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The Twin Crisis:

From the Transatlantic Banking Crisis to the Euro Crisis?

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Summary: The Transatlantic Banking Crisis has strongly raised debt-GDP ratios in many OECD countries and this is undermining the economic recovery. As regards the euro zone there are special problems which are partly related to lack of fiscal discipline in Greece and to the Irish economic crisis which – largely unknown – basically reflects total failure of prudential supervision to apply EU directives and legislation, respectively. In this context the issue is raised whether or not there are structural problems with the Euro and monetary integration. Moreover, the debt dynamics of governments are analyzed and specifically the issue whether there is a need for restructuring the debt of Greece. Taking a closer look at the figures for government assets in Greece it seems possible to strongly reduce the debt-GDP ratio mainly by privatization. As regards Ireland one may propose that the European Commission or the European Parliament take the country before the European Court of Justice. Finally, a new approach for determining the optimum debt-GDP ratio is presented.

Zusammenfassung: Während der Transatlantischen Bankenkrise sind die Staatsschulden-quoten in vielen OECD-Ländern stark gewachsen, was die wirtschaftliche Erholung beeinträchtigt. In besonderem Maße ist die Eurozone durch einen strukturellen Mangel an Haushaltsdisziplin in Griechenland und wegen der irischen Wirtschaftskrise betroffen; Letztere konnte vor allem durch Versagen der irischen Finanzaufsicht entstehen. In diesem Zusammenhang untersucht die Analyse, ob strukturelle Probleme den Euro und die monetäre Integration beeinträchtigen. Darüber hinaus werden dynamische Entwicklungen der staatlichen Verschuldungen analysiert und die Frage von Umschuldungsmöglichkeiten für Griechenland thematisiert. Hierbei wird vor allem darauf hingewiesen, dass Griechenland aufgrund großer staatlicher Vermögen durch Privatisierungsprozesse einen großen Teil seiner Staatsschulden abbauen könnte. Bezogen auf Irland wird der Europäischen Kommission bzw. dem Europäischen Parlament empfohlen, vor dem Europäischen Gerichtshof zu klagen. Schließlich wird ein neuer Ansatz zur optimalen Staatsverschuldung vorgestellt.

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1. Introduction

The Transatlantic Banking Crisis of 2007-09 has been a historical shock to the Western world and the OECD countries. Starting as a subprime crisis in the US with its poorly regulated financial markets in 2007/08, key results have been the proliferation of the banking and financial market crisis in Western Europe, a major international recession in 2009, the switch to paranormal policy strategies in 2008-10 in the US and many EU countries – bringing almost zero interest rates "plus quantitative easing" (large open market operations) – and new questions about the viability of sovereign debt-GDP ratios in OECD countries. The latter aspect became strongly apparent during the Greek crisis and the Irish crisis which were allowed to translate into a broader Euro zone crisis in 2010.

The following reflections basically raise the questions why the Transatlantic Banking Crisis has caused a strong rise in the debt-GDP ratios in the US and Europe, to what extent the systemic crises in Greece and Ireland in 2010 stand for a serious crisis of the Euro area and why the sovereign debt crisis implies new risks in terms of another banking crisis. Finally, the question of optimal debt-GDP ratio is raised.

The latter question – concerning links between sovereign debt problems and bank refinancing - is easy to answer since banks typically cannot borrow at interest rates below government bond interest rates so that any sovereign debt spreads will translate into problems of bank refinancing; this holds all the more if such spreads occur in an integrated financial market such as the Euro area. Achieving healthy bank profits along the yield curve is almost impossible if high-risk premiums on government bonds drive up interest rates for both medium- and long-term bank bonds to be placed on the market. Along this logic it will take only a few years until banks in a safe haven environment – such as Germany and France (for the time being) – will be able to overtake rival banks in Greece, Ireland, Portugal and Spain; there are a few serious arguments that might be raised against such an outcome of competition in a politically biased market environment. The governments of Spain and Portugal know themselves that it is partly their high deficit-GDP ratios of 2008-2011 that have undermined the respective country rating; however, it is also true that both countries partly fell victim to a Greek debt crisis and an Irish economic crisis – the latter largely reflecting failure of the national prudential supervision system – in combination with the partly inadequate crisis management of the Euro zone and the EU, respectively. The European Parliament has adopted new laws on prudential supervision which stand for considerable institutional progress since financial actors in the EU single market face an EU supervisory framework as of 2011. While this reform can be considered to be part of the broader G20 reforms it is unclear whether or not the euro zone can be stabilized and which are the best policy options to be considered.

While it was to be anticipated – given the experiences from the Asian Crisis of 1997/98 – that the Greek crisis could trigger a regionalization syndrome, a full Euro zone crisis could have been avoided if the crisis management of Euro zone countries, combined with a better crisis management of the EU, would have been adequate. Simply setting up a €750 bill. rescue umbrella in May 2010 – based on €60 bill. from the Commission, €440 bill. of guarantees from Euro zone member countries and €250 bill. funds earmarked by the IMF – was not enough to calm international capital markets facing true stress in 2011-13 when

large refinancing of all major OECD countries' governments and of all major banks in the US and the EU27 is on the agenda. With debt-GDP ratios of the OECD area being much higher than prior to the Transatlantic Banking Crisis of 2007-10 there is every reason to anticipate growing nominal and real interest rates in the medium term. Even if the cyclical upswing combined with lose monetary policy in the US and Europe stimulates inflation in the medium term, it is clear that real interest rates will increase in the medium and long run – unless strong inflation dynamics are triggered in the US or Europe.

One key topic of the Euro crisis of 2010/11 concerns the question whether the economic advantages pointed out by the proponents of the euro and a common central bank have been overemphasized. This question can be denied as the key advantages of the introduction of the Euro and the ECB have been realized; the assessments of the DEUTSCHE BUNDESBANK (2008), the EUROPEAN COMMISSION (2008b) and the ECB (2008) are still valid. The reputation of the ECB is as good as that of the Deutsche Bundesbank was in D-Mark times and this is an advantage for the whole Euro area since the announcement of the ECB interest rate increases will dampen inflation and bring about an appreciation of the currency (itself also dampening inflation dynamics). Moreover, the output costs of disinflation in Germany's trading partners in the Euro zone are clearly lower than in previous years when large regions of the euro area were not governed by central banks with a high stability reputation. This in turn means that German producers and exporters are to benefit from the Euro zone strongly as it should be largely possible to avoid a stabilization crisis. There is, however, a serious caveat, namely the fact that lose fiscal policies in Greece, Portugal, Italy and a few other countries have created a new potential for a stabilization crisis in the Euro zone. Here pitfalls of national policymakers are a problem as is the lack of realism in the Stability and Growth Pact of the Euro zone – here the rather naïve emphasis on a 3% deficit-GDP ratio as an upper limit has turned out to be unconvincing, not least since Germany and France in 2003-05 managed to organize a revision of the Pact in tandem, which made it less clear, less transparent and less credible: all the wrong ingredients for a Community that has to emphasize its willingness and ability to achieve sound long-term government finances.

The issues of sovereign debt risk and bank debt risk are clearly linked:

- In countries in which government has to come up with major recapitalization of banks – or outright nationalization of ailing banks – government deficits are raised through financing needs of government controlled banks: Ireland, the UK, Spain and Greece as well as the US are major cases. However, the case of the US is a minor cause and a special one, namely to the extent that the US benefits from being a safe haven country, therefore US bonds in the balance sheet of the FED generate extra profits as a consequence of falling market interest rates (a development that has been reinforced by the FED's Quantitative Easing Programs I + II). The larger the losses incurred by banks of the respective country, the larger the bill to be footed by government. This mechanism should normally give a strong incentive for policymakers to organize an effective prudential supervision of financial market actors, including banks. The Irish case, however, suggests that unclear party financing from certain financial market actors is necessary and sufficient to kill this apparent political logic.

- A weakening of sovereign debt rating will indirectly raise financing costs of banks of the respective country. This in turn will not only raise financing costs of firms in case they want to place company bonds in the market, it also increases financing costs of banks. Worse, it reduces financing costs of competing banks in countries that stand for a safe haven and will thus attract additional capital inflows and face lower interest rates on government bonds and bonds of firms and banks as well. This mechanism generates pressure for policy reforms in countries with weaker capital inflows or increased capital outflows – these countries will come under pressure to imitate more the policy strategy and key traits of the economic system of safe haven countries such as Germany and France or the Netherlands and a few other countries. There is, however, some ambiguity in the EU, namely to the extent that Germany stands for a more liberal market economy – with more emphasis on the tradables sector and exports, respectively – than the French economy. The issue of stabilizing governments in countries with weak ratings in the Euro zone also has a more complex overarching issue, namely in what direction the IMF, strongly involved in the Euro zone rescue package, will push. It is not clear whether the IMF has a neutral impact here to the extent that the IMF leaders consider the banking crisis and the sovereign debt crisis in OECD countries as ideal opportunities to reinforce the IMF's role, where there might be a global tendency to put more and more rescue funds into countries in which a switch to more structural reforms would have been the more adequate strategy for tackling both problems within the banking sector and problems associated with sovereign debt. If the IMF should follow a kind of naïve expansion approach based on the EFSF formula that the IMF gives 1/3 of the rescue package offered by the Euro zone group, there is considerable risk that rescue packages will grow over time while trimming deficits is not becoming a top priority of governments. The high deficit ratios of 2010 suggest that these issues are relevant in such countries as France, Spain, Portugal and Italy in 2010. This in turn implies increased long run debt-GDP ratios for the respective countries and higher future income tax rates that undermine prospects for high economic growth – and higher growth would, of course, be the easiest way to overcome any sovereign debt crisis.

It cannot be ruled out that outsiders will exploit the new situation in Europe. 2010 is the first year in which the presence of China as a powerful financial player becomes visible in Europe. China's government has indicated its willingness to buy government bonds in Portugal and Spain as well as to help Greece in various ways. This approach is reinforcing China's economic weight in the EU and in the global economy and it would be no surprise if China – with a rising role in the IMF already – obtained the much wanted status of a market economy much earlier than the EU was thought to be possible before the Transatlantic Banking Crisis. The following analysis takes a look at solvency issues (section 2) and aspects of policy effectiveness and the Stability and Growth Pact (sections 3 and 4) while the following sections put the focus on key issues of the Greek sovereign debt crisis, the Irish crisis, the new EU system of prudential supervision and options for overcoming the Euro crisis (section 5-7).

2. Solvency Issues

The necessary condition for a country to have a government which is solvent is that the real growth rate of output (g_Y) exceeds the real interest rate (r); if this is the case, there is a steady state solution for the debt-GDP ratio b":= (B/P)/Y where B is nominal debt and P is the output price level. Denoting government expenditures (except for interest payments) as G and the income tax rate as τ and defining G/Y:= γ we get the following result for b"# in the steady state: b"# = (γ-τ)/(g_Y-r). The primary deficit ratio divided by the difference between the output growth and the real interest rate is equal to the long-run debt-GDP ratio. If the primary deficit ratio (γ-τ) is 1% and the difference between g_Y and r is also 1%, the long-run debt-GDP ratio would be unity; it is an empirical question whether – in the perspective of national and international investors in capital markets - there is a critical debt-GDP ratio on the one hand, on the other hand one may argue that theoretical considerations could determine an optimum debt-GDP ratio. The fundamental equation b"# = (γ-τ)/(g_Y-r) has two key implications:

- It is noteworthy that the golden rule of neoclassical growth theory which implies g_Y= r is incompatible with a steady state of the government debt-GDP ratio unless b"# is zero.

- It is also noteworthy that the long-run fundamental debt-GDP equation implies that the income tax rate τ is determined by the sum of γ and b'#(r-g_Y). Hence we may state that in a stable economy – with output growth g_Y>r – with a steady state value of the government debt-GDP ratio, the tax rate is always smaller than in an economy without government debt. This statement is clearly in contradiction to the Ricardo-Barro equivalence theorem, according to which financing government expenditures through issuing debt is fully equivalent to financing such expenditures through taxation; the equivalence view of BARRO (1974) has been rather popular in the literature, but the Barro-Ricardo equivalence theorem is considered here to be clearly invalid. Tax issues of non-neutrality e.g. come up in the context of differences in the capitalization horizon of different taxes: Corporate income taxation is highly rational in the sense that one may assume that if companies are quoted on the stock market, the investors will capitalize corporate tax rates over very long time horizons – by contrast, the VAT rate might not be fully capitalized in the decisions of households. By the same token international differences in corporate taxation will affect international capital flows, possibly less so in certain industries that rely rather strongly on government R&D support of major OECD countries. Here banks are strange outliers – while many banks could claim that they regularly launch major financial innovations, banks have obtained almost no R&D promotion of financial innovations and this in turn implies zero government control as well as lack of transparency. Therefore, wildcat financial innovations are a typical phenomenon in many OECD countries. This system is doubtful and costs the taxpayers a great deal in the end. Empirical analysis of REINHART/ROGOFF (2010) suggests that there is a negative link between debt and growth when debt-GDP ratios are high: above a threshold level of 90% of GDP government debt reduces economic growth. Moreover KUMAR/WOO (2010) also present evidence – based on a panel of

advanced and emerging economies – that higher debt has a negative impact on subsequent growth. There are at least four channels affecting long term economic growth: 1. effects on the level of   taxation, 2. effects on national savings/interest rates, 3. effects on the real exchange rate, 4. effects on risk premiums.

Governments of OECD countries have intervened in the Transatlantic Banking Crisis and they have done so almost in tandem with the US, the EU and China. To the extent that the G20 countries have adopted a Keynesian expansion strategy in 2008/09, the world economy has been characterized for the first time in decades by a global Keynesian policy; and it has worked in the medium term. Recalling that the world economy is the only closed economy in reality it is obvious that a parallel fiscal expansion in many countries should have a relatively high multiplier – the argument that the import-GDP ratio is dampening the fiscal multiplier does not hold in a two-country model in which both countries pursue parallel expansionary Keynesian fiscal policies. This does not rule out that there might be a problem in the future, which is linked to the global increase of the debt-GDP ratio (read about the OECD debt-GDP ratio in 2007-2011). If governments' ability to fight future recessions is impaired by the increased debt-GDP ratio, there are serious costs of the expansionary fiscal policy strategy of 2008/09.

3.   Fiscal Policy Effectiveness and US Boom-Bust

With a lower zero bound of the central bank' interest rate reached in 2008/09 in the US and the UK, the outlook for an efficient expansionary fiscal policy was rather bright: Higher government expenditures would not trigger a strong rise in the real interest rate – on the contrary, by helping to avoid a deflation scenario, expansionary fiscal policy was effectively reducing the real interest rate in the US. The US Council of Economic Advisers argues (see the subsequent table) that fiscal policy was rather effective as the fiscal stimulus in countries with a rather high stimulus has caused a strong swing in quarterly GDP real growth rates – this is suggested by comparing the crisis peak (Q4/2008 + Q1/2009) with the growth rate in Q2/2009:

Table 1: Stimulus and Growth in Advanced G-20 Countries

	Stimulus (% of GDP)	Stabilizers* (% of GDP)	Growth during:	
			Crisis** (%)	2009: Q2 (%)
High stimulus	3.2	28.4	- 7.1	+5.4
Med. stimulus	1.7	35.3	- 8.3	- 1.3
Low stimulus	0.3	43.2	- 7.4	- 0.3
United States	2.0	28.0	- 5.9	-0.7

Notes: High countries are Australia, Japan, and Korea; middle countries are Canada, Germany, and the United Kingdom; Low Countries are France and Italy. Growth rates are annualized.
* Tax income ratio (including social security contributions)
** Q4/08+Q1/09
Source: COUNCIL OF ECONOMIC ADVISERS (2010), p. 104

Keynesian fiscal policy works well in a setup with zero bound interest rates and safe haven effects. This also can be seen in an adequately modified New Keynesian economic model such as QUEST III – the model used by the European Commission – which combines forward-looking agents with nominal and real rigidities plus policy response functions; the role of bubble elements and the housing market have been explored recently.

The commonly used DSGE models have also been used to explore medium term US economic dynamics more closely. There is an analytical challenge with respect to the current account behaviour and economic development in the US. There are many possible shocks which could explain the US boom 1995-2007 and the economic downswing in 2008/09. Considering innovations in US mortgage markets – facilitating subprime lending -, general productivity shocks or investment sector specific productivity shocks and a global savings glut we have four basically possible impulses which do could explain the observed patterns of macroeconomic variables in the US as is shown in the innovative analysis of IN'T VELD/RACIBORSKI/RATTO/ROEGER (2010). Results from impulse response functions show difficulties in explaining the current account dynamics; a preference shift in favour of US assets (affecting the interest rate parity) and bubble elements in stock markets also is not fully explaining the patterns observed in the real economy.

The Analysis of the authors suggest a clear pattern of explanation for economic growth and the investment GDP-ratio in the US: technology improvement have strongly contributed to real economic development (see Fig. 1) – from this perspective one may anticipate that medium term growth will continue even in the presence of debt problems in OECD-countries.

Decomposition of Growth and the Investment Output Ratio in the US
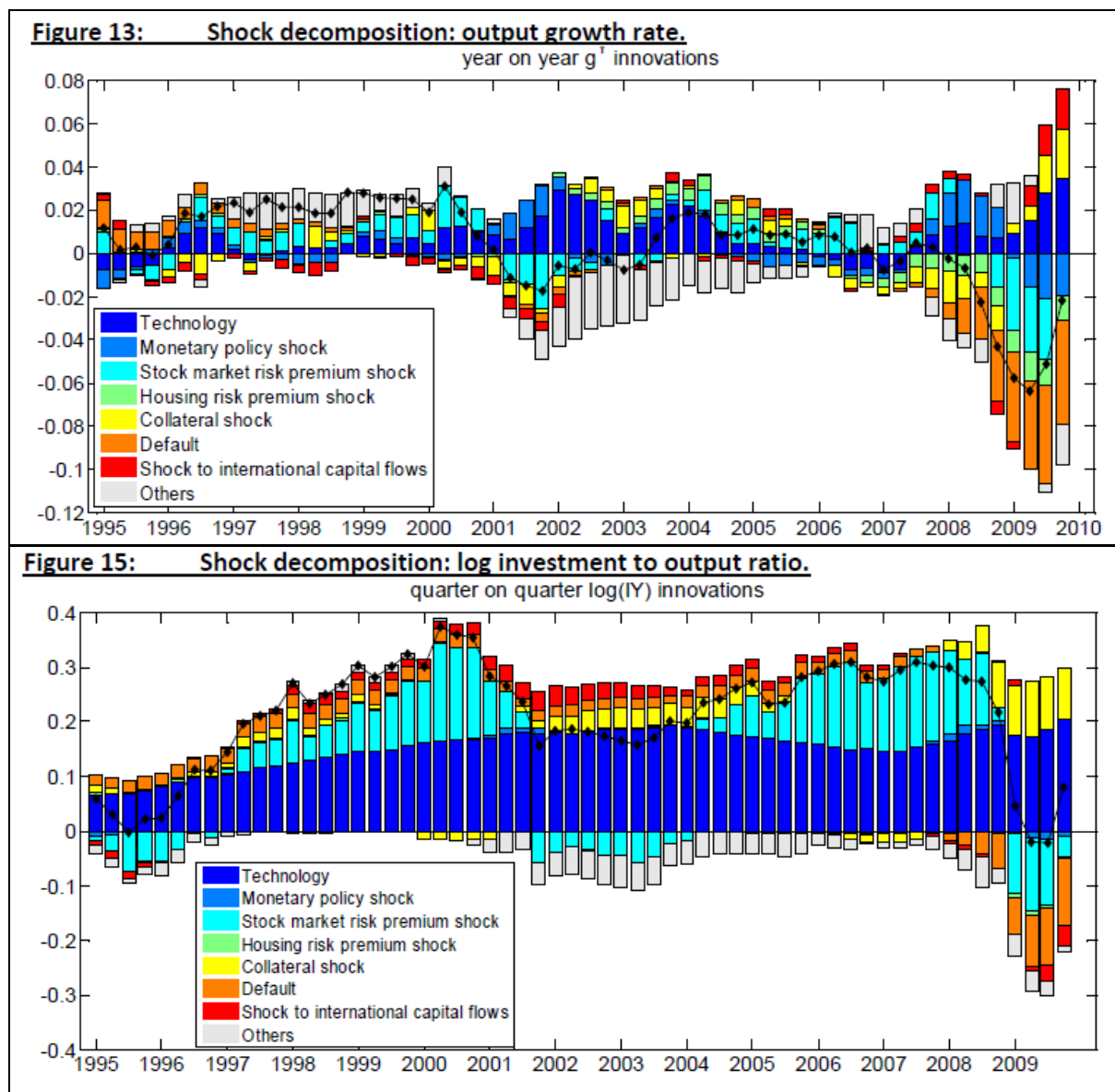
Source: IN'T VELD/RACIBORSKI/RATTO/ROEGER (2010), p.28

An important element in the analysis is the role of mortgage default shocks which raise the required rate of return on equity which in turn leads to a fall of investment and this causes a persistent reduction in GDP. Key stylized facts for the US emphasized by the authors mainly refer to persistent labor-saving technology effects, investment-specific productivity shocks – showing up in falling relative prices of capital goods -, monetary policy shocks in 2001-04, risk premium shocks (bubble effect which, of course, is only transitory), flight to safety shocks, a savings glut shock (read: change of time preference in the rest of the world) and loan default shocks. The housing risk premium shock has reduced consumption; this reflects the fact that easier borrowing conditions stimulated residential investment of households. Investment has strongly been stimulated by positive technology shocks and periods with a stock market bubble (for details the readers are referred to this

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The default shock – undermining profitability of banks and firms, respectively - largely explains the decline of investment in 2007-09. The housing risk premium effect partly explains residential investment patterns, while the rise of relative construction prices dampens residential housing investment. The decomposition analysis for explaining the trade balance suggests that shocks in international capital flows play an important role. The shock decomposition for the real interest rate shows that monetary policy between 200-2004 has played a considerable role. The fall of the US output growth is partly explained by the default shock – largely affecting general investment (not just housing investment) in a negative way. Moreover, the US productivity shock has played a crucial role for output growth in the decade after 1998.

At the bottom line bubbles and risk shocks have to be considered if investment dynamics are to be explained. Residential investment was not so important for the output decline in 2008/09. However, residential market dynamics affected – through higher default rates – economic development: Higher default rates translated mainly into lower general investment through a rise of required rates of return on equity. Bubble elements have played a role in the US, not only fundamental variables were important: Co-movement of consumption and residential investment were not strong in the US which suggests that bubble elements naturally play an important role in explaining economic dynamics. More generally, it is an important lesson from the recent and more long term economic development – and similar aspects might be relevant for other OECD countries, too – that bubble element are crucial for economic development and output dynamics, respectively. Animal spirits matter more than traditional models have suggested.

Technology Dynamics and Capital Flows

What is a convincing way to explore US current account developments? In a system of flexible exchange rates the main dynamics could be from the real economy – but not only in the sense that trade in goods and services is affected. Rather, the capital account dynamics (driving indirectly the current account) could be linked in a specific way to technology dynamics which in turn affect the current account. If one assumes that net capital imports Q' are a positive function of $A/A*$ where A is labor-saving knowledge (* denoting foreign variables) and of $V/V*$ (V is capital-saving knowledge) technology shocks could be relatively plausible explanations for the US economic dynamics. In particular a rise of A/A and of $V/V*$ would generate higher net capital inflows – both from foreign direct investment inflows (FDI) and portfolio capital flows – and this implies a current account deficit. Assume that production in country I (home country) is in line with a Cobb-Douglas function, namely $Y=(VK)^{\beta}(AL)^{1-\beta}$ and similarly $Y*=(V*K*)^{\beta*}(AL*)^{1-\beta*}$ in country II. Net capital inflow into country I is the sum of FDI inflows plus net portfolio capital inflows $Q''(i,i*,E',R', a')$ where i is the nominal interest rate, a' the expected devaluation rate, E' is the currency risk and R' is the country risk premium; foreign direct investment inflows are proportionate to the ratio v' of the expected marginal product of capital in country I to the expected marginal product of capital in country II (we define $V'=V^{\beta}$; $V'*=V*^{\beta*}$): Hence we define $v'= V'k'^{\beta}/[V'*k'*^{\beta*}]$. If the technological progress is

capital-saving – as is the case with the expansion of information and communication technology (suffice to point out the fall of relative ICT capital prices over time) – we may state for a leader in ICT technology dynamics: $r = r^* + a' - \mu(v - v^*)$; alternatively, one may specify $r = r^* + a' -- \mu v'$. Here μ and μ' are positive parameters and $v := d\ln V/dt$ is the growth rate of technological progress where the assumption is that net FDI inflows are proportionate to $v-v^*$ (or to v'). A specific technological lead of the US – as the leading ICT country in the world – thus implies that the US real interest rate will fall. At the same time the higher growth of real income will raise net imports of goods and services where part of this phenomenon is related to the fact that a high growth rate of V stimulates international outsourcing and the rise of imported intermediate products, respectively. The import function thus reads in real terms $J = j(q^*, q'^*, V/V^*)Y$ where J is the quantity imported, $q^* := eP^*/P$ is the real exchange rate and $q'^* := P^T/P^N$ stands for the relative price of tradable goods to nontradable goods; it is noteworthy that the role of the internal relative price ratio for US current account dynamics has been emphasized by OBSTFELD/ROGOFF (2005). Here real exports X may be written as $X = x(q^*, q'^*, V/V^*)Y^*$ where we assume that the technology ratio V/V^* has a positive impact on the diversity of products and product innovations, respectively; and this has a positive impact on exports. If, however, the outsourcing impact of V/V^* in the import function is stronger than the export-enhancing effect of product innovations – in a product cycle context such innovations will raise imports in the future – the net effect of technological leadership of country I is that the current account will deteriorate. This in turn is consistent with a net capital import function $Q'(V/V^*, r, r^*...)$ where the partial derivative of Q' with respect to V/V^* is positive. Part of net capital inflows of the US is, however, related to large public capital exports from China, Japan and Korea where governments have decided – for various reasons – to accumulate foreign reserves at a high speed. China's political will to accumulate foreign reserves beyond $ 2000 bill. is difficult to explain – strategic political considerations obviously play a role; plus the fear of a strong revaluation of the Yuan which the Communist party leadership considers to be a risk for sustained economic growth. Continuous reserve accumulation of Japan and the Republic of Korea largely is the price that both countries pay for the military umbrella of the US. This umbrella has its underpinning in the economic strength of the US. To the extent that the Transatlantic Banking Crisis has weakened the US economy – partly through raising the debt-GDP ratio strongly – there is a natural interest of certain Asian countries to support the attempt of the US government to overcome the banking crisis.

4.   Doubts About the Stability and Growth Pact

There is little doubt that the US subprime crisis and the Transatlantic Banking Crisis, respectively, have weakened the western world. Part of the financial market instabilities are directly related to a very strong increase in real estate prices during the decade after 1996: The US, the UK and in continental Europe Spain, Ireland and Estonia are among the

countries which have shown enormous increases of real estate prices and hence an overexpansion of the construction sector. It is clear that in principle politicians could control excessive medium term real estate price dynamics, but this can hardly be done through monetary policy, rather imposing higher specific taxes would be adequate – though not politically popular.

The Transatlantic Banking Crisis has strongly affected the EU, not least since European banks have invested in the US and since the banking system in the EU traditionally plays a relatively strong role. One of the key problems in the aftermath of the banking crisis is the fact that the consolidation process in the US, the UK and the euro zone has created a sharper too-big-to-fail problem in the sense that the number of banks has reduced in the western OECD countries while the number of big banks also has fallen. This is not only undermining competition in part of the banking services market, it also might contribute to future instability problems in the financial sector, namely in a context of artificially reduced capital costs for big banks which in turn is likely to stimulate excessive speculation. Big banks – and other institutional investors - in turn traditionally have been crucial for financing government debt; and with the rise of government debt-GDP ratios of EU countries in the aftermath of the Transatlantic Banking Crisis the strategic role of banks is getting more important.

Economists have always considered the role of government debt as a potentially serious challenge. The Maastricht Treaty of the EU has ruled out a bail out of one member country by its partner countries and the EU Lisbon Treaty – the new constitution – in Article 125 also prohibits bailing-out of partner countries. Whether or not such a rule is credible obviously depends on the incentives for deficit-financing in EU countries and the euro zone, respectively. The pragmatic limit of a debt-GDP ratio of 60% has already been ignored when the euro zone was created in 1999. Italy and Belgium came into the euro zone with a ratio of more than 100% and the same was true for Greece when it joined the Euro zone in 2001 (in 1998 the convergence tests on Greece were all negative). It is true that high debt-GDP ratios have reduced over time in countries such as Belgium, Greece and Italy until 2007 (but since then debt-GDP ratios have strongly increased – the real challenge is that so many countries at the same time are facing a strong rise of the debt-GDP ratio). The Stability and Growth Pact of the EU was supposed to reinforce the incentives for fiscal consolidation, but the Pact has turned out to be a weak instrument in euro zone countries which are expected to respect the 3% maximum deficit-GDP ratio and the 60% debt-GDP ratio.

Facing the shock of the Greek crisis and the Irish crisis in 2010 many EU governments have adopted new consolidation efforts. Some countries even consider adopting a kind of debt brake which Germany has introduced in 2009 – partly following the rules on deficit-spending in Switzerland. Poland has implemented in its constitution a debt-GDP limit of 50% and 55%, respectively – reaching 55% automatically triggers cuts in pension payments and public sector wages; Poland which has not suffered any output loss during the Transatlantic Banking Crisis and the world recession of 2009 has faced surprisingly high deficit-GDP ratios in 2009/2010. The excessive deficit procedure adopted by the European Commission is, however, a very weak institutional element; with Hungary and Poland assuming the role of the presidency in 2011 there seems to be no realistic option to impose more fiscal discipline on these two countries – not to mention France which holds

the G20 presidency. The following list presents some illustrative cases why the Stability and Growth Pact is not applied in reality in the Euro zone and the message is that there is a serious problem with the Pact:

Table 2: Informal Reasons Why the Excessive Deficit Procedure of the Stability and Growth Pact is Not Applied

CASE	REASON NOT TO APPLY PROCEDURE
1) Majority of euro zone countries with deficit-GDP ratio above 3%	No majority in ECOFIN Council (Ministers of Finance of EU member countries)
2) Two big countries exceeding 3%	Two big euro countries jointly have enough leverage to push for softening rules (e.g. Germany and France in 2003)
3) Euro country is having the rotating EU presidency	Country points to serious image problems of EU if it is singled out for deficit procedure
4) Euro country is having the G8/G20 presidency	Country points to serious image problems of EU if it is singled out for deficit procedure
5) President of European Commission is from same country (exceeding 3%)	President of the Commission has political leverage and could use it in favour of home country: trade-off with respect to avoiding country image problem and damaging the reputation of the presidency of Commission

If debt-GDP ratios in the western OECD countries should be above 100% for several years the fear of inflation will grow strongly as governments all have strong incentives to reduce the real burden of government debt via inflation. While it is difficult to imagine that inflation could be a non-monetary problem in countries with AAA rating there is some probability in countries with weak rating that the debt-GDP ratio could not only translate into a risk premium in investment markets which implies a lower investment GDP ratio and reduced economic growth – this effect will raise for a given growth rate of the money supply the inflation rate. Moreover, in a model with forward-looking agents whose decisions about consumption are influenced by the expected inflation rate a rise of the expected inflation rate will raise the actual inflation rate.

The problems of deficit control in a monetary union should not be underestimated since member of a monetary union naturally should be subject to stricter rules than EU countries in general. Moreover, there is urgent need to restore some room to manoeuvre for fiscal policy in the medium term: If debt-GDP ratios could be lowered in the US and the EU the real interest rates will remain relatively low and this should stimulate long run economic growth. As regards growth perspectives the ongoing ICT expansion – with relative prices of ICT investment goods falling over time so that incentives to invest more in ICT are

strong – and the high rate of technological progress in this field will contribute to sustained economic growth. This perspective is a bright spot in the challenging policy environment for medium term fiscal consolidation.

As regards the analytical discussion about the causes of the US subprime crisis/the Transatlantic Banking Crisis one certainly has to explore the pitfalls in US prudential supervision and the role of unnormally low risk premiums in 2004-06 (GOODHART, 2007) which can be discussed within adequately modified standard models. At the same time the bankruptcy of Lehman Brothers obviously is an exogenous shock which is a policy pitfall too stupid to predict – this holds at least if the view is correct that the Bush Administration had conveyed the message to Wall Street in spring 2008, after the rescue package for the investment bank Bear Stearns, that there would be no further rescueing of a big bank. When Lehman Brothers came on the radar of policymakers in early September 2008 there was no strong effort of the Bush Administration to rescue Lehman Brothers; and it was absolutely illusory to bet on the British Barclays bank to rescue the US investment bank since the US Congress could not be expected to give US taxpayers' money to a foreign bank willing to buy the ailing Lehman Brothers bank. The paradox of the bankruptcy case of Lehman Brothers is that the US Administration effectively was forced to save AIG a few days later since a global meltdown of the financial system seemed to be possible in the wake of the failure of Lehman Brothers. Part of the problems in the Euro zone crisis in 2010 are no less critical and one cannot expect economists to model lunatic policy failure such as the apparent total failure of the Irish prudential supervisor to implement national laws and EU legislation. The implicit assumption underlying all economic modelling – beyond key issues such as strict rational behaviour of economic and political agents vs. bounded rationality – is to assume that a central bank is a central bank and a prudential supervisor is a prudential supervisor: Institutions are working properly, that is fulfill the minimum tasks stipulated in the laws and statutes of the respective organization. If government institutions are not working properly part of the price to be paid by society will be higher deficits and debts. This is a serious challenge.

5.   The Greek Sovereign Debt Crisis

Greece had joined the EU in 1981 and for more than a decade governments were reluctant to embrace broad supply side reforms and to privatize the manifold economic activities of government. Only since the start of the EU single market program have some complementary reforms occurred in Greece. Fiscal policies were, however, inadequate in the years since joining the Euro zone – except for the paranormal year of 2004 when the Greek statistical office included (following an earlier example of Italy) an estimate of the shadow economy into the official value-added. This artificial increase in GDP brought down both the deficit-GDP ratio and the debt-GDP ratio. The whole procedure to include the shadow economy in the official GDP is doubtful since the debt-GDP ratio does not make much sense if unofficial value-added – by its very nature not taxed – is included in

GDP. The debt-GDP ratio makes sense in economic terms because it may be assumed that GDP (or even more accurate GNP) can be taxed to pay interest rates and amortization on debt. As Eurostat has accepted this strange procedure on the side of Italy and Greece as well as other countries, it cannot be expected that this doubtful exercise will be repealed, but for the calculation of the debt-GDP ratio and the deficit-GDP ratio in the Stability and Growth Pact only GDP figures without any estimate of the shadow economy should be considered. Here the Pact has to be modified. As regards the inclusion of an official estimate of the shadow economy into GDP figures of EU member countries the historical context basically refers to the pressure of net contributor countries to the EU budget: The argument was that inclusion of the estimated size of the shadow economy would raise the per capita figure of relatively poor countries so that the amount of intra-EU transfer payments would be easier to limit.

2010 brought not only the Greek debt crisis but it also brought shocking revisions of Greek deficit statistics: The announcement of the incoming new socialist government in autumn 2009 stating that the deficit-GDP figure for that year would be much higher than the conservative predecessor government had indicated to the European Commission – and international capital markets – was actually the starting point of the Greek crisis. Even in late 2010 further upward revisions occurred, which brought the deficit-GDP ratio to 15.4%, roughly three times the initial estimate of the Greek conservative government. The second report on the Stand-by Arrangement of December 2010 (IMF, 2010) brought out several important points:

- Revenue collection was not on track, therefore the consolidation path envisaged initially by the EU and the IMF seemed difficult to achieve.

- The true debt-GDP figure for 2009 had to be corrected – not in the context of revised data on the deficit-GDP ratio but on the basis of a correct inclusion of debt of government-owned loss making firms that added 7.5 percentage points to the debt-GDP ratio. Including further technical changes in coverage of deficits and GDP, the overall revision for the debt-GDP ratio was considerable as the new figure was 127 instead of 115.

- Arrears of the public sector reached 1% of GDP.

- The ECB has helped with exceptional measures to stabilize the Greek banking sector and thus to support the adjustment process in Greece.

- The expected peak of the debt-GDP ratio was 158%, which would normally mean that Greece cannot return to the capital market before 2025; this holds under the assumption that Greece could reduce its debt-GDP ratio by about 4 percentage points p.a. – and this seems to be an optimistic assumption given the fact that interest rates in the Euro zone may be expected to rise in the medium term.

- The good news is that the Greek government had assets of about 85% of GDP in 2010; the capital stock owned by government stood for 50% of GDP alone. An additional €200-300 bill. – 87-130% of the GDP in 2010 – was in real estate owned by government, however, there are no official figures on government real estate. One may doubt that privatization of real estate owned by Green government can be organized swiftly, but there is a general problem that reliable figures on the value of

real estate is difficult to obtain although such statistics would be quite important for both actors in capital markets and EU policymakers.

Table 3: Greece: Public Sector Assets, 2007-2010

	2007	2008	2009	2010 proj.
	(Billions of euros)			
Assents 1/	188	186	197	195
Financial assets	73	64	76	75
Currency	10	13	13	12
Securities	0	2	2	2
Loans	1	1	1	1
Shares	42	29	39	39
Other	19	19	21	21
Public sector capital stock	115	122	121	120
Real estate 2/	n/a	n/a	n/a	n/a
	(Percent of GDP)			
Assets 1/	83.4	79.0	84.5	84.9
Financial assets	32.2	27.3	32.5	32.7
Currency	4.2	5.5	5.4	5.4
Securities	0.2	0.7	0.7	0.7
Loans	0.5	0.6	0.6	0.6
Shares	18.6	12.4	16.9	17.0
Other	8.6	8.1	8.9	8.9
Public Sector capital stock	51.2	51.7	52.0	52.2
Real estate 2/	n/a	n/a	n/a	n/a

Source: IMF staff calculations.
1/ Excluding real estate holdings.
2/ Estimated by analysts at euro 200-300 billion (87-130 percent of 2010 GDP).

Source: IMF (2010) p.52

It should be possible to sell off about ½ of the government assets within a decade and this would indeed help to bring Greece below the 100% debt-GDP ratio, therefore Greece could return to the capital market by 2018 or so (if privatization is accelerated). At the same time, these figures show how misleading gross debt-GDP ratios can really be. Moreover, the figure of government assets reaching 85% of GDP does not even include real estate owned by government, which is estimated to reach about €250 bill. While part of real estate owned by government probably cannot be sold easily in the market, it shows that the Greek debt crisis is partly reflecting the disorganization of the government: inadequacy of fiscal policy and competitiveness policy, a statistical office that has suffered from government interference, a high amount of government assets that partly reflect lack of privatization efforts in past decades. The fall in the deficit-GDP ratio partly reflects the decline in domestic demand, which in turn reflects austerity measures taken. Not surprisingly this has also helped to improve the current account deficit of Greece, however, with foreign debt relative to GDP reaching almost 100% in 2010 there is not only a high exposure to international capital market sentiments; the fast pace at which Greece has accumulated its foreign debt suggests that once austerity measures are phased out, Greek's current account deficit will be high again – and as long as there is no mechanism for the Greek government taking adequate measures to restrain the import of consumption goods

(and promoting the import of investment goods and encouraging FDI inflows, respectively), e.g. by raising VAT rates, there will be no sustainable stabilization of Greece. Liberalization of services should help Greece to improve its current account since such liberalization will help to reduce the relative price of nontradables; to put it differently, raising the relative price of tradables will stimulate the production of tradables and reduce domestic demand for tradables so that exports will increase. A change of the domestic relative price ratio is quite important in a setting in which the external nominal exchange rate cannot change within the euro zone.

Doubtful Statistics on Government Assets

One may find good reasons to argue that IMF statistics are reliable. At the same time it is strange to read OECD data on General government net financial liabilities (OECD Outlook Database; see appendix) which reports on Greece the following data for 2009, 2010, 2011 and 2012: 88.3% of nominal GDP, 97.3%, 105.1% and 110.1%, respectively. The figure for 2010 suggests – assuming that gross general government debt relative to GDP is 125% that the value of government's gross assets is about 20% of GDP in Greece. This is in sharp contrast to the IMF's report of government assets of 85% of GDP in 2010 – and this excludes government ownership of real estate which is estimated to be around 100% of GDP (!). At the same time it is remarkable that the net financial liabilities of general government in the US will almost double between 2007 and 2012, namely from 42,4 to 78,2% of GDP; the figures for Germany, France, Spain, Italy and the UK are 51.6%, 61.6%, 49.3%, 104.7% and 57.6% in 2011.

6. The Rescue Umbrella and the Strange Irish Economic

When the EU offered guarantees and loans of €110 billion to Greece in spring 2010, the main motivation was obviously to bail out German and French banks that held large portions of Greek debt, and to signal that euro partner countries would be willing to support Euro zone countries with sovereign debt problems – support would be given with conditions attached and to credibly impose such conditions as budgetary austerity and factor market reforms, the Euro zone governments convinced the IMF to come on board. There was a 1:2 ratio in terms of rescue funding for countries with sovereign debt. To the extent that international investors could be convinced that solvency of all Euro zone countries – perhaps except for Greece – would be secured through the additional €750 bill. Euro zone rescue umbrella of June 2010, there should be no spreads visible in bond markets of Euro zone countries. The case of Greece was rather hopeless since rough calculations suggested that the country would move from a debt-GDP ratio of 110% in 2010 to about 140% by 2013: Assume a 10% reduction of output in the course of the implementation of sharp austerity measures; this adds $(B/P)/Y]0.1 = 11\%$ to the debt-GDP ratio and annual deficit-GDP ratios of 10, 6, 4 and 3% in 2010-13 would add another 24% to the existing debt-GDP ratio, which, together with a rise in the interest rate, implies a

debt-GDP ratio of at least 140% in 2013. Sovereign debt restructuring of Greek debt is the only viable way out of a permanent Greek tragedy unless the Greek government can organize swift privatization; it would be absolutely irresponsible to allow the Greek debt problem to linger on; with every "notch of rating" moving towards junk bond status or default there are negative confidence spillovers from Greece to Portugal, Spain, Italy and Belgium.

The more countries of the Euro zone go under the rescue umbrella, the narrower the range of Euro zone countries that can back the European Financial Stability Facility by AAA and the higher the interest rate that has to be charged by the EFSF. The key message to financial markets should not be that the rescue facilities are getting bigger and bigger in the Euro zone, rather that debt-GDP levels have to be reduced by privatizations. The idea that countries of the Euro zone could go bankrupt is irresponsible in the sense that the message to capital markets is strange: All of a sudden Euro zone countries – read a group of OECD countries – implicitly declare that they consider bankruptcy of a member state as a serious possibility and thus brings long-run confidence down in government to the level of Newly Industrialized Countries (and Collective Action Clauses that will be included in most new debt issues after 2013 give the same doubtful signal).

The ECB's credibility and reputation was put at stake when the ECB bought considerable amount of Greek debt, but this was obviously done with an eye on the FED's expansive open market policies and similar policies of the UK. There would probably not have been much of debate about the ECB's buying of Greek government bonds had these bonds been euro bonds, which had been placed by a euro debt agency, but no such debt agency existed.

The next small euro zone country that almost failed was Ireland, which reluctantly accepted to go under the mega rescue umbrella of the euro zone and the IMF. Ireland had produced a stunning 30% deficit-GDP ratio in 2010 of which 2/3 reflected costs of rescuing ailing Irish banks; the Anglo Irish Bank produced a shocking loss equivalent to 10% of GDP in the first half of 2010 – a bank that had put about 80% of investments into commercial property and thus ignored even the faintest principles of risk management over many years; this and other problems with Irish banks clearly pointed out that the prudential supervision of Ireland had completely failed (and it would be no surprise if clandestine party financing had occurred with specific aims in terms of undermining the application of basic principles of supervision). The Irish disaster of 2010 is mainly reflecting policy failure and it is absolutely unclear why the European Commission is not taking Ireland to the European Court in Luxembourg – mainly for violation of the EU banking directives and requirements related to risk management. Not least from an EU outsider perspective, the euro zone/the EU has offered a picture of extremely weak leadership. It is also unclear why the European Parliament is not taking Ireland to Court – why are representatives of the people in Europe allowing Ireland's government to tarnish the reputation of the Euro zone, respectively, and to undermine the reputation of the EU?

In late 2010 and early 2011 it became obvious that the €750 bill. rescue umbrella was not working as the spreads of government bonds of Portugal, Spain and other countries did not come down. Thus, the umbrella – facing only a minor challenge in the form of Ireland with its preliminary €65 bill. rescue bill – was not delivering desired results. This in turn implies that Portugal, Spain, Italy and other countries facing considerable spreads on government bonds are going to face serious problems. With spreads being high for these

countries in 2010 and in early 2011, it is clear that not only government financing has become more expansive in these countries, rather there are negative network effects between the three countries named: Spanish banks with a strong exposure of about €80 bill. in Portugal naturally face higher financing costs as Portugal is facing a decline in sovereign bond ratings and with real interest rates in Portugal and Spain rising, the real interest rate of Italy will rise as well as. This implies potential problems for Germany and France (as well as the UK), who are major investors in Italian government bonds. The pressure on higher real interest rates is somewhat mitigated by rising inflation rates in the euro zone but the overall picture implies potential destabilization of the whole euro zone; at least as long as the problems of Greece and Ireland are not isolated and as long as there is no EU leadership. True leadership would put pressure towards voluntary Greek debt restructuring plus massive privatization and it would mean to take Ireland to the European Court of Justice. No EU club can survive if rules are ignored.

The sweeping reforms in prudential supervision of the euro zone implemented on January 2011 will not deliver any meaningful results for the Community if there is no new mechanism – such as regular external inspection panels – which makes sure that national supervisors are not violating the rules of the game. The new structure of supranational prudential supervision is shown below; it might work in the end if it does not add more complexity to an already overly complex EU system (in this respect the DODD-FRANK bill in the US also bodes ill since more than 1000 pages of legislation are an open invitation to the actors in the financial sector to bypass a very complex piece of law). If the Transatlantic Banking Crisis has taught anything it is the insight that the whole system has become too complex with too many regulatory loopholes in too many "banking icebergs" whose main shadow banking activity was rather invisible under the waterline while the smaller tip of the iceberg carried the honorable name of Bank only as a kind of advertisement for a less serious business organized through special purpose vehicles that embarked on business with opaque asset-backed securities and trading of risk within a doubtful national and international framework.

EU Framework for Financial Supervision in the EU

EU framework for financial supervision in the EU (as of 1 January 2011)

Micro-prudential supervision	Macro-prudential supervision
European System of Financial Supervision	**European Systemic Risk Board**
European Banking Authority	ECB / President of the Economic and Financial Committee (non-voting)
European Insurance and Occupational Pensions Authority	National Central Banks
European Securities and Markets Authority	*European Supervisory Authoritories* / President of the Economic and Financial Committee (non-voting)
National Supervisors (including supervisory colleges)	European Commission
- Ensure EU-wide technical supervisory standards - Coordination of supervisors (also in crises)	- Issue risk warnings and, if necessary, - Macro-prudential recommendations

Source: CASTRÉN, O. (2010), Perspectives on the EU Banking Sector and the EU Bank Stress Test; mimeo.

7. Medium-Term Options for Overcoming the Euro Crisis

A very crucial element for overcoming the Euro crisis is the European Central Bank, which is a professionally operating institution that has gained high reputation. The ECB will have a broader role in maintaining financial stability since it is involved in the European Systemic Risk Council. However, the ECB could also become more involved in political conflicts about fiscal policy; e.g. with the Irish banking disaster, many banks and insurance companies face considerable losses on investments in Ireland and this undermines the stability of the EU banking sector. The ECB in turn cannot put direct political pressure on EU member countries to tighten prudential supervision and to enhance efforts to consolidate the budget. The broader picture in the euro zone in 2011/2012 shows considerable problems in consolidation – even Germany plans a 2.5% deficit ratio, which is too much for year II of an economic upswing. It seems that the magical 3% deficit-ratio fixed as an upper limit in the Stability and Growth Pact has obscured the fact that governments need to achieve balanced medium-term budgets and should certainly run a surplus in an economic boom situation. As Germany's trend growth rate is hardly more than 1.5%, a trend deficit-GDP ratio of more than 1% would be a clear violation of the

60% debt-GDP ratio. Compared to other big euro zone countries, however, Germany's position looks favorable; it is noteworthy that Germany has achieved a slight budget surplus of 0.1% of GDP in 2008.

The euro zone will benefit from China's interest in maintaining some counter-weight to the dominant US dollar. As China is likely to buy long-term bonds of selected euro zone countries, the yield curve of these countries will flatten in the short run, in the medium term there will be arbitrage businesses as soon as confidence is restored. The European Commission still faces an opportunity to restore leadership in a critical situation. This would not only require a clear commitment to EU integration and a firm commitment against those who violate the rules of the Community. It is also necessary to change the role of the European Investment Bank; the EIB could finance more infrastructure investment in all EU countries and also be part of the backing of the rescue umbrella, as it is really needed. In early 2011 only Germany, France, Austria, Finland, Netherlands and Luxembourg still had AAA rating. There is no doubt that risk premiums have increased after 2009 – it is noteworthy that actual default rates for C/CCC rated company debt have strongly increased: the default rate in that year reached 48% according to Standard & Poor´s – a default rate which was much higher than in previous years (see appendix).

One possible reform avenue for the euro zone could be to fully eliminate any medium-term deficit options and thus make member states more like states in the US where deficit is a very limited short-term policy option. Instead, stabilization policy based on Keynesian fiscal policy is organized at the federal level and this would basically mean to implement such policy at the supranational level and the euro zone level, respectively. Government outlays would have to shift from the national level to the supranational level; shifting defense outlays of 1.5 percent of GDP plus 1% of GDP for investment outlays to the supranational policy layer plus another 0.5% for R&D promotion and another 0.5% for higher education would raise the level of supranational outlays to 4.5% of the EU GDP or the euro zone GDP – the latter is relevant if such a setup is organized within the framework of the euro zone. The supranational level needs broader financing and indeed own financing resources, as initially envisaged in the beginning of the EU integration process: All ecological taxes and taxes on energy plus customs duties should go to the supranational level, plus 1% of GDP in contributions from national member states. With a ratio of government outlays to GDP of 4.5%, the supranational level would be large enough to implement stabilization policy and expansionary fiscal policy in a recession; a maximum medium budget deficit of 1% at the supranational level would be adequate as a new rule and in boom periods there must be a surplus achieved in Brussels – part of this surplus should be given as a "bonus" to national member states in order to keep their interest alive and strong so that a budget surplus is achieved in the medium term. Putting away with the deficit option at the national level is a very convincing reform option for the medium term.

With the supranational level in Brussels representing larger outlays, the political interest in the EU will certainly grow. The long history of an ever-declining voter turnout at elections of the European Parliament would end. More resources spent in Brussels, however, is not a convincing idea if efficiency of governance is not improved at the same time – an important aspect being the reduction of the incredibly high number of European Parliament members (more than 700 after the recent enlargements).

If the euro zone can be stabilized, the EU will become more stable and the concept of regional and global integration will remain attractive in the world economy. If the euro zone should disintegrate, it would pave the way to new nationalism – in Europe and elsewhere. As regards the initial trigger of the euro zone crisis, namely the Transatlantic Banking Crisis, it is interesting that both in Germany and in many other EU countries there is no independent scientific report on the banking crisis. There is an urgent need to establish a critical report as part of a new public discussion about adequate systemic reforms. It is paradoxical that the western OECD countries – only two decades after the collapse of communism – are facing signs of relative economic destabilization; and there is some disorientation with "modern Economics".

It is doubtful that democratic systems will be able to implement consistent stabilization policies if the systems themselves become ever more complex and if mathematical modeling is the main tool of analysis; the dialogue between Mathematical Economics and policymakers is a difficult one and the natural response of model builders will be to make existing models even more complex (no doubt that modern modeling is crucial for analysis and forecasts, respectively). An alternative avenue is to make the system less complex and indeed impose some restrictions of financial innovations while imposing new rules on the standardization and testing of such innovations. Highly complex products – often deliberately designed in a complex fashion to hide weak elements of the products – were part of the key problems encountered in the Transatlantic Banking Crisis. There is no need to ban financial innovations and certainly no need to impose broader regulations on all banks; rather we need continuous high quality financial innovations and more competition – wherever we have strong competition (as is the case within regional and local banking in most EU countries) there is no need for strong regulation. However, for big banks – for those banks where competition is not fully working due to too-big-to-fail-problems – there is an urgent need for more transparent and better regulation. If the euro zone is not introducing euro bonds within the frame of a new debt agency in a careful way, international capital markets might in the end force the euro zone countries to adopt this solution. Phasing-in euro bonds along with mandatory collateral of euro countries is preferable. More coordination of economic policy also is urgent in EMU.

Statistical Appendix

Table 4: Financial Market and Asset Price Influences on Growth, Inflation and Current Account Balances (1995-2005)

	Germany	Spain	Ireland	Italy	Netherlands	Portugal
Decline in Exchange Risk Premium[1]	0	90	60	90	40	140
Easier Credit Constraints[2]	-2	24	21	7	22	25
Major Impacting of Housing Demand	Yes	Yes	Yes	Yes	Yes	Yes
House Prices: Major Role in Transmission				Yes	Yes	

Notes:
[1] Exchange risk premium improvement (+) versus Germany: model values for 1995-8, in basis points.
[2] Rise (+) in household debt ratio to GDP 1999-2005, in percentage points.
Source: REGLING, K.; WATSON, M. (2008), p. 15.

Table 5: Global corporate one-year default rates by rating category (%)

	AAA	AA	A	BBB	BB	B	CCC/C
1981	0,00	0,00	0,00	0,00	0,00	2,27	0,00
1985	0,00	0,00	0,00	0,00	1,48	6,44	15,38
1990	0,00	0,00	0,00	0,58	3,56	8,54	31,25
1995	0,00	0,00	0,00	0,17	0,98	4,58	28,00
2000	0,00	0,00	0,26	0,37	1,24	7,72	34,12
2005	0,00	0,00	0,00	0,07	0,20	1,72	8,94
2009	0,00	0,00	0,21	0,53	0,70	10,14	48,42

These annual default rates indicate the incidence of default is concentrated in the lower rating agencies.
Source: Standard & Poor's: Guide to Ratings Performance, p. 10.

Table 6: General government net debt interest payments (in % of nominal GDP)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Australia	2,5	3,4	3,5	2,9	2,4	2,0	1,8	1,7	1,4	1,4	1,3	1,2	1,0	0,8	0,6	0,5	0,8	1,0	1,1	1,3
Austria	3,1	2,9	3,3	3,4	3,2	3,1	2,9	2,8	2,7	2,5	2,4	2,2	2,2	2,2	2,0	2,0	2,1	2,2	2,4	2,4
Belgium	10,3	8,8	8,4	8,0	7,3	7,0	6,5	6,3	6,1	5,4	5,0	4,6	4,1	3,8	3,7	3,6	3,4	3,3	3,4	3,6
Canada	5,3	5,2	5,7	5,3	4,8	4,8	4,3	3,1	2,9	2,6	1,8	1,6	1,0	0,7	0,6	0,0	0,9	0,4	0,2	0,1
Czech Republic	..	..	0,3	0,5	0,4	0,5	0,5	0,2	0,4	0,3	0,5	0,7	0,7	0,7	0,7	0,8	1,1	1,2	1,3	1,3
Denmark	3,9	3,6	3,5	3,2	2,9	2,7	2,5	2,1	1,8	1,7	1,5	1,3	0,9	0,6	0,4	0,0	0,4	0,5	0,5	0,5
Finland	-0,5	1,0	0,8	1,4	1,8	1,6	1,4	0,9	0,5	0,0	-0,1	-0,1	-0,2	-0,4	-0,6	-1,0	-0,6	-0,7	-0,7	-0,6
France	2,8	2,9	3,0	3,2	3,1	3,0	2,8	2,7	2,7	2,7	2,6	2,6	2,5	2,4	2,5	2,7	2,2	2,1	2,1	2,3
Germany	2,6	2,6	2,9	2,9	2,9	3,0	2,7	2,7	2,6	2,5	2,6	2,5	2,4	2,4	2,4	2,3	2,3	2,2	2,2	2,3
Greece	10,8	11,9	10,7	10,0	8,1	7,5	6,6	6,7	6,0	5,2	4,7	4,6	4,4	4,2	4,2	4,4	4,8	5,3	5,6	5,6
Hungary	..	..	8,1	7,5	7,2	6,1	6,0	4,7	4,0	3,6	3,7	4,0	3,9	3,7	3,8	3,6	4,1	4,3	4,4	4,5
Iceland	1,4	1,5	1,5	1,4	1,1	1,0	0,9	0,7	0,5	0,3	0,6	0,3	-0,4	-0,7	-0,9	-0,5	3,0	3,4	3,2	3,2
Ireland	6,1	5,6	4,9	4,1	3,4	3,1	2,1	1,7	1,1	1,0	1,1	1,0	0,9	0,8	0,9	1,2	1,8	5,5	4,9	5,7
Israel	..	..	5,3	4,9	5,3	5,1	4,6	4,6	4,5	4,1	5,0	4,9	4,2	4,0	4,0	3,1	3,1	3,2	3,3	3,3
Italy	12,1	10,6	10,7	10,8	8,8	7,8	6,4	6,1	6,0	5,4	5,0	4,7	4,5	4,4	4,7	4,9	4,4	4,3	4,6	4,9
Japan	1,2	1,2	1,3	1,3	1,3	1,5	1,5	1,5	1,4	1,4	1,3	1,2	0,8	0,6	0,6	0,9	1,1	1,2	1,2	1,6
Korea	-0,5	-0,4	-0,6	-0,7	-0,9	-1,2	-1,0	-1,2	-0,9	-0,9	-0,8	-1,0	-1,0	-1,2	-1,5	-1,3	-0,9	-0,7	-0,7	-0,7
Luxembourg	-1,9	-1,6	-1,4	-1,1	-1,0	-1,0	-0,9	-1,2	-1,4	-1,1	-0,9	-0,8	-0,7	-0,7	-1,0	-1,2	-0,5	0,2	0,2	0,3
Netherlands	4,4	4,2	4,4	4,4	4,2	4,0	3,6	2,9	2,4	2,2	2,0	1,9	1,8	1,6	1,6	1,6	1,5	1,4	1,5	1,8
New Zealand	2,3	1,2	1,4	0,7	0,8	0,7	0,2	0,4	0,1	0,1	0,0	-0,3	-0,4	-1,5	-1,0	-0,9	-0,9	-0,6	-0,6	-0,3
Norway	-2,5	-1,9	-1,6	-1,6	-1,4	-1,1	-1,5	-1,7	-1,9	-2,1	-1,9	-2,0	-2,0	-2,2	-2,9	-3,2	-2,5	-2,3	-2,4	-2,4
Poland	..	..	5,1	4,2	3,8	3,7	2,4	2,5	2,7	2,1	2,4	2,5	2,2	2,1	1,7	1,6	1,9	2,0	2,4	2,5
Portugal	6,9	5,9	5,6	4,8	3,7	3,1	2,9	2,9	2,9	2,8	2,7	2,6	2,4	2,7	2,9	3,0	2,8	2,9	3,7	3,9
Slovak Republic	..	..	1,3	1,6	1,8	2,1	2,9	3,1	3,1	3,0	1,7	1,4	1,1	0,5	0,7	0,6	1,0	1,4	1,5	1,6
Slovenia	..	..	1,6	1,7	2,0	1,8	1,9	1,8	1,8	1,8	1,5	1,4	1,3	1,2	1,1	0,7	1,1	1,4	1,4	1,6
Spain	4,5	4,4	4,7	4,7	4,2	3,8	3,3	2,9	2,6	2,4	2,1	1,8	1,6	1,3	1,1	1,1	1,4	1,6	1,8	1,8
Sweden	2,3	3,0	2,4	2,8	3,0	2,6	2,5	2,1	1,7	2,1	1,3	0,9	1,0	0,8	0,7	0,5	0,2	0,7	0,9	1,1
Switzerland	0,7	0,8	0,8	0,8	0,9	0,9	1,1	1,0	0,9	1,0	1,0	1,0	0,9	0,7	0,6	0,5	0,4	0,3	0,3	0,2
United Kingdom	2,4	2,6	3,1	3,1	3,2	3,0	2,5	2,4	2,0	1,7	1,7	1,7	1,8	1,8	1,9	1,9	1,7	2,1	2,5	2,7
United States	3,4	3,4	3,5	3,4	3,2	3,1	2,7	2,5	2,2	2,0	1,8	1,8	1,8	1,8	1,9	1,8	1,4	1,7	1,9	2,1
Euro area	5,0	4,7	4,8	4,9	4,4	4,2	3,7	3,5	3,3	3,1	3,0	2,8	2,7	2,6	2,6	2,6	2,5	2,5	2,6	2,8
Total OECD	3,5	3,4	3,6	3,5	3,2	3,1	2,7	2,5	2,3	2,1	2,0	1,9	1,8	1,7	1,7	1,7	1,6	1,7	1,8	2,0

Note: In the case of New Zealand where data on net interest payments are not available, net property income paid is used as a proxy. For Denmark, net interest payments include dividends received. For further information, see *OECD Economic Outlook* Sources and Methods *(http://www.oecd.org/eco/sources-and-methods).*

Source: OECD Economic Outlook 88 database.

Table 7: General government gross financial liabilities (in % of nominal GDP)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Australia	30,3	39,6	41,3	38,6	37,0	32,0	27,6	24,7	21,8	19,8	18,3	16,6	16,1	15,3	14,3	13,6	19,2	23,6	25,9	26,8
Austria	62,1	65,5	69,8	70,2	66,7	68,4	71,2	71,1	72,0	73,0	71,2	70,8	70,9	66,6	63,1	67,5	72,7	75,9	78,0	79,7
Belgium[1]	140,7	137,8	135,4	133,4	128,0	123,2	119,7	113,7	112,0	108,4	103,4	98,4	95,9	91,6	88,0	93,4	100,4	102,5	104,3	105,2
Canada	96,3	98,0	101,6	101,7	96,3	95,2	91,4	82,1	82,7	80,6	76,6	72,6	71,6	70,3	66,5	71,3	83,4	84,4	85,5	87,0
Czech Republic	..	..	..	..	..	..	..	..	..	32,8	34,7	34,5	34,3	33,9	33,6	36,3	42,4	49,0	52,3	55,0
Denmark	85,0	78,9	81,7	79,1	74,8	72,4	67,1	60,4	58,4	58,2	56,6	54,0	45,9	41,2	34,1	42,3	51,8	53,7	55,2	58,0
Finland	57,8	60,9	65,3	66,2	64,8	61,2	54,9	52,5	50,0	49,6	51,5	51,5	48,4	45,5	41,4	40,6	52,6	58,4	62,7	65,8
France	51,0	60,2	62,7	66	68,8	70,3	66,8	65,6	64,3	67,3	71,4	73,9	75,7	70,9	70,0	75,9	87,1	92,4	97,1	100,2
Germany[2]	46,2	46,5	55,7	58,8	60,3	62,2	61,5	60,4	59,8	62,2	65,4	68,8	71,2	69,3	65,3	69,4	76,5	79,9	81,3	82,0
Greece	..	..	101,1	103,1	100,0	97,7	101,1	114,9	117,7	117,2	112,0	114,4	114,0	108,5	104,6	105,6	120,2	129,2	136,8	142,2
Hungary	92,3	92,1	88,8	75,8	66,5	64,5	66,6	60,9	59,7	60,7	61,7	65,0	68,9	72,3	72,5	76,4	85,2	89,0	90,2	90,1
Iceland	..	..	..	..	..	77,3	73,6	72,9	75,0	72,0	71,0	64,5	52,6	57,4	53,3	102,4	119,5	124,9	116,9	111,3
Ireland	..	..	..	..	..	62,2	51,3	40,1	37,3	35,3	34,1	32,9	33,2	29,4	28,9	49,4	72,7	104,9	112,7	115,6
Israel	..	..	102,2	100,2	99,3	100,9	94,8	84,4	88,9	96,6	99,2	97,4	93,5	84,1	77,5	76,7	79,2	79,4	78,1	75,0
Italy	116,3	120,9	122,5	128,9	130,3	132,6	126,4	121,6	120,8	119,4	116,8	117,3	119,9	117,2	112,7	115,1	127,7	131,3	132,7	133,0
Japan[3]	73,9	79,0	86,2	93,8	100,5	113,2	127,1	135,4	143,7	152,3	158,0	165,5	175,3	172,2	167,1	173,9	192,8	198,4	204,2	210,2
Korea[4]	..	..	..	..	..	..	..	..	..	19,2	19,3	22,6	24,6	27,7	27,9	29,6	32,6	33,2	32,8	32,6
Luxembourg	..	..	9,5	10,1	10,2	11,2	10,0	9,2	8,2	8,4	7,9	8,6	7,6	11,5	11,8	16,5	18,0	21,0	26,0	28,1
Netherlands	96,5	86,7	89,6	88,1	82,2	80,8	71,6	63,9	59,4	60,3	61,9	62,2	61,1	54,9	52,0	66,0	69,4	74,6	77,6	79,5
New Zealand	..	56,8	50,7	44,4	41,8	41,7	39,1	37,0	35,0	33,1	31,0	28,3	27,0	26,7	25,8	29,1	34,5	38,8	43,5	46,6
Norway	40,8	37,3	40,9	36,6	32,1	30,3	31,0	34,2	33,0	40,6	50,2	52,7	49,1	60,5	58,6	56,7	49,5	51,8	53,6	51,8
Poland	..	..	51,6	48,4	44,0	44,0	46,8	45,4	43,7	55,0	55,3	54,8	54,8	55,2	51,8	54,5	58,5	63,9	66,7	67,4
Portugal	..	..	66,8	65,3	65,3	63,0	59,9	59,7	61,0	64,3	65,9	68,3	71,8	70,9	68,8	74,1	86,3	92,9	98,7	100,6
Slovak Republic	..	..	38,2	37,7	39,0	41,2	53,5	57,6	57,1	50,3	48,3	47,6	39,2	34,1	32,8	31,7	39,8	47,1	51,1	53,3
Slovenia	..	..	..	..	..	..	..	..	33,7	34,8	34,2	35,0	33,9	33,8	30,0	29,7	44,1	49,9	54,8	58,5
Spain	65,5	64,3	69,3	76,0	75,0	75,3	69,4	66,5	61,9	60,3	55,3	53,4	50,7	46,2	42,3	47,4	62,4	72,2	78,2	79,6
Sweden	78,2	82,5	81,1	84,4	83,0	82,0	73,2	64,3	62,7	60,2	59,3	59,2	59,9	52,8	47,4	46,7	51,9	51,3	48,8	45,2
Switzerland	42,9	45,5	47,7	50,1	52,1	54,8	51,9	52,4	51,2	57,2	57,0	57,9	56,4	50,3	46,5	44,3	42,2	42,1	41,1	40,5
United Kingdom	48,7	46,8	51,6	52,0	52,0	52,5	47,4	45,1	40,4	40,8	41,5	43,8	46,4	46,1	47,2	57,0	72,4	81,3	88,6	94,5
United States	71,9	71,1	70,7	69,9	67,4	64,2	60,5	54,5	54,4	56,8	60,2	61,2	61,4	60,9	62,0	71,1	84,4	92,8	98,5	101,4
Euro area	69,0	71,3	75,5	79,9	80,8	81,6	78,2	75,9	74,4	75,3	75,9	77,2	78,0	74,3	72,9	76,0	86,3	91,6	94,8	96,3
Total OECD	68,7	69,8	72,3	73,8	73,5	74,2	72,6	69,8	69,7	71,6	73,5	75,0	76,3	74,5	72,9	79,1	90,6	96,9	100,7	102,8

Note: Gross debt data are not always comparable across countries due to different definitions or treatment of debt components. Notably, they include the funded portion of government employee pension liabilities for some OECD countries, including Australia and the United States. The debt position of these countries is thus overstated relative to countries that have large unfunded liabilities for such pensions which according to ESA95/SNA93 are not counted in the debt figures, but rather as a memorandum item to the debt. Maastricht debt for European Union countries is shown in Annex Table 62. For more details, see *OECD Economic Outlook* Sources and Methods *(http://www.oecd.org/eco/sources-and-methods)*.

1. Includes the debt of the Belgium National Railways Company (SNCB) from 2005 onwards.
2. Includes the debt of the Inherited Debt Fund from 1995 onwards.
3. Includes the debt of the Japan Railway Settlement Corporation and the National Forest Special Account from 1998 onwards.
4. Data are on a non-consolidated basis (SNA93).
Source: OECD Economic Outlook 88 database.

Table 8: General government net financial liabilities (in % of nominal GDP)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Australia	20,8	25,0	25,6	20,4	20,6	15,7	14,5	8,6	6,2	4,4	2,3	0,2	-1,4	-4,7	-7,3	-7,6	-3,8	0,4	2,7	3,6
Austria	33,3	35,2	38,8	40,3	36,5	36,7	35,8	34,8	35,6	37,0	36,1	37,9	38,0	33,8	30,8	33,7	38,7	41,7	43,9	45,5
Belgium[1]	115,1	114,5	114,6	115,5	110,9	107,8	103,1	97,6	95,1	93,3	90,4	84,0	82,0	77,2	73,3	74,0	80,2	82,4	84,2	85,0
Canada	64,2	67,9	70,7	70,0	64,7	60,8	55,8	46,2	44,3	42,6	38,7	35,2	31,0	26,3	22,9	22,4	28,4	31,4	33,7	34,3
Czech Republic	..	..	..	..	..	..	..	..	..	-16,2	-7,5	-9,7	-11,4	-11,7	-14,4	-6,4	-1,7	3,5	7,5	10,6
Denmark	31,1	31,5	33,4	33,3	32,3	35,1	28,4	22,5	20,1	19,1	18,0	14,8	10,5	1,9	-3,8	-6,7	-4,5	0,3	4,2	6,8
Finland[2]	-16,0	-16,3	-7,3	-6,7	-7,5	-14,6	-50,3	-31,1	-31,7	-31,4	-38,5	-46,7	-58,6	-69,4	-72,6	-52,4	-62,6	-56,6	-52,3	-49,2
France	26,8	29,7	37,5	41,8	42,3	40,5	33,5	35,1	36,7	41,8	44,2	45,3	43,2	37,2	33,8	43,4	50,8	57,1	61,8	64,7
Germany[3]	18,3	19,1	29,7	32,7	32,4	36,2	34,7	34,0	36,3	40,4	43,2	47,2	49,5	47,5	42,2	44,0	48,5	50,5	51,6	52,0
Greece	..	..	81,0	81,4	76,8	72,6	70,2	88,7	92,9	94,7	87,2	88,0	85,0	78,3	72,5	78,7	88,3	97,3	105,1	110,1
Hungary	-19,4	3,3	24,4	25,1	24,9	31,6	33,8	32,3	32,0	36,7	37,6	41,5	46,3	51,6	52,8	51,5	58,9	61,6	62,1	61,3
Iceland	..	..	..	..	..	42,6	35,9	37,5	29,2	28,5	30,7	27,7	13,6	7,9	-1,0	26,1	39,8	45,2	45,7	43,1
Ireland	..	..	..	..	..	42,2	27,3	16,4	13,0	14,0	11,5	8,7	6,5	1,4	-0,3	11,3	28,6	61,5	69,7	74,6
Italy	100,5	104,5	99,0	104,5	104,6	107,0	101,1	95,6	96,3	95,7	92,7	92,5	93,7	90,5	87,0	89,7	100,0	103,3	104,7	105,0
Japan[4]	17,1	19,6	23,8	29,2	34,8	46,2	53,8	60,4	66,3	72,6	76,5	82,7	84,6	84,3	81,5	94,9	108,2	114,0	120,4	127,1
Korea[5]	..	..	..	..	..	..	..	..	..	-32,3	-30,9	-31,4	-35,6	-37,0	-40,4	-37,9	-38,5	-36,6	-36,6	-37,1
Luxembourg	..	..	-37,7	-41,0	-41,6	-46,8	-47,8	-50,7	-58,2	-55,5	-56,7	-52,2	-48,6	-44,7	-44,2	-44,7	-45,9	-41,6	-39,0	-36,8
Netherlands	45,5	44,6	54,1	52,8	49,7	48,2	36,7	34,9	33,0	34,9	36,2	37,6	35,0	31,6	27,9	26,8	29,9	34,7	37,7	39,6
New Zealand	..	43,9	37,6	32,4	29,8	27,8	25,5	23,5	21,1	16,9	11,0	4,8	-1,5	-8,1	-13,1	-12,7	-8,9	-4,4	0,4	3,8
Norway	-32,0	-30,6	-36,1	-41,1	-48,5	-52,1	-57,5	-67,4	-85,1	-80,6	-95,0	-104,4	-122,4	-136,3	-142,5	-126,1	-154,4	-157,0	-158,9	-160,6
Poland	..	..	-15,0	-5,7	0,3	6,4	13,5	15,5	18,5	22,1	22,7	20,8	23,5	22,4	17,0	17,3	22,3	29,0	33,8	36,2
Portugal	..	..	24,3	26,5	31,2	32,2	29,8	27,4	29,2	33,3	35,9	40,7	43,5	42,7	42,7	47,1	57,4	63,2	67,6	70,0
Slovak Republic	..	..	-30,7	-18,2	-12,1	-3,7	1,2	12,5	10,9	1,7	1,8	7,6	4,9	6,5	7,3	8,9	17,1	24,5	28,4	30,5
Slovenia	..	..	..	..	..	..	..	..	-15,7	-14,2	-9,5	-9,7	-8,5	-9,9	-17,6	-5,5	-0,4	5,4	9,9	13,4
Spain	43,5	46,4	51,6	55,5	54,2	53,7	47,7	44,2	41,5	40,3	36,8	34,6	29,9	23,5	18,5	22,9	34,3	43,4	49,3	52,8
Sweden	10,5	20,7	25,6	26,6	24,6	22,0	12,4	5,5	-2,5	3,9	0,0	-3,6	-8,7	-20,0	-24,7	-18,3	-23,5	-21,1	-19,6	-19,3
Switzerland	..	..	..	..	..	..	12,5	11,4	10,9	15,7	15,9	17,7	16,7	13,5	8,9	6,2	5,1	5,7	6,0	5,8
United Kingdom	17,4	19,7	26,3	27,9	30,6	32,6	29,0	26,8	23,2	23,7	23,9	25,9	27,1	27,5	28,5	33,0	43,8	51,3	57,6	62,3
United States	54,9	54,4	53,8	51,9	48,8	44,9	40,2	35,3	34,6	37,2	40,5	42,1	42,5	41,7	42,4	48,3	59,7	67,8	74,3	78,2
Euro area	42,8	44,3	49,0	53,4	53,4	54,0	48,6	47,6	48,2	50,5	50,6	51,5	50,7	46,4	42,1	46,4	53,7	58,7	61,7	63,3
Total OECD	40,5	41,7	43,3	44,2	43,5	44,0	40,6	38,3	37,9	40,1	41,5	42,6	42,2	40,0	38,0	43,3	51,9	57,9	62,3	64,9

Note: Net debt measures are not always comparable across countries due to different definitions or treatment of debt (and asset) components. First, the treatment of government liabilities with respect to their employee pension plans may be different (see note to Annex Table 32). Second, the range of items included as general government assets differs across countries. For example, equity holdings are excluded from government assets in some countries whereas foreign exchange, gold and SDR holdings are considered as assets in the United States and the United Kingdom. For details, see *OECD Economic Outlook Sources and Methods (http://www.oecd.org/eco/sources-and-methods).*

1. Includes the debt of the Belgium National Railways Company (SNCB) from 2005 onwards.
2. From 1995 onwards housing corporation shares are no longer classified as financial assets.
3. Includes the debt of the Inherited Debt Fund from 1995 onwards.
4. Includes the debt of the Japan Railway Settlement Corporation and the National Forest Special Account from 1998 onwards.
5. Data are on a non-consolidated basis (SNA93).

Source: OECD Economic Outlook 88 database.

Appendix 2: Hybrid Macro Model

A simple model to highlight the points made here can be stated on the basis of a consumption function (WELFENS, 2010; 2011), which considers both the impact of the steady state income (with weight θ) and the current real income Y (with weight $1-\theta$); the equilibrium condition for the goods market for the simple case of a closed economy reads:

(1) $Y = [(1-\theta)cY(1-\tau) + \theta c'Y\#(1-\tau\#)/r] + G + \delta((\beta Y/K)/r)K$

The term in square brackets is the consumption function where c and c' are positive parameters in the interval $(0,1)$, while Y# is the future steady state income, τ is the income tax rate, # denotes (expected) steady state and r is the real interest rate. G is pure government expenditures, δ is the depreciation rate of capital, K is the capital stock and ß is the output elasticity of capital. The population L is given. Assuming (with s in the interval 0,1) a savings function $S=s(1-\tau)Y$ and a given growth rate of technological progress (a), the steady state income $Y\#= A_0L\{s(1-\tau)/(a+\delta)\}^{\beta/1-\beta}$. A_0 is the initial level of knowledge. The gross investment function is written in a way that we have only reinvestment once the marginal product of capital $\beta Y/K= r$; if the marginal product of capital exceeds the real interest rate, we have a positive net investment since then the expression $\delta[\beta Y/K)/r]K$ is larger than reinvestment δK. Note that the production function here is implicitly $Y=K^{\beta}(AL)^{1-\beta}$, where A is knowledge.

Inserting the solution for the steady state income Y#, we obtain:

(2) $Y = [(1-\theta)cY(1-\tau) + \theta c'A_0L\{s(1-\tau\#)/(a+\delta)\}^{\beta/1-\beta}/r] + G + \delta((\beta Y/K)/r)K$

We can thus write:

(3) $Y[1- [(1-\theta)cY(1-\tau)] = \theta c'A_0L\{s(1-\tau\#)/(a+\delta)\}^{\beta/1-\beta}/r] + G + \delta((\beta Y/K)/r)K$

If the interest rate is fixed, the short-term fiscal multiplier is given by:

(4) $dY/dG = 1/[1- [(1-\theta)c(1-\tau)]>1$

Taking into account the government budget constraint $G + rB/P - \tau Y = (dB/dt)/P$, where B is nominal government debt and t the time index, the equation can be derived for a steady state value b"#, where b":= $(B/P)/Y$; for the sake of simplicity, a constant price level P has been assumed. There is convergence towards b"# only if the real interest rate falls short of the long-run output growth rate – in a neoclassical growth model equal to the sum of the progress rate a and the growth rate (n) of the population. Whether or not a terminal constraint that b# = 0 should be imposed is unclear: Those who believe in the Ricardo-Barro equivalence theorem will argue yes and this requires that $(\tau - \gamma)/r =b"\#$; the discounted primary budget surplus ratio in the steady state must be equal to the debt-GDP ratio. Various objections may be raised against this view. A crucial objection is related to the spending pattern of the government. If all deficits would be invested into infrastructure capital – assumed to be necessary both for production and for consumption (read: transporting consumer goods to households) – there is no terminal condition b"# =0; the same would hold if government real deficits would all reflect R&D promotion which in turn may be assumed to be proportionate to dA/dt; thus A(t) would be proportionate to real debt and there is no way that disembodied technological knowledge can be destroyed unless we face the end of the world and all people have died.

Thus it has been assumed that b#>0. If we assume a given rate of technological progress dlnA/dt= a and a constant population, we can state the government long-run budget constraint as $\tau\# = \gamma - b''\#(a - r)$. Thus there is the phenomenon that the future expected income tax rate is reduced by b#, provided a – the growth rate of output - exceeds r, which is the requirement for a steady state of b''# to exist in the first place as it will be emphasized subsequently. If the expected relationship is a<r and b''=b''(r) – with db''/dr>0 – the government must at first switch from a primary deficit to a transitory primary surplus over some time period which then implies a lower long-run b''#, which in turn implies a fall in the real interest rate (thus it no longer holds that r is given, rather r = r(b'',m''), where m'':= (M/P)/Y. In this perspective the real interest rate is a positive function of b'' and a negative function of m''. The fall in b''(t) must be strong enough so that a>r(b#) is holding.

In a short-term setup in a stagnant economy we can state that the expected tax rate in the current period – with zero economic growth – is $\tau'= \gamma + b''r(b'')$ and this will affect the consumption function accordingly:

(5) $Y = [(1-\theta)cY(1-\gamma-b''r(b''_T)) + \theta c'A_0 L\{s(1-\tau\#)/(a+\delta)\}^{\beta/1-\beta}/r(b'')]$

$+G+\delta((\beta Y/K)/r(b''))K$

In this modified setup a rise in b'' will reduce current consumption as the expected tax rate immediately goes up. If G is raised while b'' has to be reduced in the future (after time T), the fiscal multiplier will fall. In a more complex dynamic model, the problem will have to be considered that short term expansionary fiscal policy is effective in the sense that Y is raised while b'' goes up in parallel. If a critical ratio b''## exists, which is above the ratio that capital markets are willing to accept – read: rating agencies are willing to classify as still investor grade – there is the problem that an expansionary fiscal policy would in some countries bring about b''>b## in the medium term. This means that in an open economy context the country considered can no longer be stabilized by domestic fiscal policy (and a specific monetary policy will not be available if the country is a member of a monetary union). Only foreign expansionary fiscal policy or monetary policy of partner countries could help. With more and more OECD countries facing high debt-GDP ratios there is an increasing risk that the effectiveness of future fiscal policy is impaired. If there is a natural volatility of the economic system that can be limited by a mix of monetary policy and fiscal, many of these OECD countries will face larger output and job volatility in the future as part of the costs of the Transatlantic Banking Crisis.

It would be quite interesting to have surveys on expected future income tax rates in the EU and the US. While such surveys for households should not be too difficult, the situation is much more complex for the business sector as most multinational companies have considerable leeway in splitting the tax burden between the headquarter country and countries with subsidiaries. Here lies an unexplored argument for a minimum corporate tax rate since such a minimum will facilitate expectation building on tax rates.

Appendix 3: Theoretical Aspects of Government Debt and a New Approach

Impact of Government Budget Deficits and Debt on the Interest Rate

It is crucial to understand how strong the impact of debt and deficits on the interest rate normally are. LAUBACH (2009) has empirically analyzed the link between the deficit-GDP ratio and the debt-GDP ratio and the interest rate for the case of the USA. The analytical emphasis of the LAUBACH study has been on the role of expected/projected deficit GDP ratios – based on figures of the Congressional Office of Budget Analysis:

- A rise in the expected deficit ratio in the USA by 1 point increases the interest rate by 0.25 points. The rise in the deficit ratio from 1% to 2% would thus raise the interest rate by 25/100 which is, however, implausible given the impact of such a change in the implied long-run debt-GDP ratio – an aspect that will be picked up later.

- A rise in the debt-GDP by one percentage point causes a rise in the interest rate by 3-4 basis points: A rise in the debt GDP ratio thus brings about a rise in the interest rate by 0.035 points.

The message of the empirical analysis thus is that higher US debt dynamics will bring about a higher real interest rate. It is also clear that a rise in the US interest rate will raise the world interest rate. However, it is adequate to take a closer look at the link between the deficit-GDP ratio (d') and the debt GDP ratio (d"). Basically, the hypothesis may be stated that the real interest rate is determined according to the following equation:

(6) $r = \alpha + \alpha'd' + \alpha''d'' + \lambda'R' + \lambda''S''$

where α, α', α'' and λ' are positive parameters and the country rating R' is in the range from AAA to D, which corresponds to a scale of 0=AAA to 9=D); $\lambda''S''$ covers the safe haven effect where S" is an indicator for the strength of the safe haven quality of the respective country and λ'' is a negative parameter. The safe haven effect can only occur in countries with a relatively low expected long-run debt-GDP ratio and its significance depends on the number and size of countries that are facing a strong fall in sovereign debt rating.

If one assumes that the long-run growth rate of output is given, there is a simple link between the deficit-GDP ratio d', the debt-GDP ratio d" and the growth rate g_Y (DOMAR, 1944); it holds for the long-run debt GDP ratio $d''\# = d'/g_Y$. Hence we can write (for a country with triple A rating and ignoring safe haven effects):

(7) $r = \alpha + \alpha'd' + \alpha''d'/g_Y$

Hence the marginal impact of the deficit-GDP ratio on the interest rate can be calculated as:

(8) $dr/dd' = \alpha' + \alpha''/g_Y$

If one assumes that the long-run growth rate is 0.02 and if one takes the case of $\alpha' = 0.25$ and $\alpha'' = 0.04$ in the US, a rise in the long-run deficit-GDP ratio by 1 percentage point implies a rise in the real interest rate by 2.25%. For the euro zone a similar order of

magnitude might be considered. However, if there is an international increase in the debt-GDP ratio, safe haven effects might bring a counter effect – countries that are considered safe havens will face a lower interest rate. The DEUTSCHE BUNDESBANK (2010) finds a safe haven effect for Germany which amounts to 2.2 percentage points. To the extent that the Euro zone interest rate is a synthetic interest rate based on weighted interest rates of euro zone member countries, it cannot be ruled out that despite a rise in the deficit-GDP ratio of the euro zone, the overall impact could be a fall in the interest rate.

It may be pointed out that an optimum RAMSEY growth model implies that the real interest rate is $r = \eta' g_C + \theta$, where θ is the rate of time preference, η' is the inverse of the intertemporal elasticity of substitution and g_C is the growth rate of consumption, which will be equal to the growth rate of output in the steady state.

Budget Deficit and Long-Run Tax Rate

Considering the government budget constraint – with G denoting real government spending (except for interest payments), r the real interest rate, B denoting nominal debt, P the price level, τ the income tax rate and t the time index we obtain:

(9) $G + rB/P – \tau Y = (dB/dt)/P$

For the sake of simplicity we consider an economy with a given price level and a given growth rate of the economy. From the equation $d[(B/P)/Y]/dt = (dB/dt)/P – (B/P)g_Y$ we get the equation (after dividing the above equation for the budget constraint by Y and defining $b'' := (B/P)/Y$ and denoting the growth rate of output g_Y):

(10) $G/Y + rb'' – \tau = db''/dt + b''g_Y$

This is a differential equation in b(t), which is stable if the growth rate of output exceeds the real interest rate; hence we must have $g_Y > r$ and if this holds – and herein lies a challenge for government – the debt GDP ratio will converge over time to a stable ratio b#. Setting $db''/dt = 0$ gives the following equation:

(11) $\gamma – \tau = b''\#(g_Y - r)$

The term $\gamma – \tau$ is the primary budget deficit (the deficit ratio without interest payments on debt). From this equation we conclude that the long-run tax rate is given by:

(12) $\tau = \gamma – b''\#(g_Y – r)$

If the growth rate exceeds the real interest rate, the tax rate will be lower in an economy with a positive debt-GDP ratio than in an economy without government debt. Since taxation – beyond a point at which negative externalities are internalized (say through Pigou taxes) – will create welfare costs, the reduction of the tax rate through government debt is welcome. This effect should be larger the more past deficits are reflected in investment in public capital or in R&D promotion; provision of public capital amounts to a subsidy for private investors since public capital raises the marginal product of private investment. If all primary deficits are reflecting R&D investment I^R and if such investment is proportionate to new knowledge dA/dt (A is knowledge) we have $B/P = \Omega A$ (Ω is a positive parameter) and $(dB/dt)/P = dA/dt$ and hence $b'' = \Omega A/Y$ in a setup with a constant price level. This case, however, is not what reality shows us although there are certain rules in some countries that government borrowing should not exceed public investment (and government's R&D promotion could be defined broadly as coming under this heading).

Optimal Debt-GDP Ratio

In the literature an analysis on the optimum debt or the optimum debt-GDP ratio can rarely be found. This is somewhat surprising since the topic is so important in reality. From a theoretical perspective the gross debt-GDP ratio – much emphasized in the euro zone's Stability and Growth Pact – is not really relevant; it is the net debt GNP ratio that is the crucial ratio. The only reason why one might want to focus on the gross debt-GDP ratio is that for many OECD countries the difference between GDP and GNP is rather small (however, this is not true for the case of Ireland and generally doubtful for all countries with high net foreign indebtedness: if the foreign debt-GDP ratio is 100% and the world interest rate is 5%, the GNP will fall short of GDP by 5 percent even if we assume that cumulated net FDI inflows and hence international profit transfers are small). If a country is a major host country of foreign direct investment – and if we assume for the sake of simplicity that there is no outward FDI – the ratio of real debt to real GNP (denoting real debt by D and D/Z as the ratio of debt to real GNP) the ratio $D/Z = D/[Y(1- ß\alpha^*)]$ may be written, where ß is the output elasticity of capital K and α^* is the share of the capital stock owned by investors from abroad; GDP is assumed to be produced according to a Cobb-Douglas production function $Y = K^ß(AL)^{1-ß}$ where A is knowledge and L is labor. Thus we can write that $\ln(D/Z) \approx \ln(D/Y) + ß\alpha^*$, where it has been assumed that $ß\alpha^*$ is close to zero. If a rising ratio D/Z negatively affects reinvestment of foreign investors this will show up in the form of α^* falling over time and it also implies a devaluation provided that we consider a system of flexible exchange rates; a devaluation of the currency will reinforce any foreign debt problem - assuming that part of sovereign debt is in foreign currency.

For the sake of simplicity the distinction between gross debt and net debt and the distinction between national income and GDP may be ignored. Here we simply raise the question whether there is a long-run tax rate τ that can be minimized by an adequate choice of b"#; such a b"# will be dubbed the optimum debt-GDP ratio – it is optimal in the sense that it helps to minimize negative welfare effects from taxation (assuming that the negative welfare effect from tax rate τ is a positive function of τ). The basic idea is to carefully consider the impact of b" on γ, gY and r, which implies that in the above differential equation for b"(t) these variables are not constant – or that the convergence process for these variables is fast enough to make sure that b"(t) is converging indeed. For the sake of simplicity the latter is assumed here without further proof. The three key functions considered subsequently are as follows:

- It is assumed that r(t) is a positive function of b"(t), namely $r(t) = \rho b"(t)$ where ρ is a positive parameter. This is in line with standard credit market models.

- Secondly, it is realistic to assume that government has costs for debt management per unit of GDP that are a positive function of ρ, since a larger ρ provides incentives for government to invest more in searching investors willing to buy part of the sovereign debt of the country considered – consider e.g. the costs of road shows for placing government bonds; at the same time it is assumed that government debt management costs per unit of GDP can spread a fixed cost element over b"(t). Hence one may specify $\gamma = \gamma' + \{\rho'\rho + \rho''/[1+b"]\}$ where ρ' and ρ" are positive parameters and γ' is the government expenditure-GDP ratio without any direct and indirect debt costs (per

unit of GDP); the term {…} stands for the costs of debt management and γ'-τ may be dubbed the pure primary deficit ratio.

- Thirdly, economic growth is assumed to be a positive function of b" – up to a critical point for b"(t): For the GDP growth rate we specify $g_Y = a + n'/b" + n"b"$, where a is the exogenous growth rate of technological progress; n' is a positive parameter and n" could be either positive or negative. The growth rate will be a more positive function of b", the higher the share of cumulated growth-enhancing government deficits in past debt accumulation has been (read: high public investment or high share of government expenditures devoted to promotion of research and development). If n" is assumed to be close to zero, the main impact of b" on the growth rate would come through the term n'/b" and this term will be smaller the larger b" is. It is noteworthy that in principle n" may be assumed to be negative - within a critical range below zero - without affecting the key results derived subsequently.

Note that the fundamental differential equation for b"(t) thus reads:

$$(13) \quad \gamma' + \rho'\rho - \tau = \frac{db"}{dt} + "b\left[a + \frac{n'}{b"} + "b"\right] - \frac{\rho"}{1+b"} - \rho b"^2$$

Assuming that b" is rather small, we can use the approximation $1/[1+b"] \approx 1-b"$, therefore the differential equation reads:

$$(14) \quad \frac{db"}{dt} \approx (\rho - n")b"^2 - (a + \rho")b" + \gamma' + \rho'\rho - \tau + \rho" - n'$$

For b"# we have to consider db"/dt = 0 (assuming that a steady state value b"# exists), and hence the quadratic equation can be solved in principle.

We return to the implicit steady state solution for b"#, namely $\tau = \gamma - b"\#(g_Y - r)$. Hence for the income tax rate it may be written:

$$(15) \quad \tau = \gamma' + \rho'\rho + \frac{\rho"}{1+b"} - "b\left[a + \frac{n'}{b"} + "b" - \rho b"\right]$$

For ease of exposition it is convenient to consider a case with rather small b", therefore 1/[1+b"] can be approximated by [1-b"], which allows us to write (assuming ρ>n"):

$$(16)$$
$$\tau \approx \left[\gamma'+\rho'\rho +\rho"(1-b")-n'-ab"\right] + \left[-n"+\rho\right]b"^2 = \left[\gamma'+\rho'\rho+\rho"-n'\right] - \left[\rho"+a\right]b" + \left[\rho-n"\right]b"^2$$

$$(17) \quad \frac{\tau}{\rho - n"} \approx \frac{\gamma' + \rho'\rho +\rho" - n'}{\rho - n"} - \frac{\rho"+a}{\rho - n"}b" + b"^2$$

Hence it holds for $\tau/(\rho-n")-[\gamma'+\rho'\rho+\rho"- n']/(\rho-n") + \alpha'^2 = (b"-\alpha')^2$, where α' = [(ρ"+a)/(2(ρ-n"))] which in τ/(ρ-n") – b" space is the parabola that has a minimum in (ρ"+a)/(2(ρ –n")). Thus we immediately can see that the optimum government debt-GDP ratio is a positive function of the debt management cost degression parameter (ρ") and the growth-enhancing debt impact parameter (n"; assuming that n">0) and the autonomous growth rate (a), while the interest rate push parameter (ρ) has a negative effect on the optimum debt-GDP ratio; if n" is negative this parameter reduces the optimum debt-GDP ratio. For the illustrative special case that ρ-n" = (ρ"+a) the optimum debt-GDP ratio is 0.5 which would be slightly

below the 0.6 requirement of the stability and growth pact. From the theoretical perspective developed it would be quite interesting to have statistical information on the relevant (cost) parameters of the small model presented and look into empirical analysis on the debt growth nexus. In a practical perspective governments face the problem to reduce debt management costs on the one hand, on the other hand establishing a positive link between deficits and public investment (and promotion of innovation) could be a way to make sure that n">0.

Empirical analyses have suggested that government expenditures raising the scope for permanent productivity gains – such as education, public infrastructure and research & development – can raise long-run growth rates (see, e.g., WORLD BANK, 2006 and EUROPEAN COMMISSION, 2004 for surveys of the literature). There is a caveat, however, which concerns the fact that only a simple uniform income tax rate has been considered here. Empirical tax analysis indicates that real estate taxation has a modest negative impact on growth, followed by consumption taxes and other property taxes, while income taxation and corporate income taxation have strong negative effects on output growth (OECD, 2008; EUROPEAN COMMISSION, 2008a). Thus growth-enhancing reforms of the tax system should be considered in countries with a high debt-GDP ratio. As regards the impact of the Transatlantic Banking Crisis on the stability of the euro zone and Greece and some other euro zone countries critical reflections on a potential Greek crisis and a euro zone crisis were formulated early (WELFENS, 2009, p. 158/9 – the manuscript was finished in October 2008).

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