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Why performance differed across countries in the Recent Crisis

How country performance in the Recent Crisis depended on pre-crisis conditions

Abstract

The growth performance of countries proved to be very different during the recent crisis. We apply principal component analysis to derive a single ordinal indicator on growth performance and to analyze whether initial conditions of economies or structural characteristics can explain the differences in growth performance. As initial conditions at the start of the crisis we use fiscal situation, trade competitiveness, output and credit growth, as structural characteristics we test size, openness, share of sectors and per capita income. The task has proved to be as difficult as expected as causality often works in two ways and policy variables have intervened, which themselves are dependent on the initial conditions and structural characteristics. The three indicators that end up as the best predictors for the depth of the crisis are correlated with one another and thus difficult to disentangle.

JEL No: E20, E30, E32, E44, E60, G18, G28

Keywords: financial crisis, cross country performance differences, predictors for crises

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Why performance differed across countries in the Recent Crisis

How country performance in the Recent Crisis depended on pre-crisis conditions

1. Introduction and outline

The Recent Crisis has been the deepest crisis the industrialised economies have seen since the Great Depression in the nineteen thirties. While the crisis was rather synchronized across regions and countries during its first months[1], the performance of individual countries now – three years after the start and two years after "Lehmann Brothers" – looks very different. This paper analyses to what extent these differences in country performance can be explained by the pre-crisis macroeconomic development and by structural characteristics of the economies.

The research question is specified, motivated and related to existing literature in section 2. We measure "growth performance" in the crisis by a composite performance indicator (section 3). It integrates four indicators on macroeconomic dynamics in and around the crisis into one robust performance indicator by applying the Principal Component Analysis. Section 4 presents the main empirical results, analyzing to which extent "growth performance" across regions and countries in the recent crisis was related to the "pre-crisis conditions" of the economies (such as the budget situation, competitiveness, past growth of GDP and credits) and on structural characteristics (such as openness, size, GDP per capita, the share of manufacturing, finance and public sector). Section 5 tests the robustness of the results and how they change if we add the size of the stimulus packages (which partly depended on pre-crisis conditions too) and presents caveats. We summarize in section 6.

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[1] This is indicated by the sharp and simultaneous fall in exports, industrial production and stock prices in the first three quarters, see *Aiginger* (2010A, http://www.economics-ejournal.org/economics/journalarticles/2010-18).

2. Motivation of the research question and literature existing

The goal of this paper is to find evidence why growth performance of countries differed in the Recent Crisis. There are abundant hypotheses about the causes of the Recent Crisis (*Aiginger*, 2009, 2010B). Maybe they could be clustered into a first group emphasizing overleveraging of firms, banks and governments, the inherent instability of the financial sector and bubbles in asset and house prices, a second one emphasizing macroeconomic causes from trade disequilibria to loose monetary policy and a third group pointing at regulatory failures. This is not the place to repeat or restructure these hypotheses. What we know is that (i) the crisis happened and was transmitted with enormous speed across countries and (ii) that the world economy started to grow again in mid 2009 with greater variation as to the date and the speed of recovery.

There is much less – albeit growing – empirical literature as to explain differences in cross country performance. The lack of in-depth analysis is understandable since the countries first looked to be hit rather synchronically: the standard deviation of decline in the first quarters had been much smaller than in the Great Depression (see *Aiginger*, 2010A). Furthermore researchers may hesitate to draw too early conclusions since in some countries GDP did not start to increase up to late 2010 and several countries now have debt and budget problems which will last for years.

The reason for investigating performance differences is clear-cut. If we want to prevent future crises it is important to understand the past ones. Country differences could be one source of information. If there is a common shock – the near breakdown of a rather global financial system – different performance in the countries may reveal which structures are more resilient, which dynamics before the shock contributed to or mitigated the crisis in a specific country. The focus of this paper is to "relate" performance of countries to pre-crisis conditions of the economies (PCC) and on structural characteristics (STR). It intentionally emphasizes "real conditions", since most existing research – often produced by research departments of central banks – emphasize the financial sector conditions (credit growth, assets bubbles). We focus on industrialized countries since crisis started in countries with a sophisticated financial system. We use the word "relate" instead of explain, since causation is expected to prove difficult if a singular event is to be explained and if several variables moved in parallel in the building-up period of the crisis.

Pre-crisis conditions (PCC)

Among the real imbalances the first candidate is fiscal prudence at the start of the crisis. It is expected that low deficits and low public debt will indicate a sound medium-term fiscal policy aiming at surpluses in good times. Alternatively a good fiscal position might be the consequence of rather high growth in the run-up period. In either case low deficits and debts signal the possibility to react quickly after a crisis started. Countries with large deficits have less

room for maneuvering and the pressure to consolidate will be further stimulated if credits tighten, risk premia increase, debt repayment is reassessed under weaker growth prospects. Therefore we expect a negative relation between performance in the crisis and pre-crisis debt.

The second imbalance could be external surpluses or deficits, be it in trade or in current accounts. A relation between performance in the crisis and pre-crisis current accounts may come via four channels. The first could be that debts of government and private firms are seen as an interrelated problem by financial markets in rating "country risk". A second might be that weak trade competitiveness is seen by financial market as a barrier for further growth and therefore makes borrowing more expensive. A third would be that losing currency reserves via current account deficits increases the risk premium for a country if either the government or firms want to raise money. A fourth reason would be that countries with weak external position in good times might be marginal suppliers which are able to sell on the world markets if demand is strong, but are squeezed out of the markets, if more competitive producers have free capacities.[2]

We focus less on the financial sector than other studies as mentioned already. However we cannot ignore that part of the problems were accumulated in the run-up period by financial innovations, overleveraging and bubbles. We therefore include variables on the price dynamics, on credit growth, on foreign capital reserves to capture these effects. The first two of these variables should to some extent also correlate with bubbles on the property and asset markets.

Additionally we include pre-crisis growth of real GDP. This could be a proxy for the consequences of bubbles: if the credits and assets boomed and the financial sector was inflated, this would have accelerated growth and inflation. Past growth can however also signal an exceptional catching-up process e.g. of peripheral countries during a process of integration.

Structural characteristics (STR)

Among the structural characteristics of countries, we test whether open economies had performed ceteris paribus worse. This could be the case since the crisis had been transmitted via trade and capital flows. We could furthermore expect that a larger government sector would limit the crisis and that a large manufacturing or financial sector would contribute to the depth of a crisis. We follow literature insofar as the size of the economy could limit the

[2] Literature on "economic" integration decries the importance of trade deficits, they should be as irrelevant as deficits between intra-country regions (States in the US, countries or regions in Europe). Competitiveness literature in parallel abandoned concepts on competiveness or emphasizing at trade balances (at least since the *Krugman's* (1994) critique that looking at trade figures is meaningless, dangerous, obsessive etc.). New concepts of competiveness start from a broad vision of performance incorporating growth, social inclusion, environmental stability (and constraints like budgetary prudence and balanced trade; see *Aiginger,* 2006).

crisis (due to smaller export and import shares or less leakages from stimulus packages), while per capita income could contribute to the depth via a more sophisticated and innovative financial sector or higher income elasticity of demand and exports. And we add dummies for Asian countries (alternatively for China plus India).

Our basic regression therefore relates output performance to one bloc of variables for pre-crisis conditions (PCC) and another on structural indicators (STR).

Growth performance = f (PCC, STR)

Growth performance is measured by the ordinal variable "growth performance", generated by the Principal Component Analysis (PC-value) using several indicators on economic growth. The set of pre-crisis conditions (PCC) contains the budget situation and public debt ("fiscal prudence") in 2007, the balance of trade and balance of current account ("revealed competitiveness"), financial variables (inflation, credit growth, liabilities) plus the average growth of GDP from 2000 to 2007 ("past growth dynamics"). The set of structural characteristics (STR) includes trade openness ("globalisation and interconnectedness"), the size of government, the share of manufacturing and finance, country size and of GDP per capita and a country rating on the financial sector.

Empirical studies existing

There are not many cross country analyses on the differences in the severity of the crisis, but the amount of literature is increasing fast (see *Berkmen et al*., 2009, *Rose – Spiegel*, 2010; *Lane – Milesi-Ferretti*, 2010, *Claessens et al*., 2010). [3]

Studies differ as (i) to the range of countries involved (developed countries vs. emerging economies, or a combined sample), (ii) to the indicator for the severity of the crisis (single indicator, combination of real and financial indicators) and how indicators are combined (averaging ranks versus extracting a principal component), (iii) to the explanatory factors used and finally (iv) as to the statistical technique used (correlations, multivariate regressions, MIMIC models, robust regressions). Most of the studies come from the think tanks of National Banks; therefore financial variables dominate (as compared to the present paper). None of the papers cited combined financial data with imbalances in fiscal position, and none investigated the impact of policy response - for example the use or size of fiscal stimuli packages. As expected in a new strand of literature, emerging at a time where the crisis is still not over in some countries, and when in many countries echo effects or hangovers exist, the findings do not yet converge to a clear picture. On the one end is the very skeptical summary in *Rose – Spiegel* (2009) that it is very difficult to explain country differences in performance,

[3] The relationship between the probability or depth of a crisis with the trade or current account position has not been highlighted in the literature on economic crises in general and literature on the Recent Crisis in particular. However, screening the literature we find several hints to this fact, usually as a by-product of investigations with a broader focus.

namely the size of the equity market in the run-up phase prior to the crisis. Other studies find several indicators as important and significant but have to acknowledge problems of collinearity.

Rose and Spiegel use a set of performance indicators ranging from GDP growth to stock market performance, from credit rankings to exchange rates for 107 countries, and investigate sixty potential causes for the crisis. They essentially find only one robust predictor, namely the size of equity market run ups prior to the crisis. They conclude to be unable to link most of the commonly cited causes of the crisis to its incidence across countries[4]. This negative finding makes them "skeptical of the accuracy of early warning systems". In *Rose and Spiegel* (2010) a somewhat different method is used, inter alia three different performance aspects are now investigated separately. The main result now is that only house prices, credit growth and current accounts are significant for all three performance indicators.

Lane – Milesi-Ferretti (2010) explain in-crisis growth (in fact the two years growth in 2008 and 2009) by pre-crisis growth, trend growth and a set of real side variables and one of financial variables. This is done for a large sample of countries dominated by non-industrial countries. The main conclusion of this study is that the pre-crisis level of development increases in the ratio of private credits to GDP, current account deficits and openness to trade did aggravate performance. Higher GDP per head and higher pre-crisis growth lead to a more severe crisis.

Berkmen et al. (2009) use revisions of GDP forecasts as indicators to measure the severity of the crisis, specifically revision of "consensus forecasts" and IMF predictions prior and after the intensification of the crisis in September 2008. The rational is that revisions – in contrast to growth rates or rates of decline – are not affected by cyclical positions and anticipated adjustments in growth. The investigation is done for 43 emerging markets (and extended in a robustness test for 126 low-income plus emerging countries). They use four sets of determinants (trade, financial variables, vulnerabilities, institutions). The main conclusion is that a relatively small set of variables can explain much of the differences in country performance, namely leverage, cumulative credit growth and exchange rate pegs. Specifically leverage explains virtually all growth revisions for the least affected countries, two thirds of the revisions of an averagely affected country and slightly more than half for those countries most affected by the crisis. The primary budget position is significant, leading to the policy conclusion that a solid fiscal position during good times creates buffers for shocks. *Berkmen et al*. find some evidence that lower current account deficits prior to a crisis are associated with better growth outcome (p. 8). However in the final regressions current accounts are insignificant due to their strong correlation with credit growth.

[4] Current accounts are investigated as determinants; they prove significant in bilateral regressions, but are insignificant in multi-regressions. However, "countries with large current account deficits and fewer reserves were also more vulnerable" (p. 27).

Claessens et al. (2010) alternatively try to explain three performance indicators (duration, drop of GDP, and change vs. trend); only three variables are significant for all three measures of the depth of the crisis, namely house price appreciation, bank credit growth and current account. Countries with close links to the US financial system or direct exposure to asset backed securities were the first affected. Homegrown vulnerabilities (leverage, asset price bubbles etc.) are to be seen in the economies most severely hurt.

Barrell et al. (2010) investigate the factors which explain the probability of crises in general using a sample of one hundred crises in different countries and at different times. They find that the current account position helps to predict a crisis. This is quite in contrast to the use of the fiscal position before the crisis starts which is not so helpful.

Summarizing, studies on country performance in the Recent Crisis focus mainly on a large set of countries (with emerging economies dominating) and on financial variables. Budget position and government debt at the start is usually not contained nor stimulus packages as reaction to the shock. Results differ widely from the pessimistic assessment of a sad state of knowledge to the optimistic one, that a small set of variables explains a lot of variance. Credit growth, leverage, country size, GDP per capita, stock market booms, past GDP growth are variables suggested to have explanatory power.

3. Measuring growth performance by a composite indicator

In this section we describe which indicator for performance we chose and how countries performed according to this indicator. Our sample contains industrialized countries plus China, India, Turkey, Bulgaria, Estonia, Lithuania, Latvia, and Romania; we intentionally focus on developed countries plus economies linked to them including emerging new economies.[5]

Information used and condensed

In order to get a performance measure on economic dynamics for countries during the crisis we combine four indicators on the development of real GDP for 37 countries:

- The rate of change of GDP in 2009 ("in crisis decline"); in 32 countries real GDP was lower in 2009 relative to 2008. An increase in GDP in the year 2009 occurred in China, India, Poland, Australia, and Korea.
- The cumulated change in the three years 2008, 2009, 2010 to indicate the status of the economy several quarters before the climax and the speed of recovery after it ("three years performance"). This measure yields a decrease for 24 counties and an increase in 13 countries.

[5] The final choice of the countries was also limited by the countries for which data and especially estimates on the fiscal stimulus packages existed (see appendix). In general the Recent Crisis was deeper in industrialized countries as compared to developed countries (*Aiginger*, 2010A).

- The decrease of quarterly GDP from the pre-crisis peak to its trough: this indicator should describe the potential severity of the crisis not revealed by annual figures ("steepness of the crisis").
- The actual growth in the three years 2008, 2009, 2010 ("three years performance") relative to the "pre-crisis" trend growth from 2000 to 2007 ("trend change")[6].

The country rankings are to some extent rather robust as to the specific indicator chosen. The spearman rank correlations between the four indicators for growth performance in the crisis lie between 0.7 and 0.9 and are all significant at the 1% level. We think that each of the indicators demonstrate some element of "the depth of a crisis". Therefore we combine the information by extracting a Principal Component (PC). The weights of the composite "growth performance" index are based on factor loadings on the first component of the Principal Component Analysis. The first component explains 90% of the common variance across the indicators. The resulting ordinal indicator (PC-value) is the main performance indicator we will use.[7] Additionally we show in table 1 in the last column the ranking of the ordinal Principal Component (PC-rank).

Best and worst performing countries

According to all indicators (see table 1) the crisis was mildest in China and India, where even the trend change was less than one percentage point. The cumulated three years growth was between 15% and 30% in the crisis years. Australia and Korea, Canada and the US performed well, too. In Europe the positive outliers were such different countries like Switzerland and Poland (one of them member of EU vs. the other not, small vs. large, export oriented vs. domestic oriented, financially globalized vs. domestic oriented banking system).

The crisis was deepest in new member countries of the EU, namely the Baltic countries, in Hungary and Romania. Additionally it hit the high-income economies of Ireland and Iceland. Finland and Japan are among the countries with large drop in GDP due to its large manufacturing sector. According to the GDP indicators chosen the crisis was not really severe in the Southern European countries with Greece, Spain and Portugal in a middle zone. This assessment might be revised if recovery comes later and if budget deficits are cut dramatically in 2010 and 2011. France, the Netherlands and Austria had the best

[6] Additionally we could measure the length of the crisis by counting the number of quarters in which GDP decreased; in rare cases these were one to two quarters, on average five quarters. In a few countries we cannot say yet how many quarters the crisis lasted, since GDP is still declining.

[7] It furthermore could be used to rank countries (PC-rank). Alternatively a "Composite Rank Indicator" (CI-rank) had been tried by ranking the countries according to the four indicators, then adding up the ranks and finally ranking countries according to the rank sum again. All three indicators are closely correlated. The PC-value is theoretically optimal since it has the highest information value. The CI-ranking may give the best intuitive ranking. Therefore we concentrate on the PC-value for econometric calculations while using the Composite Rank Indicator (CI-rank) for some illustrations.

performance within the Euro area. The New Member Countries of the EU took one top ranking (Poland) but many countries were severely hit by the crisis.

Table 1: Growth performance differences during the crisis: top 10 vs. low 10 countries

	GDP performance					
	2009	2010/2007	Trough 2009/ peak 2008	2010/2007 minus 2000/2007	Principal component	
		p.a.	Percentage change	Trend change	PC-value	PC-rank
	Annual data, percentage change		Quarterly data			
Top 10						
China	7.7	8.7	7.7	-1.7	99	1
India	5.9	6.5	5.9	-0.7	93	2
Poland	1.7	3.1	1.7	-0.9	80	3
Australia	1.3	1.9	1.3	-1.6	77	4
Korea	0.2	2.5	0.2	-2.2	75	5
Switzerland	-1.5	0.6	-2.4	-1.3	70	6
Canada	-2.6	0.2	1.4	-2.4	70	7
Norway	-1.5	0.6	-2.4	-1.7	69	8
New Zealand	-1.6	0.0	-1.6	-3.5	66	9
USA	-2.4	0.2	-3.8	-2.2	66	10
Low 10						
Romania	-7.1	0.2	-7.1	-5.9	56	28
Japan	-5.2	-1.5	-8.4	-3.0	54	29
Iceland	-6.5	-2.3	-6.3	-6.8	51	30
Hungary	-6.3	-2.0	-7.9	-5.7	50	31
Finland	-7.8	-1.8	-9.1	-5.0	50	32
Slovenia	-7.8	-1.2	-9.5	-5.6	50	33
Ireland	-7.1	-3.7	-12.5	-9.3	40	34
Lithuania	-15.0	-4.6	-18.1	-12.7	22	35
Estonia	-14.1	-5.8	-19.6	-13.9	18	36
Latvia	-18.0	-8.9	-26.1	-17.9	0	37

Source: Eurostat (AMECO, May 2010).

While country differences regarding the depth of the crisis can be seen independently of the specific indicator chosen, there are some differences highlighted by individual indicators. The crisis was deeper in Greece, France, and Italy if we rank these countries according to their relative dynamics in all three years together, than if we look at 2009 only (since growth had been meagre in 2008 and/or recovered less in 2010). On the other hand the crisis looks less

severe if performance in 2008 is included in Bulgaria, Romania, Slovakia and Czech Republic since growth had been rather high in Central and Eastern European countries in 2008.

If we compare the depth of the crisis not only by looking at the performance in the years of the crisis but relate the "in crisis performance" to the "pre-crisis performance" ("trend change"), the output loss in Italy, Germany and Mexico is set against a backdrop of slow growth before the crisis started. The crisis itself is not the cause of meagre performance in these countries, it has deeper structural causes.

4. Main empirical results on pre-crisis conditions and structural characteristics

We now assess whether the growth performance of countries in the crisis (revealed by the PC-value indicator) is related to the prevailing pre-crisis conditions, to structural conditions and finally on a combination of PCC and STR.

4.1 Performance versus pre crisis condition (correlations)

Weak impact of fiscal conditions

Growth performance of countries is unrelated to fiscal prudence; the correlation coefficient has the expected positive sign for the budget surplus in 2007 and an unexpected positive one with public debt relative to GDP (both are insignificant and very low, see table 2). Government budgets were in surplus in 2007 in 19 out of the 37 countries.[8] Some countries with good performance during the crisis had a budget surplus before, namely Norway, China, India, Australia and New Zealand. Also in support of the expected positive correlation would have been the fact that the Baltic countries, Hungary, Italy and the United Kingdom had a large deficit and consequently suffered a severe crisis. The correlation was weakened by Portugal and Greece which had a large deficit, but did not suffer a very severe crisis (maybe the consequences will be seen if the recovery is delayed); the same may be true for France and the US. Finland, Sweden and Denmark enjoyed a surplus, but the crisis was at least as strong as in other European countries (figures in 2010 indicate that recovery may be stronger here).

The inability to predict in crisis performance by the budget situation is extremely robust, it holds for both variables on all transformations (2007, average 2000/2007, changes 2000-2007).

[8] Among these countries the five Nordic European countries (Norway, Denmark, Sweden, Finland and Iceland) as well as Korea enjoyed a rather large surplus of about 4% of GDP. Smaller but still considerable surpluses occurred in Canada, Switzerland, Spain and Australia. High deficits (about 5%) were already seen in Greece and Hungary and deficits of more than 2% were present in France, Portugal, the USA and the United Kingdom.

Figure 1: Growth performance (PC-value) and budget surplus/deficit 2007 (R = 0.09)

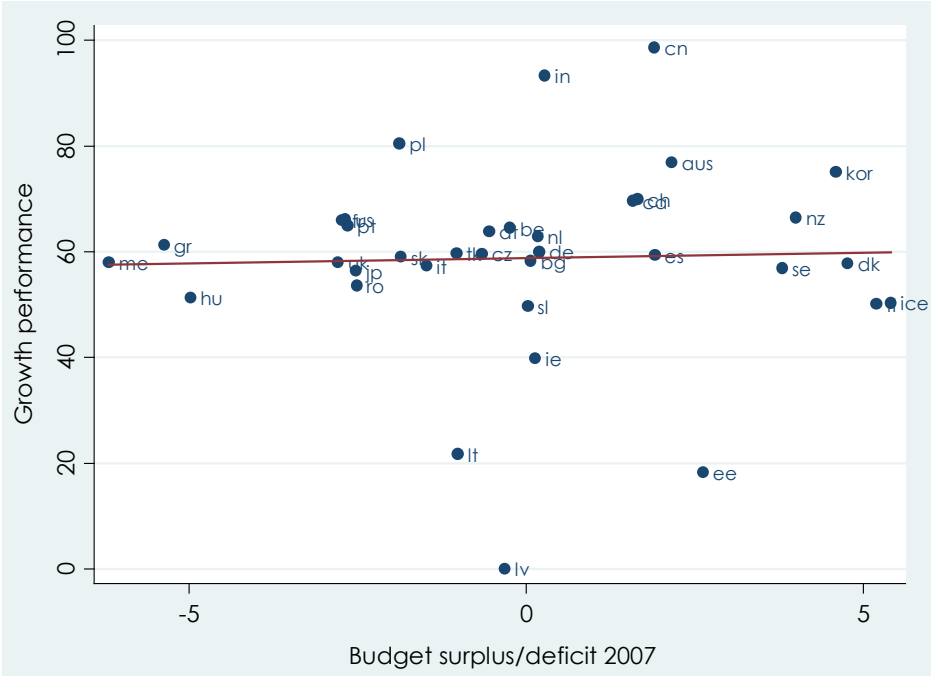
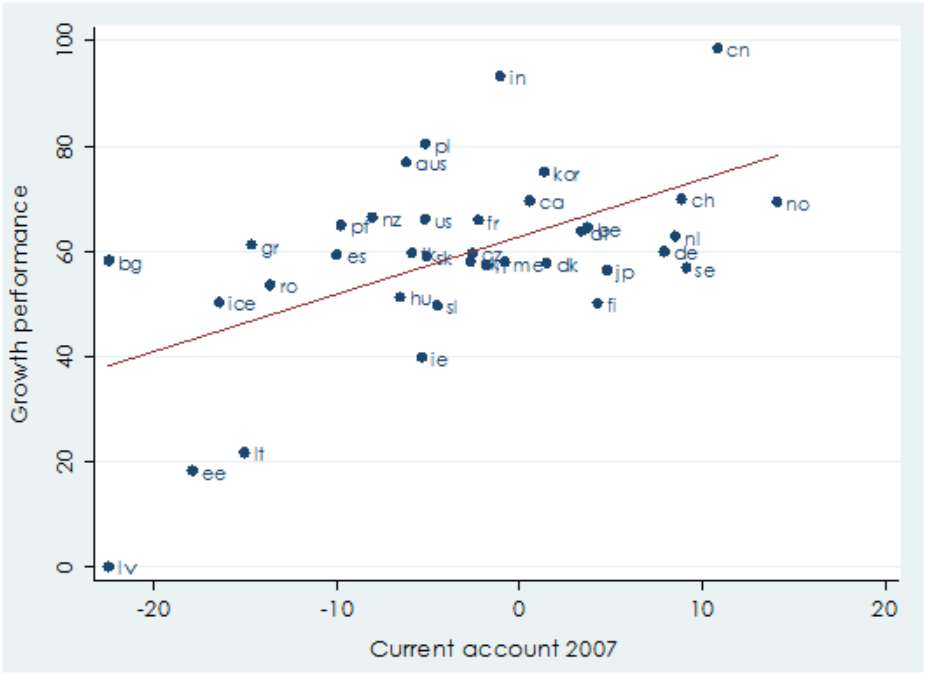


Figure 2: Growth performance (PC-value) and current account 2007 (R = 0.56)



Strong impact of trade competitiveness (current account position)

Growth performance is significantly related to trade competiveness before the crisis, this holds for trade balances and even stronger for the position of current accounts in 2007. It also holds for current account position in the longer run (2000-2007) and to the change in current accounts between 2000 and 2007.

Trade deficits of about ten percent of GDP existed in 2007 in Greece, Portugal, Bulgaria and Latvia; the United Kingdom and Spain also had deficits nearing 10%. The deficits are translated into current account deficits for all countries with one small and one large exception. The deficit in the current account for Greece is somewhat lower due to tourism (15% instead of 18% of GDP) and that for the United Kingdom decreased to 3% (from 9½% for trade of goods) due to the financial sector's surplus. In the US both deficits are about 5%.

High surpluses and good performance are shown by Norway, China, India, Belgium, the Netherlands and Austria. Deficits and an ensuing deep crisis occurred in the Baltic States, Bulgaria, Ireland and Spain. Outliers in this correlation are Sweden and Finland which both had good trade positions and medium sized or larger crises and Australia, Poland and the US which had a negative trade position but a rather mild crisis.

The correlation is rather robust. Significance is given for ranked correlations with the current account too, also if we correlate growth performance with changes of the current account balance between 2000 and 2007.

Figure 3: Growth performance (PC-value) and growth of GDP 2000/2007 (R = -0.30)

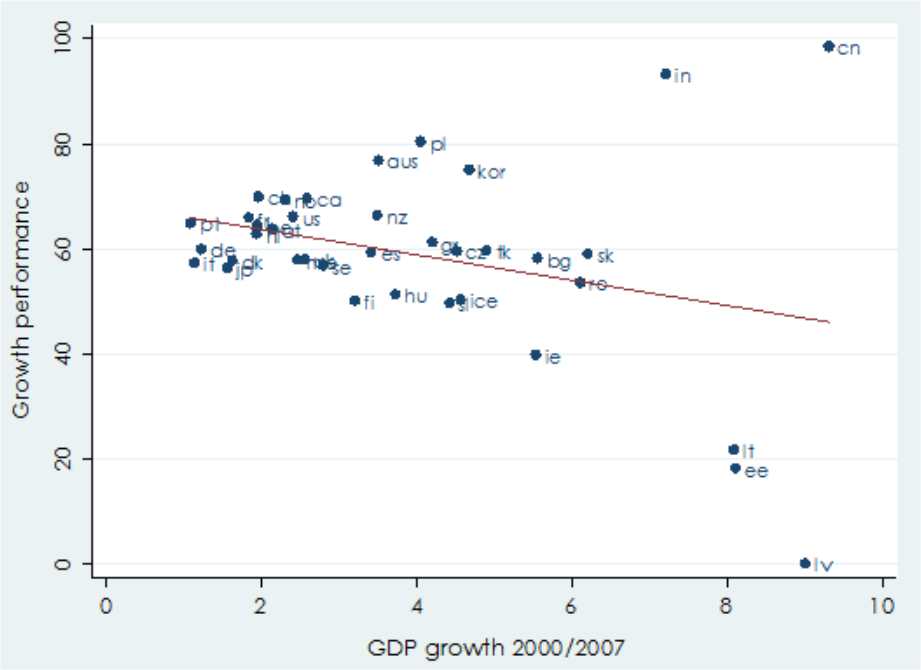
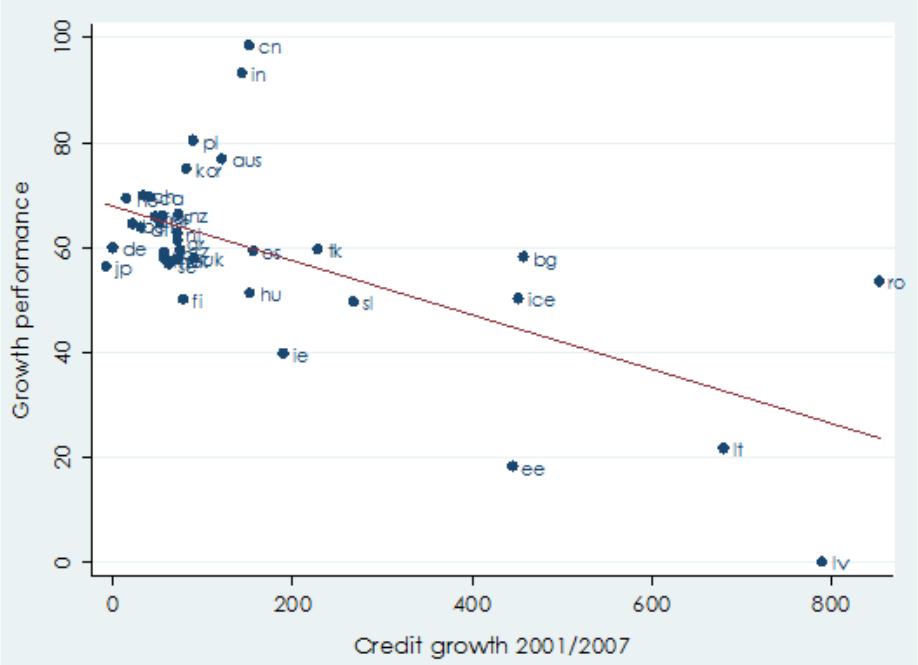


Figure 4: Growth performance (PC-value) and credit growth 2000/2007 (R = -0.62)



Pre-crisis dynamics of output, credits and inflation

Performance during the crisis is correlated to pre-crisis growth (t = -1.89), the correlation is significant at the 10 % level. If we take ranks for the past growth variable (which reduces the impact of outliers), the correlation is not significant. Low growth before and good performance during the crisis occurred in very rich countries (Switzerland, Norway, Canada). High growth and weak performance in the crisis occurred in several eastern European countries and specifically the Baltic countries. These two groups foster the negative correlation; China and India combine high pre-crisis growth and good performance; Italy, the United Kingdom and Mexico combine low growth and deep crisis.

Performance is significantly negatively related to credit growth between 2001 and 2007; this relationship is created by a few countries with extreme credit growth. In Romania, Iceland, Latvia, Bulgaria credits in 2007 were more than four times as high as in 2000. Credit growth was also very high in China and India, but here it was more in line with a quickly expanding real sector. If we do not use quantitative credit growth, but the rankings of countries for credit dynamics- which downgrades the importance of outliers- the correlation is no longer significant. The relation of credits to GDP in 2007 is not significant, its change between 2000 and 2007 is (and in this case the correlation is less dependent on outliers, so that ranks prove significant too)

Performance proved unrelated to changes in the currency reserves and inflation.

Table 2: The relation between growth performance and pre-crisis conditions

Pre-crisis conditions (bold letters if ranks are used)	Growth performance	
	PC-value	
	R^2	t-value
Budget surplus/deficit (relative to GDP) 2007	0.01	0.55
Budget surplus/deficit (relative to GDP)2000-2007; absolute change	0.00	0.11
Budget surplus/deficit (relative to GDP)2000-2007; average	0.00	0.21
Public debt (relative to GDP) 2007	0.04	1.17
Public debt (relative to GDP) 2010-2007; absolute change	0.00	0.39
Public debt (relative to GDP) 2010-2007; average	0.01	0.55
Current account (relative to GDP) 2007	0.31	3.96
Current account (relative to GDP) 2007; rank	**0.26**	**3.49**
Current account (relative to GDP) 2000-2007; absolute change	0.39	4.75
Current account (relative to GDP) 2000-2007; average	0.20	2.96
Foreign exchange reserves; growth 2000-2007	0.00	-0.25
Foreign exchange reserves; growth 2000-2007; rank	**0.00**	**-0.32**
Foreign exchange reserves (relative to GDP) 2007	0.02	-0.77
Foreign exchange reserves (relative to GDP) 2000-2007; absolute change	0.06	-1.52
Foreign exchange reserves (relative to GDP) 2000-2007; average	0.01	-0.50
Domestic credits; growth 2001/2007	0.35	-4.35
Domestic credits; growth 2001/2007; rank	**0.06**	**-1.47**
Domestic credits (relative to GDP) 2007	0.03	-1.04
Domestic credits (relative to GDP) 2001-2007; absolute change	0.24	-3.33
Domestic credits (relative to GDP) 2001-2007; absolute change; rank	**0.25**	**-3.42**
GDP growth 2000/2007	0.09	-1.89
GDP growth 2000/2007; rank	**0.06**	**-1.48**
Inflation (consumer prices)	0.01	-0.56

Source: Eurostat (AMECO).
The critical value for significance at the 5% level is 2.03 (1.69 at 10% level).

4.2 Performance versus structural characteristics (correlations)

Performance is slightly (but not significantly) negatively correlated to openness as measured by the sum of exports and imports to GDP (t = -1.39). Some very open economies such as Belgium, the Netherlands and Austria performed rather well, while closed economies such as Japan, Romania and Iceland had severe crises. There are also open economies with deep crises (Ireland, Finland and Latvia) and closed economies with excellent performances (China, India and Poland).

Performance is positively related to the share of manufacturing sector (significant at 10% level) and unrelated to that of the financial sector (as well as the change of the financial sector relative to GDP between 2000 and 2007). A negative correlation could be expected for the share of manufacturing since the output loss in manufacturing had been much stronger than for total GDP (see *Aiginger*, 2010)[9] and since the inflation of the financial sector is usually seen as cause of the crisis. Performance is furthermore unrelated to an indicator on country risk (financial component).

Performance is slightly negatively correlated to government size at the start (t = -1.53). This is a surprise, since larger government shares could mean more effective automatic stabilizers and maybe also an indicator of the ability and determinedness of governments to intervene in difficult times. The correlation is driven by Denmark, France, Italy, Sweden and Finland, all countries with a large public sector share and low "in crisis performance". In Switzerland and Australia there was a small government share and good performance, but this was also true for China and India. Government size may however be a proxy either for Northern Europe (large public sector) or for new industrialized countries in Asia (small public sector) and not a variable to be interpreted in a causal way.

Table 3: The relation between growth performance and structural characteristics

Structural characteristics	Growth performance	
	PC-value	
	R^2	t-value
Openness 2007	0.05	-1.39
Government size 2007	0.06	-1.53
Share of manufacturing 2007	0.08	1.77
Share of financial sector 2007	0.02	0.92
GDP 2007	0.05	1.39
GDP per capita 2007	0.00	-0.27
Country risk evaluation (financial risk)1)	0.00	0.08

Source: Eurostat (AMECO).
The critical value for significance at the 5% level is 2.03 (1.69 at 10% level). –1) International Country Risk Guide, Copyright, The PRS Group, Inc.

Performance is weakly positively related to the size of the economy as measured by absolute GDP. It is unrelated to the per-capita income, but this could be due to the focus on industrialized countries (*Lane – Milesi-Ferretti*, 2010, find a negative relation in a sample focusing on developing countries).

[9] *Berkmen et al.* show that a higher share of manufacturing exports increased the severeness of the crisis. This result may come from the larger number of developing countries in their sample.

A regional dummy for Asia is significant; the same holds for more a dummy which is set 1 only for China and India only.

4.3 Multiple explanation of country performance

Now we combine the variable within the set on pre-crisis conditions (PCC) and that on structural characteristics (STC) in multivariate regressions. A sample of our favourite explanations is given in table 4.

Budget variables are never significant, neither current deficits, nor debt/GDP, neither in the short run (2007) nor in the longer run (average 2000 to 2007). No combination with other initial conditions or structural characteristics helps.

Out of the structural variables government size has a stable negative coefficient (in most cases near significance), the share of the manufacturing sector is never significant neither that for the financial sector. An Asian dummy is significant; it specifically lowers somewhat the significance of the current account variable.

The explanatory power of the equations is raised considerably if we switch from single regressions to multiple regressions. The highest explanatory power have equations combining the three variables current account, credit growth and past GDP growth (together with the Asia proxy); here adjusted R^2 is 0.46. The t-values of the three variables however are unstable and in some cases insignificant indicating multicollinearity between these three variables.

If we combine (i) current account with credit growth, the coefficient of the latter remains significant. (ii) If we try to downgrade the influence of outliers (by using ranks instead of ordinal values), current account remains significant, while credit growth loses significance. (iii) If we combine current account and past growth the current account variable is the only significant. (iv) If all three variables are used in the same regression, credit growth is the only significant indicator for qualitative data, current account for ranks of the explaining variable, while past credit growth remains significant if not.

This leaves us with the interpretation that all three variables capture some elements of a common factor which explains the depth of the latter crisis, but also some specifics. The common factor of credit growth and pre crisis real growth is easier to grasp. High growth and specifically high growth incurred by over optimism and by cheap credit and high leverages of private and financial sector generated a high downward potential. The relation between real growth and credit growth to current account are less clear cut. High growth of the real sector and cheap credit could have reduced current account surpluses and increased deficits (which would establish a negative relation) and high growth could be the result of increased competitiveness and gains in market shares (as shown in China, Sweden, and Finland). The negative relation between current accounts and dynamics indicate that the cyclical or short/medium run relation is the stronger than the shifts in underlying competitiveness.

Table 4: The regression between growth performance and structural characteristics
Dependent variable is performance (PC-value); coefficient and (t-value); bold letters if ranks are used

Budget surplus 2007	Current account 2007	GDP growth 2000/2007	Credit growth 2000/2007	Dummy Asia	Government size 2007	Share of manufacturing 2007	R^2 adj.
0.40							-0.02
(0.55)							
	1.09						0.29
	(3.96)						
	0.84						**0.24**
	(3.49)						
		-2.41					0.07
		(-1.89)					
		-0.40					**0.03**
		(-1.48)					
			-0.05				0.37
			(-4.73)				
			-0.66				**0.14**
			(-2.58)				
				24.46			0.16
				(2.80)			
					-0.38		0.04
					(-1.53)		
						0.79	0.06
						(1.77)	
	1.05	-0.33					0.27
	(3.28)	*(-0.25)*					
	0.86	**0.03**					**0.21**
	(3.02)	***(0.11)***					
	0.45		-0.04				0.38
	(1.23)		*(-2.49)*				
	0.74		**-0.15**				**0.22**
	(2.18)		***(-0.46)***				
		1.95	-0.07				0.39
		(1.36)	*(-4.40)*				
	0.60	-2.12		23.62			0.38
	(1.76)	*(-1.53)*		*(2.61)*			
	-0.52	**-0.26**		20.53			**0.29**
	(-1.64)	***(-0.87)***		*(2.16)*			
	0.19		-0.04	19.14			0.47
	(0.54)		*(-2.98)*	*(2.64)*			
	-0.40		**-0.37**	19.67			**0.30**
	(-1.13)		***(-1.12)***	*(2.23)*			
	0.45	1.95	-0.05				0.40
	(1.25)	*(1.37)*	*(-2.86)*				
	-0.72	**0.26**	**-0.38**				**0.21**
	(-2.08)	***(0.63)***	***(-0.76)***				
	0.20	0.14	-0.04	18.73			0.46
	(0.54)	*(0.09)*	*(-2.43)*	*(2.16)*			
	-0.40	**-0.06**	**-0.33**	**20.19**			**0.28**
	(-1.10)	***(-0.15)***	***(-0.69)***	***(2.10)***			
-0.12	**0.66**	**0.10**	**-0.30**	19.31	-0.14	-0.31	**0.24**
(-0.43)	***(1.41)***	***(0.21)***	***(-0.61)***	*(1.78)*	*(-0.50)*	*(-0.99)*	
-0.11	0.44	0.21	-0.04		-0.44	0.09	0.41
(-0.16)	*(0.82)*	*(0.10)*	*(-2.20)*		*(-1.95)*	*(0.16)*	
-0.18	**0.93**	**0.35**	**-0.33**		-0.32	-0.23	**0.18**
(-0.62)	***(2.02)***	***(0.76)***	***(-0.65)***		*(-1.25)*	*(-0.71)*	

Remark: regression coefficients plus t-value in parenthesis; t-values above 2 (resp. 1.7) denote 95% (90%) significance.

Table 5: Growth performance, pre-crisis conditions and structural characteristics

	Principal component		Composite rank indicator	Budget surplus 2007	Public debt 2007	Trade balance 2007	Current account 2007	Openness 2007	Government size 2007	GDP Nom 2007	GDP growth 2007/2000	GDP growth 2010/2007	Size of packages
	PC-value	PC-rank	CI-rank										
								Values					
Belgium	65	13	13	1.6	84.2	1.6	3.7	131.9	48.4	334.9	1.9	-0.8	-1.4
Denmark	58	25	25	4.8	27.4	0.0	1.5	8.7	50.9	227.0	1.6	-4.2	-3.3
Germany	60	17	19	0.2	65.0	8.2	7.9	72.6	43.7	2428.2	1.2	-2.6	-3.2
Greece	61	16	16	-5.4	95.7	-17.7	-14.7	36.6	45.0	226.4	4.2	-2.9	0.8
Spain	59	20	19	1.9	36.2	-8.6	-10.0	45.2	39.2	1052.7	3.4	-3.2	-3.9
France	66	11	10	-2.7	63.8	-2.0	-2.3	44.5	52.3	1894.6	1.8	-0.5	-0.7
Ireland	40	34	34	0.1	25.0	10.4	-5.3	78.2	36.6	189.8	5.5	-10.8	8.3
Italy	57	26	27	-1.5	103.5	0.2	-1.8	47.1	47.8	1546.2	1.1	-5.5	0.0
Netherlands	63	15	15	0.2	45.5	8.0	8.5	112.9	45.5	568.7	1.9	-0.8	-2.5
Austria	64	14	14	-0.5	59.5	0.7	3.4	87.2	48.7	270.8	2.1	-0.3	-1.2
Portugal	65	12	12	-2.7	63.6	-10.1	-9.8	58.9	45.8	163.1	1.1	-2.1	-0.8
Finland	50	32	32	5.2	35.2	5.1	4.3	68.2	47.3	179.5	3.2	-5.3	-3.2
Sweden	57	27	26	3.8	40.8	0.5	9.1	7.7	52.5	331.1	2.8	-3.4	-3.3
United Kingdom	58	23	24	-2.8	44.7	-9.4	-2.7	55.5	44.2	2044.1	2.6	-3.2	-1.9
Japan	56	28	29	-2.5	187.8	0.0	4.8	0.2	36.0	3197.0	1.6	-4.4	-4.7
USA	66	10	8	-2.7	62.2	-4.4	-5.2	16.3	36.7	10223.3	2.4	0.7	-5.6
Bulgaria	58	22	22	0.1	18.2	-13.0	-22.5	60.7	41.5	16.0	5.6	0.7	2.3
Czech Republic	60	19	18	-0.7	29.0	0.1	-2.6	4.9	42.5	127.3	4.5	-0.3	-2.8
Estonia	18	36	36	2.6	3.8	-1.1	-17.9	7.8	34.8	15.6	8.1	-16.4	9.4
Hungary	51	30	31	-5.0	65.9	0.0	-6.5	0.5	49.8	101.1	3.7	-5.7	7.7
Lithuania	22	35	35	-1.0	16.9	-4.3	-15.1	29.7	34.8	21.1	8.1	-13.1	12.5
Latvia	0	37	37	-0.3	9.0	-34.2	-22.5	115.6	35.7	5.5	9.0	-24.5	11.6
Poland	80	3	3	-1.9	45.0	-1.0	-5.2	19.0	42.2	311.0	4.1	9.7	-1.2
Romania	54	29	28	-2.5	12.6	-4.3	-13.6	18.5	36.0	124.7	6.1	0.5	2.5
Slovenia	50	33	33	0.0	23.4	-4.9	-4.5	119.4	42.4	34.6	4.4	-3.5	0.0
Slovakia	59	21	21	-1.9	29.3	-1.6	-5.1	139.4	34.4	54.9	6.2	4.0	-1.3
Turkey	60	18	17	-1.0	39.4	-4.1	-5.9	24.1	20.6	472.0	4.9	0.6	-4.4
Canada	70	7	9	1.6	64.2	2.1	0.6	39.0	39.2	1044.3	2.6	0.6	-4.1
Switzerland	70	6	5	1.6	43.6	1.1	8.9	47.3	32.2	317.2	2.0	1.9	-0.5
Norway	69	8	6	17.7	52.4	1.7	14.1	7.0	41.1	283.4	2.3	1.9	-1.2
Iceland	50	31	30	5.4	29.1	-0.1	-16.4	0.6	42.3	14.9	4.6	-6.6	7.3
Mexico	58	24	23	-6.2	28.1	-1.0	-0.8	54.0	15.4	743.4	2.5	-1.5	-1.6
Korea	75	5	6	4.6	27.6	0.0	1.4	0.1	21.5	765.9	4.7	7.6	-6.1
Australia	77	4	4	2.2	14.8	-1.1	-6.2	20.1	22.3	722.9	3.5	5.7	-5.4
New Zealand	66	9	11	4.0	14.8	-0.7	-8.1	23.2	4.4	95.3	3.5	-0.1	-3.7
China	99	1	2	1.9	9.0	7.5	10.8	9.2	18.7	2555.9	9.3	28.3	-4.4
India	93	2	1	0.3	58.0	-6.7	-1.1	33.3	14.1	1152.0	7.2	20.9	-0.5
Correlation PC-value with ...	1.00			0.09	0.19	0.40	0.55	-0.23	-0.25	0.22	-0.30	0.93	-0.75
Correlation PC-rank with ranks of ...		1.00		0.10	0.26	0.14	0.39	-0.11	-0.22	0.52	-0.21	0.87	0.53
Correlation CI-rank with ranks of ...			1.00	0.10	0.25	0.12	0.38	-0.12	-0.22	0.51	-0.20	0.88	0.51

Source: Eurostat (AMECO, May 2010).

5. More on robustness, the impact of fiscal stimuli, caveats

In this section we try to tackle first the problem of multicollinearity between the best explanatory variables. Then we discuss the impact of stimulus packages on performance. Finally we discuss caveats as to the time of the study and the countries covered.

Extracting Principal Components out of PCC and STR

The three best explaining variables, current account, credit growth and past GDP growth are highly multicollinear. This results in instable t-values, between single regressions and multiple regressions; the regression coefficients of capital account variable as well as that of past growth and credit growth loose significance if one of the other two variables is added. The problem of multicollinearity was found in other papers too, it had to be expected specifically between credit growth and past GDP growth (positive correlation). And it exists for the

current account position too if the cyclical effect of growth on capital accounts (increasing imports) dominates the competitiveness effect (that growth originates from excellent export dynamics).

We try to cope with the problem of multicollinearity by Principal Component Analysis again. We extract a Principal Component (i) out of the whole set of pre-crisis conditions, (ii) out of the subset of the three most successful predictors, and (iii) out of all structural variables. The first Principal Component drawn out of the full sample and then out of the best three are rather similar (we report results for the Principal Component drawn out of the best three; see table 6). This demonstrates that the three variables, current account, credit growth and past GDP growth are by far the most important determinants of country performance dwarfing the rest of the pre-crisis indicators. The resulting Principal Component indicator is highly significant for explaining country performance if used alone, if used in combination with the Asia dummy and with the first Principal Component extracted from the structural indicators. The indicator "PC-Initial Conditions" is loaded nearly equally by the three variables, showing that all three contain important orthogonal information. The coefficients of the new Principal Component Variables are more significant and the coefficients of determination higher in table 6, than in most equations in table 5. The coefficient of the structural variables is significant at the 10% level; if the Asian dummy is not included it loses its weak significance.

Table 6: Robustness test with Principal Component of pre-crisis conditions and structural change

PC-Initial Conditions Top 3	PC-Structural Variables	Asia Dummy	R^2 adj.
Dependent variable PC-value			
0.45			0.30
(4.08)			
0.44		23.01	0.45
(4.46)		*(3.27)*	
0.58	-0.68		0.34
(4.49)	*(-1.77)*		
0.53	-0.48	21.16	0.47
(4.51)	*(-1.36)*	*(2.98)*	

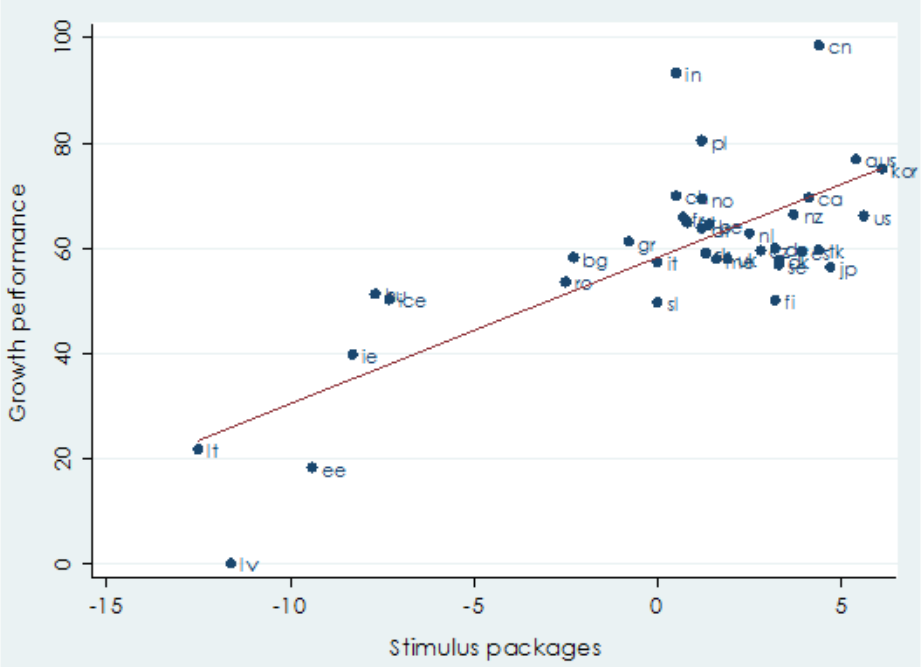
Remark: Top 3 Initial Conditions: Current account, past GDP growth, credit growth.

The impact of stimulus packages

A contentious problem is that performance of countries during the crisis depended not only on initial conditions and on structural characteristics but also on economic policy. Many countries did allow automatic stabilizers to work and most also added discrete stimulus

packages. If we relate our performance indicator to stimulus packages, we get a very significant positive relationship[10], which is closer than the relation to any single indicator on the pre-crisis conditions or on structural characteristics (and only slightly inferior to the best combination). However we cannot add stimulus packages to the explanation, since the size of the stimulus packages themselves depended heavily on the initial conditions and on the structural characteristics. If we run a regression of the size of packages on the initial conditions it depends pretty much on the same indicators as performance: a positive current account favoured large stimulus packages, while credit and past GDP growth limited their size. Again and surprisingly the size of stimulus packages is nearly unrelated to public budgets or debt.

Figure 5: Growth performance (PC-value) and the size of the packages (R = 0.75)



If we would put initial conditions, structural characteristics and the size of stimulus packages into one equation, the latter would be the only significant variable. This is again no surprise, since the size of the packages by definition is a direct and simultaneous part of GDP[11] (

[10] The overall correlation between performance and the size of the stimulus packages in the crisis is positive and quite large (R = 0.75): countries with larger stimulus packages experienced a less severe crisis. This correlation is supported positively by China, Korea, Australia, New Zealand and the US, which had large packages and smaller crises. The correlation is furthermore supported on the negative side by those countries which had to consolidate very early and suffered severe drops in GDP (Ireland, Lithuania and Hungary). Large stimulus packages concurred with an inferior performance in Japan (which was afraid of a new period of deflation). Good performers without large packages were Switzerland and Poland.

[11] Via the equation GDP = C + I + X-M + G-T, where G-T is the budget deficit, which stimulus packages are part of. C, I, X, M is consumption, investment, imports and exports. Stimulus packages are not lagged, as are the other sets of variables.

We cannot do much about this, and other studies have ignored this problem totally. But we find that we should keep in mind that the performance of countries during the crisis depended not only on the pre-crisis conditions or structural characteristics of countries but also on their economic policies, especially the stimulus packages enacted by governments[12]. The size of these packages in turn depended on the pre-crisis and structural conditions. This makes it difficult to separate out which variable had more/less effect the pre-crisis conditions or the size of the stimulus package.

Caveats

Finally we want to acknowledge that it may be too early to make a final assessment of the performance differences between countries during the Recent Crisis. Some countries have still not recovered, and production is still falling e.g. in Greece and Portugal in 2010. Thus the fiscal deficits at the start of the crisis may prove more important than currently reflected by our performance indicators if we take the consolidation period for the public budgets in account. On the positive side, recent data indicate that growth is resuming at great speed in Sweden, a country which had a large budget surplus in 2007. Overall we can use currently only a very simple lag structure, and a cross section approach; panel analyses and more sophisticated lag structure have to be applied in future research.

A further caveat is that our sample is constrained to 37 countries, we intentionally wanted to focus on industrialized countries plus emerging economies, in the latter case we were mainly limited by data e.g. on fiscal stimuli during the crisis for other countries. We know from studies which focussed on emerging economies, that the results can be different. Specifically the lack of significance of some structural variables (size of economy, per capita income) or the result of a positive impact of the size of manufacturing which we have found in some equations might be different in samples dominated by emerging economies. We see that regional dummies matter (like that for Asia); this indicates that the regional distribution of countries in the sample and that between developing and developed countries is important.

6. Summary

(1) The objective of this paper is to find some clues as to why the performance of countries during the Recent Crisis differed. Economic performance had been rather similar during the first few months of the crisis. Then however it started to diverge with some economies rebounding quickly and some continued to decline in 2010. "Performance" is defined by the change of real GDP in the crisis, using four alternative measures of dynamics, and

[12] Economic policy reacted comprehensively to mitigate the Recent Crisis – in contrast to the economic policy employed during the Great Depression – see *Aiginger* (2010A). Neither monetary policy, nor fiscal policy alone would have worked if applied separately and without the help of extensive schemes of guarantees, safeguards and bailing outs.

combining them in a single indicator derived by the Principal Component Analysis. This performance indicator is then related to a set of pre-crisis conditions prevailing at the start of the crisis and to a set of structural characteristics of the economies. This is done with single correlations, multiple regressions and finally a regression using Principal Component Analysis also for both sets of determinants. Our sample contains mainly industrialized countries but also China, India, Turkey and Eastern European countries (37 countries).

(2) Among best performers according to our growth indicators are India, China, Australia and Korea (four Asian economies). In Europe completely differing economies such as Poland, Switzerland and Norway performed the best. Worst performers were the three Baltic economies, as well as Ireland and Iceland, two economies which had actually climbed up to take the top position as regards per capita income. A rather deep crisis also occurred in Slovenia and Finland which were top ranking countries as far as the progress in transition respectively transformation into a knowledge-based society is concerned. Looking into this hierarchy of top and low performers in the crisis demonstrates that it is not actually a straight forward task to explain why countries were hit differently by the crisis.

(3) The most robust result is a negative one, namely that performance differences across countries are not related to the fiscal position in 2007. The negative result holds if we take the budget position for a longer pre-crisis period, the change in the position between 2000 and 2007 or the debt/GDP relation. The impact of the budget position at the start of the crisis might be finally somewhat larger than seen today, since some of the countries with large deficits have not restarted to grow. The negative finding is however very robust and supported by *Barrel et al*. (2010). An influence of deficits on performance was found in *Berkmen et al*. (2009), a study which focuses on low-income countries.

(4) The robust positive result is that a cluster of three variables can explain about one third of the actual country variance:

- the position of current account balance in 2007 is positively related with in-crisis performance, as is the change of the balance between 2000 and 2007 and the average for this longer period;
- countries which experienced a very high growth of real GDP between 2000 and 2007 were more severe hit by the crisis; a significant proxy for Asia indicates that this holds not for high-growth Asian countries;
- growth of credits between 2000 and 2007 is negatively related to performance.

(5) The positive impact of current accounts has been found in other studies. Several countries with surpluses in the current account in 2007 are best performers in the crisis (Norway, China, India, Belgium, the Netherlands, Austria and Germany). Trade deficits and rather deep crises are seen in the Baltic States, Bulgaria, Ireland and Spain. The correlation holds also for an average of the current account balance over a longer

period and (even slightly closer) for changes in the current account; it exists whether we take quantitative values as well as ranks.

Credit growth between 2000 and 2007 has the highest single (negative) correlation with performance. It may be a proxy for asset bubbles in the upcoming phase (albeit consumer price inflation is insignificant). It is insignificant if we take the ratio of credits to GDP alone in 2007 or if we take ranks for credit growth. These facts indicate that it is the very fast credit growth in a few countries which determine the negative relation between performance and credit growth.

Performance in the crisis is worse in countries that grew fast between 2000 and 2007. This correlation is supported by the high growth and deep crisis in the Baltic States, slow growth and good performance in Switzerland and Poland. Some fast-growing economies performed well in the crisis too (China and India), so that the correlation is less significant than that of current account, it is also less robust (not significant for ranks).

(6) The depth of the crisis is not related to the country risk rating, not to GDP per capita in 2007, not to inflation, nor to the share of the financial sector in 2007. It is weakly related to openness and to the size of the economy (better performance for less open and larger economies). Performance is somewhat better for economies with a larger manufacturing sector and a smaller government sector (both findings may be surprising but fit to the importance of competiveness – of a strong private sector – as determinant of performance).

(7) If we combine the indicators into multiple regressions, the results indicate complicated interactions and multicollinearities between the three variables current account, past growth and credit growth. Equations which use these three variables together (plus a proxy for Asia) explain about one third of country performance. Most structural variables are at the verge or below significance and do not really raise explanatory power.

It is difficult to tell which variable "survives" as most significant if they are used together in multiple regressions. If quantitative figures are used credit growth and past GDP growth remain significant, if ranks are used current account seems the most robust one. Robust equations tend to favour credit growth as the strongest single impact.

(8) If we extract the best combinations by Principal Component Analysis all three factors – current account, past GDP growth, credit growth – have an approximately equal weight and the combined indicator on pre-crisis conditions is highly significant. Structural indicators altogether are still much less important and at the verge of significance. This leads us to the conclusion that it was more important what happened in the running-up period of the crisis, than the structure of the economies like size, GDP per head, openness, share of government, manufacturing and finance sector.

(9) The impact of trade competitiveness on country performance should be further investigated. The result is found in different studies on the probability of crises as well as

on the performance differences in the Recent Crisis. Tentative economic explanations might be that (i) the debts of government and private firms are seen as an interrelated problem by financial markets, (ii) that weak trade competitiveness is seen as a problem for further growth and therefore makes borrowing more expensive, or (iii) that losing currency reserves via current account deficits increases the risk premium for a country if either the government or firms want to raise money and (iv) that some fast-growing economies are "marginal" suppliers in the sense that they are able to export if high-income countries are running at full speed, but loose market shares if there are idle capacities in sophisticated economies. In general, economists in the past had downgraded the importance of balanced trade account for growth. Specifically literature on integration areas as well as those on country performance ("competitiveness") had assessed trade deficits as relatively meaningless.

(10) Further research is needed, with more sophisticated econometric techniques, longer and may be country specific lags and more information on post-crisis performance (length of crisis and speed of recovery). The irrelevance of the budget situation at the start of the crisis (and that of debt and fiscal prudence for a longer period) is striking. This is even more the case since the size of stimulus packages has mitigated the crisis in several countries. The size of the stimulus packages is expected to depend on the financial buffers available; this however was not the case, packages again depended more on the situation of the current accounts.

Some policy conclusions can be derived from the results: countries which are growing very fast, whose credits are booming and whose current accounts are negative or deteriorating, should be aware of the risks in their economies. On the other hand countries with slow growth of output, credits and a positive current account could engage in more proactive growth policy without being afraid of downside risks.

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Annex

The size of fiscal stimuli

There are several estimates available as to the size of the fiscal stimuli packages by OECD, European Commission, Bruegel, Bertelsmann (summarized in *Breuss – Kaniovski – Schratzenstaller*, 2009). The estimates of the exact size of the packages are different since it is often not easy to define what would happen if no crisis would have occurred. Some projects were planned before, but then realized quicker, in some countries tax reforms were discussed for some time and then done earlier or larger. In some countries several packages were enacted (Germany, Austria). In all cases the effects relate to at least three fiscal years.

Our indicator is based on the estimates by OECD as to the size of the fiscal packages. We then add information on the size of the packages in China and India and then an estimate about several member countries of the EU, for which the OECD does not publish data (mainly Eastern European Countries). We relate the total fiscal stimulus of a country – however distributed between taxes and expenditures or across years – to the size of one annual GDP (in fact they are related to GDP 2008) and use an unweighted average across countries to get an estimate as to the total size relative to GDP. For the OECD subsample the average "package size" amounts to 1.5% of GDP. Since some countries had no fiscal stimulus programs, but had on the contrary to consolidate budgets, this figure underestimates the size of the packages in the "active" countries. If we take an average of those countries with expansionary programs, the size amounts to 2.8% of GDP. In the extended data set we add China with a large and India with a rather small stimulus program, Rumania and Bulgaria with small consolidation efforts and the Baltic countries and Hungary with large consolidation programs ("negative stimuli") near or above 10% of GDP. If we calculate averages for the extended set it is less than 0.5% for the unweighted average (due to very large consolidations of the few mentioned countries), the average of the countries with expansionary programs is 2.8% also for the extended data set.

The largest expansionary packages were tied in non European countries, namely in Korea, Japan, US, Australia, New Zealand, Canada, Turkey and China. In the average of these eight countries the packages amounted to 5% of GDP. It is not easy to grasp what the common characteristic between these countries is. Japan had already a very high government debt. The US had a large budget deficit; the crisis was not really deeper but maybe expected to become deeper than in other countries in 2007/08). From the perspective of the socio economic systems, the most active countries represent members of the rather liberal Anglo-American model (US, Australia, Canada, New Zealand) as well as members with traditional strong public interventions like China, Korea, Turkey). All these eight countries had lower

government shares in GDP (average 25% relative to 37% for all 37 countries). Therefore the knowledge that automatic stabilizers were smaller may have motivated larger packages.

Summarizing, out of the 37 countries in the enlarged data set 11 countries did have to consolidate. Two countries did neither engage in expansionary fiscal policy nor in consolidation (Italy, Slovenia), Greece had a small reduction in the fiscal deficit. Large consolidation happened in the midst of the crisis in the Baltic countries, in Hungary, Iceland and Ireland. All these countries had high pre-crisis growth, but could not continue to grow either due to a breakdown of the housing bubble, bank failures, and large deficits in external balance or in fiscal balance. Most of these countries had a combination of two or three of these factors.

Table A1: The size of the packages

	Size of packages		Initial conditions					Country size
	% of GDP	Rank	BS2007 Budget surplus 2007	PD2007 Public debt 2007	CA2007 Current account 2007	OPEN2007 Openness 2007	GOV2007 Government expenditures 2007	GDP nom 2007
			Ranks					
Belgium	-1.4	18	20	4	9	2	6	16
Denmark	-3.3	10	4	27	11	29	3	22
Germany	-3.2	12	15	6	6	8	13	4
Greece	0.8	29	36	3	32	19	11	23
Spain	-3.9	8	10	20	30	16	20	8
France	-0.7	24	33	8	17	17	2	6
Ireland	8.3	34	17	28	24	7	23	24
Italy	0	27	26	2	16	15	7	7
Netherlands	-2.5	15	16	14	5	5	10	14
Austria	-1.2	20	22	11	10	6	5	21
Portugal	-0.8	23	31	9	29	11	9	26
Finland	-3.2	12	3	21	8	9	8	25
Sweden	-3.3	10	7	18	3	31	1	17
United Kingdom	-1.9	16	34	16	19	12	12	5
Japan	-4.7	4	30	1	7	36	24	2
USA	-5.6	2	32	10	23	27	22	1
Bulgaria	2.3	30	18	30	36	10	18	34
Czech Republic	-2.8	14	23	24	18	33	14	27
Estonia	9.4	35	8	37	35	30	28	35
Hungary	7.7	33	35	5	27	35	4	29
Lithuania	12.5	37	24	31	33	21	27	33
Latvia	11.6	36	21	35	37	4	26	37
Poland	-1.2	20	28	15	22	25	17	19
Romania	2.5	31	29	34	31	26	25	28
Slovenia	0	27	19	29	20	3	15	32
Slovakia	-1.3	19	27	22	21	1	29	31
Turkey	-4.4	5	25	19	25	22	33	15
Canada	-4.1	7	13	7	13	18	21	9
Switzerland	-0.5	25	12	17	4	14	30	18
Norway	-1.2	20	1	13	1	32	19	20
Iceland	7.3	32	2	23	34	34	16	36
Mexico	-1.6	17	37	25	14	13	35	12
Korea	-6.1	1	5	26	12	37	32	11
Australia	-5.4	3	9	32	26	24	31	13
New Zealand	-3.7	9	6	32	28	23	37	30
China	-4.4	5	11	36	2	28	34	3
India	-0.5	25	14	12	15	20	36	10
Structural packages (extended; unweighted average over 37 countries)	-0.3	19	19	19	19	19	19	19
Structural packages (positive signs; unweighted average over 27 countries)	-2.7	14	18	17	15	19	19	15
Correlation SP (37 countries)			0.2234	0.1329	0.5063	-0.2395	-0.1389	0.6584

Source: WIFO calculations, OECD, Eurostat (AMECO, May 2010).