

# Austerity and Economic Growth

## Policy insights for the euro area from the NIME world macroeconomic model

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# 1. Introduction

The financial and economic crises that have hit the world economy since 2008 have led to considerable discussion on, first, the efficiency of and the need for fiscal stabilisation policies and, more recently, on “exit” or budgetary consolidation strategies.

The present paper is devoted to the second of these two aspects, regarding the issue of budgetary consolidation<sup>1</sup>. Indeed, the economic and financial crises led to lower growth in tax receipts, while they simultaneously produced a rise in public expenditures, be it through countries’ automatic fiscal stabilisers (transfers to households in the form of unemployment benefits), through financial sector recapitalisation and guarantee schemes, and through discretionary countercyclical expenditures. The growth in expenditures over the period 2008-2012, accompanied by weakly rising or outright declining revenue, pushed governments’ budgetary positions into deficit and led to often-unprecedented increases in public sector debt-to-GDP ratios.

In Europe, and in particular in the euro area, the often already high and but still rising public deficits and debts led to rapidly escalating fears in financial markets that governments’ budgetary positions were becoming structurally unsustainable. This means that financial markets increasingly anticipated that governments would not be able to face up to future debt interest liabilities, while growth prospects were being revised downwards due to structural issues and to the cyclical effects linked to the winding down of past fiscal stimulus plans.

In a first section, this paper attempts to review recent debates surrounding budgetary consolidation and sustainability issues. We indicate that, in our view, notions of expansionary fiscal consolidation rest on weak foundations and that budgetary consolidation should be implemented so as to limit its recessive effects. However, it is also clear that care must also be taken not to let countries build up unsustainable levels of debt that would place them at risk of facing sudden stops in financial flows.

In a second section, we provide model simulation results regarding the effects of alternative budgetary consolidation strategies. Building on a 2012-2025 baseline projection for the euro area in which significant austerity is already built in, we show the macroeconomic and budgetary effects of alternative austerity scenarios. The scenarios that we examine are the following: the effects of austerity implemented only in the euro area; the effects of internationally synchronised austerity; the effects of the delayed implementation of austerity in the euro area.

For each of these policy scenarios, we examine the macroeconomic effects for the euro area as well as eventual international spill-over effects. We examine the effects on euro area general government net borrowing requirements and public debt ratios. We also evaluate and compare the overall costs of each scenario in terms of intertemporal output and employment losses.

All of the model simulations are carried out with the NIME model, the Belgian Federal Planning Bureau’s global macroeconomic model.

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<sup>1</sup> In this document, we make use of the term “budgetary consolidation” instead of the usual American equivalent of “fiscal consolidation”. The reader may, however, view the two as perfectly interchangeable.

## 2. The state of the debate on budgetary consolidation

Since the outbreak of the global financial and economic crisis in 2008, there has been renewed interest in the strand of literature regarding fiscal policy, its effectiveness and the sign and size of various fiscal multipliers in specific contexts, such as at the zero lower bound. More recently, another strand of economic literature, this time regarding budgetary sustainability and consolidation, optimal budgetary policy instruments and sequencing has attracted renewed attention. We will now present a short review what we see as the essential papers that have covered these issues of budgetary consolidation since the beginning of the crises.

Coming in the wake of their now famous "This Time is Different" paper of 2008, Reinhart and Rogoff (2010) sparked a new debate arguing that once public sector debt exceeds the threshold of 90% of a country's GDP, the debt level can lead to a significant reduction in the country's GDP growth rate. At about the same time, Alesina and Ardagna (2009) laid the basis for their subsequent claim that fiscal consolidation implemented through reductions in public expenditures can be correlated with economic expansions. These statements proved to be quite influential, allowing for Alesina to be invited to present his views at the Madrid informal Ecofin council meeting in April 2010. The analyses presented in Reinhart and Rogoff (2010) and in Alesina and Ardagna (2009), as well as the personal views expressed by some of these authors have, however, been the object of heated debate in academic circles. An opposing analysis, showing that fiscal stabilisation is useful in order to underpin GDP growth when an economy is in a recession was put forward in Almunia et al (2009). Papers from IMF (2010) and Guajardo et al (2011) also came out in defence of fiscal stabilisation and prudent budgetary consolidation. Furthermore, DeLong and Summers (2012) show how, under a set of plausible assumptions, fiscal stabilisation can be effective and can even be self-financing in a recession.

Although the IMF (2010) and the DeLong and Summers (2012) papers have themselves been debated, e.g. by Ramey (2012) and Perotti (2012), it appears that a consensus view is now building in academic circles around the analyses and recommendations as expressed in Blanchard and Cottarelli (2010), as well as in Corsetti (editor, 2012).

Broadly speaking, these views are that in some countries, debt-to-GDP ratios have become unsustainable, given these countries' structural difficulties and their outlooks for real GDP growth and inflation over the medium term. For these countries, the benefits from further fiscal stimulus would clearly be lost through increased risk premia on sovereign borrowing, leading to sudden stops in capital flows whereby both sovereigns and private sector borrowers would find themselves completely shut out of credit markets. For these countries, there is no alternative to austerity and structural reforms. Furthermore, current deleveraging and signalling the readiness of implementing long-term growth enhancing policies could even lead to improved growth prospects in the short run by reducing risk premia, thus reducing nominal interest rates and public sector debt interest payments (Corsetti et al, 2012). The only other options available to countries that find themselves faced with unsustainable debt levels are negotiated debt restructuring or debt repudiation. Of course, a country that is effectively shut out of credit markets could, in principle, pay down its debt, reform its economy and finally return to budgetary sustainability, if it were to be provided with credit at concessionary rates from third parties

such as other creditworthy euro area Member States or international financial institutions such as the IMF and the European Stability Mechanism (ESM).

For countries that are not facing imminent risks of having financial markets lose faith in the sustainability of their debt trajectories, i.e. countries whose interest rate spreads on sovereign borrowing are not rising significantly but whose debt levels have risen to historically high levels and whose medium-term growth outlooks are weak, structural reforms should be put in place so as to raise long-term potential output growth and to ensure that cyclically-adjusted budgetary positions remain balanced. Notwithstanding, in these countries further fiscal stabilisation policies could be implemented, within the limits of their available fiscal space. Furthermore, for these countries, budgetary consolidation measures do not need to be front-loaded, as long as clear signals are sent to financial markets on these countries' commitment to sound budgetary policies (Corsetti et al, 2010).

Finally, governments benefitting from negative real borrowing rates, that do not have significant cyclically adjusted budget deficits and whose debt levels are not seen to be unsustainable, could implement further fiscal stabilisation policies and should even back-load any eventual budgetary consolidation measures. The back-loading of budgetary adjustment efforts for countries with robust economic fundamentals and structurally balanced budgets would leave room for further or new fiscal stabilisation measures that would provide the urgently needed growth momentum for countries struggling in the face of the economic and social costs of immediate and harsh austerity programmes.

### 3. A non-technical description of the NIME model

In this section, we provide a brief overview of the basic structure and properties of the NIME model. NIME is a macroeconometric model of the world economy. The model distinguishes six different economic areas:

1. The EU area: this area represents the twelve countries that formed the euro area as of January 1, 2001;
2. The NE area: this area represents the Western, non-euro EU Member States, consisting of Denmark, Sweden and the United Kingdom;
3. The US area, consisting of the United States of America;
4. The JP area, consisting of Japan;
5. The EC area: this area represents the twelve Central & Eastern EU Member States, consisting of Bulgaria, Cyprus, Czech republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia;
6. The RW area: this area represents the Rest of the World, consisting of a wide range of diverse economies, of which: Algeria, Argentina, Australia, Brazil, Canada, Chile, China, Colombia, Egypt, Gabon, India, Indonesia, Iran, Israel, Ivory Coast, Libya, Mexico, Morocco, Nigeria, Norway, Peru, Saudi Arabia, Senegal, Singapore, South Africa, Switzerland, Taiwan, Thailand, Turkey, Russia, the United Arab Emirates and Venezuela.

National annual data series are aggregated in a bottom-up approach so as to construct data series for each of the model's aggregate economic areas. Data series in chained volume terms are aggregated using Laspeyres volume indices. The main data sources are the Commission's AMECO database and the IMF's International Financial Statistics Database.

In the EU, NE, US and JP areas, the model distinguishes a general government sector, a private business sector, a household sector, an interest rate setting monetary authority and an external sector.

The household sector provides labour services to the public sector and the private business sector. In exchange for these services, households receive wage incomes, from which they pay income taxes and social security contributions to the public sector. The household sector also receives transfers from the public sector, which provides income for the unemployed and for pensioners, and which also covers a share of medical expenses and of the costs of rearing children. Finally, households may receive income streams from their stock of financial assets. Note that in our model, we pierce the corporate veil and net out business sector financial flows. Hence, all relevant financial assets are part of the domestic household sector's wealth and all income streams from these assets are part of aggregate household income. Financial assets are income-yielding stocks and net bonds, as well as non-income bearing money balances. Households can use their aggregate income to buy goods and services, or to spend on housing-related investment. The part of household income that is not spent on goods, services and residen-



tial investment can be held in the form of non-income bearing cash balances, or can be saved in the form of income bearing financial assets, which add to the household stock of financial assets. Household decisions to consume goods and services, to invest in housing and to hold money balances all depend on the relative prices of the various expenditure categories, on inflation and expected inflation, on interest rates and expected interest rates, on current real disposable income, on expected future labour income and on the current value of the stock of total net wealth<sup>2</sup>.

The private business sector produces goods, services and fixed capital that are delivered to final demand. Final demand is composed of household consumption of goods and services, public consumption of goods and services, household demand for residential gross fixed capital (dwellings), private business sector demand for gross fixed capital, public sector demand for gross fixed capital, export demand for goods and services and inventory demand from households and the private business sector. It is assumed that, in equilibrium, the private business sector produces its output using a Cobb-Douglas constant-returns-to-scale technology. The production technology requires three inputs: labour services, capital services and intermediate imported inputs. Equilibrium factor demand is derived from first-order conditions. Equilibrium output is determined by the available private business sector equilibrium labour input and an assumption regarding trend average hourly labour productivity. The private business sector equilibrium labour input is a function of an assumption regarding the equilibrium public sector labour input, the active-aged population, a labour market participation rate and an estimate of the natural rate of unemployment (NAIRU). Note also that the modelling strategy pierces the corporate veil, doing away with financial intermediation and assuming that the household sector is the final owner of corporate equity and of all debt obligations and that it is the final beneficiary of all income streams from financial assets.

The price-setting behaviour for the prices of goods, services and capital supplied to all components of final demand follows a Calvo-type staggered price setting rule, where the fraction of prices revised in each period depends on menu costs and on the ability of price setters to accurately gauge marginal costs and to formulate expectations regarding future prices and costs. The price of households' private consumption expenditure and workers' real wage claims are modelled to react to measures of the private business sector output gap, generating inflationary pressures as the output gap becomes positive and disinflationary pressures as the output gap becomes negative.

The government sector's revenue is obtained through the direct taxation of household labour income and wealth, the direct taxation of corporate income, the indirect taxation of household consumption of goods and services, as well as through the levy of social security contributions on workers' wages. While the NIME model can be run so as to reach a steady state equilibrium where tax rates change to ensure a long-term budget balance, the version of the model that was used to prepare the latest 2012-2025 projection as well as the scenarios that are presented in this paper has exogenous tax rates. Similarly, in the full steady-state version of the NIME model, public sector expenditure is endogenously determined by econometric equations. However, in the version of the model that was used in the framework of this paper, expenditure is constrained to follow exogenously determined time paths.

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<sup>2</sup> Household net wealth is defined as comprising current income including transfers, plus the net present value of expected labour income, plus the current value of the stock of residential buildings, plus the current value of the stock of financial assets.

The monetary authority sets the nominal short-term interest rate so as to drive the economy towards its medium-term (inflation and/or output growth) objective in a standard Taylor rule setting. In particular, it is assumed that for the euro area, it is the European Central Bank (ECB) that moves short-term money market rates to steer the euro area economy towards a medium-term headline inflation rate target of close to, but below, two percent. A positive output gap leads the monetary authority to raise interest rates in order to curtail contemporaneous final domestic demand growth, while a negative output gap leads to a reduction in the nominal short-term interest rate that underpins contemporaneous final domestic demand growth. However, monetary policy is downwardly constrained by the nominal zero interest rate lower bound (ZLB). In such a framework, deflation can thwart monetary policy actions by producing positive real interest rates even in the face of zero nominal interest rates. Note that while the monetary authorities are a crucial driver of the model's behaviour, the ECB or Eurosystem balance sheet is not made explicit in the model.

Nominal effective exchange rates are assumed to be market-determined, are fully endogenous and are modelled following a standard uncovered interest rate parity condition. Monetary authorities are not assumed to target exchange rate levels, preferring to maintain control over domestic interest rates and strive for their inflation targets.

For the Central & Eastern EU Member States area, aggregate output is composed of household consumption, public consumption, aggregate gross capital formation and exports. Behavioural equations are often less sophisticated and more ad hoc than for the EU, NE, US and JP areas.

For the Rest of the World area, final demand is only composed of aggregate domestic demand and exports. Here also, behavioural equations are less sophisticated and much more ad hoc than for the EU, NE, US and JP areas.

The NIME model has explicit import and export trade flows for each economic area. Aggregate world trade flows are constructed so as to ensure that the adding-up constraint for total world imports and exports is always satisfied, both in nominal terms and in volume terms.

Finally, the model's behavioural equations are estimated econometrically, while long-run equilibrium paths are based on historical trends produced with statistical filtering techniques that are either extended mechanistically over the forward simulation periods, or are extended on the basis of long-run scenarios.

## 4. The NIME baseline projection for 2012-2025

The current NIME baseline scenario was prepared in May 2012. The projection is based on a number of assumptions relative to variables such as active-aged population, trend growth in hourly labour productivity, hours worked, public sector labour demand, inflation and the natural rate of unemployment<sup>3</sup>.

The euro area's growth prospects over the period 2012-2025 are adversely affected by the public sector consolidation programmes that are assumed to be implemented through 2025. Indeed, between 2014 and 2025, the growth rate of public consumption of goods and services in real terms gradually falls to nil, while the level of public sector employment is held constant. At the same time, an assumed freeze of public sector real wage rates implies that the public sector real wage bill also remains constant between 2014 and 2025. Direct tax rates on household labour income and wealth, indirect tax rates on production and imports and social security contributions rates are all based on EU Commission forecasts for 2012-2013 and are held constant thereafter at their levels of 2013. Finally, after having declined sharply in 2010 and 2011, real public sector investment is assumed to decline further in 2013 and 2014 and to pick up thereafter so as to bring its level in 2025 up to the level of 2010.

In the face of significant public sector retrenchment, real output growth can only come from private domestic demand and exports. Real private consumption is projected to rise over the period 2012-2025, experiencing only a temporary dip in 2015 as households increase their holdings of real money balances while simultaneously investing in other, income-bearing, financial assets. Real household investment in residential buildings is projected to rise as of 2014 but to slowly decline after 2018 as rising real interest rates discourage household investment and raise the savings rate.

Euro area real export growth is projected to continue to weaken in 2012 and 2013 due to both limited external growth prospects and unfavourable exchange rate developments. Export growth should pick up as of 2014 due to rising foreign effective demand, despite the appreciation of the nominal effective exchange rate. Euro area real import growth is projected to follow the rise in final demand, increasing regularly as of 2013. Average yearly import growth over the period 2012-2025 should however fall short of the growth rates that prevailed before the global economic and financial crisis, as growth in final demand should be weaker and as the euro currency is projected to appreciate in nominal effective terms. Net exports should then provide increasingly positive contributions to the area's real GDP growth through 2025, as imports tend to rise less rapidly than exports. The positive real net exports and rising terms-of-trade should then produce trade surpluses throughout the projection period.

A combination of tepid growth in final domestic demand and positive real net exports generate positive real GDP growth over the period 2012-2025. Output growth is strong enough to outpace the rise in the area's potential output, thus closing the euro area's output gap by 2017. The closing of the output gap comes with a decline in the unemployment rate, which falls back to its pre-crisis level. At the same time, consumer price inflation picks up, reaching a level that is on average in line with the ECB's target range of below, but close to, 2 percent as of 2021.

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<sup>3</sup> For a more detailed presentation of the latest NIME projection for the world economy, see Van Brusselen (2012).

Finally, the rigorous fiscal consolidation that is assumed to be implemented in the baseline projection leads to primary budgetary surpluses as of 2014 and to general surpluses as of 2021. The primary surpluses produce a gradual decline in the area's aggregate general government net borrowing requirement and a subsequent decline of the aggregate public sector gross debt, which reaches 66.3% of euro area GDP in 2025.

**Table 1 The NIME baseline projection for 2012-2025**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Private consumption	-0.6	0.3	1.1	0.8	0.9	0.9	1.0	1.0	1.1	0.7	0.8	0.7	0.6	0.5
Public consumption	0.1	-1.3	-0.8	-0.9	-1.1	-0.9	-0.7	-0.4	-0.2	-0.1	0.0	0.0	-0.0	-0.1
Gross fixed capital formation	-1.5	0.6	4.4	4.8	4.9	3.7	2.0	0.3	-0.8	-1.5	-1.9	-2.3	-2.5	-2.7
Exports	2.1	1.0	3.1	4.7	5.4	6.0	6.4	6.4	6.3	6.3	6.2	6.2	6.3	6.5
Imports	-0.8	1.1	3.2	3.5	3.7	3.8	3.9	3.9	4.0	4.0	4.1	4.2	4.3	4.4
Gross Domestic Product	-0.6	0.1	1.4	1.6	1.9	1.9	1.8	1.5	1.3	1.0	1.0	0.9	0.9	1.0
Output gap (% of potential)	-3.0	-3.5	-2.9	-2.1	-1.1	-0.0	0.9	1.4	1.8	1.9	1.9	1.9	1.8	1.9
Deflator of private consumption	1.8	0.7	0.4	0.4	0.6	0.9	1.3	1.6	1.8	1.9	2.0	2.0	2.0	2.1
Deflator of GDP	2.5	1.3	1.4	1.3	1.4	1.5	1.7	1.9	2.0	2.1	2.2	2.3	2.4	2.5
3-month money market interest rate, level	0.7	0.5	0.2	0.1	0.4	0.9	1.6	2.4	3.0	3.5	3.9	4.1	4.2	4.3
	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Nominal effective exchange rate, growth rate (+ is depreciation)	3.5	-2.3	-1.9	-1.6	-0.9	-0.3	0.0	-0.0	-0.3	-0.7	-1.0	-1.1	-1.0	-0.7
Unemployment rate, % labour force	11.2	10.9	10.1	9.2	8.6	8.4	8.5	8.6	8.6	8.4	8.1	7.8	7.5	7.2
Public sector Net borrowing (-) or lending (+), % GDP	-3.4	-3.4	-2.7	-2.1	-1.5	-1.1	-0.7	-0.5	-0.2	0.0	0.3	0.6	1.0	1.4
Gross public sector debt,% GDP	90.6	92.7	92.9	92.3	90.9	88.9	86.6	84.2	81.7	79.1	76.4	73.4	70.1	66.3
Current account, % GDP	0.6	1.2	1.6	2.4	3.3	4.3	5.6	6.9	8.3	9.8	11.4	13.1	14.9	16.9

## 5. Euro area economic growth and budgetary positions in alternative austerity scenarios

The medium-term outlook that is presented in the previous section provides a conditional picture of the direction in which the euro area economy is headed. However, there are numerous uncertainties and risks that could substantially modify the outlook.

Indeed, euro area governments and EU institutions are currently embarked in fundamental discussions concerning the implementation of new and stringent austerity measures as well as institutional and governance changes. It is therefore of considerable importance to be able to evaluate the effects of the measures that are currently under discussion.

While the analysis of institutional changes and of changes in governance clearly do not fall within the remit of what is possible using our macroeconomic modelling approach, the analysis of economic policy scenarios concerning austerity and economic growth falls squarely within the scope of what can be done with the NIME model.

In this section, we will provide the results of model simulation experiments carried out with the NIME model and casting light on three essential economic policy scenarios.

First, we present the results of a simulation whereby the euro area implements austerity measures over the period 2012-2025 that go beyond what is built into the NIME model's baseline projection.

The second scenario that is presented is a simulation whereby these supplementary austerity measures are implemented not only in the euro area but also simultaneously in the Western non-euro EU Member States, the US and Japan.

Finally, the simulation results for a third scenario are presented, whereby the implementation of supplementary austerity measures in the euro area is delayed until 2017, when the euro area's negative output gap is projected to have closed.

The simulation results are analysed to determine the effects of each austerity policy scenario on the euro area's real GDP, unemployment, budgetary positions and debt.

## 5.1. Scenario 1 - Austerity in the euro area

In this scenario, we assume that more stringent austerity measures are adopted in the euro area than what is assumed in the NIME baseline projection. The supplementary austerity is implemented as of 2012 and extends through 2025.

The austerity measures imply that the following policy decisions are implemented:

1. Public sector employment, expressed in hours, is reduced by 10 percent with respect to the baseline projection;
2. The public sector hourly gross wage rate is reduced by 10 percent with respect to the baseline projection;
3. Public sector consumption of goods and services is reduced by 10 percent with respect to the baseline projection;
4. Public sector gross investment is reduced by 10 percent with respect to the baseline projection;
5. Direct tax rates on household income are increased by 2 percentage points with respect to the baseline projection;
6. Indirect tax rates are increased by 2 percentage points with respect to the baseline projection.

The main effects on real GDP, on selected components of final domestic demand, on unemployment, inflation, public sector net lending and gross public sector debt, will be discussed and compared with the baseline projection.

### 5.1.1. The short-run macroeconomic effects

On impact, i.e. in 2012, the austerity measures reduce the level of real GDP by 3.1% with respect to (w.r.t.) the baseline level. Thus, instead of obtaining the baseline's year-on-year (yoy) percentage decline in real GDP of 0.6% in 2012, GDP falls in yoy terms by a massive 3.6%.

The austerity measures affect domestic demand, reducing household real consumption by 1.6% below the baseline level. Exports remain unchanged in 2012, but the measures have significant effects on imports, which fall by 1.3% below baseline. As the decline in imports is less important than the declines affecting the components of domestic demand, the aggregate impact on real GDP is all the more significant. The decline in output raises the level of unemployment in the euro area, which increases in 2012 from 17.3 million in the baseline to 20.8 million persons. Regarding the area's unemployment rate, it rises from 11.2% of the labour force in the baseline to 13.5% in this austerity scenario.

As austerity leads to a decline in output and a rise in unemployment, the rate of (consumer price) inflation falls from 2.0% in the baseline to 1.8% in this scenario. At the same time, the euro area's negative output gap widens significantly due to the loss of output for final domestic demand. The lower infla-

tion and larger negative output gap lead to a reaction from the monetary authorities, who act to bring the short-term money market rate down from 0.7% in the baseline to 0.5% in this variant.

We have thus noted that our model indicates that the more stringent austerity would unequivocally reduce the euro area's output, reduce inflation, reduce imports, reduce the nominal short-term interest rate and raise unemployment. However, what are the effects on the area's budget deficit and debt ratios? Regarding the area's 2012 deficit, we note that the consolidated net borrowing requirement of public administrations declines by 209 billion euros, as the deficit ratio falls from 3.4% of GDP in the baseline to just 1.2% of GDP in this variant. This implies that instead of obtaining a small primary budget deficit as in the baseline, this scenario allows for a significant primary surplus as of 2012. The overall effect on the euro area's aggregate debt ratio is, however, insignificant, as both the area's debt and nominal GDP decline by 2.5% w.r.t. the baseline.

### 5.1.2. The medium- to long-run macroeconomic effects

As of 2013, the effects of the austerity measures on the euro area's real GDP tend to become less pronounced. In 2013, GDP is still at 3.0% below baseline, but this deviation decreases gradually to reach only 1.3% below baseline in 2025. However, it is striking to note that the gradual return of GDP towards the baseline level is obtained with a continued relative decline in domestic consumption. Indeed, household real consumption expenditure lies 1.4% below baseline in 2013 and this deviation then increases gradually to reach 2.9% in 2025. Real output and GDP only tend to return towards baseline due to two factors. First, there is the strong reaction of private sector gross fixed capital formation to the lower inflation and the very low interest rate environment that results from the implementation of austerity. Indeed, it is noteworthy that in this scenario, the euro area's nominal short-term interest rate falls to, and remains at, the zero lower bound over the period 2013-2017. Furthermore, the area's nominal short- and long-term interest rates remain below the baseline levels throughout the period 2012-2025. Second, there is a positive contribution to real GDP growth from the euro area's real net export position.

All in all, over the entire 2012-2025 period, the enhanced austerity measures would lead to a cumulative GDP loss of 2.1% relative to cumulative baseline GDP. To put this figure into perspective, this loss would represent approximately 32% of baseline euro area GDP of 2012.

The loss in aggregate real private sector output, which corresponds to total deliveries to final demand would see a cumulative output loss over the period 2012-2025 of approximately 2.5 trillion euros (of 2005), which is equal to about 1.7% of cumulative baseline output. This represents approximately 27% of the euro area's baseline output for 2012.

The austerity leads to a gradual appreciation of the euro area's nominal effective exchange rate relative to the baseline level, due to the combined effects of the zero-bounded nominal interest rates and the decline in inflation rates. This relative exchange rate appreciation w.r.t. the baseline is accompanied by a gradual decline in euro-denominated export prices relative to the baseline, but the this price effect does not stop the real exchange rate from appreciating w.r.t. the baseline.

Due to the exchange rate-induced loss in export price competitiveness, the euro area's real exports gradually fall w.r.t. the baseline. However, real imports also decline and at a somewhat faster pace than the decline in exports, due to the effects of austerity on domestic demand and output. All in all, these combined effects push real net exports up above the baseline level throughout the period 2012-2025 and thus have a net positive effect on real GDP.

**Table 2 Scenario 1 - Austerity in the euro area (deviations in % w.r.t. baseline levels, unless otherwise noted)**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Private consumption	-1.6	-1.4	-1.2	-1.4	-1.4	-1.6	-1.9	-2.0	-2.2	-2.4	-2.7	-2.8	-2.8	-2.9
Public consumption	0.0	-10.3	-10.5	-10.6	-10.6	-10.6	-10.6	-10.5	-10.5	-10.5	-10.5	-10.4	-10.4	-10.3
Gross fixed capital formation	-2.1	-1.3	-0.3	0.2	0.5	1.3	2.9	4.6	6.1	7.2	8.3	9.7	11.2	12.5
Exports	0.1	-0.4	-0.9	-1.6	-2.4	-3.1	-3.5	-3.8	-3.9	-4.2	-4.3	-4.5	-4.7	-5.0
Imports	-1.3	-1.6	-2.0	-2.4	-2.9	-3.2	-3.5	-3.8	-4.0	-4.3	-4.7	-4.9	-5.1	-5.3
Gross Domestic Product	-3.1	-2.9	-2.5	-2.5	-2.5	-2.5	-2.2	-1.9	-1.6	-1.5	-1.5	-1.3	-1.1	-1.1
Output gap, p.p. difference w.r.t. baseline	-1.9	-1.6	-1.3	-1.4	-1.4	-1.4	-1.2	-0.9	-0.7	-0.6	-0.5	-0.5	-0.4	-0.4
Deflator of private consumption	0.4	-0.3	-0.9	-1.5	-2.1	-2.6	-3.1	-3.5	-3.9	-4.2	-4.4	-4.6	-4.8	-5.0
Deflator of GDP	0.6	-0.2	-0.6	-1.1	-1.6	-2.1	-2.6	-3.0	-3.4	-3.8	-4.2	-4.6	-5.0	-5.4
3-month money market interest rate, p.p. difference w.r.t. baseline	-0.2	-0.5	-0.2	-0.1	-0.3	-0.8	-1.1	-1.1	-1.0	-0.9	-0.8	-0.7	-0.6	-0.6
Nominal effective exchange rate (+ is depreciation)	0.6	-0.3	-1.0	-1.8	-2.9	-3.6	-3.8	-3.9	-4.1	-4.3	-4.7	-5.2	-5.8	-6.5
Unemployment rate, p.p. difference w.r.t. baseline	2.3	1.9	1.8	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.4
Public sector Net borrowing (-) or lending (+), p.p. difference w.r.t. baseline	2.2	2.2	2.4	2.4	2.4	2.5	2.6	2.7	2.8	2.8	2.8	2.9	2.9	2.9
Gross public sector debt, p.p. difference w.r.t. baseline	0.0	-1.7	-3.9	-5.8	-7.6	-9.4	-11.5	-13.7	-16.0	-18.1	-20.2	-22.4	-24.5	-26.4
Current account, p.p. difference w.r.t. baseline	0.4	0.4	0.4	0.4	0.3	0.1	-0.0	-0.1	-0.3	-0.4	-0.5	-0.7	-1.0	-1.2

The current account, which is a nominal concept, tends to deteriorate w.r.t. the baseline, due to a deterioration in the euro area's terms of trade; this occurs mainly over the second half of the projection period. The volume and relative price effects combine to push the current account, in percent of GDP,



up above the baseline level over the period 2012-2017. However, the negative terms of trade effects then dominate over the period 2018-2025 and lead to a decline in the current account-to-GDP ratio relative to the baseline level.

The simulations indicate that euro area's unemployment rate is raised durably by the reinforced austerity. Indeed, on impact, the unemployment rate rises by 2.25 percentage points, from 11.2% of the labour force in the baseline to 13.5% in the variant. This spread then rises gradually over the period 2012-2025, to reach 2.33 percentage points above the baseline rate in 2025. In the baseline projection, cumulative unemployment over the period 2012-2025 totals 190 million man-years. This loss rises to approximately 235 million man-years in the austerity scenario, indicating a supplementary loss of approximately 44 million man-years. For some perspective, this corresponds to roughly 2.6 times the baseline scenario's figure for total euro area unemployment in 2012 (i.e., about 17 million persons) and thus represents a massive loss of human capital as well as great personal distress.

**Table 3 Selected effects of euro area austerity w.r.t. the baseline scenario**

	Cumulative difference, in levels	Cumulative deviation, in % of baseline
Real GDP	-2.7 (trillion euros of 2005)	-2.1 %
Real output	-2.5 (trillion euros of 2005)	-1.7 %
Real potential output	-1.1 (trillion euros of 2005)	-0.7 %
Unemployment	+44.3 (million man-years)	+23.3 %
World real GDP	-5.3 (trillion euros of 2005)	-0.7 %

It is also interesting to note that as austerity drives up unemployment in the baseline relative to the baseline scenario, it also affects the model's measure of long-term unemployment or NAIRU. Indeed, the NAIRU is sensitive to unemployment hysteresis, whereby a period of high unemployment leads to a loss of human capital and increases the number of persons unable to find new employment opportunities. This leads to a decline in the euro area's private business sector potential output level. Potential output declines throughout the period 2012-2025 w.r.t. the baseline level, with the fall reaching -1.1% of baseline in 2025. Over the period 2012-2025, the cumulative loss in potential output is of approximately -0.7% of the cumulative potential output of the baseline, equalling about 11.4% of the euro area's baseline potential output for 2012. Note further that though the effect on potential output is persistent, it is not permanent. Indeed, once budgetary consolidation will have achieved its goals, one can assume that euro area governments will return to a neutral fiscal policy stance. In this respect, the temporary rise in, e.g., labour income tax rates, will not have any significant effect on the discounted present value of the household sector's expected intertemporal disposable labour income and wealth. Hence, once structural budgetary balance is attained, fiscal policy should change and no longer restrain domestic demand. From then on, assuming unchanged steady-state labour productivity growth and an unchanged labour supply w.r.t. the baseline, prices and wages in this austerity scenario should gradually adjust so as to bring the natural rate of unemployment back down to the baseline level. This would then allow the euro area's potential output to converge to the baseline level of potential output.

### 5.1.3. The budgetary effects

Let us now turn to what would be obtained in terms of deficit and debt reduction in the euro area in exchange for the loss in economic output and higher unemployment due to the austerity measures. In the baseline, a primary budgetary surplus appears as of 2014 and an overall surplus as of 2021. Aggregate gross public sector debt declines as of 2017 in the baseline and as of 2015 in this austerity scenario. However, the debt-to-GDP ratio would already decline as of 2015 in the baseline, reaching 66% of euro area GDP by 2025. In the austerity scenario, the debt-to-GDP ratio starts to decline as of 2014 and falls below the 60% of GDP threshold after 2021.

In terms of debt reduction, we may note that the 66% of GDP debt level would be reached by 2020 in the austerity scenario, thus five years earlier than in the baseline projection. Public sector net borrowing would turn into positive public sector net lending in 2015, whereas this would be achieved only in 2021 in the baseline scenario. Thus, euro area public finance objectives could be reached approximately five years sooner in the austerity scenario, albeit at a considerable cost. The cumulative loss in real GDP is shown to be of about 2.7 trillion euros (in euros of 2005). In terms of lost GDP per year gained in achieving the EU's budgetary objectives, this would amount to approximately 533 billion euros per annum. In terms of unemployment, we calculate that austerity measures that we simulate here would imply an increase in cumulative unemployment of about 44 million man-years over the period 2012-2025; this amounts to approximately 9 million man-years of supplemental unemployment per year gained in reducing the euro area's debt ratio.

### 5.1.4. The international spill-over effects

Finally, a word on the effects of the euro area's austerity on the world economy. As was noted concerning the euro area's current account, export volumes are affected by the measures. These effects are mainly price effects stemming from nominal effective exchange rate developments. However, the austerity measures do have effects on the economic activity of other main economic areas. Indeed, on impact, real GDP in the Western non-euro EU Member States area falls below the baseline GDP level and only returns to the baseline level after 2024. The US and Japanese economies also face lower real GDP levels in the austerity scenario and these depressed levels fail to return to baseline by 2025. Finally, the Rest of the World area appears to benefit from the euro area's austerity, as its GDP rises above baseline as of 2013 and then gradually converges back towards the baseline level over the period 2014-2025. These international spill-over effects result from the decline in euro area import volumes as well as from the combined changes in international relative prices and nominal effective exchange rates.

Regarding the international effects, it should be remembered that the NIME model provides an aggregate representation of the euro-12 national economies. Hence, the aggregate representation of the euro area does not allow the model to provide assessments of any possibly specific, fast-developing and clearly unsustainable developments in an individual national economy of the euro area, masking such idiosyncrasies behind the veil of aggregation. As such, the model is not able to provide insights into the effects of national developments on either the institutional framework of the euro area, or on

the euro area economy, for instance through such channels as the financial contagion effects of domestic banking and sovereign borrowing risk assessments.

### 5.1.5. Conclusions

The euro area austerity implemented over the period 2012-2025 has significant recessive effects on the area's real GDP. Indeed, on impact, real GDP falls by about 3 percent below the baseline level and only returns slowly towards baseline as lower inflation mitigates the real effects of the austerity, as real wage rates change so as to allow the private business sector to absorb the employment that is lost in the public sector and as lower interest rates underpin household consumption and private sector investment. All in all, budgetary consolidation is clearly recessive, at least in the absence of significant confidence effects on the risk premia of highly indebted sovereigns.

While budgetary consolidation proves to be recessive, reducing output levels and inflation, the overall budgetary effect is to reduce borrowing requirements and to bring the budgetary positions into surplus. There is thus no evidence of "reverse Laffer curve effects", whereby fiscal multipliers are so large that austerity is self-defeating in terms of effects on deficit- and debt-to-GDP ratios.

## 5.2. Scenario 2 - Internationally synchronised austerity

Scenario 1 showed the effects of budgetary consolidation in the euro area, in the case where the euro area was alone in implementing such policies. Scenario 2 now assumes that the austerity measures described in Scenario 1 are adopted not only in the euro area, but also in the Western non-euro EU Member States, in the US and in Japan. As in Scenario 1, austerity is implemented throughout the period 2012-2025. We will focus on the effects of this policy synchronisation on the euro area economy.

### 5.2.1. The short-run macroeconomic effects outside the euro area

Outside the euro area, the worldwide, synchronised austerity produces area-specific initial impacts on real GDP, depending on various elements such as the share of government spending in overall final demand economy, the baseline level of tax rates, and on the econometrically estimated parameter values of each area's behavioural equations.

The simulation results indicate that the on-impact effects on real GDP range from a decline w.r.t. baseline of 3.3% for the euro area to a maximum fall of 4.0% for the USA, leading finally to an overall decline in world real GDP of 2.0%. Recall that we assume here that the Rest of the World aggregate does not implement austerity measures. Hence, the Rest of the World is affected only indirectly by the budgetary consolidation process that is implemented in the other major economic areas. On impact, world real GDP falls by 2.0% below baseline, but this negative effect subsequently declines, reaching only about 0.6% below baseline by 2025.

## 5.2.2. The short-run macroeconomic effects for the euro area

In the euro area, the initial impact of the worldwide synchronised austerity is to reduce euro area real GDP by 3.3% w.r.t. baseline GDP in 2012. This implies that, instead of the 0.6% yoy decline in GDP that was obtained in the baseline, real GDP in this Scenario 2 declines by 3.9% yoy in 2012. Recall that in Scenario 1 (austerity, euro area only) real GDP falls by 3.6% in yoy terms. Hence, the simultaneous implementation of similarly designed budgetary consolidation measures in the other main economic areas of the world adds an additional 0.3 percentage point to the euro area's GDP contraction in 2012.

**Table 4 Scenario 2 - Internationally synchronised austerity**  
(deviations in % w.r.t. baseline levels, unless otherwise noted)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Private consumption	-1.4	-1.0	-0.7	-1.0	-1.3	-1.5	-1.6	-1.9	-2.1	-2.3	-2.5	-2.6	-2.8	-2.9
Public consumption	0.0	-10.3	-10.5	-10.6	-10.7	-10.7	-10.8	-10.8	-10.8	-10.9	-10.8	-10.8	-10.7	-10.6
Gross fixed capital formation	-2.2	-1.2	-0.3	0.2	0.4	1.1	2.9	5.7	8.6	11.3	13.9	16.7	19.5	22.5
Exports	-1.4	-2.6	-3.6	-4.6	-5.9	-7.2	-8.4	-9.2	-9.8	-10.3	-10.7	-11.0	-11.4	-11.9
Imports	-1.5	-1.8	-2.2	-2.8	-3.5	-4.1	-4.6	-5.0	-5.4	-5.9	-6.5	-6.9	-7.4	-8.0
Gross Domestic Product	-3.3	-3.1	-2.9	-3.1	-3.3	-3.4	-3.3	-3.0	-2.6	-2.3	-2.1	-1.8	-1.6	-1.4
Output gap, p.p. difference w.r.t. baseline	-2.1	-1.9	-1.7	-1.9	-2.2	-2.4	-2.4	-2.1	-1.8	-1.5	-1.4	-1.2	-1.2	-1.2
Deflator of private consumption	0.3	-0.5	-1.2	-1.9	-2.7	-3.5	-4.4	-5.2	-5.9	-6.5	-7.1	-7.6	-8.1	-8.6
Deflator of GDP	0.6	-0.3	-0.8	-1.4	-2.1	-2.9	-3.7	-4.5	-5.3	-6.1	-6.9	-7.8	-8.6	-9.6
3-month money market interest rate, p.p. difference w.r.t. baseline	-0.3	-0.5	-0.2	-0.1	-0.3	-0.9	-1.6	-1.9	-2.0	-1.9	-1.8	-1.7	-1.6	-1.5
Nominal effective exchange rate (+ is depreciation)	-0.2	-1.4	-2.4	-3.7	-5.3	-7.0	-8.5	-9.4	-10.1	-10.7	-11.5	-12.4	-13.6	-15.1
Unemployment rate, p.p. difference w.r.t. baseline	2.3	2.0	1.8	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.4
Public sector Net borrowing (-) or lending (+), p.p. difference w.r.t. baseline	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.3	2.4	2.5	2.5	2.5	2.4	2.3
Gross public sector debt, p.p. difference w.r.t. baseline	0.3	-1.2	-3.1	-4.5	-5.6	-6.7	-8.1	-9.8	-11.6	-13.3	-15.0	-16.6	-18.1	-19.4
Current account, p.p. difference w.r.t. baseline	0.0	-0.2	-0.4	-0.6	-0.9	-1.3	-1.7	-2.2	-2.7	-3.2	-3.7	-4.2	-4.8	-5.5

### 5.2.3. The medium- to long-run macroeconomic effects for the euro area

The downwards level shift in real GDP relative to the baseline remains more or less stable up to 2019. Then, as of 2020, real GDP tends to converge back towards baseline real GDP, albeit very slowly, as demonstrated by the fact that euro area real GDP in this Scenario 2 still lies 1.7% below baseline in 2025.

The total cumulative loss of real GDP over the period 2012-2025 amounts to about 3.5 trillion euros (of 2005). This represents a loss of approximately 2.7% w.r.t. the cumulative baseline real GDP over the same period. It also represents a loss equivalent to 41.6% of the baseline real GDP of 2012. This is a significantly higher loss than the cumulative loss of about 32% of baseline GDP of 2012 that is obtained in Scenario 1, where the euro area is alone in implementing austerity.

**Table 5 Selected effects of internationally synchronised austerity w.r.t. the baseline scenario**

	Cumulative difference, in levels	Cumulative deviation, in % of baseline
Real GDP	-3.5 (trillion euros of 2005)	-2.7 %
Real output	-3.7 (trillion euros of 2005)	-2.5 %
Real potential output	-1.1 (trillion euros of 2005)	-0.8 %
Unemployment	+45.4 (million man-years)	+23.8 %
World real GDP	-8.3 (trillion euros of 2005)	-1.1 %

Total cumulative unemployment in this internationally synchronised austerity scenario over the period 2012-2020 reaches approximately 236 million man-years. This leaves cumulative unemployment about 45 million persons higher than in the baseline projection, or about 24% higher than in the baseline. On impact, the number of unemployed rises by 20.8% above baseline, but the number of unemployed then continues to rise to 33.5% above the baseline level in 2025. The unemployment rate jumps from 10.9% in 2012 in the baseline, to 13.2% in this scenario. The unemployment rate then declines gradually to reach 9.4% of the labour force in 2025, as compared with 7.1% in 2025 in the baseline scenario.

The higher unemployment rate in this scenario of internationally synchronised austerity affects the natural rate of unemployment. Indeed, in 2012, the NAIRU rises from 8.5% of the labour force in the baseline to 8.6% in this scenario. The NAIRU begins to decline as of 2020 in this scenario, reaching 7.6% by 2025. This is about 0.8 percentage point higher than in the baseline, but about equal to the NAIRU of euro area stand-alone austerity presented in Scenario 1. This higher NAIRU w.r.t. the baseline leads to a relative decline in the euro area's level of potential output. Indeed, potential output falls on impact to 0.1% below baseline. This reduction w.r.t. baseline gradually increases to reach 1.1% in 2022 and then remains more or less constant through 2025. The cumulative loss in potential output over the period 2012-2025 is of 0.8% of the cumulative potential output of the baseline. This represents about 11.6% of the euro area's baseline potential output of 2012, hence a loss that is not significantly higher than the 11.4% loss of Scenario 1.

#### 5.2.4. The budgetary effects for the euro area

As regards the effects of internationally synchronised austerity on euro area deficits and debt, we may note that on impact, the internationally synchronised consolidation tends to impede the deficit reduction process. Indeed, the euro area aggregate general government deficit rises to 1.3% of GDP in this Scenario 2, as compared with a deficit of only 1.2% of GDP in Scenario 1, where austerity is implemented in the euro area only. The slightly higher deficit ratio in Scenario 2 comes about through a lower level of real GDP than in Scenario 1, a lower level of the GDP deflator than in Scenario 1, but also through a somewhat higher net borrowing requirement than in Scenario 1. We thus note that both the growth and price effects of the synchronised austerity lead to a somewhat worse outcome for the deficit-to-GDP ratio due mainly to lower fiscal revenue. Notwithstanding the relatively higher deficit in Scenario 2 as compared with Scenario 1, we find no indication of a “reverse Laffer effect” of austerity on deficit reduction, whereby enhanced austerity reduces nominal GDP to such an extent that the fall in output, prices and fiscal revenue lead to a rise in the deficit-to-GDP ratio. Indeed, whereas the deficit ratio stands at 3.4% in the baseline, it falls to 1.2% in Scenario 1 and to 1.3% in Scenario 2, indicating that austerity effectively leads to significant reductions in the deficit-to-GDP ratio. Finally, note that in this internationally synchronised austerity scenario, the euro area general government borrowing requirement falls to nil in 2015, as compared with nil in 2021 in the baseline projection. The budgetary surpluses that arise as of 2016 in Scenario 2 are then recycled into accelerated debt reduction, allowing to reach the debt-to-GDP target of 60% by 2022, instead of 66% in 2025 as in the baseline. Note that we could also imagine an alternative scenario where the budgetary surpluses are recycled into enhanced fiscal stabilisation, underpinning output growth and employment and leading to a faster rise in the denominator of the debt-to-GDP ratio.

### 5.3. Scenario 3 - Delayed austerity in the euro area

#### 5.3.1. The case for a delay in the implementation of austerity

Scenario 3 starts from the baseline projection but it assumes that the implementation of austerity in the euro area is delayed to 2017 so as to allow the euro area’s negative output gap to close, inflation to rise and real interest rates to become positive before hitting the economy with new contractionary measures.

Since the beginning of the financial and economic crises in 2008, particular vulnerabilities have been exposed in a number of euro area countries, such as Greece, Ireland, and Portugal. However, the economic downturn has led to increases in budget deficits and debt in other EU Member States too, leading to calls from a number of prominent policymakers for widespread and synchronised budgetary consolidation throughout the euro area.

The calls for rapid consolidation have been balanced by warnings of others as to the effects of synchronised austerity. Indeed, concerns were raised that the implementation of such policies could be highly contractionary and even counter-productive in a context where negative output gaps remain large and where the private business sector and households are both still engaged in balance sheet deleveraging. Budgetary prudence could warrant the swift implementation of austerity in those coun-

tries where fiscal space has effectively disappeared and where financial markets have indicated their doubts regarding budgetary sustainability by raising lending rates to unsustainable levels. However, overall macroeconomic prudence calls at the same time for other countries, which still have access to financial markets -sometimes even at historically low borrowing rates- to cushion the downturn and to backload measures aimed at reaching cyclically-adjusted budget balance. These principles were already clearly expressed in Blanchard and Cottarelli (2010).

So, is delaying budgetary consolidation a possibility for the euro area as a whole? We see that for individual countries that are effectively locked out of credit markets, there is no clear alternative to austerity unless they are ready to turn to debt restructuring or write-downs. For others however, there is clearly scope for delaying adjustment until the euro area's economy recovers from the downturn or even for immediate further fiscal stimulus.

### 5.3.2. The delayed austerity scenario

The NIME model contains only an aggregate area representing twelve euro area countries. Hence, it cannot be used to simulate the effects of differentiated policies that are implemented simultaneously in different countries of the euro area. For instance, it is not possible to simulate the effects of austerity in peripheral countries of the euro area and simultaneous fiscal stabilisation policies in the euro area core. However, it is possible to simulate the effects of an average, delayed implementation of budgetary consolidation in the euro area. The scenario consists in delaying the implementation of supplementary austerity measures until the euro area economy as a whole has recovered. This would limit the contractionary effects of consolidation on output and employment. We thus define a new scenario in which austerity measures identical to those implemented in Scenario 1 are introduced over the period 2017-2025. This leaves the period 2012-2016 for euro area output to grow, for unemployment to decline, for inflation to pick up and for real short-term interest rates to become positive. All of this is summarised by the effective closing of the area's output gap by 2017 in the baseline projection.

### 5.3.3. The macroeconomic effects for the euro area

In this Scenario 3, the contractionary budgetary consolidation measures are introduced only as of 2017. Hence, it is to be expected that the overall cumulative real GDP loss over the period 2012-2025 will be more limited here than in Scenario 1, where the same measures are implemented but where they extend over the entire period 2012-2017. Indeed, in this scenario, the cumulative loss of real GDP w.r.t. the baseline over the period 2012-2025 is of approximately 1.3 trillion euros (of 2005), or 1.0% of baseline cumulative real GDP. Recall that in Scenario 1, the output loss was of 2.7 trillion euros or 2.1% of baseline cumulative real GDP. Hence, quite unsurprisingly, we note that delaying the implementation of budgetary consolidation up to 2017 reduces the cumulative output loss over 2012-2025 by about half as compared with the immediate implementation of austerity as simulated in Scenario 1.

The scenario's effects in terms of real GDP loss are straightforward. Let us now turn to the effects on unemployment. We note that in this scenario, cumulative unemployment over the period 2012-2025 reaches about 215 million man-years, as compared with 235 million man-years in Scenario 1. Here

again the results are in line with expectations, as the shorter period of austerity in this scenario than in Scenario 1 leads to lesser increases in unemployment.

**Table 6 Scenario 3 - Delayed austerity in the euro area (deviations in % w.r.t. baseline levels, unless otherwise noted)**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Private consumption	0.0	0.0	0.0	0.0	0.0	-1.5	-1.4	-1.4	-1.5	-1.8	-2.0	-2.0	-2.0	-2.2
Public consumption	0.0	0.0	0.0	0.0	0.0	0.0	-10.2	-10.3	-10.4	-10.4	-10.3	-10.2	-10.1	-10.0
Gross fixed capital formation	0.0	0.0	0.0	0.0	0.0	-1.8	-1.0	0.4	2.2	3.7	4.9	6.0	6.4	6.5
Exports	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.2	0.3	0.4	0.3	0.1	-0.2
Imports	0.0	0.0	0.0	0.0	0.0	-1.2	-1.6	-1.8	-2.0	-2.1	-2.3	-2.3	-2.4	-2.6
Gross Domestic Product	0.0	0.0	0.0	0.0	0.0	-2.7	-2.4	-1.9	-1.5	-1.2	-1.0	-0.7	-0.7	-0.8
Output gap, p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	-1.8	-1.5	-1.1	-0.6	-0.3	-0.1	0.2	0.3	0.2
Deflator of private consumption	0.0	0.0	0.0	0.0	0.0	0.4	-0.2	-0.8	-1.1	-1.4	-1.6	-1.6	-1.6	-1.6
Deflator of GDP	0.0	0.0	0.0	0.0	0.0	0.4	-0.3	-0.6	-0.9	-1.1	-1.3	-1.4	-1.4	-1.4
3-month money market interest rate, p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	-0.1	-0.8	-1.0	-1.0	-0.8	-0.6	-0.4	-0.2	-0.0
Nominal effective exchange rate (+ is depreciation)	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.6	0.9	1.2	1.4	1.4	1.2	0.9
Unemployment rate, p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	2.3	1.9	1.6	1.4	1.5	1.6	1.8	1.9	2.0
Public sector Net borrowing (-) or lending (+), p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	2.1	2.2	2.5	2.7	2.8	3.0	3.1	3.1	3.0
Gross public sector debt, p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	-0.1	-1.9	-4.5	-7.2	-9.9	-12.6	-15.4	-18.1	-20.4
Current account, p.p. difference w.r.t. baseline	0.0	0.0	0.0	0.0	0.0	0.4	0.6	0.8	0.9	1.1	1.2	1.3	1.3	1.3

#### 5.3.4. The budgetary effects for the euro area

Moving on to the effects of Scenario 3 in terms of public sector budgetary positions, let us begin by recalling that in Scenario 1, the euro area's budgetary position swings into surplus as of 2015, after three years of austerity. The budgetary surpluses then rise throughout the rest of the simulation period, reaching 4.3% of GDP in 2025.



In this delayed austerity scenario, we note that a budgetary surplus is generated as of 2017, the first year of the implementation of austerity. This is only two years later than in the case of Scenario 1, where austerity is implemented as of 2012. In 2025, we note that the budgetary surplus reaches 4.5% of GDP in this Scenario 3, as compared with a surplus of just 2.9% in Scenario 1. Hence, somewhat surprisingly, we note that the delayed implementation of austerity allows for a quicker reduction of budgetary deficits than the immediate implementation of austerity in the face of a negative output gap.

**Table 7 Selected effects of delayed austerity in the euro area w.r.t. the baseline scenario**

	Cumulative difference, in levels	Cumulative deviation, in % of baseline
Real GDP	-1.3 (trillion euros of 2005)	-1.0 %
Real output	-0.9 (trillion euros of 2005)	-0.7 %
Real potential output	-0.5 (trillion euros of 2005)	-0.3 %
Unemployment	+24.9 (million man-years)	+13.1 %
World real GDP	-1.6 (trillion euros of 2005)	-0.2 %

As regards the aggregate gross public sector debt-to-GDP ratio, we note that the ratio reaches 45.8% of GDP in 2025 in the case of a delayed austerity. This compares with a debt ratio in Scenario 1 that falls to 39.9% of GDP in 2025. Hence, the difference between this scenario and Scenario 1 in terms of the reduction of the debt-to-GDP ratio is rather limited. Indeed, the immediate implementation of austerity in Scenario 1 only allows for a one-year lead in terms of debt reduction in the euro area.

### 5.3.5. The international spill-over effects

Recall that in Scenario 1, where the austerity is immediately implemented and maintained throughout the period 2012-2025, we noted the presence of international spill-over effects that were obtained through the trade and exchange rate channels.

On impact, Scenario 1 pushes real GDP in the Western non-euro EU Member States below the baseline level and it only returns to the baseline level after 2024. The US and Japanese economies also face lower real GDP levels as compared with the baseline and these depressed levels of real GDP fail to return to baseline by 2025. Finally, the Rest of the World area benefits from euro area austerity, as this area's real GDP rises above baseline as of 2013 and then gradually falls back towards the baseline over the period 2014-2025.

In the context of delayed austerity of Scenario 3, the implementation of austerity measures in the euro area as of 2017 has its greatest effect on the real GDP of the Western non-euro EU area. This area's real GDP falls below baseline on impact and the decline then increases to about 0.5% below baseline in 2025. The initial negative effects on real GDP of the US and Japan are smaller than those noted for the Western non-euro EU area. However, the recessive effects also increase and reach levels in 2025 that are close to the GDP loss of the Western non-euro EU area. As for the Rest of the World area, it experiences only a very slightly negative on-impact effect. The initial recessive shock subsequently gives way to a

slight rise in real GDP up to 2022, after which the Rest of the World's real GDP falls back to its baseline level.

For the world economy, the cumulative real GDP loss over the period 2012-2025 is of about 1.6 trillion euros (of 2005) or 0.2% of the world's baseline cumulative real GDP. This compares with a cumulative real GDP loss of 5.3 trillion euros or 0.7% of baseline cumulative real GDP in the case of an immediate implementation of austerity as in Scenario 1.

### **5.3.6. Conclusions**

Delaying the implementation of budgetary consolidation until the closing of the euro area's output gap in 2017 allows to minimise the losses in terms of real GDP and employment over the period 2012-2025, as compared with Scenario 1 where austerity is implemented over the entire period 2012-2025.

The implementation of euro area austerity as of 2012 would produce a gain of only one year in terms of the debt-to-GDP ratio attained in 2025. However, this one-year lead comes at a substantial cost in terms of a considerably higher cumulative loss of real GDP and much higher cumulative unemployment.

It thus appears clearly that the implementation of significant austerity when output is depressed relative to potential, when unemployment is high, inflation is falling and when nominal interest rates are close to their ZLB is not a social welfare maximising proposition for governments wishing to balance their budgetary positions.

## 6. References

Aghion, Philippe, Emmanuel Farhi and Enisse Kharroubi (2012), "Monetary Policy, Liquidity, and Growth", NBER Working Paper N° 18072, May.

Alesina, Alberto (2010), "Fiscal adjustments: lessons from recent history", paper prepared for the Eco-fin meeting in Madrid April 15 2010, Harvard University, April.

Alesina, Alberto and Silvia Ardagna (2009), "Large Changes in Fiscal Policy: Taxes Versus Spending", National Bureau of Economic Research, NBER Working Paper N° 15438, October.

Almunia, Miguel, Agustín Bénétrix, Barry Eichengreen, Kevin O'Rourke and Gisela Rua (2009), "From Great Depression to Great Credit Crisis: Similarities, Differences and Lessons", National Bureau of Economic Research, NBER Working Paper N° 15524, November.

Bivens, Josh and John Irons (2010), "Government Debt and Economic Growth: Overreaching Claims of Debt "Threshold" suffer from Theoretical and Empirical Flaws" Economic Policy Institute, EPI Briefing Paper N° 271, July 26.

Blanchard, Olivier and Carlo Cottarelli (2010), "Ten Commandments for Fiscal Adjustment in Advanced Economies", International Monetary Fund, IMFdirect, 24 June.

Boussard, J., F. de Castro and M. Salto (2012), "Fiscal Multipliers and Public Debt Dynamics in Consolidations", Economic Papers N° 460, EU Commission, July.

Buiter, Willem and Ebrahim Rahbari (2012), "Looking into the Deep Pockets of the ECB", Citi Economics, Global Economics View, February 26.

Buiter, Willem (2010), "Sovereign Debt Problems in Advanced Industrial Countries", Citi Economics, Global Economics View, April 26.

Buiter, Willem (2009), "The Limits to Fiscal Stimulus", Centre for Economic Policy Research, CEPR Discussion Paper N° 7607, December.

Buiter, Willem (2007), "Seigniorage", *Economics*, the Open-Access, Open-Assessment E-Journal, Article N° 2007-10, July 25.

Buiter, Willem (1995), "Measuring Fiscal Sustainability", mimeo, University of Cambridge, August 29.

Corsetti, Giancarlo, editor (2012), "Austerity: Too much of a good thing?", EBook, VoxEU.org, June.

Corsetti, Giancarlo and Gernot Müller (2012), "Multilateral economic cooperation and the international transmission of fiscal policy", Centre for Economic Policy Research, CEPR Discussion Paper N° 8748, January.

Corsetti, Giancarlo, Keith Kuester, André Meier and Gernot Müller (2012), "Sovereign Risk, Fiscal Policy, and Macroeconomic Stability", International Monetary Fund, IMF Working Paper WP/12/33, January.

Corsetti, Giancarlo, Keith Kuester, André Meier and Gernot Müller (2010), "Debt Consolidation and Fiscal Stabilization of Deep Recessions", American Economic Review, Vol. 100, N°2, pp. 41-45, May.

DeLong, J. Bradford and Laurence Summers (2012), "Fiscal policy in a depressed economy", Paper presented at the Spring 2012 Brookings Panel on Economic Activity, The Brookings Institution, March 22-23.

Guajardo, Jaime, Daniel Leigh and Andrea Pescatori (2011), "Expansionary Austerity: New International Evidence", International Monetary Fund, IMF Working Paper WP/11/158, July.

International Monetary Fund (2010), World Economic Outlook: Recovery, Risk, and Rebalancing, Chapter 3, "Will it hurt? Macroeconomic Effects of Fiscal Consolidation", October.

Perotti, Roberto (2011), "The "Austerity Myth": Gain Without Pain?", National Bureau of Economic Research, NBER Working Paper N° 17571, November.

Ramey, Valerie (2012), "Discussant comments on "Fiscal Policy in a Depressed Economy" by J. Bradford DeLong and Laurence H. Summers", mimeo, University of California San Diego, June 26.

Reinhart, Carmen and Kenneth Rogoff (2010), "Growth in a Time of Debt", American Economic Review, Vol. 100, N°2, pp. 573-578, May.

Shiller, Robert (2011), "Debt and Delusion", Project Syndicate, July 21.

Van Brusselen, Patrick (2012), "The NIME Outlook for the World Economy: 2012-2020", Federal Planning Bureau, July.

Van Brusselen, Patrick (2009), "Fiscal Stabilisation Plans and the Outlook for the World Economy", Centre for European Policy Studies, CEPS-ENEPRI Working paper N° 55, August.