

THE LONG HAUL: DEBT SUSTAINABILITY ANALYSIS

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Highlights

- This working paper details and updates the debt sustainability analysis of Darvas, Sapir and Wolff (2014) for Greece, Ireland and Portugal. The goal is not the calculation of a baseline scenario which best corresponds to our views, but to set-up a baseline scenario which broadly corresponds to official assumptions and current



1. Introduction

Assessing the sustainability of public debt is a

The next section describes the composition of public debt stocks at the end of 2013, our starting point for the DSA, which is followed by the discussion of the assumptions underlying long debt sustainability analysis in Section 3. Section 4 presents updated DSA simulation results.

2. Composition and maturity profile of gross public debt

The starting point of the DSA is the outstanding volume of gross public debt and its composition. For all countries, we take the end-2013 outstanding stock of debt from the European Commission's Spring 2014 forecast (published in May 2014). Data on the composition of gross public debt come from different sources as we detail below in Table 1.

Table 1: The stock and composition of gross public debt at the end of 2013

A: Greece	
New bonds from the 2012 debt exchange (bn)	31
Hold-outs (bn)	4
ECB/NCB holdings (bn)	38
Short-term securities (bn)	15
IMF loans (bn)	29
Bilateral EU loans (bn)	53
EFSF loans (PSI sweetener and accrued interest) (bn)	35
EFSF loans (2nd programme) (bn)	99
Others (bn)	15
Total (bn)	319
Total (% GDP)	175

B: Ireland	
Short-term securities (bn)	2
Long-term securities (bn)	
Former PFI	0.92

C: Portugal

Short-term securities (bn)	7
Long-term securities (bn)	103
ECB/NCBs holdings (bn)	21

- The European Commission's homepage on assistance to Greece gives the data on bilateral loans (see http://ec.europa.eu/economy_finance/assistance_eu_ms/greek_facility/index_en.htm).
- The data on EFSF loans regarding the Private Sector Involvement (PSI) sweetener and accrued interests as well as the 2nd programmes taken from the EFSF homepage (see <http://www.efsf.europa.eu/about/operations/index.htm>).
- The category 'others' was calculated as residual, including among others, currency and deposits, other domestic loans, special purpose bilateral loans and other external loans. We assume that the current outstanding volume of such liabilities will be gradually reduced to zero by 2019.

Ireland:

- For Ireland, total (both in billion and % of GDP) is taken from the European Commission Spring 2014 forecast.
- Eurostat provides data up to the fourth quarter of 2013 for Short- and Long-term securities. We assume that the outstanding volume of short term securities will remain constant over time, while for long-term securities we use the maturity profile available from the Irish National Treasury Management Agency.
- The data on the Former Promissory Notes are taken from the Irish National Treasury Management Agency.
- The ECB's Security Market Programme is described in the ECB 2013 annual accounts, press release from 20 Feb 2014 shows that the ECB holdings of Irish government bonds amount to 9.7bn. Data on the National Central Bank's holdings of government bond are not available. We do not have information on the maturity profile of ECB holdings and assumed that their outstanding stock will be gradually reduced to zero by 2019.
- IMF loans are taken from Table 9 (Indicator EUC of Credit, page 47) in the IMF Review of December 2013, which also shows the repayment schedule up to 2023. The repayment schedule is reported in SDRs: we assumed a constant euro/SDR exchange rate when converting SDR values to euros.
- The maturity profile of Ireland's EFSF loans is from the National Treasury Management Agency.
- Concerning the maturity profile of EFSM loans the Treasury provided the following information: *EFSM loans are also subject to a year extension that will bring their weighted average maturity from 12.5 years to 19.5. It is not expected that Ireland will have to refinance any of its EFSM loans before 2027. However the revised maturity dates of individual EFSM loans will only be extended as they approach original maturity dates. It is possible that individual EFSM loans will be extended more than once in order to achieve the objective of increasing the weighted average maturity to 19.5 years. The original EFSM maturities are reflected in the table and graph above.* We therefore assume no repayment of EFSM loans up to 2025 and a later repayment profile similar to Portugal's repayment profile, since the Portuguese Treasury published an approximate repayment profile of EFSM loans.
- Data on bilateral loans from the United Kingdom, Sweden and Denmark can be found in table 4.1 in the European Commission's Economic Adjustment Programme for Ireland (2013 Autumn

Review), while the maturity profile of these loans is available from the International Treasury Management Agency.

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Table 2: Nominal GDP growth assumptions (compared to the previous year), 2014-30

	2014	2015	2016	2017	2018	2019	2020	2021	2022	...	2030
Greece	0.1	3.3	4.8	4.8	4.7	4.5	4.2	4.0	3.7	<i>f</i>	3.7
Ireland	2.3	3.4	3.6	3.9	4.2	4.1	4.0	3.8	3.7	<i>f</i>	3.7
Portugal	2.0	2.5	3.4	3.6	3.7	3.7	3.7	3.7	3.7	<i>f</i>	3.7

Sources: IMF World Economic Outlook April 2014 for 2014-2019 and assumptions from 2020 onward, as described in the main text.

3.2 Primary surplus

We use the IMF's April 2014 World Economic Outlook for the primary surplus for 2014-2019, since the European Commission's forecasts only run until 2015. We assume that that privatisation revenues and bank-recapitalisation costs are reported in the IMF's primary surplus projections. For the 2020s, the Commission assumes 4.0% of GDP of persistent primary surplus for Greece. For Portugal and Ireland, the Commission's base case is respectively 2.6% and 4.6% of GDP in 2020, but we have no information on the Commission's expectations beyond 2020.

Such differences in assumptions make it difficult to compare the debt trajectories for the three countries. For example, Portugal might have a higher 2.6 percent of GDP primary surplus should debt sustainability be in danger, and for Ireland and Greece it might prove difficult to sustain a 4.0-4.6 percent primary surplus throughout the 2020s. We therefore chose to assume the same long-run values for all three countries.

There are few examples of advanced countries (such as Norway) being able to sustain high levels of primary surpluses over periods of time. As Alesina (2013) show, the average primary surplus for successful consolidations in advanced countries is 3.1 percent of GDP. We therefore assume that the three countries will gradually converge to this level by 2022, starting from the 2019 IMF forecast primary surplus, and will stay at 3.1 percent until 2030 (Table 3).

Table 3: Primary surplus assumptions (percent of GDP), 2014-30

	2014	2015	2016	2017	2018	2019	2020	2021	2022	...	2030
Greece	1.5	3.0	4.5	4.5	4.2	4.2	3.9	3.5	3.1	<i>f</i>	3.1
Ireland	-0.7	1.6	2.4	3.0	3.4	3.8	3.6	3.3	3.1	<i>f</i>	3.1
Portugal	0.3	1.9	2.4	2.8	3.1	3.3	3.3	3.2	3.1	<i>f</i>	3.1

Sources: IMF World Economic Outlook April 2014 for 2014-2019 and assumptions from 2020 onward, as described in the main text.

3.3 Non-standard revenues and expenditures: privatisation revenues and bank bail-outs

We consider the privatisation scheduled in the Commission's country reports:

- Greece: the Commission expects 20 billion privatisation revenue between 2014 and 2020 (see European Commission, 2014a, page 28);

- Ireland: 110 million of privatisation revenues expected in 2014 (see European Commission Irish review, December 2013, Section 3.3.3);
- Portugal: 100 million in 2014 (see April 2014 Review Portugal, Table 4, page 40).

We assume that these privatisation revenues are incorporated in the IMF's primary surplus projections of the World Economic Outlook.

We do not assume any new bank recapitalisation in the public sector in our baseline scenario.

3.4 Stock-flow adjustment of debt

The Commission's projection of the stock-flow adjustment is sizable in three countries in 2014-16 (up to 2017 for Portugal): -6.3 percent of GDP for Greece, -7.1 percent of GDP for Ireland and -6.0 percent of GDP for Portugal (Table 4). And, most of this adjustment is due to the expected reduction of the government's cash balances from 13 percent of GDP to 6 percent of GDP. More information regarding the stock-flow adjustment can be found for Portugal and Greece in the programme documents. We used the Commission projections.

Table 4: Stock-flow adjusted debt (percent of GDP), 2014-17

	2014	2015	2016	2017
Greece	-0.8	-1.2	-2.2	n.a.
Ireland	-5.6	-0.4	-1.1	n.a.
Portugal	-3.7	-1.3	-0.2	-1.8

Sources: Greece: Table C2 on page 138 of DG ECFIN's April 2014; Ireland: Table A3.7 on page 65 of Autumn 2013 review (published in December 2013); Portugal: Table 7 on page 70 of ECFIN's 11th review, June 2014.

3.5 Borrowing costs

We tracked the interest rates of different parts of the debt stock (Table 1) and aimed to project expected interest rates on new borrowings using market expectations (derived from data of 10 June 2014), whenever it was possible.

EFSF (European Financial Stability Facility) All three countries borrowed from the EFSF (see Table 1). The interest rate that the three countries have to pay on EFSF loans are linked to the actual borrowing cost of the EFSF: Greece pays an approximately 150 basis points surcharge, while Ireland and Portugal pay an approximately 11 basis points surcharge. The average maturity of EFSF bonds is close to 6 years, meaning that we could approximate the average future borrowing costs of the EFSF with its 6-year maturity yields. Unfortunately, the full yield curve of EFSF is not available and therefore we cannot use the expectations hypothesis of the term structure (EHTS) to calculate the expected 6-year EFSF yield for future years. However, for Germany the yield curve is available, making it possible to calculate the expected future 6-year German yield using the EHTS. Currently, EFSF bonds pay approximately 40 basis points over the German bunds at this time and therefore we assume that the average cost of EFSF borrowing will be 40 basis points over the expected German 6-year yields.

¹ See Darvas (2011) for details on how to use the EHTS in calculating expected future yields.

Figure 1 indicates that the 6-year German yield is expected to rise from current 0.6 percent per year to about 3.2 percent by 2030.

Figure 1: Expected 6-year German yield assumption for the average borrowing cost of the EFSF (percent per year), 2014-30

Figure 2: Expected 1-year yield (2014-2030) and the 1-month EURIBOR futures prices (2014-19), percent per year

Sources: German yield is calculated with the expectation hypothesis of the term structure of interest rates using data of 11 Jun 2014. The source for EURIBOR futures data is www.barchart.com/commodityfutures/Euribor_futures.html?mod=D&view.

For Ireland, the interest payment on bilateral loans from the United Kingdom is composed of a service charge of 0.18 percentage points and the UK funding, defined as the average yield of gilt issuance. We approximate the average yield with the 1-year yield and again use the expectation hypothesis of the term structure to approximate future yields. Given lack of other information, we assume the same interest rate determination for the Danish and Swedish bilateral loans. Figure 3

Eurosystem holdings. We do not have information on the interest rates paid by bonds held by the EC and national central banks and therefore assume average pre-crisis borrowing rate, which was about 5 percent in Greece and 4.5 percent in Ireland and Portugal.

Other liabilities. As Table 1 indicates, after taking out various items of public debt, a category we called 'others' remains. Similarly to Eurosystem holdings, we assume average pre-crisis borrowing rate, which was about 5 percent in Greece and 4.5 percent in Ireland and Portugal.

New Greek bonds from the 2012 debt exchange. The 20 new bonds which were issued during the Greek debt exchange of 2012 have a coupon of 2 percent per year in 2013-2015, 3.5 percent per year in 2016-2020, 3.65 percent per year in 2021, 3 percent per year in 2022 and later. They are accompanied by warrants which pay an interest (capped at 1 percent per year) if GDP targets are met (for details, see Annex in Darvas, 2012). In our calculations, we checked the fulfilment of these GDP conditions and added the cost of the warrants to interest costs.

Greek hold-outs. For the pre-2010 bonds, which were involved in the Greek debt exchange, we assume a 5 percent interest rate, which was the average pre-crisis borrowing cost of Greece.

Irish government bonds replacing the earlier 'Promissory Notes'. The interest rate on these bonds is the six-month EURIBOR plus average interest margin of 2.63 percent (in our calculations, we use the bond-specific spreads, which is available from the Irish Treasury). We do not have a separate projection for the 6-month EURIBOR, but instead assume that it will be 11 basis points higher than the 3-month EURIBOR, which is the historical difference between the rates during January 1999 ... May 2014. See Figure 2 and discussion on the expected 3-month EURIBOR rates.

Long-maturity (pre-programme) bonds of Ireland and Portugal. For Ireland, we assume a 4.5 percent rate, which is about the average pre-crisis borrowing costs. For Portugal, we have information on the interest rate of each bond, which allows calculating the interest to be paid in each year. In 2014, the average interest on outstanding pre-programme debt is 4.59 percent.

New borrowing. By tracking the maturity and repayment schedule of all vintages of all kinds of debt liabilities and having a projection of the overall budget deficit, the annual gross financing need can be derived, which should be met with new borrowing from the market (or optionally from a new financial assistance programme). The crucial question is at what spread over the German bunds the three could borrow from the market in future. In Darvas, Sapir and Hoff (2014) we assumed the

current yields. Therefore, we assume future yields are lower than what is reflected in the current term structure of interest rates for a hypothetical clean exit scenario. Specifically, we assume that relative to Portugal, the current 170 basis points spread is reduced to 50 basis points by 2023 and thereby 200 basis points over German bunds, similarly adding long-run assumptions of Darvas, Sapir and Wolff (2014).

4. Debt simulations

In addition to a baseline scenario, we simulate the trajectory of the public debt-to-GDP ratio to four adverse scenarios, one-by-one and in combination:

- 1) GDP growth is 1 percentage point slower than the baseline scenario in each year from 2014-30;
- 2) the primary surplus is 1 percentage point lower than in the baseline scenario in each year from 2014-30;
- 3) interest rates for the floating-rate liabilities are 100 basis points greater than in the baseline scenario in each year from 2014-30;
- 4) at the end of 2014, governments have to pay an additional 5 percent of GDP for bank recapitalisation (which would amount to about 9 billion in the three countries);
- 5) these four adverse scenarios in combination.

Before presenting the results, we have two remarks concerning Greece.

First, the possibility of extending the maturity of the bilateral loan facility to 50 years and reducing its spread over the three-month EURIBOR to zero has been included in our scenarios, we take into account this maturity extension and spread reduction and we also take account a further extension of EFSF loans to Greece that Greece does not have to repay any principal to European lenders until 2030. The reason is that such help to Greece by euro-partners would most likely come first and would be relatively easy, as it would not lead to losses, nor would require the commitment of new funding. To date this change in the current financing conditions, we talk about

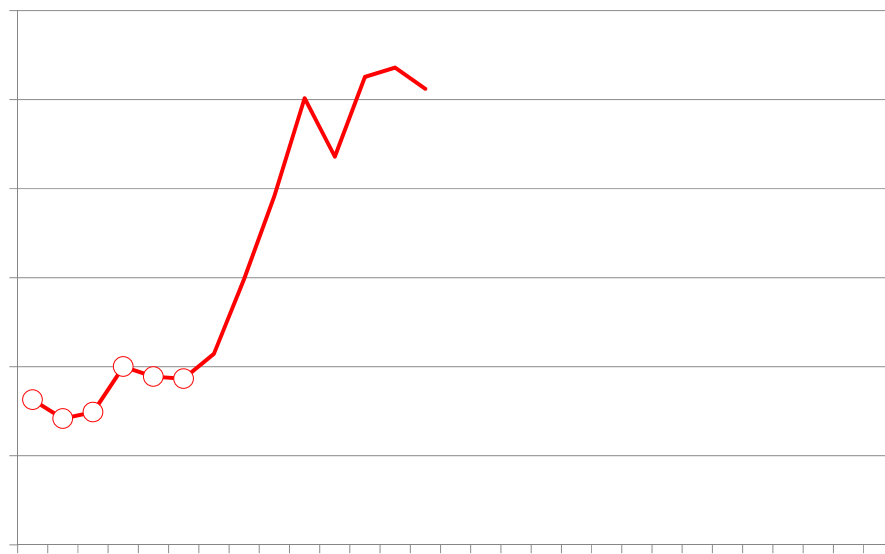
unchanged for Greece and Portugal, for Ireland there was a decline. For Ireland, the IMF now expects a significantly larger primary budget surplus (2.4 percent versus 1.9 percent), while for Greece and Portugal there is no change in this indicator. Expected interest rates came down slightly for all three countries. For Portugal, the Commission now expects a 1.5 percent of GDP higher reduction in the debt ratio due to the stock-flow adjustment in 2014-15 and for Greece a 2.0 percent of GDP smaller adjustment in 2014-16 than in earlier programme reviews.

Table 5: Comparison of our current projections with assumptions and results of Darvas, Sapir and Wolff (2014)

		Greece	Ireland	Portugal
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Figure 5: Greek public debt ratio scenarios (% GDP)

A: Bruegel revised baseline, AMECO and IMF projections

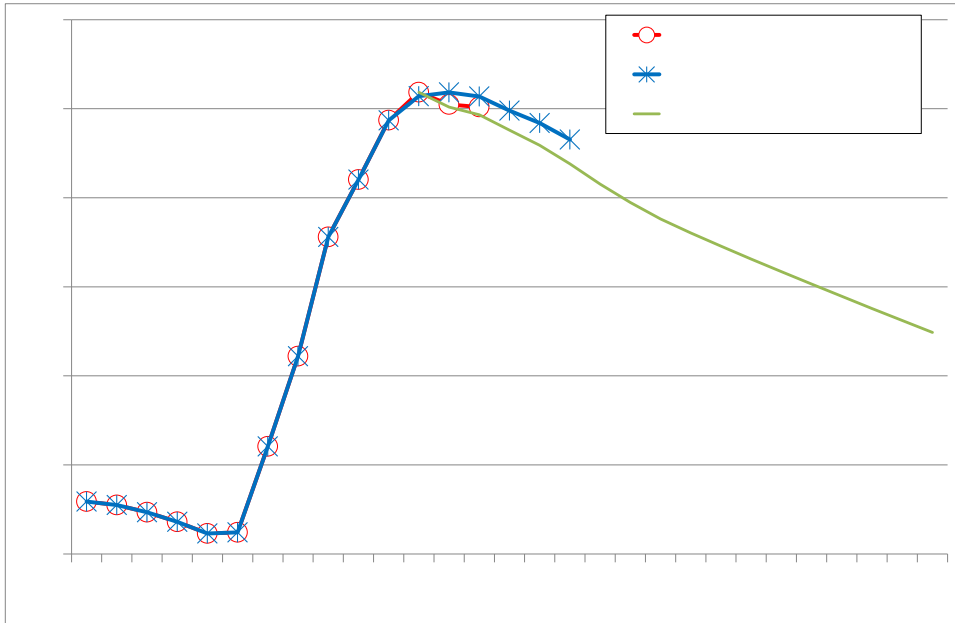


B: Bruegel sensitivity analysis

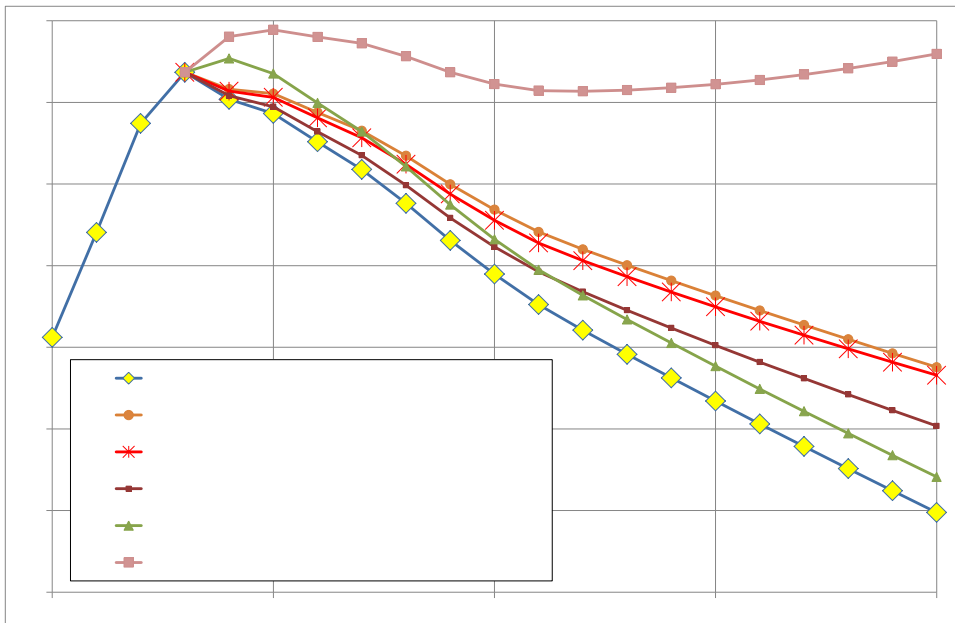
Source: Bruegel. Note: Revised baseline extended maturity of bilateral loans with zero funding spread.

Figure 6: Irish public debt ratio scenarios (% GDP)

A: Bruegel baseline versus AMECO and IMF projections



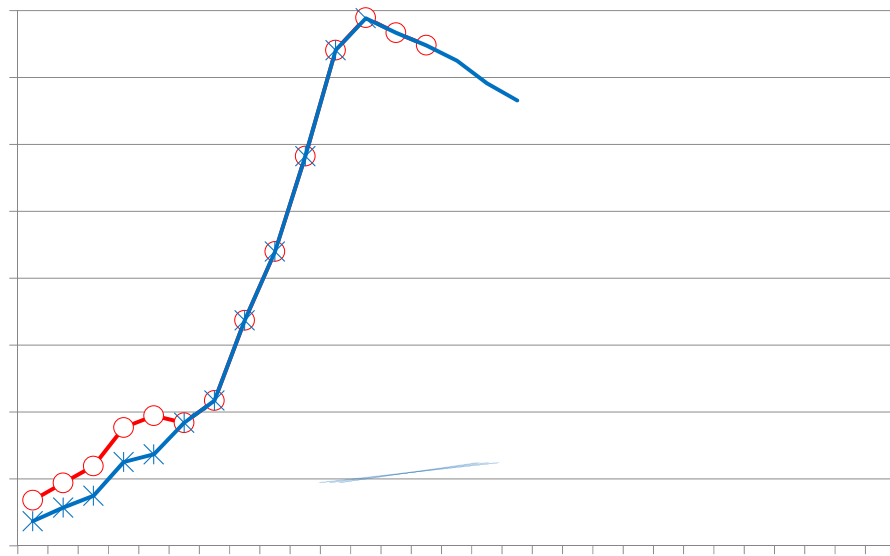
B: Bruegel sensitivity analysis



Sources: Bruegel

Figure 7: Portuguese public debt ratio scenarios (% GDP)

A: Bruegel baseline versus AMECO and IMF projections



B: Bruegel sensitivity analysis

Source: Bruegel.

5. Summary

This paper detailed and updated the debt sustainability analysis (DSA) of Darvas, Sapir and Wolff (2014) for Greece, Ireland and Portugal. The goal was the calculation of a baseline scenario which best corresponds to our views, but to also describe a scenario which broadly corresponds to official assumptions and current market views as well as its sensitivity to deviations from these assumptions.

The results have marginally changed compared to Darvas, Sapir and Wolff (2014), whereby the simulated public debt/GDP ratios are slightly lower in 2020 our new results are 2-3 percent of GDP lower than in our February projections. The forecasts are downward revision of the 2013 debt level for Greece and Ireland (is the starting point of our calculation), higher expected primary surpluses in Ireland, slightly lower interest rates in free countries, and a 1.5 percent of GDP higher reduction in the debt ratio due to the structural adjustment in 2014-15 for Portugal.

Notwithstanding the slightly lower baseline results of this working paper, findings continue to support the conclusions of Darvas, Sapir and Wolff (2014). The public debts set to decline in all three countries under market-based interest rate projections, the IMF growth and primary balance projections up to 2018, and longer-term assumptions based on historical experience with the primary balance and on Consensus Economics forecasts. However, the debt trajectory is vulnerable to negative growth, primary balance and interest rate shocks ... yet we do not examine extreme negative scenarios ... especially in Greece and Portugal though also in Ireland.

References:

- Abbas, S. Ali, Bernardin Akiyoshi, Andritzky Helge Berger, Takahashi and Justin Tyson (2013) • Dealing with High debt in an Era of Low Growth, *Staff Discussion Note* 13/7, International Monetary Fund
- Consensus Economics (2014), *sensus Forecasts* February
- Darvas, Zsolt (2012) • The Greek debt: An escape plan, *Bruegel Policy Contribution* 2012/19, <http://www.bruegel.org/publications/publication-detail/publication/759e-greek-debt-tran-escape-plan/>
- Darvas, Zsolt, André Sapir, Gantram B. Wolff (2014) • The long haul: managing exit from financial assistance, *Bruegel Policy Contribution* 2014/03 <http://www.bruegel.org/publications/publication-detail/publication/816-the-long-haul-managing-exit-from-financial-assistance/>
- Darvas, Zsolt, Christophe Gouardo, Jean Pisani-Fredé Sapir (2011) • A comprehensive approach to euro-area crisis: Background calculations, *Bruegel Paper* 2011/05, <http://www.bruegel.org/publications/publication-detail/view/499-a-comprehensive-approach-to-euro-area-crisis-background-calculations/>
- European Commission (2013) • The Economic Adjustment Programme for Greece, *Occasional Papers* 167, *European Economy* December, http://ec.europa.eu/economy_finance/publications/occasional_paper/2013/pdf/ocp167_en.pdf
- European Commission (2014a) • Second Economic Adjustment Programme for Greece, *Review*, *Occasional Papers* 192, *European Economy* April, http://ec.europa.eu/economy_finance/publications/occasional_paper/2014/pdf/ocp192_en.pdf
- European Commission (2014b) • Spring forecast, May, http://ec.europa.eu/economy_finance/publications/european_economy/2014/pdf/ee3_en.pdf
- European Commission (2014c) • Economic Adjustment Pr