0.13
US banks' share of foreign credit	13	12	−3.3	−0.8	2.49***	1.55***
4. Monetary and fiscal policy variables						
Foreign exchange peg	34	11	−2.1	−5.0	−2.93	−1.59*
Foreign exchange reserves / GDP	22	23	−2.9	−1.1	1.80	0.81**

Description					Difference	Coefficient (scaled)
Inflation target	15	30	−1.8	−2.5	−0.75	0.87
Inflation rate	23	21	−2.0	−4.8	−2.79	−1.59**
Government budget balance	22	23	−1.9	−3.6	−1.76*	−0.43
Government revenues	22	23	−0.7	−4.6	−3.87***	−1.48***
Government expenditures	23	22	−0.8	−4.5	−3.63**	−1.30***
Government debt 2007	23	22	−4.1	−2.0	2.09*	1.38*
5. Financial sector response						
Purchase bank assets	27	18	−2.3	−2.6	−0.31	0.16
Bank debt guarantees	22	23	−1.1	−3.0	−1.92	−0.20
Bank recapitalisation	23	22	−1.0	−3.1	−2.10	−0.33
Deposit guarantees	23	22	−2.2	−2.5	−0.31	0.52
Swap line with Fed	20	25	−1.5	−2.8	−1.31	0.12
Swap line with ECB	30	15	−1.1	−4.6	−3.52**	−0.89
Other swap line	18	27	−3.8	−2.0	1.89	0.46
6. Monetary and fiscal policy response						
Monetary policy rate change	29	16	−3.1	−0.9	2.17*	−0.32
Monetary policy rate cut	2	43	−4.2	−2.3	1.91	0.21
Exchange rate change	30	14	−2.3	−2.4	−0.17	−0.86
Exchange rate depreciation	27	17	−2.8	−1.9	0.93	1.20*
Discretionary fiscal stimulus	8	37	−7.8	−2.0	5.80**	2.13**
Change in government debt / GDP	23	22	−0.8	−3.1	−2.32**	−1.70***

[1] The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. [2] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on the dependent variable.

Table A2

Dependent variable: change in the average growth rate between 2000-2007 and 2008-2009; univariate analysis

	Rank-sum tests					Linear regression
	Observations		Median CGAP			Coefficient (scaled)[1,2]
Description	0	1	0	1	Difference[1]	
Emerging market economy	22	24	−0.9	−1.2	−0.24	−0.18
1. Banking system structure						
Total bank capital ratio	23	21	−0.9	−1.0	−0.11	−0.03
Banking crisis 1990–2007	22	24	−0.9	−1.3	−0.38	−0.24
CB bank supervisor	21	25	−1.0	−1.0	0.01	0.17
Banking concentration	23	23	−0.9	−1.0	−0.09	0.04
Loan / deposit ratio	23	23	−0.9	−1.4	−0.42**	−0.33**
2. Trade openness						
Current account	23	23	−1.4	−0.9	0.50**	0.59**
Trade openness	21	21	−0.9	−1.4	−0.48**	−0.27
Commodity exporter	38	8	−1.2	−0.9	0.38	0.19*

3. Financial openness

Net foreign assets	23	23	−1.3	−0.9	0.39	0.28*
Financial openness	23	23	−0.9	−1.3	−0.39	−0.15
Foreign holdings of US LT debt	23	22	−1.4	−0.9	0.49**	0.02
Foreign holdings of US ST debt	23	22	−1.1	−1.0	0.11	−0.24***
Foreign holdings of US equity	23	22	−1.3	−1.0	0.35	0.04
US holdings of foreign LT debt	23	22	−1.3	−0.9	0.39	0.02
US holdings of foreign ST debt	23	22	−1.3	−0.9	0.39	−0.23**
US holdings of foreign equity	23	22	−1.1	−1.0	0.11	0.18
Private sector credit / GDP	22	21	−1.0	−0.9	0.10	−0.10
Growth in private sector credit / GDP	22	21	−0.9	−1.4	−0.51**	−0.76***
Foreign banks' share of US credit	13	12	−1.0	−1.0	−0.03	0.06
US banks' share of foreign credit	13	12	−1.1	−1.0	0.14	0.22

4. Monetary and fiscal policy variables

Foreign exchange peg	35	11	−0.9	−1.9	−0.96**	−0.51**
Foreign exchange reserves / GDP	23	23	−1.0	−1.2	−0.22	−0.01
Inflation target	16	30	−1.3	−1.0	0.35	0.32
Inflation rate	23	22	−0.9	−1.4	−0.50**	−0.60***
Government budget balance	23	23	−0.9	−1.0	−0.09	−0.08
Government revenues	23	23	−0.9	−1.3	−0.37	−0.19**
Government expenditures	23	23	−1.0	−1.1	−0.10	−0.16*
Government debt 2007	23	23	−1.4	−0.9	0.53***	0.37*

5. Financial sector response

Purchase bank assets	27	19	−1.0	−0.9	0.09	0.15
Bank debt guarantees	22	24	−1.0	−1.0	0.06	0.15
Bank recapitalisation	23	23	−1.0	−1.1	−0.10	0.08
Deposit guarantees	23	23	−1.0	−0.9	0.09	0.23
Swap line with Fed	20	25	−1.2	−1.0	0.18	0.20
Swap line with ECB	30	16	−1.0	−1.2	−0.24	−0.03
Other swap line	18	28	−1.2	−1.0	0.23	0.03

6. Monetary and fiscal policy response

Monetary policy rate change	30	16	−1.0	−1.1	−0.11	0.00
Monetary policy rate cut	2	44	−1.1	−1.0	0.06	−0.05
Exchange rate change	31	14	−0.9	−1.3	−0.41	−0.13
Exchange rate depreciation	28	17	−1.2	−0.9	0.25	0.27*
Discretionary fiscal stimulus	8	38	−1.7	−1.0	0.74*	0.54**
Change in government debt / GDP	23	23	−1.0	−1.1	−0.10	−0.43**

[1] The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. [2] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on the dependent variable.

Table A3

Multivariate analysis of macroeconomic performance[1]

Dependent variable: sum of residuals for 2008-2009 from a regression of national real GDP growth on US real GDP growth

Independent variables:	Coefficient[1]	Standard error	p-value
Loan / deposit ratio (%)	−1.27	0.48	0.01
Current account (% of GDP)	2.81	0.67	0.00
Foreign holdings of US equity (% of GDP)	−1.15	0.48	0.02
US holdings of foreign short term debt (% of GDP)	−0.55	0.40	0.17
Number of observations			44
Adjusted R^2			0.45

Dependent variable: change in the average growth rate between 2000-2007 and 2008-2009

Independent variables	Coefficient[1]	Standard error	p-value
Loan / deposit ratio (%)	−0.15	0.10	0.12
Current account (% of GDP)	0.71	0.23	0.00
Foreign holdings of US equity (% of GDP)	−0.30	0.18	0.08
US holdings of foreign short term debt (% of GDP)	−0.07	0.12	0.57
Number of observations			45
Adjusted R^2			0.34

[1] The explanatory variable is normalised in each case so that the reported coefficients indicate the estimated effect of a one-standard deviation increase in the explanatory variable on the dependent variable.