

# The NIME Outlook for the World Economy

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At the time of writing, and although certain segments of financial markets do not yet seem to have returned to their normal, pre-global financial crisis, functioning, it appears that the wide-spread and massive policy initiatives of the past year have managed to avert any systemic financial meltdown and limit the depth of the world-wide recession. Indeed, monetary policy, financial policy, the fiscal stimulus plans that began to be implemented in 2009 and the simultaneous boost from countries' automatic fiscal stabilisers, all managed to limit the scale of the downturn in real GDP and employment levels. The downturn is also thought to have been limited in OECD countries due to the unexpected resilience of GDP growth in emerging market economies such as China, Brazil and India, who helped to prop up OECD activity by helping to contain the decline in world trade.

In early 2010, policy has remained supportive on all fronts, fiscal, monetary and financial. However, with respect to fiscal policy in particular, after the massive public interventions of 2009, the time has come to look at the effects that these initiatives have had, both in terms of their support to the economy, but also in terms of their effects on countries' budget deficits and debts and the exit strategies. A difficult balance must be struck between the necessary continued public support for the economy as long as output gaps and unemployment rates remain high, and the medium-run adjustments to public deficit and debt trajectories.

The current scenario is one where governments withdraw public support from the economy gradually without compromising the recovery. Over the medium term, public deficits do not explode. Real GDP growth picks up as the private sector begins to drive the recovery.

In the euro area, we see the emergence of structural current account surpluses. In the United States, there is low inflation and a rebalancing of the current account deficit. In Japan, unfavourable demographic trends lead to low GDP growth; furthermore, the country is projected to continue down a path of deflation throughout the projection period.

## *Editorial Board:*

Henri Bogaert  
Michel Englert  
Joost Verlinden  
Jan Verschooten

DTP & Web Publishing:  
Adinda De Saeger  
Geert Bryon  
Dominique van der Wal

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# A Medium-Term Scenario for the World Economy

## A. Introduction

The NIME medium-term scenario for the world economy presents a macroeconomic scenario for the major areas of the world economy. The scenario builds on the data provided in the European Commission's November 2009 AMECO database, which accompanied its Autumn 2009 Economic Forecasts. Making use of all available incoming data through to December 24, 2009, the scenario presents a new NIME medium-term scenario for the world economy. The scenario was prepared using the Bureau's NIME model of the world economy.

The FPB's medium-term projections for the Belgian economy are based on an international economic scenario that is derived from the medium-term views of various international institutions such as the OECD and the European Commission. The methodological choices underlying the FPB's forecasts and projections for Belgium are independent of the interest that the Bureau has for pursuing its own international economic scenarios and analyses of the world economy.

## B. The world economy since 2008

The world economy was hit hard by the onset of what was initially perceived as a purely financial crisis. However, the financial crisis had its origins in a number of deep-rooted macroeconomic imbalances.

One of the frequently invoked reasons behind the global financial crisis was excessively lax monetary policy in the United States, leading to an excessive provision of credit, which helped to finance a boom in US housing markets.

In the US, it has also been argued that easy and cheap credit in the US encouraged households to borrow to finance consumption, sometimes against houses whose rising values appeared to be the source of never-ending capital gains.

Another often-cited cause of the global financial crisis resided in structural worldwide current account imbalances, linked to fast consumption growth and low saving rates in the US on the one hand, allowing for high investments, high exports and slowly rising private consumption in emerging market countries such as China on the other hand.

The crisis also had its roots in ill-placed faith in new economic paradigms whereby productivity growth was destined to rise ever faster, and where the factors behind the great moderation had brought lasting and stable economic growth to the world economy. This perception of strong and stable growth had all but eliminated volatility-based risk spreads from financial markets. It was hoped that asset prices, be they real

or financial, could rise forever. It was sometimes thought that financial markets had developed to the point where the industry had made it possible, through the securitisation of new and complex financial products, to spread the risks of liquidity and default in such an optimal way that these risks had effectively become inconsequential.

When the financial crisis broke out in full, in September of 2008, the first response of governments around the world was to prop up all of the ailing major financial institutions so as to avert a possible systemic meltdown. The view was that the only way to save banking was for governments to save existing banks; in the US, this meant helping out, first and foremost, the major Wall Street investment banks. In Europe, where most banks are built on the model of the universal bank, it meant shoring up the continent's largest banks with equity, loans, guarantees and sometimes partial and temporary nationalisations.

Governments also devised large fiscal stabilisation plans, with a view to limiting the scale of the more wide-spread economic downturn that was expected as collateral damage from the financial crisis.

In the US, the American Recovery and Reinvestment Act of 2009 provided support through a combination of public expenditures and tax cuts, the brunt of which was to be implemented in 2009 and 2010, providing unemployment insurance extensions for the unemployed, investments in infrastructure, State aid, and tax cuts.

In the European Union, the European Commission drafted an Economic Recovery Plan blueprint, which suggested that the Union's national governments put in place the fiscal stimulus required, following a menu where Member States could choose between various types of public expenditures and tax cuts.

In Japan, nominally large emergency stimulus measures were adopted within the budgetary framework of the 2009 fiscal year. These measures aimed to underpin household incomes and to boost private consumption through consumption subsidies for automobiles, consumer durables, and environmentally friendly investments.

In China, the government increased bank lending, extended consumption subsidies for household durables, put in place large investment programmes targeting public infrastructure and buildings, and scaled up its export tax rebate programme.

Monetary policy also reacted swiftly to underpin the financial sector, with central banks putting in place programmes of quantitative easing or credit easing. These programmes provided financial institutions with the low short-term interest rates necessary for their liquidity needs, at rates that ensured that banks would be able to make significant profits on the term structure. The unconventional programmes of quantitative and credit easing then also allowed financial institutions to unload a part of their illiquid or toxic assets onto central bank balance sheets.

## C. Summary of the 2010-2018 scenario

Early in 2010, certain segments of financial markets had not yet returned to their normal, pre-GFC, functioning. Indeed, the corporate bond markets for small and medium-sized businesses had not returned to what were considered as normal conditions in terms of rates, spreads and the volume of credit provided; and markets for many asset-backed derivatives had not returned to what were considered as normal conditions in terms of liquidity and trading activity. However, it would appear that the financial policy initiatives of the past year have managed to avert any systemic financial meltdown.

**Table 1. Summary table: main results for the major economic areas**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Euro Area</b>												
1. Real Gross Domestic Product	2.3	-4.0	1.4	1.9	2.4	2.1	2.1	2.1	2.2	2.4	2.4	2.1
2. Deflator of private consumption	1.7	-0.0	0.3	0.2	0.5	0.9	1.2	1.5	1.8	2.2	2.6	1.2
3. Unemployment rate (level, % of civilian labour force)	8.7	9.4	10.3	11.2	10.1	8.9	7.8	6.9	6.4	6.2	6.2	8.2
4. Short-term interest rate (level)	3.4	1.2	0.7	0.5	0.8	1.2	1.8	2.5	3.2	4.1	5.2	2.2
5. Nominal effective exchange rate (+: depreciation)	-3.4	-9.1	0.5	0.0	-0.1	-1.0	-1.4	-1.8	-2.1	-2.3	-2.6	-1.2
6. General government net lending (level, % of GDP)	-2.0	-6.1	-7.0	-6.9	-6.5	-6.1	-5.9	-5.7	-5.7	-5.8	-6.0	-6.2
7. Current account balance (level, % of GDP)	0.5	-0.4	-1.1	0.4	1.8	2.9	3.8	4.6	5.2	5.8	6.3	3.3
<b>II. United States</b>												
1. Real Gross Domestic Product	3.2	-2.6	3.1	3.5	4.0	4.4	3.5	3.2	2.9	2.8	2.8	3.3
2. Deflator of private consumption	2.1	0.2	0.0	-0.2	-0.1	0.2	0.5	0.9	1.2	1.6	1.9	0.7
3. Unemployment rate (level, % of civilian labour force)	4.9	9.2	9.1	9.2	10.6	10.0	9.0	8.0	7.1	6.5	6.2	8.4
4. Short-term interest rate (level)	4.2	1.5	1.1	0.9	1.2	1.7	2.6	3.5	4.4	5.4	6.4	3.0
5. Nominal effective exchange rate (+: depreciation)	-2.8	-11.9	-6.5	-6.5	-6.5	-5.9	-5.5	-5.0	-4.5	-4.2	-3.8	-5.4
6. General government net lending (level, % of GDP)	-1.8	-11.4	-11.7	-9.8	-9.3	-9.5	-9.6	-9.7	-9.8	-10.0	-10.3	-10.0
7. Current account balance (level, % of GDP)	-4.2	-3.0	-5.0	-4.9	-5.0	-5.0	-4.8	-4.6	-4.4	-4.2	-4.0	-4.6
<b>III. Japan</b>												
1. Real Gross Domestic Product	1.2	-6.0	1.4	2.6	0.6	0.5	0.4	0.4	0.5	0.6	0.6	0.8
2. Deflator of private consumption	-0.5	-1.5	-1.5	-1.3	-0.7	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	-0.7
3. Unemployment rate (level, % of civilian labour force)	4.5	5.2	6.4	6.1	5.4	4.9	4.5	4.3	4.2	4.1	4.0	4.9
4. Short-term interest rate (level)	0.3	0.4	0.1	0.5	0.9	1.2	1.4	1.6	1.8	2.0	2.3	1.3
5. Nominal effective exchange rate (+: depreciation)	-1.2	-18.3	-3.8	-3.5	-3.1	-3.5	-3.6	-3.5	-3.4	-3.2	-2.8	-3.4
6. General government net lending (level, % of GDP)	-6.3	-7.5	-8.0	-8.2	-8.1	-8.1	-8.1	-8.0	-7.8	-7.6	-7.3	-7.9
7. Current account balance (level, % of GDP)	3.2	1.9	1.2	2.6	3.4	3.9	4.0	4.0	3.9	3.7	3.6	3.4
<b>IV. World</b>												
1. Real output	3.5	-2.3	3.8	5.4	5.0	4.9	4.6	4.3	4.2	4.2	4.1	4.5
2. Real exports	6.8	-14.8	3.6	1.2	1.9	2.3	2.4	2.7	2.9	3.1	3.3	2.6
3. Output deflator	3.4	-0.2	4.6	1.4	1.5	1.1	1.1	1.1	1.0	0.8	0.5	1.5
4. Total population	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1
5. Price of oil (Brent, USD/bbl)	35.2	61.6	82.5	83.4	84.7	85.6	86.6	87.5	88.4	89.1	89.5	86.4

*All figures are year-on-year growth rates of yearly averages, unless otherwise specified.*

*The NIME model's euro area represents the 12 Member States that composed the euro area up to 2007.*

*The NIME model's world real output and real export aggregates are measured here in euro.*

As for the macro economy, it also appears that monetary policy, the fiscal stimulus plans that began to be implemented in 2009, and the simultaneous boost from countries' automatic fiscal stabilisers, all managed to limit the scale of the downturn in real GDP and employment levels. The downturn is also thought to have been limited in OECD countries due to the unexpected resilience of GDP growth in emerging market economies such as China, India and Brazil, who helped to prop up OECD activity by helping to contain the decline in world trade. Thus, though the scale of the declines in GDP were often unprecedented in recent history, many observers and forecasters had braced themselves for even more dramatic declines in activity.

In early 2010, policy has remained supportive on all fronts, fiscal, monetary and financial. However, regarding fiscal policy in particular, after the massive public

interventions of 2009, the time has come to look at the effects that these initiatives have had, both in terms of their support to the economy, but also in terms of their effects on countries' budget deficits and debts and the exit strategies.

With respect to monetary policy, the exit strategy must be framed in view of the possible inflationary effects of the large increase in central bank balance sheets since 2007 and the large excess reserves that banks hold with central banks. Furthermore, central banks must frame the mopping-up of any excess liquidity in the context of maintaining credible and stable inflation expectations.

As for governments, they must now attempt to exit from the fiscal stimulus plans, withdrawing support from public spending and from tax cuts, without stopping the nascent recovery. However, while withdrawing public support must not come too quickly, it must also not come too late, the risk being that continued government deficits could rise and they could lead to spirals of deficits and debt, accompanied by rising default risk spreads on sovereign debt.

The main results from this medium-term scenario for the world economy are given in Table 1. Over the medium term, public deficits do not explode or become unmanageable; but neither are they effectively reined in. In effect, the scenario is built on the basis of current laws and policies, and the "constant policy" assumption leads to persistent but non-explosive deficits, accompanied by rising public debt stocks.

In the euro area, strong exports lead to structural current account surpluses. In the US, exports also produce a gradual rebalancing of the current account deficit. In Japan, unfavourable demographic trends lead to barely positive GDP growth, even if per capita GDP growth holds up better; furthermore, the country continues down a path of entrenched deflation.

In the Bureau's view, there exist a number of uncertainties that are not reflected in the present medium-term scenario. Among these possible uncertainties, we can point to potential trade disputes that could curtail the export-led recoveries that appear to be crucial for major economies such as the United States, Japan and Germany.

Then, there are the potential uncertainties linked to governments' exit strategies, where too rapid removal of fiscal support could reduce real GDP growth, whereas too slow exits could lead to an accumulation of deficits and debt that could lead to debt monetisation and thus stoke inflation.

Another uncertainty lies in the possibility of a resurgence of risk in the financial sector. Indeed, after the outbreak of the global financial crisis in 2008, governments and central banks helped the ailing financial sector, propping it up with exceptionally low nominal short-term policy rates, loans, guarantees, equity injections, and sometimes partial or temporary nationalisations. After the crash of the financial services and investment bank Lehman Brothers in September 2008, governments around the world estimated that the costs associated with bank failures were too great and effectively adopted the policy that no more banks would be allowed to fail. Since then, governments have put forward a raft of tentative proposals along the lines of more stringent capital requirements and new regulations. To date, however, little has been effectively put in place to this end.



### A. The euro area

#### 1. Summary of the medium-term scenario

This section provides a summary of the scenario's results for the euro area. More detailed results can be found in Table 3. The scenario indicates that, after a 4% decline in 2009, euro area real GDP rises by 1.4% in 2010. Growth then accelerates in 2011-2012 and levels out at 2.3% per year as of 2015. Hence, the scenario is one where there is a return to strong real growth of 2.1% over 2010-2018. This rate of expansion would be close to the 2.3% yearly average growth rate that was achieved over the 1997-2007 period.

Another feature of the projected GDP growth is that growth is strongly driven by the euro area's net exports even as final domestic demand rises over the scenario's horizon. While domestic demand accounted for an average contribution to growth of 2.2 percentage points (p.p.) over 1997-2007, real net exports only contributed an average of 0.1 p.p. to the area's growth rate, indicating that the area's growth was essentially domestically-driven, did not rely excessively on foreign demand, and did not contribute in any significant manner to the build-up of global trade imbalances over that period.

Over the 1997-2007 period, the euro area's current account posted an average surplus of 0.5% of GDP. The main destination areas for euro area exports were the areas experiencing structural current account deficits, such as the Central & Eastern European Union Member States, but, more importantly in terms of export volumes, the United States and the area we define as the "Rest of the World"<sup>1</sup>. Over the 2010-2018 period, the euro area's current account posts ever-increasing surpluses, which come mainly at the cost of Rest of the World external deficits. Indeed, while the Rest of the World had an average current account surplus of 2.9% of GDP over 1997-2007, this surplus gives way to an average current account deficit of 1.3% of GDP by 2018.

#### 2. Evolution of the structural variables underlying the euro area economy

The results of the medium-term scenario are determined in part by the NIME model's reactions to past cyclical conditions and in part by the model's long-run structural trends. While the short run is mainly determined by cyclical movements, the fundamental determinants of the medium-term results are to be found in such variables as the evolution of an area's demographics, the evolution of hours worked per person, the evolution of trend labour productivity and structural unemployment.

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1. The major components of the model's "Rest of the World" aggregate are: the OECD minus the United States, Japan and the EU; Brazil; China; India; Indonesia; Russia; South Africa.

Table 2 presents the evolutions of the structural variables underlying the results for the euro area. It indicates that the core determinants of trend real private sector output lead to a return to relatively robust growth rates of real output and GDP over the 2010-2018 period.

**Table 2. The euro area: main structural developments underlying the results**

	Average 1997 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
1. Population	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2
2. Working-age population	0.3	0.4	0.3	0.1	0.0	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1
3. Trend labour supply (persons)	0.9	0.8	0.6	0.5	0.4	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2
4. Trend hours worked per person, private sector	-0.5	-0.4	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
5. Trend total hours worked, private sector	0.7	0.5	-0.4	-0.9	-1.0	-0.1	0.3	0.3	0.2	0.1	0.0	-0.2	-0.2
6. Trend hourly labour productivity, private sector	2.0	1.2	1.0	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.1
7. Trend private sector potential output	2.7	1.6	0.6	0.0	0.0	1.0	1.4	1.4	1.4	1.3	1.3	1.1	1.0
8. Trend inflation rate (consumption deflator)	1.8	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
9. Structural rate of unemployment (level)	8.2	8.1	8.1	8.5	9.0	8.8	8.6	8.5	8.4	8.3	8.2	8.2	8.5

*All figures reported are year-on-year growth rates of yearly averages, unless otherwise specified.*

Over the 1997-2007 period, demographics made a positive contribution to euro area growth. Indeed, over that period, total population increased at an annual average rate of 0.5%. Population growth temporarily reached 0.7% in 2004 but has since been in steady decline. Population is expected to have increased by just 0.4% in 2009 and growth rates are projected to fall to no more than 0.1% per annum by 2015. The working-age population fared worse than total population: the working-age population increased on average by 0.3% per year over 1997-2007, but growth is expected to have fallen to just 0.3% in 2009. The level of the working-age population should remain more or less flat in 2010-2011 and decline as of 2012. The area's labour supply fared somewhat better over the recent past, rising at an annual average rate of 0.9% over 1997-2007. The labour supply is expected to have increased by 0.8% in 2008 and 0.6% in 2009 and is expected to expand at an annual average rate of 0.2% over 2010-2018.

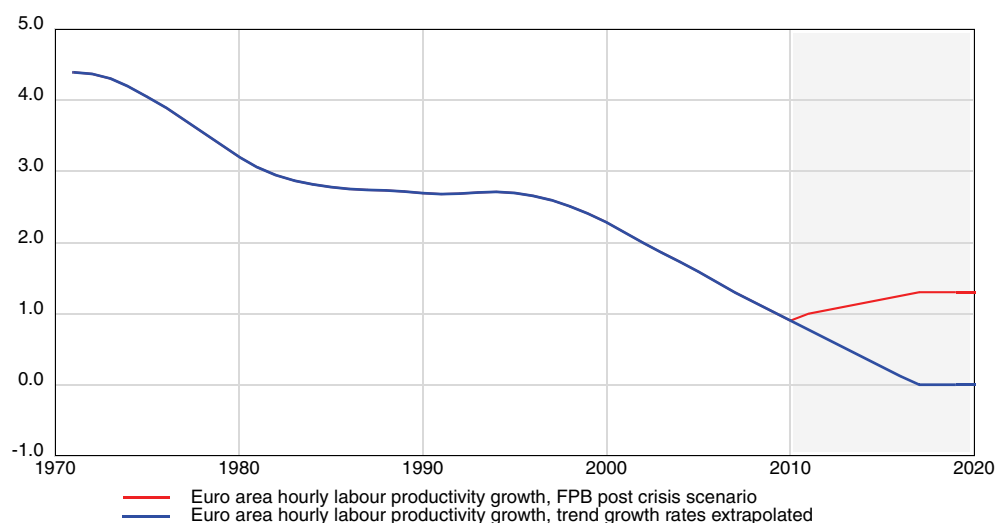
Total hours worked per person employed in the private sector followed a marked trend decline of -0.5% per year over the 1997-2007 period. This steadily declining trend has been apparent since at least the early 1970s and is assumed to persist through 2018.

As for private sector trend labour productivity growth<sup>1</sup>, Table 2 indicates that trend productivity increased at an annual average rate of 2% over 1997-2007. However, trend private sector labour productivity growth was gradually declining, from 2.6% growth in 1997 to just 1.3% in 2007. Labour productivity growth is estimated to have subsequently fallen to 1.2% in 2008. After 2009, the scenario is for labour productivity to rise once again and reach a medium-term growth rate of 1.3% by 2017. Figure 1 indicates that the scenario is thus for a break in the trend decline in hourly labour productivity growth, with productivity growth rates rebounding as of 2010 and converging to their 1.3% growth rate of 2007. As shown in Figure 2, this trend break leads to a level of labour productivity in 2018 that ends up about 10% above the productivity level that would have been reached in a situation where productivity growth rates had continued to fall along the path set by their historical trend of the 1970-2007 period. As shown in Figure 3, this positive rate of trend labour productivity growth assumed in the scenario, in combination with the trends that are assumed

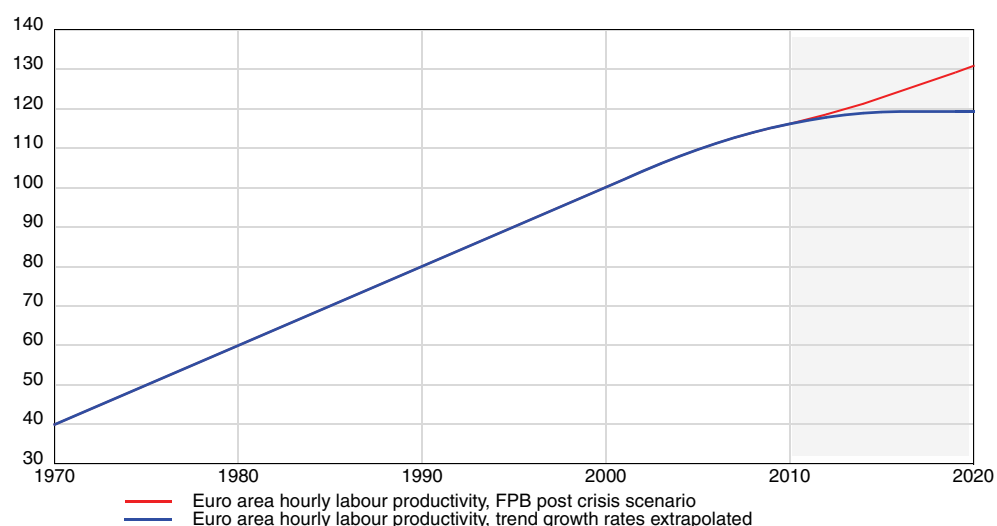
1. The trend is computed using a Hodrick-Prescott filter with the  $\lambda$  parameter set to 100. So as to avoid its well-known end-point bias, the filter was used on a data set that was extended to include data estimates and forecasts from the EU Commission's AMECO database for the 2009-2010 period.

for the labour supply and for hours worked per person, ensures that the euro area's output gap closes by 2016.

**Figure 1. Euro area private sector labour productivity growth rates (% per annum)**



**Figure 2. Euro area private sector labour productivity level (trend, year 2000 = 100)**



### 3. The euro area over the 2010-2018 period

#### a. Short-term assumptions and dynamics

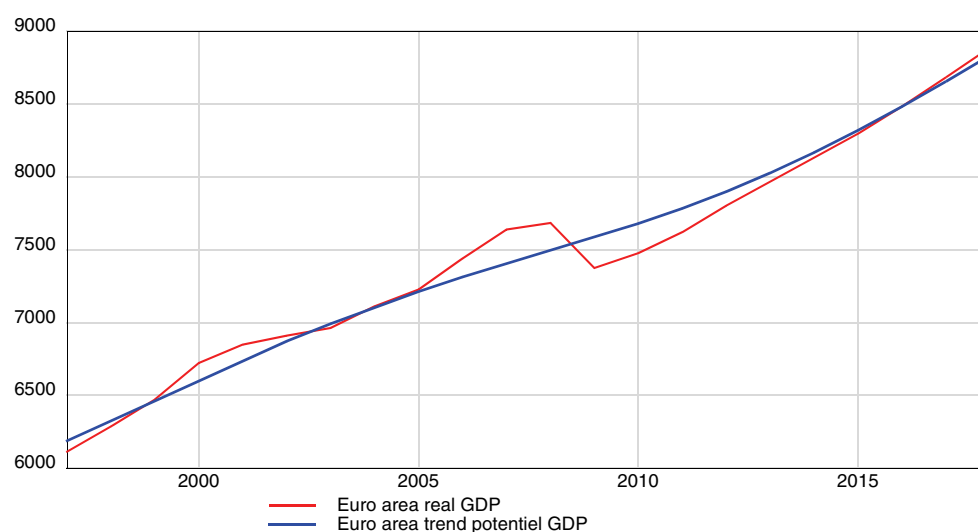
Euro area<sup>1</sup> real GDP reached its highest level in the first quarter of 2008, after which it began to decline with increasing speed through the second quarter of 2009. In the first quarter of 2009 (2009Q1), the decline in euro area real GDP hit a high of 2.4% quarter-on-quarter<sup>2</sup> (qoq). The decline slowed to 0.1% in 2009Q2, and euro area GDP then rebounded by 0.4% qoq in 2009Q3. Between 2008Q1 and 2009Q2, i.e., the latest peak and trough of euro area GDP, respectively, the area's real GDP fell by 5.1%.

Euro area growth prospects remain fragile and surrounded by uncertainty, as the evolutions of real GDP were very contrasted between the twelve countries that com-

1. In this document, the "euro area" represents the "euro-12", unless otherwise noted.  
 2. All quarterly GDP data are given in seasonally adjusted terms.

pose the area, and as the recovery in euro area GDP in second half of 2009 appeared to be heavily dependant on the significant public economic stimulus measures put in place since the end of 2008, on what could well be a limited and temporary jump in export volumes, and on large volatile shifts in inventories.

**Figure 3. Euro area output gap scenario** (levels, in billions of chained (2000) euros)



It is widely acknowledged that the evolution of GDP over 2009 benefited largely from the various national economic stimulus packages that were implemented in the wake of the EU Commission's call for a "European Economic Recovery Plan" in November 2008. These measures began to be implemented in the first quarter of 2009, and have most likely already produced their maximum effect on the level of euro area GDP. The contribution of public support to GDP growth is thus now likely to become negative, as measures such as public support for work-time reduction schemes, the public subsidising of redundant workers that employers keep on their payrolls, or public support for buyers of new consumer durables, is withdrawn over 2010.

The euro area economy benefited from exceptional support in 2009, stemming from fiscal stabilisation plans, from financial policy and from monetary policy. On the fiscal side, it is estimated that the consolidated fiscal package that was assembled with a view to stabilising the euro area economy in the face of the GFC reached 1.7% of euro area GDP. The main measures were aimed at staving off massive, rapid layoffs in sensitive sectors such as construction and automobile assembly, and at underpinning household spending by financing scrapping schemes for consumer durables such as automobiles. On top of this, in order to avoid a generalised seizing-up of the financial sector, troubled banks were offered government loans, loan guarantees, capital injections and deposit guarantees, notionally worth about 25% of euro area GDP.

As for monetary policy, the European Central Bank (ECB) provided assistance with policy steps in order to affect rates and spreads. The ECB's strategy appears to have enabled it to keep inflation expectations stable while providing liquidity support to financial markets. Notwithstanding some persistent difficulties in the transmission of monetary policy to the interbank and money markets, monetary policy and the revised financial market policy hastily put in place by euro area governments seem to have succeeded in bringing down risk premiums and in reviving lending. All these measures provided invaluable support to an economy that would otherwise have been in free fall, due to a simultaneous financial freeze, collapse in domestic demand and exports, and major downward shift in inventories.

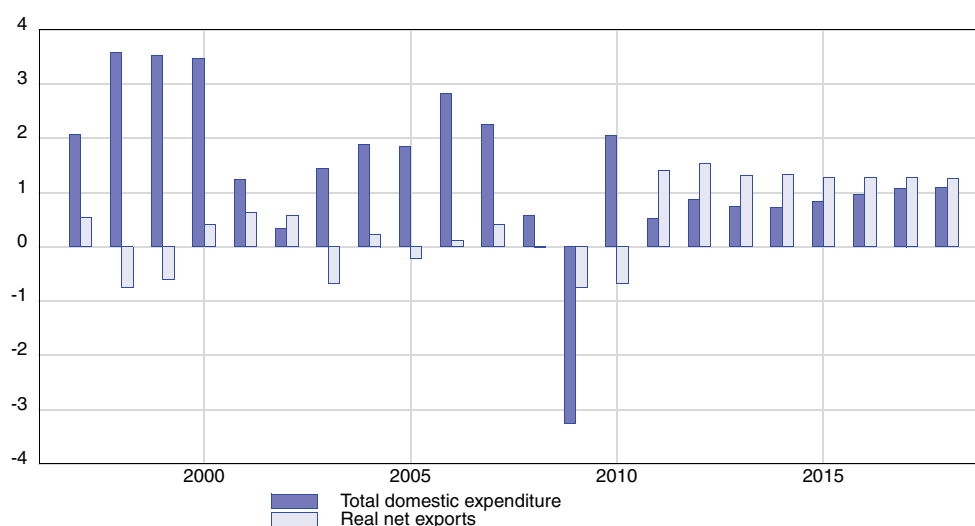
## b. The medium-term scenario for the euro area

### i. Results for 2010

In 2010, euro area real GDP should rise by 1.4% yoy. As indicated in Table 3, GDP growth remains relatively good over the year, even though the effects on GDP of a rise in private demand are offset by a decline in the contribution to growth from net exports.

Total domestic expenditures increase by 2.1% in 2010 on the back of public sector consumption and investment and due to an uptick in business gross fixed capital investment as it recovers from its massive decline of 2009. Growth in household private consumption expenditure is also projected to pick up and rise by 1.6% in yoy average terms, while residential investment should continue to retreat from the previous exceptionally high investment levels that were reached between 2002 and 2007.

**Figure 4. Contributions to real GDP growth in the euro area (percentage points)**



After their massive declines of 2009, the recovery in world output and trade in 2010 help euro area exports to pick up, leading to a rise of 0.3% yoy. The rise in export volumes is underpinned by rising world demand, but also by a nominal effective depreciation of the euro; this is accompanied by a very slight increase in export prices, which implies a significant depreciation of the area's real effective exchange rate. Imports also rebound after their free fall of 2009, rising by 3.6% in 2010. The result is that real net exports provide a negative contribution of 0.7 p.p. to euro area GDP growth in 2010. A decline in the area's terms of trade then lead to a renewed deterioration in the area's current account position, which posts a deficit of 1.1% of GDP in 2010.

In 2009, the 4% decline in the level of euro area real GDP combined with an initial positive output gap of 2.5% of potential output in 2008 to generate a negative output gap of 2.8% of potential GDP. In 2010, the area's GDP output gap is expected to remain largely negative, at 2.6% of potential GDP, as the rise in real output is accompanied by a significant rise in potential output. This persistent large negative output gap will tend to raise the area's unemployment rate and bring downward pressure to bear on the euro area's short run inflation.

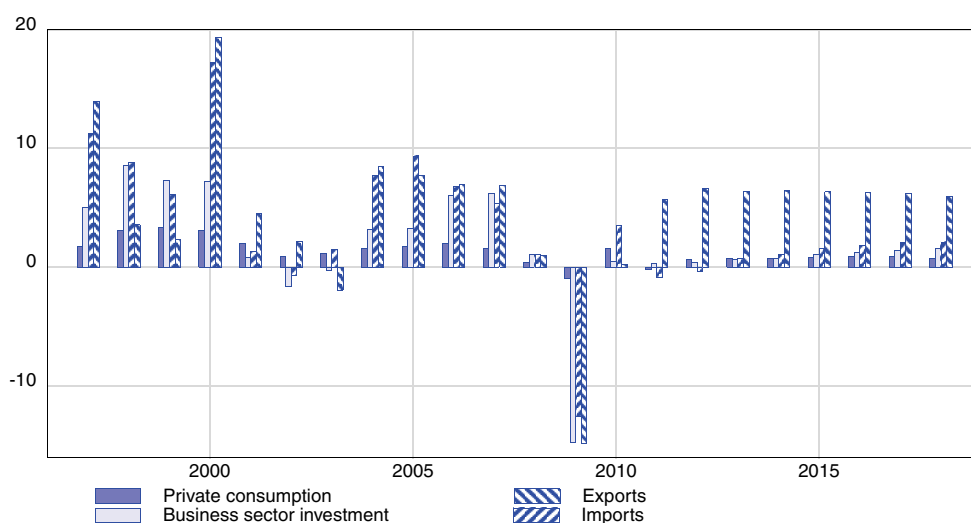
Consumer prices increase by 0.3% in yoy average terms in 2010. This is equal to the yoy headline inflation rate of 0.3% of 2009. At the same time, the deflator of private consumption expenditure was flat in 2009, reflecting a severe demand shortfall. Infla-

tion in 2010 picks up somewhat as aggregate final demand is no longer in decline, as the euro currency depreciates in nominal effective terms, and as world oil prices<sup>1</sup> rise to a yearly average level of 82.5 US dollars per barrel (USD/bbl) in 2010, after having fallen to just 61.6 USD/bbl in 2009.

In 2010, total hours worked<sup>2</sup> declines by 0.9%, after a 3.5% drop in 2009. At the same time, after declining by 2% in 2009, hours worked per person per year in the private sector stabilise in 2010, while the labour supply expands. This leads to a rise in the euro area's unemployment rate, which climbs to a yearly average rate of 10.3% of the labour force in 2010, as compared to 9.4% in 2009. The loss of skills due to longer unemployment stints caused by the recession, and the difficulty for graduates to find a qualifying first employment opportunity, are further expected to raise the euro area's structural rate of unemployment, which is projected to rise from 8.1% of the labour force in 2009 to 8.5% in 2010.

After a 2.7% decline in 2009, contemporaneous hourly labour productivity in the euro area's private sector is assumed to rebound by 3% in 2010, as firms cut costs and streamline processes so as to compensate for the sharp rise in unit labour costs in 2009, to boost competitiveness, and to raise profit margins. Nominal euro area wage rates are projected to rise by 0.6% in the private sector; real labour wage costs should rise by 0.9%, while real take-home private sector wages should progress by 0.4%. This relatively moderate evolution of real wages will then ensure that private sector unit labour costs decline by 2.2% in 2010, after rising by 2.9% in 2009.

**Figure 5. Selected components of demand in the euro area (yoy, % change)**



Assuming that the remainder of the economic stimulus package is spent out in 2010, public expenditures would only provide a limited positive boost to GDP growth. Hence, the hopes of further real GDP growth lie on an eventual resurgence of private final demand, be it domestic or foreign. Public sector spending in 2010 is expected to increase in nominal terms by 3.4% in 2010, after a 3.1% rise in 2009. This continued brisk increase in government outlays is linked to the effects of automatic stabilisers in the context of the sharp economic downturn, reinforced by supplementary discretionary spending as euro area-wide fiscal stabilisation plans continue to be spent out. Contrary to 2009, however, where government revenue plummeted due to the effects of the recession on income and spending, tax revenue begins to rise once again, increasing by 1.4% in nominal terms.

1. The yearly average price level of Brent crude oil, in US dollars.  
 2. The volume of labour services that is used in the production process, measured in hours.

Public deficits continue to swell but much more slowly than over the previous year. Indeed, the euro area's net borrowing requirement is expected to rise from 6.1% of GDP in 2009 to 7% of GDP in 2010. The euro area's gross public debt rises from 78.6% of euro area GDP in 2009 to 85% of GDP in 2010. Although credit risk spreads remain somewhat more elevated on both private borrowers and sovereigns than during the immediate pre-GFC years, public financing needs are fully met by an abundant supply of world-wide liquidity, stemming from the significant domestic private sector de-leveraging, at the level of both corporate and household balance-sheets. Loanable funds could also stem from emerging market economies, as they continue to recycle their excess domestic savings into relatively safe government bonds of major euro area countries.

## *ii. Results for 2011-2018*

Over the 2011-2018 period, the euro area's potential real GDP rises at a yearly average rate of about 1.8%. As indicated in Table 2, this comes mainly from the assumed strong rise in trend labour productivity, with a marginal contribution from an increase in the labour supply, while the declining trend of hours worked per person per year continues to weigh negatively on potential output, as it has done at least since the early 1970s.

Real GDP growth picks up significantly in 2011 and 2012, progressing by respectively 1.9% and 2.4%. At the same time, total final domestic demand rises, led by increases in both private consumption expenditure and household investment in residential buildings. Hence, the robust rise in real GDP can be attributed to the strong upswing in both domestic spending and real net exports.

Though private consumption rebounds in 2010 thanks to the massive support for final demand from both fiscal and monetary policy, household expenditure increases regularly as of 2012. This rise extends right through to the end of the projection period. Household consumption progresses due to relatively strong increases in real take-home wages, which raise unit labour costs between 2013 and 2016.

Robust growth in household take-home nominal wage rates stems largely from a rise in trend labour productivity growth. Indeed, wage growth is indexed on the evolution of long-run labour productivity, which increases from a growth rate of 0.9% in 2009 to a growth rate of 1.3% by 2017. The GFC is expected to have a negative effect on human capital - knowledge and skills - through an increase in the structural unemployment rate. The return to strong growth slowly reduces the structural rate of unemployment as of 2012, leading to rising pressures on real wage rates.

Business sector investment recovers slowly from its precipitous decline of nearly 15% in 2009. After a first small rise of 0.5% in 2010, growth in business sector investment remains mild through 2014, picking up only afterwards as the euro area's output gap is closed and as rising output and depreciation push capacity utilisation rates back up to more normal levels. Hence, over the 2011-2018 period, business gross fixed capital investment is projected to increase at an average rate of 0.9% per year.

With household income and consumption straining to progress over the 2011-2018 period, with high unemployment rates and a rise in structural unemployment, and with private sector capacity utilisation rates still below normal levels over the first years of the projection period, pricing power and upward price pressure is projected to remain contained in the euro area. After a 0.8% yoy rise in 2010, consumer prices are projected to pursue a very gradual rise back to the ECB's preferred range of inflation, and end up slightly above the 2% mark.

**Table 3. Medium-term results for the euro area**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Real aggregate demand and supply</b>												
1. Private consumption	2.0	-0.9	1.6	-0.2	0.6	0.7	0.8	0.9	0.9	0.9	0.8	0.8
2. Government consumption	1.8	2.4	2.3	2.7	1.8	1.0	0.6	0.7	1.1	1.6	1.9	1.5
3. Gross fixed capital formation	3.2	-10.2	-0.4	0.1	0.6	0.6	0.8	1.1	1.3	1.5	1.6	0.8
a. of which residential sector	1.8	-8.7	-3.4	-0.9	0.6	0.3	0.6	1.0	1.4	1.7	1.6	0.3
b. of which business sector	4.2	-14.7	0.5	0.3	0.4	0.6	0.8	1.1	1.3	1.5	1.6	0.9
4. Exports	6.7	-14.8	0.3	5.7	6.6	6.4	6.4	6.3	6.3	6.2	6.0	5.6
5. Imports	6.8	-12.5	3.6	-0.9	-0.3	0.8	1.0	1.6	1.9	2.1	2.1	1.3
6. Gross Domestic Product	2.3	-4.0	1.4	1.9	2.4	2.1	2.1	2.1	2.2	2.4	2.4	2.1
7. Output gap (deviation of GDP from trend GDP, in %)	0.6	-2.8	-2.6	-2.1	-1.2	-0.8	-0.5	-0.3	0.0	0.3	0.6	-0.7
<b>8. Contributions to real GDP growth</b>												
a. Total domestic expenditure	2.2	-3.0	2.1	0.5	0.9	0.7	0.7	0.8	1.0	1.1	1.1	1.0
b. Net exports	0.1	-0.8	-0.7	1.4	1.5	1.3	1.3	1.3	1.3	1.3	1.3	1.1
<b>II. Deflators</b>												
1. Private consumption	1.7	-0.0	0.3	0.2	0.5	0.9	1.2	1.5	1.8	2.2	2.6	1.2
2. Exports	0.6	0.3	0.1	-0.1	-0.3	-0.5	-0.8	-1.0	-1.1	-1.3	-1.4	-0.7
3. Imports	1.0	-5.1	2.7	0.3	0.5	0.5	0.7	0.8	0.8	0.9	0.9	0.9
4. Gross domestic product	1.7	1.5	-0.7	-0.8	-0.3	0.4	0.7	0.9	0.9	1.0	1.1	0.4
<b>III. Financial Markets</b>												
1. Short-term interest rate (level)	3.4	1.2	0.7	0.5	0.8	1.2	1.8	2.5	3.2	4.1	5.2	2.2
2. Long-term interest rate (level)	4.6	3.6	2.7	2.6	2.7	2.9	3.3	3.6	4.0	4.5	5.0	3.5
3. Spot exchange rate, local/\$US (level x 100)	90.8	71.8	76.1	80.1	84.4	87.9	90.9	93.3	95.1	96.4	97.1	89.0
4. Spot exchange rate, local/\$US (+: depreciation)	-0.3	5.6	5.9	5.4	5.4	4.1	3.4	2.7	2.0	1.4	0.6	3.4
5. Nominal effective exchange rate (+: depreciation)	-3.4	-9.1	0.5	0.0	-0.1	-1.0	-1.4	-1.8	-2.1	-2.3	-2.6	-1.2
6. Real effective exchange rate (+: depreciation)	1.1	-5.9	2.6	2.2	2.5	2.0	2.0	2.0	2.0	1.9	1.8	2.1
<b>IV. Labour Market</b>												
1. Labour supply, in persons	1.1	0.2	0.2	0.2	0.1	0.4	0.5	0.5	0.4	0.3	0.2	0.3
2. Employment, in hours	0.9	-3.5	-0.9	-0.8	0.7	1.2	1.2	0.9	0.5	0.1	-0.3	0.3
. of which private sector	0.9	-3.9	-1.2	-1.0	1.0	1.5	1.4	1.1	0.5	0.1	-0.4	0.3
3. Unemployment rate (% of civilian labour force)	8.7	9.4	10.3	11.2	10.1	8.9	7.8	6.9	6.4	6.2	6.2	8.2
4. Nominal wage rate, private sector	2.7	0.9	0.6	0.2	0.5	1.0	1.7	2.3	2.7	3.1	3.2	1.7
5. Real take-home wage rate, private sector	0.9	2.9	0.4	-0.3	-0.0	0.1	0.4	0.7	0.9	0.9	0.7	0.4
6. Real producer wage rate, private sector	1.2	0.2	0.9	0.6	0.1	0.6	1.0	1.5	1.8	2.1	2.1	1.2
7. Contemporaneous labour productivity, private sector	2.3	-2.7	3.0	2.2	1.0	0.5	0.6	1.1	1.7	2.3	2.7	1.7
<b>V. Household sector</b>												
1. Total real means	3.4	2.8	1.3	0.8	1.1	0.8	0.9	1.1	1.4	1.7	1.8	1.2
. of which real disposable income	1.8	-0.8	1.4	-0.3	0.5	0.7	0.8	0.9	0.9	0.8	0.6	0.7
2. Net saving by households (% of disposable income)	9.6	9.3	9.8	9.6	9.5	9.5	9.6	9.7	9.7	9.7	9.6	9.6
<b>VI. Fiscal sector</b>												
1. Net lending (+) or borrowing (-) (% of GDP)	-2.0	-6.1	-7.0	-6.9	-6.5	-6.1	-5.9	-5.7	-5.7	-5.8	-6.0	-6.2
2. General government gross debt (% of GDP)	69.9	78.6	85.0	91.0	95.6	99.5	102.7	105.4	107.8	110.0	112.3	101.1
<b>VII. International environment</b>												
1. Foreign effective output	5.2	-8.4	3.0	4.8	4.8	5.0	4.9	4.8	4.8	4.7	4.6	4.6
2. Current account balance (% of GDP)	0.5	-0.4	-1.1	0.4	1.8	2.9	3.8	4.6	5.2	5.8	6.3	3.3
<b>VIII. Miscellaneous</b>												
1. Real GDP per capita	1.8	-4.4	1.0	1.6	2.2	1.9	1.9	2.0	2.1	2.2	2.3	1.9
2. Total population	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.

The NIME bloc for the euro area represents the 12 Member States that composed the euro area up to 2007.

The real effective exchange rate of the euro area is defined here as the ratio of the euro area's foreign effective output price to its export price, measured in the euro area's own currency.



Euro area GDP growth over the 2011-2018 period is underpinned by the area's real net exports as well as by domestic demand. After plunging 14.8% in 2009, export volumes recover in 2010, rising by 0.3% on the year. Exports then surge in 2011, and increase significantly over the next years, rebounding from the low level to which they had fallen and rising also as the euro area's foreign effective demand increases.

Export growth is not projected to be durably underpinned by favourable exchange rate developments. Indeed, while the euro currency depreciates against the US dollar and the Japanese yen over the projection period, it appreciates against other the basket of world currencies. This translates into a moderate average nominal effective exchange rate appreciation of 1.4% per year over 2011-2018. This overall nominal effective exchange rate appreciation imposes downward price pressures on exports, so as to ensure a regular real effective exchange rate depreciation.

Finally, relatively stable public spending on goods and services, on investment, stable public sector employment and the unconstrained working of the area's automatic fiscal stabilisers, all tend to underpin euro area domestic demand, but lead also to a continued buildup of public sector debt. The euro area's consolidated public deficit reaches 6.9% of GDP in 2011 and then edges back down to 5.7% of GDP in 2014. However, as of 2016, deficits resume their upwards course once again as fiscal positions are negatively impacted by the costs of ageing and as population growth grinds to a halt.

## **B. The United States**

### **1. Summary of the medium-term scenario**

Table 5, which presents the detailed results of our baseline projection for the United States, indicates that after a 2.6% decline in 2009, US real GDP is expected to rise by 3.1% in 2010. Growth is then projected to accelerate to 4.4% by 2013, but it should then gradually decline again, settling around an average of 3% per year between 2014 and 2018. Hence, the scenario is one with a return to strong growth in 2010, with growth continuing at a moderate yearly average rate of 2.5% over the entire 2010-2018 period. Over the 2010-2018 period, the growth rate would reach 3.3% per year, thus even exceeding the 3.2% yearly average growth rate achieved over the 1997-2007 period.

Another feature of the GDP growth scenario is that, with the exception of 2010, growth is driven by both domestic demand and real net exports. While US domestic demand accounted for an average contribution to growth of 3.6 percentage points over 1997-2007, real net exports subtracted an average of 0.5 p.p. from the United States' growth rate, indicating that US growth was domestically-driven and unbalanced. Indeed, between 1997 and 2007, US domestic demand tended to exceed US domestic output, obliging the US economy to rely on foreign output to fill the gap between demand and supply. This then led to large, structural current account deficits, which were one of the causes of the build-up of global trade imbalances over that period.

### **2. Evolution of the structural variables underlying the US economy**

The results of the macroeconomic scenario for the US economy are determined in part by the model's reactions to past cyclical conditions, and in part by the model's long-run structural trends. Table 4 presents the main structural variables underlying the results for the United States.

The table indicates that, contrary to the euro area, population growth *per se* will not be an issue in the economy's future trend performance. Indeed, population is projected to continue to grow by 1% per year throughout the projection period. However, the trend expansion in the country's labour force should decline considerably as compared to its performance over the 1997-2007 period, due to the projected decline in the country's working-age population. Indeed, trend working-age population growth is set to fall from 0.9% per year in 2009 to around 0.5% per year as of 2013. This decline in the rate of expansion of the US labour force should reduce trend potential output growth over the medium term. Trend hours worked per person per year in the private sector are also projected to pursue their trend decline, falling at an average rate of 0.5% per year over 2010-2018, thus also contributing to the reduction in the period's trend potential output growth.

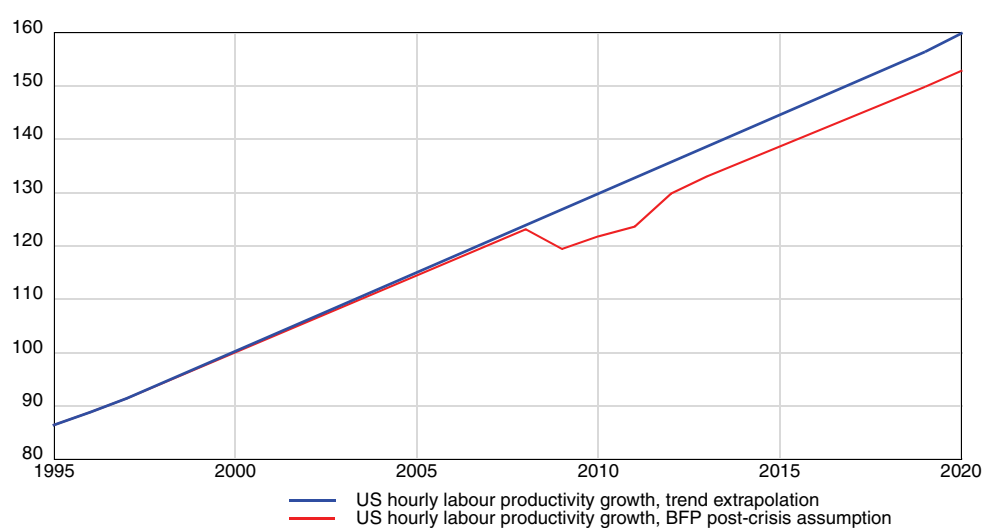
**Table 4. The United States: main structural developments underlying the projection results**

	Average 1997 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
1. Population	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2. Working-age population	1.3	0.9	0.9	0.8	0.8	0.7	0.5	0.5	0.5	0.5	0.6	0.5	0.6
3. Trend labour supply (persons)	1.1	0.8	0.8	0.8	0.8	0.6	0.4	0.4	0.4	0.5	0.5	0.4	0.5
4. Trend hours worked per person, private sector	-0.4	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5
5. Trend total hours worked, private sector	1.0	-0.3	-1.0	0.6	0.6	-3.2	-0.2	-0.3	-0.1	-0.1	-0.1	0.0	-0.3
6. Trend hourly labour productivity, private sector	2.8	2.2	-3.0	2.0	1.5	5.0	2.5	2.0	2.0	2.0	2.0	2.0	2.3
7. Trend private sector potential output	3.8	1.9	-4.0	2.6	2.1	1.8	2.3	1.7	1.9	1.9	1.9	2.0	2.0
8. Trend inflation rate (consumption deflator)	2.0	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
9. Structural rate of unemployment (level)	5.0	4.9	4.8	4.8	4.7	7.3	7.7	8.0	8.3	8.6	8.8	9.0	7.5

All figures reported are year-on-year growth rates of yearly averages, unless otherwise specified.

However, the most important determinant of trend potential output growth remains trend private sector labour productivity growth, which progressed at an impressive annual average rate of 2.8% over the 1997-2007 period. Trend labour productivity growth is thought to have taken a severe hit in the wake of the GFC, but is expected to recover in terms of growth rates over 2010-2013 and settle thereafter on a stable average growth rate of 2% per year as of 2014.

**Figure 6. US private sector labour productivity level (trend, year 2000 = 100)**



As can be seen in Figure 6, the rapid rise in productivity between 2010 and 2013 would allow a partial recovery of the ground that was lost in terms of productivity levels after the collapse of 2009. However, the 2% average growth rate notched up after 2013 would still leave the level of US labour productivity permanently below the

level that it would have reached without the adverse shock of the GFC. Finally, the combination of all of these core determinants of real output should lead to a 2% annual average increase in private sector potential real output over the 2010-2018 period. As Figure 7 indicates, this would then ensure that the US's currently large and negative GDP output gap disappears by 2013.

Table 4 also indicates that the rise in the US's unemployment rate from 9.2% of the labour force in 2009 to 10.6% in 2012 would raise the country's structural rate of unemployment, as graduates have trouble finding first-time jobs and as experienced workers lose their positions, bringing about a waste in valuable human capital. It is also expected that the structural rate of unemployment will be increased by the expected future fiscal stance. Indeed, our projection is conditional on current US laws and policies, under which important tax cut provisions enacted in the Economic Growth and Tax Relief Reconciliation Act of 2001, the Jobs and Growth Tax Relief Reconciliation Act of 2003, the Economic Stimulus Act of 2008 and the American Recovery and Reinvestment Act of 2009, will expire. Furthermore, the temporary exemptions from the "alternative minimum tax" are also due to disappear in 2010. We also assume that the current administration will pursue fiscal consolidation within the framework of the administration's current budget plans<sup>1</sup>, implying an effective partial "spending freeze" as of fiscal year 2011 and tougher rebalancing policy initiatives as of 2012. All of these changes would raise tax rates, reduce outlays, and finally also reduce the economy's medium-term potential growth prospects.

### 3. The scenario for the US over the 2010-2018 period

#### a. Short-term assumptions and dynamics

US real GDP reached its highest level in the second quarter of 2008, after which it fell with increasing speed through the second quarter of 2009. Between 2008Q2 and 2009Q2, US real GDP fell by 3.8%, as compared to a 5.1% decline for euro area GDP. In 2009Q1, the decline in US real GDP hit a maximum of 1.7% quarter-on-quarter<sup>2</sup>. The decline slowed to 0.2% in 2009Q2 and US GDP subsequently rebounded by 0.6% qoq in 2009Q3. US growth prospects remain highly uncertain and fragile. The recovery in 2009Q3 GDP appeared to be heavily dependant on the significant public economic stimulus measures put in place since the end of 2008, on what could well be a limited, temporary jump in export volumes and on large, volatile shifts in inventories.

In early 2010, the US GDP growth figure for 2009Q4 was generally expected to be strong due to public expenditure, export growth and stockbuilding. In this scenario, we pencil in a qoq increase in GDP of 1.1%. This leads to a yoy average decline of US GDP of 2.6% in 2009.

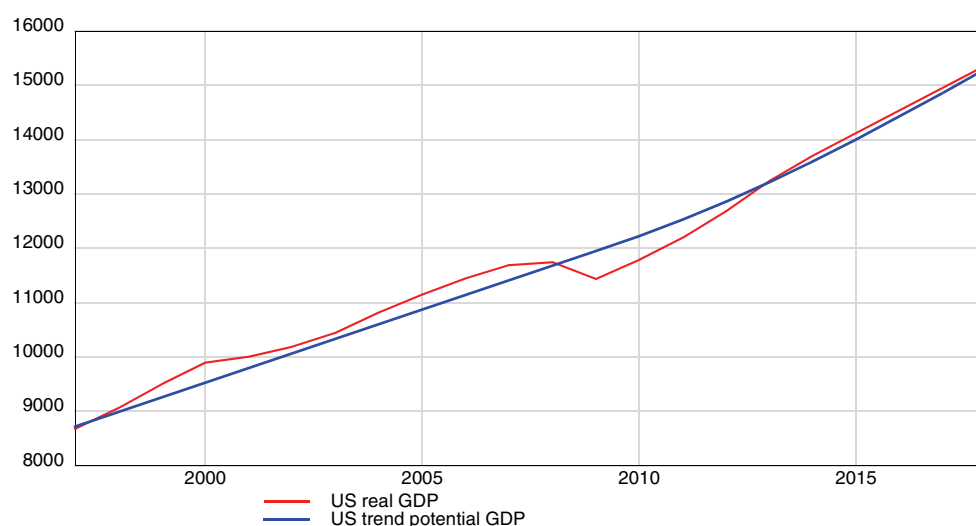
The US economy benefited from exceptional support in 2009, stemming from fiscal stabilisation under the American Recovery and Reinvestment Act (ARRA), financial policy, as well as from monetary policy. The scale of the US's discretionary fiscal stabilisation measures amounted to about 787 billion dollars, or about 5.8% of GDP of 2008<sup>3</sup>.

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1. See: Congressional Budget Office, "The Budget and Economic Outlook: Fiscal Years 2010 to 2020", January 2010.
  2. Contrary to usual practice in the US, all of the quarterly GDP data provided here are given in non-annualised, seasonally adjusted terms.
  3. See: Congressional Budget Office (2009), "Estimated Impact of the American Recovery and Reinvestment Act of 2009 on Employment and Economic Output as of September 2009", CBO Report, November.

A January 2010 report by the Council of Economic Advisors indicates that 263 of the 787 billion dollars of the ARRA have been spent in 2009. This fiscal support is estimated to have made a positive contribution to growth of roughly 1.1 percentage point on the year's yoy growth rate. Hence, had these measures not been implemented, GDP might have fallen by 3.6% yoy in 2009 instead of by the 2.5% that is currently expected for the year. The main measures aimed at staving off a sharp recession by boosting public spending on infrastructure, providing block grants for state and local fiscal relief, investment on health, education and energy efficiency, and underpinning private demand and employment through tax cuts. On top of this, in the framework of financial market policy, the Treasury and the Federal Reserve put in place a wide range of programmes targeted at providing support to financial institutions; the US government's major financial support programme is TARP, under which the Treasury was allowed to purchase up to 700 billion dollars of troubled private sector assets.

Early 2010, the fiscal measures are estimated to have already produced their maximum effect on the growth rate of US GDP. The contribution of fiscal support to GDP growth is now expected to become negative, as measures such as public support for first time home buyers, for the sale of new automobiles and extensions of unemployment benefits and state aids are wound down over 2010. However, infrastructure projects should continue to underpin activity in 2010.

**Figure 7. US output gap projection** (levels, in billions of chained (2000) US dollars)



Regarding monetary policy, the Fed provided massive assistance by both conventional and non-standard policy steps in order to affect spreads. The Fed reacted to the crisis by swiftly lowering its main policy rate. By December 2008, the Fed Funds target had been brought down to a range of 0 to 25 basis points. Importantly, the Fed assumed a role in the provision of liquidity to financial markets in a framework of credit easing. All of these interventions led to an increase of 150% in the size of the Fed's balance sheet between December 2007 and December 2009.

Notwithstanding some persistent difficulties in the transmission of monetary policy to the interbank and non-bank financial markets, difficulties in regional banks heavily exposed to commercial real estate loans, and persistent funding difficulties reported by small and medium sized companies, the Fed's monetary and financial market policies have succeeded in bringing down risk premiums and also seem to have brought to a halt the tightening of lending conditions.

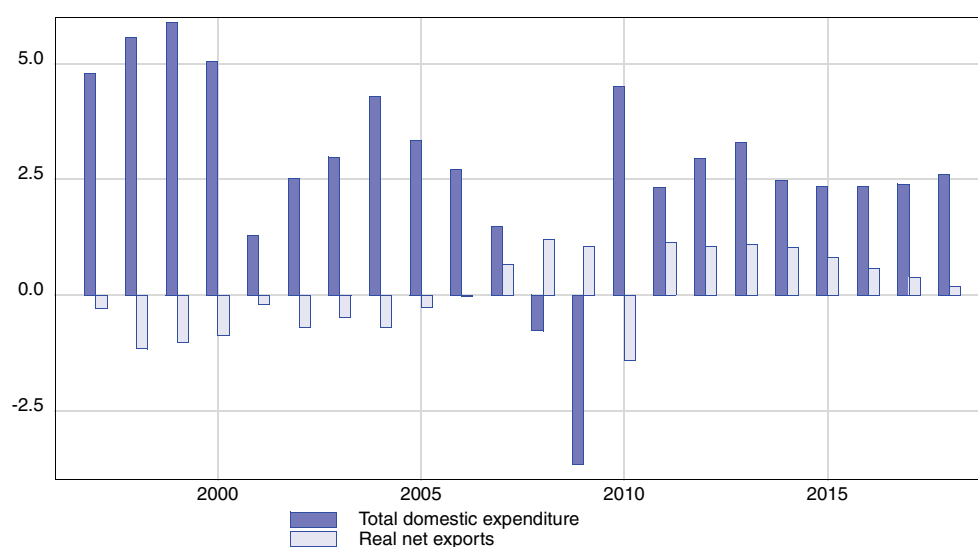
## b. The medium-term scenario for the United States

### i. Results for 2010

The scenario is for US real GDP to grow by 2.6% yoy in 2010. Total US domestic expenditures increase by 4.4% in 2010, on the back of both private and public sector consumption, public sector investment and due also to a revival of residential gross fixed investment. Growth in household private consumption expenditure rises by 2.2% in yoy average terms, while business investment declines by 1.8%, which is a much better performance after the staggering 18.6% decline of 2009.

In 2010, US real exports rise by 4.5% yoy, as world output and trade begin to recover thanks to resilient emerging market economies. The rise in US export volumes is underpinned by rising world demand, but it is also accommodated by a 10.1% decline in export prices. Indeed, the dollar's nominal effective exchange rate appreciates by about 6.5% yoy in 2010, implying that declines in export prices are necessary so as to ensure the continued competitiveness of US exports. Thus, thanks to the strong reductions in export prices, the US's real effective exchange rate is able to depreciate and ensure export price competitiveness. Imports rise significantly in 2010, progressing by about 13.7% on the year, in reaction to the pickup in real output and to the country's nominal effective exchange rate appreciation. The result is a negative contribution of 1.4 p.p. of real net exports to US real GDP growth in 2010. This decline in net exports is accompanied by a decline in the country's terms of trade. This produces a new deterioration in the US current account position, which posts a deficit of 5% of GDP in 2010, after a deficit of 3% of GDP in 2009.

**Figure 8. Contributions to real GDP growth in the United States (percentage points)**



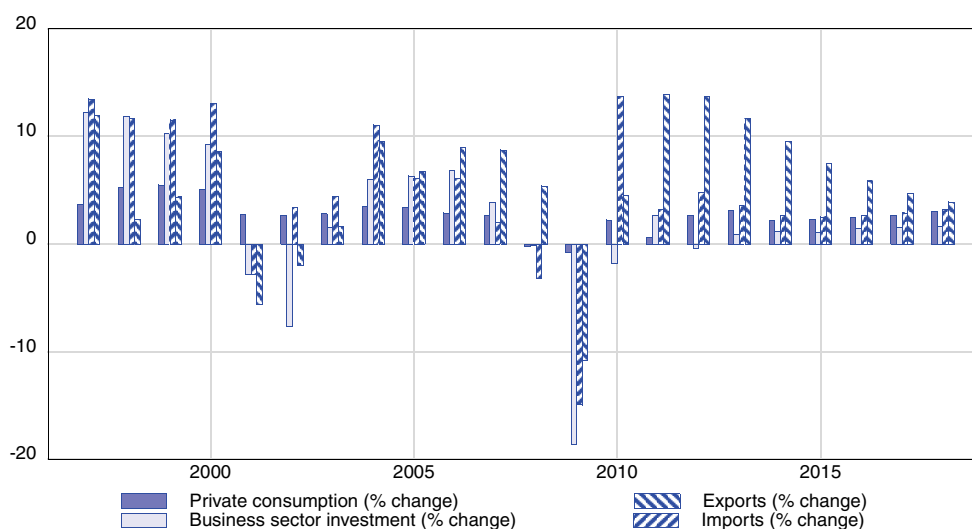
In 2009, the barely positive output gap of 2008 and the 2.6% decline in the level of US real GDP is estimated to have produced a large negative output gap of 4.3% of potential GDP. In 2010, the country's GDP output gap shrinks just a little, remaining negative at 3.6% of potential GDP. This persistently large negative output gap, even in the face of a relatively strong rebound in real GDP, comes about because of a rise in trend private sector labour productivity and in the trend labour supply, both of which tend to raise the US's potential output level. Note that the US GDP output gaps are considerable in both 2009 and 2010, and are clearly larger than the GDP output gaps of the euro area for the same years. These persistent and significant output gaps tend to raise the country's unemployment rate and reduce expected future income growth, thus bringing substantial downward pressures to bear on US inflation.

US consumer price inflation remains flat at 0% in yoy average terms in 2010; this is down from a positive headline inflation rate of 0.2% yoy in 2009. The deflator of private consumption expenditure stalls in 2010 as unemployment is high and as the dollar continues to appreciate in nominal effective terms. Furthermore, inflationary pressures are tempered in 2010 by continued moderate levels of oil prices, which remain well below their historical high of 2008.

In 2010, total hours worked in the US rises by 0.9%, after a 1.9% drop in 2009. The rise in hours worked is due in part to a significant rise in public sector employment. At the same time, hours worked per person per year in the private sector remain flat in 2010, after rising by 2.4% in 2009. Given that the labour supply expands by 0.9%, this leads to a slight decline in the US unemployment rate, which reaches a yearly average rate of 9.1% of the labour force in 2010, as compared to 9.2% in 2009.

After declining by 3.3% in 2009, contemporaneous hourly labour productivity in the US private sector is assumed to rebound by 3.7% in 2010 as firms cut costs and streamline processes so as to offset the sharp rise in unit labour costs in 2009, boost competitiveness, and raise profit margins. In 2010, nominal wage rates are projected to rise by 2.7% in the private sector while real take-home private sector wages should progress by 2.2%. However, real wage costs should rise by 3.9%, as government measures aimed at temporarily reducing labour costs in the wake of the rapid rise in unemployment in 2009 are phased out. This significant rise in real wage costs should lead to a slight rise of 0.2% in private sector unit labour costs, as compared to a 5.7% increase in unit labour costs in 2009.

**Figure 9. Selected components of demand in the United States (yoy, % change)**



After progressing by 7.5% in 2009, US public sector<sup>1</sup> spending on current expenditures in 2010 increases by 3% in nominal terms. This continued brisk increase in government outlays is linked in part to the effects of automatic stabilisers in the context of the economic downturn, and is further reinforced by discretionary spending as fiscal stabilisation plans under ARRA continue to be spent out. Next to current expenditures, public sector capital real expenditure rises by 25.6%, reflecting the longer-term infrastructure spending component of ARRA. Contrary to 2009, where government revenue plummeted due to the effects of the recession on income and spending, nominal tax revenue rises once again in 2010. However, the general government deficit continues to swell, rising slightly more quickly than in the previous year. Indeed the US public sector net borrowing requirement rises from 11.4% of GDP

1. The “public sector” concept that is used in this document refers to General Government, comprising Federal, State and Local authorities, and also includes Social Security.

in 2009 to 11.7% of GDP in 2010. The US's gross public sector debt also rises, from 65.1% of GDP in 2009 to 75.4% of GDP in 2010. It is assumed that although sovereign credit risk spreads remain somewhat more elevated than during the immediate pre-GFC years, the public sector's financing needs are fully met by the abundant supply of world-wide liquidity stemming from the massive private sector deleveraging occurring at the level of both corporate and household balance sheets.

## *ii. Results for 2011-2018*

Over the 2011-2018 period, the United States' potential real GDP rises at a yearly average rate of about 2.9%. This comes mainly from a rise in trend labour productivity but partly also from an increase in the labour supply. The declining trend of hours worked per person per year continues to weigh negatively on potential output, as it has been doing over the entire 1997-2007 period.

Real GDP growth picks up significantly between 2011 and 2013, progressing by 3.5%, 4% and 4.4% yoy, respectively. The rise in real GDP is broad-based, underpinned by both domestic and external demand. Final domestic demand rises due to a rebound in both private consumption expenditure and household investment in residential buildings. Real net exports also provide a positive and stable contribution to GDP growth on the back of robust foreign effective demand growth and as sharp reductions in dollar-denominated export prices offset a nominal effective appreciation of the dollar, producing a depreciation in the country's real effective exchange rate over the first years of the scenario.

After a 2.2% rise in 2010, private consumption progresses by only 0.6% in 2011 as the unemployment rate remains high, due to a decline in hours worked per person, and as a fall in the real private sector take-home wage rate reduces real wage income. What's more, household income is negatively affected by the expected expiration of the Bush tax cuts, as well as by the current administration's plans to rein in the federal government's large deficits and steadily rising stock of debt.

Household investment in residential buildings rises substantially over the 2011-2018 period. This rise comes after a very severe downturn in gross residential investment that started in 2006, as prices for residential buildings reached their peak due largely to lax financing conditions for residential investments. Between 2006 and 2009, investment levels plummeted by about 50%, bringing about a slight overall decline in the US real stock of residential buildings.

As population in the US continued to grow by about 1% per year over the 2006-2009 period, the residential stock per capita declined somewhat more steeply, setting the stage for a recovery in residential investment on the back of continued population growth. The strong rise in residential investment over the 2011-2018 period allows investment levels to rise to more balanced levels, allowing growth in the residential capital stock to catch up with population growth as of 2013, and to rise in per capita terms as the decline in unemployment rates as of 2013 also allows for an expansion in the number of households in the US.

Business sector investment posts a substantial rise of 2.7% in 2011. This comes after a 20% fall in gross investment levels between 2008 and 2010. Business sector investment declines by 0.4% yoy in 2012, being temporarily curtailed by the rise in tax rates that is assumed to occur that year. Capital expenditure then gradually recovers as excess production capacity is gradually worked away through a combination of capital depreciation and rising output levels. All in all, business sector fixed investment rises at a tepid annual average rate of 1.3% over 2013-2018.

**Table 5. Medium-term results for the United States**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Real aggregate demand and supply</b>												
1. Private consumption	3.6	-0.8	2.2	0.6	2.6	3.1	2.2	2.3	2.4	2.7	3.0	2.4
2. Government consumption	2.2	2.5	7.9	5.9	3.1	2.8	2.2	1.8	1.4	1.1	1.0	3.0
3. Gross fixed capital formation	4.2	-15.0	4.6	5.7	3.8	4.4	3.9	3.3	3.1	2.8	2.6	3.8
a. of which residential sector	1.8	-20.3	7.6	18.1	19.4	15.8	12.0	9.1	7.0	5.8	5.0	11.1
b. of which business sector	5.2	-18.6	-1.8	2.7	-0.4	0.9	1.2	1.1	1.5	1.5	1.6	0.9
4. Exports	5.0	-10.9	4.5	13.9	13.7	11.7	9.5	7.5	5.9	4.7	3.9	8.4
5. Imports	7.3	-14.9	13.7	3.2	4.8	3.6	2.7	2.5	2.7	2.9	3.2	4.4
6. Gross Domestic Product	3.2	-2.6	3.1	3.5	4.0	4.4	3.5	3.2	2.9	2.8	2.8	3.3
7. Output gap (deviation of GDP from trend GDP, in %)	1.2	-4.3	-3.6	-2.6	-1.4	0.2	0.8	1.0	0.9	0.6	0.4	-0.4
8. Contributions to real GDP growth												
a. Total domestic expenditure	3.6	-3.6	4.5	2.3	2.9	3.3	2.5	2.4	2.3	2.4	2.6	2.8
b. Net exports	-0.5	1.0	-1.4	1.1	1.0	1.1	1.0	0.8	0.6	0.4	0.2	0.5
<b>II. Deflators</b>												
1. Private consumption	2.1	0.2	0.0	-0.2	-0.1	0.2	0.5	0.9	1.2	1.6	1.9	0.7
2. Exports	1.1	-6.0	-10.1	-10.5	-8.9	-6.4	-3.8	-1.4	0.4	1.6	2.4	-4.1
3. Imports	1.4	-11.3	-2.3	-1.7	-0.2	0.6	0.9	1.1	1.3	1.5	1.6	0.3
4. Gross domestic product	2.3	1.4	-0.9	-1.6	-1.7	-1.2	-0.5	0.2	0.8	1.3	1.7	-0.2
<b>III. Financial Markets</b>												
1. Short-term interest rate (level)	4.2	1.5	1.1	0.9	1.2	1.7	2.6	3.5	4.4	5.4	6.4	3.0
2. Long-term interest rate (level)	5.0	3.3	3.0	2.9	3.0	3.2	3.5	3.8	4.1	4.4	4.8	3.6
3. Spot exchange rate, local/euro (level x 100)	112.1	139.2	131.5	124.8	118.4	113.8	110.0	107.2	105.1	103.7	103.0	113.1
4. Spot exchange rate, local/euro (+: depreciation)	1.1	-5.3	-5.6	-5.1	-5.1	-3.9	-3.3	-2.6	-1.9	-1.3	-0.6	-3.3
5. Nominal effective exchange rate (+: depreciation)	-2.8	-11.9	-6.5	-6.5	-6.5	-5.9	-5.5	-5.0	-4.5	-4.2	-3.8	-5.4
6. Real effective exchange rate (+: depreciation)	0.7	-3.3	6.9	7.3	5.7	3.5	1.3	-0.5	-1.8	-2.6	-3.0	1.9
<b>IV. Labour Market</b>												
1. Labour supply, in persons	1.2	0.0	0.9	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7
2. Employment, in hours	1.1	-1.9	0.9	0.3	-1.0	0.8	1.0	1.1	1.0	0.7	0.4	0.6
. of which private sector	0.9	-1.3	0.8	0.1	-1.7	0.9	1.3	1.3	1.1	0.7	0.3	0.5
3. Unemployment rate (% of civilian labour force)	4.9	9.2	9.1	9.2	10.6	10.0	9.0	8.0	7.1	6.5	6.2	8.4
4. Nominal wage rate, private sector	4.4	1.8	2.7	2.6	2.8	0.7	-0.4	0.1	0.9	2.1	3.1	1.6
5. Real take-home wage rate, private sector	2.2	4.7	2.2	-0.6	1.8	-0.1	-1.4	-1.1	-0.7	0.1	1.0	0.1
6. Real producer wage rate, private sector	2.3	2.4	3.9	4.2	4.2	1.5	-0.1	-0.2	0.1	0.8	1.4	1.8
7. Contemporaneous labour productivity, private sector	2.9	-3.3	3.7	3.1	5.7	3.3	2.0	1.7	1.8	2.2	2.6	2.9
<b>V. Household sector</b>												
1. Total real means	4.1	4.9	3.0	3.1	3.4	3.7	2.9	2.6	2.4	2.3	2.3	2.9
. of which real disposable income	3.4	2.9	2.1	-0.4	2.0	2.4	1.4	1.5	1.7	2.1	2.6	1.7
2. Net saving by households (% of disposable income)	3.2	6.3	7.1	6.1	5.6	5.1	4.3	3.6	2.9	2.4	2.0	4.3
<b>VI. Fiscal sector</b>												
1. Net lending (+) or borrowing (-) (% of GDP)	-1.8	-11.4	-11.7	-9.8	-9.3	-9.5	-9.6	-9.7	-9.8	-10.0	-10.3	-10.0
2. General government gross debt (% of GDP)	60.8	65.1	75.4	83.8	91.3	97.9	104.7	110.9	116.7	122.1	127.1	103.3
<b>VII. International environment</b>												
1. Foreign effective output	5.0	-4.4	4.1	6.4	5.6	5.4	5.1	4.9	4.8	4.7	4.6	5.1
2. Current account balance (% of GDP)	-4.2	-3.0	-5.0	-4.9	-5.0	-5.0	-4.8	-4.6	-4.4	-4.2	-4.0	-4.6
<b>VIII. Miscellaneous</b>												
1. GDP per capita	2.1	-3.6	2.1	2.4	3.0	3.4	2.5	2.2	1.9	1.8	1.8	2.4
2. Total population	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3. Price of residential buildings	4.4	-5.1	-0.6	1.5	2.6	2.9	2.7	2.2	1.7	1.2	0.8	1.7

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.

The real effective exchange rate of the United States is defined here as the ratio of the United States' foreign effective output price to its export price, measured in the United States' own currency.



With a combination of moderate growth in household real wages and strong productivity growth leading to reductions in unit labour costs over the 2011-2018 period, with high unemployment rates, with a rise in structural unemployment and with private sector capacity utilisation rates still below normal levels over the first years of the projection period, pricing power and upward price pressure is projected to be generally absent from the US economy. After a 0% yoy growth rate in 2010, consumer prices fall further in 2011 and 2012. Inflation only turns positive thereafter as the country's negative output gap disappears and as unemployment rates drift downward. However, even after 2013, inflation remains subdued as the pickup in the trend rate of private sector labour productivity growth is accompanied by modest increases in real wage costs and declines in unit labour costs. At the same time, the dollar's regular appreciation in trade-weighted terms limits the impact of imported inflation, as does the very moderate increase in the price of crude oil over the 2011-2018 period.

It has already been noted that as of 2011, US GDP growth is underpinned by positive contributions to growth from both domestic demand and foreign trade. Domestic demand should provide support to the recovery process as private consumption expands over 2010-2018 at rates not too much lower than those over 1997-2007 and as growth in business sector gross fixed capital formation picks up as the output gap closes. However, as the fiscal boost from ARRA gradually disappears, the most dynamic element in the recovery is residential investment.

Export volumes surge as of 2011, progressing at an annual average rate of 8.8%, as compared to 5% over the 1997-2007 period. Exports are buoyant in the wake of a strong revival in foreign demand and as US export prices fall sharply to offset the dollar's nominal effective appreciation. As imports increase much more slowly due to the more moderate expansion of domestic demand, the country's real net exports provide substantial positive contributions to GDP growth throughout the period. The strong progression of net foreign trade in volume terms is accompanied by a marked decline in the US's terms of trade, as dollar-denominated export prices decline over much of the projection period. This decline in the terms of trade mitigates the effects of positive real net exports on the current account balance, which rebalances at a relatively slow pace. Indeed, the US current account posts a deficit of 5% of GDP in 2010 and this shortfall shrinks to a deficit of 4% of GDP in 2018.

Finally, relatively stable public spending on goods and services, on investment, stable public sector employment, and the unconstrained working of the country's automatic fiscal stabilisers, all tend to underpin domestic demand but also lead to continued public deficits. As of 2011, public deficits retreat, reaching 9.8% in 2011 and falling to 9.3% in 2012. Thereafter, deficits begin to rise once again under the pressure of ballooning interest payments and as primary expenditures rise more quickly than revenue due to rising costs in health care, social security and pension liabilities. Hence, by 2018 the US general government deficit rises to 10.3% of GDP, while the US general government gross debt rises from 75.4% of GDP in 2010 to 127.1% of GDP in 2018.

## C. Japan

### 1. Summary of the medium-term scenario

Table 7 provides detailed results of the scenario for Japan. Looking at GDP, after a 6% decline in 2009, Japanese real GDP rises by 1.4% in 2010. Growth even accelerates to 2.6% in 2011, but subsequently declines and settles around an annual average rate of 0.5% as of 2016. Hence, though Japan's economy experiences a significant rebound in 2010 and 2011, GDP progresses at the exceptionally low annual average rate of 0.8% over 2010-2018. This projected rate of expansion falls well below the 1.2% yearly average growth rate that Japan achieved over the 1997-2007 period. Another distinctive feature of the GDP growth scenario is that, while GDP growth was firmly underpinned by rising real net exports over 1997-2007, the positive contributions to growth from foreign trade decline sharply after 2011, due mainly to exchange rate developments. This leaves only the fragile final domestic demand to underpin the country's sagging output growth.

### 2. Evolution of the structural variables underlying the Japanese economy

Table 6 presents the structural variables underlying the results for Japan. Strikingly, it indicates that all of the core determinants of trend output lead to reduced growth rates for real private sector output and GDP over the 2010-2018 period.

**Table 6. Japan: main structural developments underlying the projection results**

	Average 1997 2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
1. Population	0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.3
2. Working-age population	-0.4	-0.4	-0.3	-0.8	-0.8	-1.3	-1.4	-1.4	-1.2	-1.0	-0.9	-0.8	-1.1
3. Trend labour supply (persons)	-0.3	-0.4	-0.4	-0.9	-0.9	-1.3	-1.5	-1.5	-1.3	-1.1	-1.0	-0.9	-1.1
4. Trend hours worked per person, private sector	-0.5	-0.1	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4	-0.4
5. Trend total hours worked, private sector	-0.9	-0.4	-1.6	-2.1	-0.9	-0.9	-1.3	-1.5	-1.5	-1.4	-1.3	-1.3	-1.4
6. Trend hourly labour productivity, private sector	2.0	1.2	-2.0	3.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
7. Trend private sector potential output	1.1	0.8	-3.6	0.9	0.1	0.6	0.2	0.0	0.0	0.1	0.2	0.2	0.2
8. Trend inflation rate (consumption deflator)	-0.5	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
9. Structural rate of unemployment (level)	4.5	3.1	3.2	4.5	4.5	4.1	3.9	3.7	3.5	3.4	3.4	3.3	3.8

*All figures reported are year-on-year growth rates of yearly averages, unless otherwise specified.*

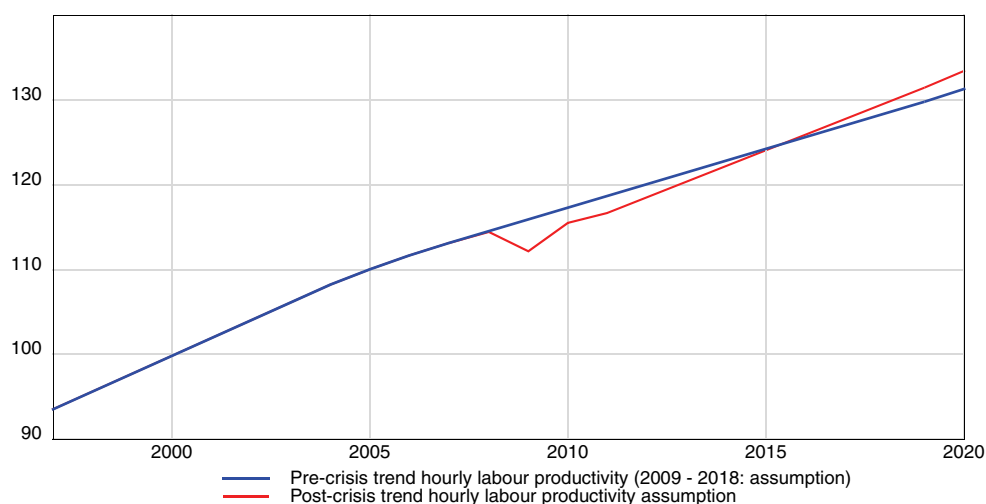
Regarding the country's demographics, Japan's population increased at the paltry annual average rate of 0.1% over the 1997-2007 period. Population growth temporarily reached 0.4% in 1995 but has since been in steady decline. Total population is expected to have declined by 0.1% in 2008 and 2009 and growth rates are projected to continue to fall through 2018. Working-age population fared worse than total population: although working-age population increased through 1995, it has fallen at an annual average rate of 0.4% over 1997-2007. Working-age population should continue to decline ever more quickly, with the decline reaching 1.4% in 2013-2014 before tapering off over the remainder of the projection period. The area's labour supply fared somewhat better over the recent past, falling at an annual average rate of just 0.3% over 1997-2007. The labour supply follows the decline in working-age population closely, falling on average by 1.1% per year between 2010 and 2018.

The trend of total hours worked per person employed per year in the private sector declined particularly quickly in Japan, at least since the early 1970s. The yearly average decline in hours worked per person was 0.5% over the 1997-2007 period. This

steadily declining trend is assumed to persist over the 2010-2018 period, with hours worked per person falling on average by 0.4% per year.

The only very relative bright spot for Japan's potential output growth is linked to the assumption that is made on Japan's private sector trend hourly labour productivity growth. Indeed, Table 6 indicates that trend productivity growth reached an annual average rate of 2% over the 1997-2007 period. However, this figure hides the fact that trend private sector labour productivity growth declined steadily, from 4.5% in the early 1970s to just 1.3% in 2007, with the exception of the short period between 1982 and 1987.

**Figure 10. Japanese private sector labour productivity** (trend, year 2000 = 100)



As of 2010, it is assumed that labour productivity regains some of the lost ground, rising at an annual average growth rate of 1.5% between 2012 and 2018. As indicated in Figure 10, this implied that we assume that Japan's trend labour productivity will progress at a faster rate than what would have been expected had we simply assumed an increase in productivity of 1.2%, which is the measured trend growth rate of 2008. Although clearly optimistic, this assumption is seen as necessary as only an increase in private sector productivity growth can forestall a decline in Japanese GDP and allow the country to bear the financial burden imposed by its ageing population.

Combining the assumptions on trend labour productivity, trend labour supply and trend hours worked per person, the scenario indicates that though real GDP growth falls fairly close to nil in 2014 and 2015, per capita real GDP continues to rise over the second half of the period. Furthermore, as indicated in Figure 11, these assumptions allow for a rise in potential GDP that is such that the evolution of effective real GDP manages to close the country's output gap over the medium term.

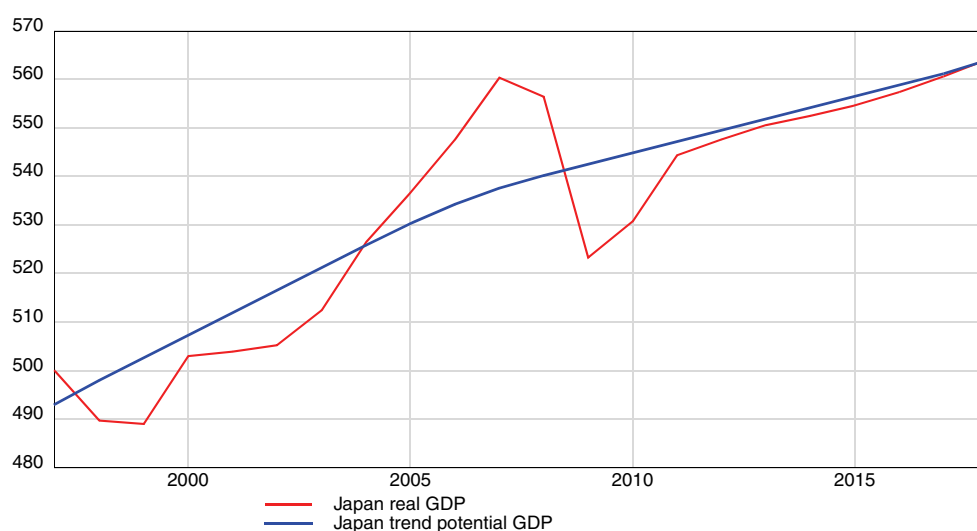
Finally, Table 6 also indicates that the current economic crisis will raise Japan's structural rate of unemployment from 3.1% of the labour force in 2008 to 4.5% in 2011. The structural unemployment rate then declines and reaches 3.3% of the labour force by 2018, thanks to a steady decline in both the working-age population and the labour supply.

### 3. The scenario for Japan over the 2010-2018 period

#### a. Short-term assumptions and dynamics

Japan's real GDP reached its peak in the first quarter of 2008, after which it began to decline with increasing speed through the first quarter of 2009. Between 2008Q1 and the latest trough of Japanese GDP in 2009Q1, the country's real GDP fell by a phenomenal 8.6%. In the first quarter of 2009, the decline in Japanese real GDP hit a maximum of 3.1% quarter-on-quarter. The Japanese economy then turned around in 2009Q2, expanding by 0.7% qoq. Japan's growth prospects remain both weak and vulnerable, as the recovery that appears to have taken hold since 2009Q2 is heavily dependant on what could well be a temporary rise in exports to its more resilient Asian and Latin American trading partners and on adjustments in the level of inventories. Furthermore, Japanese growth figures are known to be subject to sometimes very large revisions, meaning that the figures for 2009Q2 to 2009Q3 should not be taken as final and could be significantly revised.

**Figure 11. Japanese output gap projection** (levels, in trillions of chained (2000) yen)



In early 2010, the Cabinet Office's Economic and Social Research Institute's first estimate of Japanese GDP growth in 2009Q4 had still to be released, but indications were that growth in 2009Q4 and in the first half of 2010 could remain weak. Given the sharp past declines in real private consumption expenditures, household spending could rebound and provide a short-term boost to GDP growth in 2010. However, given the trend decline in the growth rate of household real consumption, it is doubtful that it will be able to provide any sustained and robust impetus to Japan's GDP. In our scenario for 2009Q4, we pencil in a qoq increase in GDP of 0.2%, which should be essentially export-driven. On this basis, the Japanese economy posts a year-on-year average decline of 6% in 2009.

In 2009, Japan's economy benefited from various government economic stimulus measures integrated in the Fiscal 2009 Budget and in subsequent supplementary budgets. The bulk of these measures consisted of the provision of fixed sum benefits to underpin household income, subsidies for new consumer home appliances and automobiles, public works projects and the extension of government guarantees for loans to small and medium sized businesses. However, part of the effect of these spending measures is likely to have been offset by the cancellation of other projects in the supplementary budgets of Fiscal 2009. Some measures are expected to be extended in 2010, but are to be accompanied by large cuts in public investment. All

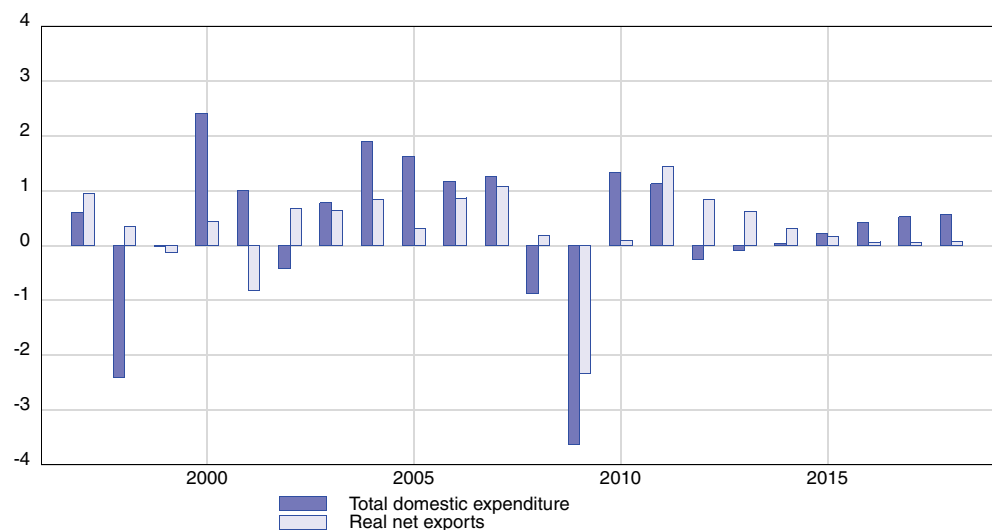
in all, although the gross size of the announced stimulus measures<sup>1</sup> seems to be substantial, the net effects of the Japanese government's economic stimulus measures are thought to have been relatively limited. These measures began to be implemented in the second quarter of 2009, and have most likely already produced their maximum effect on the country's GDP growth.

## b. The medium-term scenario for Japan

### i. Results for 2010

In 2010, Japan's real GDP progresses by 1.4% yoy. Japan's real GDP progresses only slowly in the first half of the year as the decline in public sector investment is offset by an uptick in the country's household consumption. Over the second half of 2010, final private demand strengthens due to the continued rise in private household spending, based in part on the public measures put in place in 2009 to boost consumption and underpin household income. Total domestic expenditures increase by 1.4% in 2010 on the back of strong private sector spending, public sector spending and a stabilisation in business sector gross fixed capital formation, which recovers from its precipitous decline of 19.2% in 2009. Growth in household private consumption expenditure reaches 2.4% in yoy average terms, while residential investment falls by 7.2% yoy. The share of residential investment in Japan's GDP fell from 5% in 1997 to 3.5% in 2007; its share comes out at only 2.6% of GDP in 2010.

**Figure 12. Contributions to real GDP growth in Japan (percentage points)**



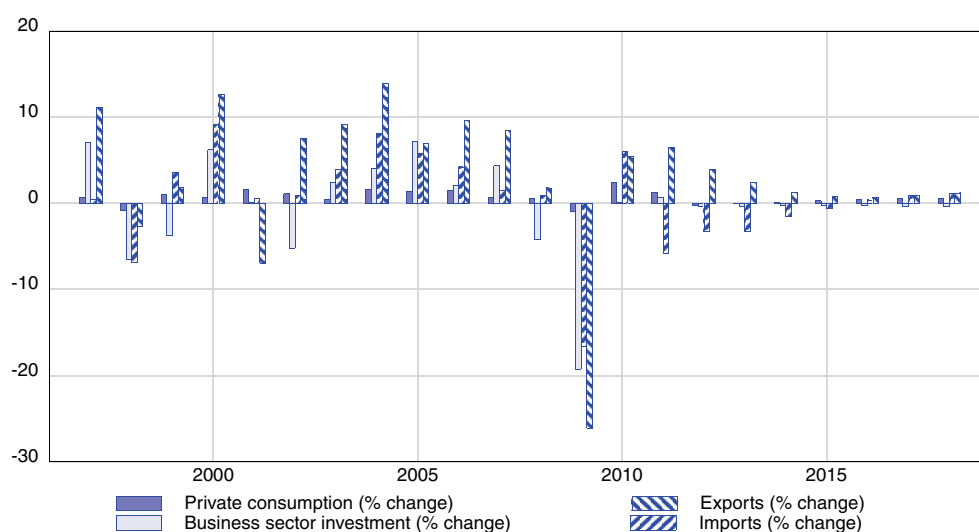
In 2010, as world trade begins to recover from the effects of the world-wide recession of 2009, Japanese exports pick up significantly, rising by 5.2% yoy due to continued robust demand from China, India, Brazil and other resilient emerging and developing economies that comprise our "Rest of the World" area. While the rise in Japan's export volumes is due to a strong progression in its foreign effective demand, it is at the same time hindered by the continued nominal effective appreciation of the yen. This nominal trade-weighted appreciation is only partly offset by declining yen-denominated export prices, so as to produce a real effective exchange rate appreciation over the first years of the scenario. In 2010, imports also rebound after their tumble of 2009, rising by 6.1% yoy. The result is a slightly positive contribution of 0.1 p.p. of real net exports to Japan's real GDP growth rate in 2010. A decline in the coun-

1. See: OECD (2009), Economic Outlook, Interim Report, March 2009. The OECD estimated that Japan's stabilisation measures rose to about 2% of GDP of 2008, the bulk of which are expected to have targeted GDP in 2009.

try's terms of trade then reinforces the deterioration of the current account implied by real net exports; the current account posts a surplus of 1.2% of GDP in 2010, down from 1.9% in 2009.

Notwithstanding the relatively large initial positive output gap of 3% of potential GDP in 2008, the massive 6% yoy decline in Japan's real GDP in 2009 produced a negative output gap of 3.5% of potential GDP. In 2010, the country's output gap remains large and negative, at 2.5% of potential GDP, as a rise in real final demand is insufficient to offset the pre-existing shortfall and the continued rise in Japanese potential real GDP. In such a context of slow output growth, low capacity utilisation rates and rising unemployment, significant downward pressures ensure that Japanese prices continue to move down their deflationary path.

**Figure 13. Selected components of demand in Japan (yoy, % change)**



Due to the generally deflationary domestic environment, consumer prices fall by 1.5% in yoy average terms in 2010. This is similar to the decline in headline prices of 2009. Prices in 2010 continue to fall as businesses engage in competitive price markdowns, vying for consumers who have built price declines into their price expectations and who are waiting before spending. Pricing pressure is also further reduced by the yen's continued and large nominal effective appreciation in 2010, and notwithstanding the fact that world oil prices rise, reaching a yearly average level of 82.5 USD/bbl.

In 2010, total hours worked declines by 1.5%, coming after a 2.5% decline in 2009. At the same time, the number of hours worked per person per year in Japan's private sector declines by 0.1% in 2010, while the labour force falls by 0.2% in 2010. This leads to a rise in Japan's unemployment rate, which climbs to a yearly average rate of 6.4% of the labour force in 2010, as compared to a rate of only 5.2% in 2009. The gradual loss of skills due to longer periods in unemployment caused by the GFC, and the difficulties for graduates to rapidly find a qualifying first employment opportunity, lead to a rise in Japan's structural rate of unemployment, which rises from 3.2% of the labour force in 2009 to 4.5% of the labour force in 2010.

After a massive 5.2% decline in 2009, contemporaneous hourly labour productivity in Japan's private sector rebounds by 4% in 2010 as firms lay off redundant workers and restructure in order to compensate for the sharp rise in unit labour costs in 2009. Nominal wage rates rise by 1.6% in the private sector; real labour wage costs and real take-home private sector wages both progress by 2.9%. As real wage costs rise less than labour productivity, this leads to a 1.2% decline in 2010 unit labour costs.

**Table 7. Medium-term results for Japan**

	Average 1997-2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010-2018
<b>I. Real aggregate demand and supply</b>												
1. Private consumption	0.9	-0.9	2.4	1.3	-0.2	-0.0	0.1	0.3	0.5	0.6	0.6	0.6
2. Government consumption	2.2	0.8	0.1	0.8	-0.1	-0.5	-0.5	-0.4	0.0	0.3	0.5	0.0
3. Gross fixed capital formation	-0.7	-12.9	-0.7	1.2	-0.7	0.1	0.5	0.7	0.8	0.8	0.7	0.4
a. of which residential sector	-4.2	-14.0	-7.2	3.1	-4.1	1.9	4.5	6.2	6.8	6.4	5.6	2.6
b. of which business sector	1.6	-19.2	0.1	0.7	-0.4	-0.4	-0.2	-0.3	-0.3	-0.3	-0.4	-0.2
4. Exports	6.5	-26.1	5.4	6.5	4.0	2.4	1.3	0.8	0.7	0.9	1.2	2.6
5. Imports	2.9	-16.7	6.1	-5.8	-3.3	-3.2	-1.5	-0.6	0.4	0.9	1.2	-0.6
6. Gross Domestic Product	1.2	-6.0	1.4	2.6	0.6	0.5	0.4	0.4	0.5	0.6	0.6	0.8
7. Output gap (deviation of GDP from trend GDP, in %)	-0.1	-3.5	-2.5	-0.4	-0.2	-0.1	-0.1	-0.2	-0.2	-0.1	0.0	-0.4
<b>8. Contributions to real GDP growth</b>												
a. Total domestic expenditure	0.7	-3.7	1.3	1.1	-0.2	-0.1	0.0	0.2	0.4	0.5	0.6	0.4
b. Net exports	0.5	-2.3	0.1	1.4	0.8	0.6	0.3	0.2	0.1	0.1	0.1	0.4
<b>II. Deflators</b>												
1. Private consumption	-0.5	-1.5	-1.5	-1.3	-0.7	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	-0.7
2. Exports	-0.6	-10.0	-0.9	0.1	-0.1	-0.4	-0.7	-1.0	-1.3	-1.5	-1.7	-0.8
3. Imports	2.5	-20.0	1.8	-0.1	0.1	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	0.0
4. Gross domestic product	-1.0	1.1	-1.6	-0.9	-0.5	-0.5	-0.6	-0.6	-0.6	-0.5	-0.5	-0.7
<b>III. Financial Markets</b>												
1. Short-term interest rate (level)	0.3	0.4	0.1	0.5	0.9	1.2	1.4	1.6	1.8	2.0	2.3	1.3
2. Long-term interest rate (level)	1.5	1.4	1.5	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.1	1.9
3. Spot exchange rate, local/euro (level)	131.0	130.0	124.1	119.5	115.3	111.9	108.8	106.1	104.0	102.6	101.9	110.5
4. Spot exchange rate, local/euro (+: depreciation)	1.9	-14.4	-4.6	-3.8	-3.5	-3.0	-2.8	-2.4	-2.0	-1.4	-0.6	-2.7
5. Nominal effective exchange rate (+: depreciation)	-1.2	-18.3	-3.8	-3.5	-3.1	-3.5	-3.6	-3.5	-3.4	-3.2	-2.8	-3.4
6. Real effective exchange rate (+: depreciation)	3.5	-7.0	-1.2	-2.0	-1.3	-1.1	-0.6	-0.1	0.5	1.1	1.8	-0.3
<b>IV. Labour Market</b>												
1. Labour supply, in persons	-0.3	-1.1	-0.2	-0.6	-1.0	-1.3	-1.4	-1.3	-1.2	-1.0	-0.9	-1.0
2. Employment, in hours	-0.6	-2.5	-1.5	-0.5	-0.6	-1.1	-1.4	-1.5	-1.4	-1.3	-1.2	-1.2
. of which private sector	-0.9	-2.4	-1.7	-0.5	-0.6	-1.1	-1.4	-1.4	-1.4	-1.3	-1.3	-1.2
3. Unemployment rate (% of civilian labour force)	4.5	5.2	6.4	6.1	5.4	4.9	4.5	4.3	4.2	4.1	4.0	4.9
4. Nominal wage rate, private sector	0.1	-0.8	1.6	0.3	0.0	0.7	1.2	1.7	2.1	2.3	2.3	1.4
5. Real take-home wage rate, private sector	0.4	1.4	2.9	1.5	0.7	1.4	1.9	2.3	2.5	2.5	2.4	2.0
6. Real producer wage rate, private sector	0.7	1.1	2.9	1.2	0.4	1.3	1.8	2.3	2.6	2.8	2.8	2.0
7. Contemporaneous labour productivity, private sector	2.3	-5.2	4.0	2.4	0.9	1.4	1.7	1.9	2.0	2.0	2.0	2.0
<b>V. Household sector</b>												
1. Total real means	1.1	1.1	1.6	2.7	1.2	1.1	0.8	0.7	0.7	0.6	0.6	1.1
. of which real disposable income	0.1	-1.0	2.2	1.5	0.1	0.3	0.5	0.6	0.7	0.8	0.8	0.8
2. Net saving by households (% of disposable income)	6.4	4.4	3.2	3.6	3.9	4.3	4.8	5.2	5.5	5.9	6.1	4.7
<b>VI. Fiscal sector</b>												
1. Net lending (+) or borrowing (-) (% of GDP)	-6.3	-7.5	-8.0	-8.2	-8.1	-8.1	-8.1	-8.0	-7.8	-7.6	-7.3	-7.9
2. General government gross debt (% of GDP)	157.4	189.3	197.6	202.5	210.5	218.5	227.1	235.5	243.5	251.0	257.9	227.1
<b>VII. International environment</b>												
1. Foreign effective output	4.9	-4.5	4.3	5.6	5.4	5.3	4.8	4.6	4.4	4.3	4.3	4.8
2. Current account balance (% of GDP)	3.2	1.9	1.2	2.6	3.4	3.9	4.0	4.0	3.9	3.7	3.6	3.4
<b>VIII. Miscellaneous</b>												
1. GDP per capita	1.1	-5.9	1.6	2.8	0.8	0.8	0.7	0.7	0.9	1.0	1.1	1.2
2. Total population	0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4	-0.4	-0.3

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.

The real effective exchange rate of Japan is defined here as the ratio of Japan's foreign effective output price to its export price, measured in Japan's own currency.

Assuming that the remainder of the economic stimulus package is spent out in 2010, public expenditures no longer provide any significant positive boost to growth but only help to underpin the level of GDP. This places all of the hopes of continued GDP growth on a resurgence in private final demand, either domestic or foreign. In 2010, public sector consumption increases by 0.1% and public investment by 1%; this comes after increases in 2009 of 0.8% and 23.7%, respectively. However, public sector subsidies to small and medium-sized businesses and income support to households continue, helping to prop up final domestic demand. On the revenue side, contrary to 2009, where government revenue plummeted due to the effects of the recession on income and spending, nominal tax revenue rises once again. However, as growth in expenditures outpaces growth in revenue, the public deficit continues to rise. Indeed, Japan's net borrowing requirement rises from 7.5% of GDP in 2009 to 8% of GDP in 2010. The country's gross public debt rises from 189% of GDP in 2009 to 198% of GDP in 2010. It is assumed that though credit risk spreads remain somewhat more elevated than during the pre-GFC years, public financing requirements are fully met by an abundant supply of world-wide savings coming from continued large private sector deleveraging.

#### *ii. Results for 2011-2018*

Over the 2011-2018 period, Japan's trend potential GDP rises at a yearly average rate of about 0.4%. This comes mainly from a rise in trend labour productivity, as the trend labour supply and the trend of hours worked per person both reduce potential output levels. After its sharp decline in 2009, the rebound in labour productivity in 2010 and 2011 raises the level of private sector productivity close to the level where it would have been without the negative effects of the GFC. Productivity is then assumed to rise at an annual average rate of 1.5% through 2018, which is a growth rate that is somewhat higher than the 1.3% growth rate to which productivity growth had fallen in 2007, prior to the GFC. As shown in Figure 10, this pushes the post-GFC productivity levels up above levels that would have been reached by 2016 without the GFC. It further ensures that the absolute level of Japan's real GDP does not decline over the projection period.

Real GDP growth picks up significantly in 2011, progressing by 2.6% on the year. Final domestic demand expands at 1.2%, with a significantly slower rise in private consumption and with an increase in aggregate gross fixed investment as compared to 2010. The rise in real GDP also stems in part from a large positive contribution to growth from Japan's real net exports.

As of 2012, Japanese GDP growth declines rapidly. The growth rate of real private consumption falls, coming out at a yearly average increase of 0.4% over the 2011-2018 period, as compared to an annual average increase of 0.9% over 1997-2007. This weak progression of household spending stems not so much from insufficient real wage increases as from the constant decline in Japan's total population. The decline in population and its associated decline in the labour supply also leads to a decline in business sector gross fixed capital formation, which falls so as to ensure that firms' net capital stock remains optimally aligned with labour inputs. Household investment in residential buildings is the only component of final domestic demand that holds up, allowing to stop by 2017 the trend decline in the per capita stock of residential buildings that began in the early 1970s.

Finally, looking at the large positive contributions to growth from real net exports over the 2011-2013 period, one could expect that growth in Japan would continue to be driven by the external sector. However, as of 2013, Japan's real export growth tapers off as the steady decline in yen-denominated export prices proves to be insufficient to offset the country's continued nominal effective exchange rate appreciation,



implying a real effective exchange rate appreciation which cuts into the competitiveness of the country's exports and reduces export volumes straight through 2018. The declining contributions to GDP growth from real net exports slowly reduce the country's historical structural current account surplus, bringing the surplus down from 4% of GDP in 2014 to 3.6% of GDP in 2018.

Moderate real growth in household income stems largely from a rise in real wages in the wake of persistent growth in private sector labour productivity. However, household income growth is somewhat curtailed by a significant decline in the volume of labour services used in production. Private sector real take-home wage rates rise at an annual average pace of 1.9% over 2011-2018, while total hours worked fall by 1.1% over the same period.

As unemployment rates over the 2011-2018 period are projected to remain stuck above the country's structural rate of unemployment, with only tepid increases in final domestic demand and with declining export growth, Japan's private sector capacity utilisation rates strain to rise to optimal levels. The result is an output gap that closes rapidly in the early years of the scenario, but that then tends to open up again as real output tends to fall below potential output levels. In this situation, firms' pricing power remains all but in-existent and price levels continue to decline over the projection period. This is all the more so given that the country's effective exchange rate appreciation precludes the emergence of imported inflationary pressures while putting significant downward pressure on export prices. Hence, over the 2011-2018 period, the deflator of private consumption falls at a yearly average rate of 0.7%.

Finally, as of 2012, low real public spending on goods and services, on public investment and on public sector wages, all lead to very limited increases in total real public expenditures. The only expenditure category that rises over the projection period is the one relative to interest charges on the gross public sector debt, which rises at an annual average rate of nearly 5% over 2011-2018. Real public sector income also rises very moderately between 2011 and 2018, as Japan's total population declines and as domestic consumption growth progresses only tepidly. The relatively parallel evolution of public sector income and expenditure ensures that the strong rise in public sector budget deficits that were seen over 2007-2009, and that are projected over 2010-2011, are brought to a halt. Public deficits edge down from 8.2% of GDP in 2011 to 7.3% of GDP in 2018. However, as budget deficits persist throughout the scenario, the gross public sector debt pursues its rise through 2018 and reaches 258% of GDP.

## D. Main results for other areas of the world economy

The NIME model distinguishes three main economic areas: the euro area, the United States and Japan. However, the NIME model also distinguishes three other areas: the Western non-euro European Union Member States (EU MS), the Central and Eastern EU MS and an aggregate area for the “Rest of the World”. The model also allows for basic macroeconomic results aggregated at the level of the world. Essential projection results for each of these three latter areas, as well as for the world aggregate, are presented in Tables 8 to 11 below.

### 1. The Western non-euro EU Member States

Table 8 provides basic results for the area called “Western non-euro EU Member States”, which is composed of the United Kingdom, Denmark and Sweden. As was the case for the three previous main economic areas (the euro area, the United States and Japan) the scenario assumes that the model reacts in the short run to cyclical conditions, while gradually converging towards longer run trends over the medium term. Likewise, the main structural determinants of the area’s economic evolution are population and the working-age population, hours worked per person, and trend hourly labour productivity. The scenario is built assuming that this area is affected by a common average monetary policy based on a Taylor-type policy rule, that the common average exchange rate is determined by an uncovered interest parity condition, and that the common average fiscal policy continues as indicated by current laws and policies.

**Table 8. Main results for the Western non-euro EU Member States**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Real aggregate demand and supply</b>												
1. Gross Domestic Product	2.9	-5.0	0.6	-0.2	1.8	1.8	2.9	3.7	4.4	4.5	4.2	2.6
2. Exports	5.2	-11.7	-3.1	2.7	6.5	8.5	9.1	9.0	8.4	7.7	7.0	6.2
3. Imports	6.5	-14.0	0.0	1.8	-1.5	0.3	1.1	2.7	3.5	3.9	3.7	1.7
<b>II. Deflators</b>												
1. GDP	2.4	2.8	0.3	-2.5	-2.7	-1.7	-0.8	-0.1	0.4	0.6	0.6	-0.7
2. Exports	0.3	1.4	-2.9	-5.0	-5.2	-4.1	-2.5	-1.0	0.1	0.6	0.5	-2.2
3. Imports	0.0	2.9	-9.1	-1.9	0.6	0.5	0.4	0.6	0.8	1.0	1.0	-0.7
<b>III. Financial variables</b>												
1. Nominal effective exchange rate (+: depreciation)	-3.5	7.4	-6.1	-6.1	-5.0	-4.0	-2.9	-2.2	-2.0	-2.3	-3.0	-3.7
2. Real effective exchange rate (+: depreciation)	0.1	8.5	-1.5	0.6	2.3	2.3	1.9	1.2	0.4	-0.3	-0.9	0.7
<b>IV. Miscellaneous</b>												
1. Current account balance (% of GDP)	-0.6	-0.5	0.5	-0.1	0.5	1.4	2.8	4.2	5.5	6.5	7.4	3.2
2. Total population	0.4	0.6	0.6	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4

*All figures are year-on-year growth rates of yearly averages, unless otherwise specified.*

*The real effective exchange rate of an area is defined here as the ratio of the area’s foreign effective output price to its export price, measured in the area’s own currency.*

## 2. The Central and Eastern EU Member States

Table 9 provides the essential results for the area called the “Central and Eastern EU Member States”, which is composed of the twelve Central and Eastern European countries that joined the European Union as of May 2004<sup>1</sup>. This economic area provides average results for this group taken as a whole.

The simpler modelling strategy that was adopted for the aggregate economy of this group of countries implies that the results for this area are only affected in a limited way by cyclical developments. The results basically highlight the evolutions of the area’s longer run structural determinants, which are population and trend labour productivity growth. The scenario is built assuming that this area is affected by a common average monetary policy based on a Taylor-type policy rule, that the common exchange rate is determined by an uncovered interest parity condition and that the common average fiscal policy continues as indicated by current laws and policies.

**Table 9. Main results for the Central and Eastern EU Member States**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Real aggregate demand and supply</b>												
1. Gross Domestic Product	4.1	-4.2	-7.3	-5.8	-2.4	0.4	1.4	1.5	1.6	1.6	2.1	-0.8
2. Exports	10.3	-13.6	1.9	-4.0	-1.7	2.5	4.7	5.2	5.7	5.6	6.6	2.9
3. Imports	10.9	-12.3	8.2	-4.7	-1.9	3.7	6.3	6.6	6.8	6.3	7.0	4.2
<b>II. Deflators</b>												
1. GDP	15.6	0.1	3.2	3.3	3.5	4.0	4.1	3.8	3.4	2.9	2.5	3.4
2. Exports	13.0	2.7	4.1	4.7	4.7	4.3	3.6	2.8	2.0	1.1	0.4	3.1
3. Imports	12.4	0.0	3.0	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.1	1.5
<b>III. Financial variables</b>												
1. Nominal effective exchange rate (+: depreciation)	5.3	13.1	-0.9	-1.0	-1.3	-1.4	-1.5	-1.6	-1.7	-1.7	-1.8	-1.4
2. Real effective exchange rate (+: depreciation)	-2.1	14.2	-1.5	-2.3	-2.3	-2.1	-1.5	-0.7	0.1	0.8	1.5	-0.9
<b>IV. Miscellaneous</b>												
1. Current account balance (% of GDP)	-4.0	-4.4	-7.7	-5.6	-3.6	-2.7	-2.3	-2.2	-2.5	-3.0	-3.8	-3.7
2. Total population	0.5	-0.0	-0.1	-0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3

*All figures are year-on-year growth rates of yearly averages, unless otherwise specified.*

*The real effective exchange rate of an area is defined here as the ratio of the area’s foreign effective output price to its export price, measured in the area’s own currency.*

1. These twelve countries are: Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

### 3. The Rest of the World

Table 10 provides the results for the aggregate area called the “Rest of the World”. This area represents all of the economic areas that are not explicitly accounted for in one of the other areas. This area thus represents a relatively heterogeneous group of economies, the 30 largest of these being, by decreasing size of USD GDP in 2009: PR China (mainland), Brazil, Canada, Russia, India, Australia, Mexico, Korea, Turkey, Indonesia, Switzerland, Saudi Arabia, Norway, Taiwan Province of China, Venezuela, Iran, Argentina, South Africa, Thailand, Colombia, United Arab Emirates, Israel, Hong Kong PRC, Malaysia, Egypt, Pakistan, Nigeria, Singapore, the Philippines and Chile.

The aggregate of this group of economies is only affected in a limited way by cyclical developments, reacting more to its longer run structural determinants which are population and trend labour productivity growth. The purpose of including this economic area is to provide a complete economic environment, closing the world model essentially for trade and exchange rate developments, while also allowing for aggregate results at the world level.

**Table 10. Main results for the Rest of the World**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>I. Real aggregate demand and supply</b>												
1. GDP	6.2	0.5	5.5	9.3	8.0	7.5	7.0	6.4	6.2	6.0	5.8	6.9
2. Exports	7.9	-14.4	6.3	-7.7	-8.4	-8.5	-8.7	-7.5	-6.0	-4.4	-2.9	-5.3
3. Imports	7.2	-15.9	-2.5	3.0	3.5	3.4	3.4	3.3	3.4	3.4	3.5	2.7
<b>II. Deflators</b>												
1. GDP	6.8	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
2. Exports												
a. In euro	1.2	-6.3	12.4	11.9	14.6	14.0	13.5	11.9	10.1	8.3	6.5	11.5
c. In local currency	6.8	5.4	15.5	15.7	18.3	18.5	18.1	16.7	15.0	13.4	12.0	15.9
3. Imports												
a. In euro	0.3	2.3	9.7	5.9	5.5	4.2	3.6	3.0	2.5	1.9	1.2	4.2
c. In local currency	6.1	15.1	12.8	9.6	8.9	8.3	7.8	7.4	7.0	6.7	6.4	8.3
<b>III. Exchange rates</b>												
1. Nominal exchange rate (local/euro, +: depreciation)	6.0	12.4	2.8	3.4	3.2	3.9	4.1	4.2	4.5	4.7	5.2	4.0
2. Nominal exchange rate (local/USD, +: depreciation)	5.3	18.8	8.8	9.0	8.7	8.2	7.6	7.0	6.5	6.2	5.9	7.5
3. Nominal effective exchange rate (+: depreciation)	4.7	13.5	6.0	6.3	6.0	6.0	5.7	5.7	5.3	5.3	5.4	5.7
4. Real effective exchange rate (+: depreciation)	-4.9	-3.3	-11.7	-11.8	-13.3	-13.9	-13.7	-12.7	-11.5	-10.5	-9.5	-12.0
<b>IV. Miscellaneous</b>												
1. Current account balance (% of GDP)	2.9	2.3	4.3	2.9	1.9	1.2	0.5	-0.1	-0.6	-1.0	-1.3	0.9
2. Real GDP per capita	4.7	-0.8	4.2	8.0	6.6	6.2	5.7	5.2	4.9	4.8	4.7	5.6
3. Population	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.2
4. Population (billions)	5.3	5.8	5.9	6.0	6.1	6.1	6.2	6.3	6.3	6.4	6.5	6.2

All figures are year-on-year growth rates of yearly averages, unless otherwise specified.

The real effective exchange rate of an area is defined here as the ratio of the area's foreign effective output price to its export price, measured in the area's own currency.

The 30 largest economies that are included in the NIME model's "Rest of the World" area are the following, by decreasing size of USD GDP in 2009: PR China (mainland), Brazil, Canada, Russia, India, Australia, Mexico, Korea, Turkey, Indonesia, Switzerland, Saudi Arabia, Norway, Taiwan Province of China, Venezuela, Iran, Argentina, South Africa, Thailand, Colombia, United Arab Emirates, Israel, Hong Kong PRC, Malaysia, Egypt, Pakistan, Nigeria, Singapore, the Philippines and Chile.

## 4. The World

Table 11 provides basic results for the world economy. These results are produced by computing averages of macroeconomic variables of six fully-specified economic areas (the euro area, the United States, Japan, the Western non-euro EU MS, the Central and Eastern EU MS, and the Rest of the World) of the model. Variables such as world population are simply the sum of the populations of the six areas. Current price variables are obtained by summing in a common currency, such as the euro or US dollar, using the available bilateral exchange rates.

The determination of the price of oil is a special case. Although the model's world oil price is endogenous, it is specified in a simple and ad hoc manner so as to keep the real price of oil constant, in terms of effective world prices.

**Table 11. Main results for the world economy**

	Average 1997 2007	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average 2010 2018
<b>II. World real GDP</b>												
1. Real GDP, in euro	3.5	-2.3	3.8	5.4	5.0	4.9	4.6	4.3	4.2	4.2	4.1	4.5
. per capita	2.2	-3.4	2.6	4.2	3.9	3.8	3.4	3.2	3.2	3.1	3.1	3.4
2. Real GDP, in USD	4.6	-7.5	-2.0	0.0	-0.3	0.8	1.1	1.6	2.2	2.8	3.5	1.1
. per capita	3.3	-8.6	-3.1	-1.1	-1.4	-0.3	0.0	0.5	1.1	1.7	2.4	-0.0
<b>III. World export volumes</b>												
1. % change, in euro	6.8	-14.8	3.6	1.2	1.9	2.3	2.4	2.7	2.9	3.1	3.3	2.6
2. % change, in USD	7.8	-19.3	-2.1	-4.0	-3.3	-1.7	-0.9	0.0	0.9	1.7	2.6	-0.7
3. Exports, in % of World GDP	18.4	17.9	18.4	18.1	18.0	17.9	17.8	17.8	17.8	17.8	17.8	17.9
<b>IV. Price of world exports, % change</b>												
1. at euro exchange rates	0.9	-4.0	4.8	3.4	3.9	3.2	2.9	2.5	2.1	1.7	1.3	2.9
2. at USD exchange rates	1.6	-9.1	-1.1	-1.9	-1.4	-0.8	-0.5	-0.2	0.1	0.4	0.6	-0.5
<b>V. Price of oil (bbl, Brent crude),</b>												
1. level, in USD	35.2	61.6	82.5	83.4	84.7	85.6	86.6	87.5	88.4	89.1	89.5	86.4
2. % change, in USD	15.4	-36.4	33.9	1.2	1.5	1.1	1.1	1.1	1.0	0.8	0.5	4.7
3. level, in euro	30.4	44.3	62.7	66.9	71.5	75.2	78.7	81.7	84.1	85.9	86.9	77.1
4. % change, in euro	15.4	-32.9	41.7	6.6	6.9	5.2	4.6	3.8	3.0	2.2	1.2	8.3
<b>VI. World population</b>												
1. in billions	6.2	6.8	6.8	6.9	7.0	7.1	7.2	7.2	7.3	7.4	7.5	7.2
2. % change	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1

*All figures are year-on-year growth rates of yearly averages, unless otherwise specified.*



The NIME model is a macroeconometric world model developed by economists at the Belgian Federal Planning Bureau. The model is used to make medium-term projections for the international economy, as well as to study the transmission mechanisms of economic policies and exogenous shocks.

In NIME, the world is divided into six entities: the euro-12 area, a bloc consisting of three “western non-euro EU Member States”, the twelve “eastern EU Member States”, the United States, Japan and a bloc representing the “rest of the world”. All of these areas are linked through trade and financial flows. Data for the euro area is aggregated using ECU/euro exchange rates. Data for the western EU Member States, for the eastern EU Member States and for the rest of the world are aggregated into specific synthetic currency units using market exchange rates. Data for the United States and Japan are expressed in their national currency units. World aggregates are computed in euro or USD.

In all blocs except the eastern EU Member States and the rest of the world, we distinguish a household sector, an enterprise sector, a government sector and a monetary sector. A similar set of behavioural equations and accounting identities is specified for each sector across blocs, while the parameter values of the equations are obtained using econometric techniques applied to the aggregated, annual data of the different blocs.

The household sector allocates its total available means to goods and services, real money balances, residential buildings and other assets as a function of the nominal interest rate, the real interest rate, the user cost of residential buildings and a scale variable. This scale variable consists of the household sector’s assets (including bonds and residential buildings), its current income from assets, its current and expected future take-home wage income and its transfers. Error correction mechanisms and partial adjustment schemes capture sluggish adjustments in households’ expenditure plans. Moreover, households are liquidity-constrained in the short-run, implying that a fraction of their expenditures are financed by disposable income.

The enterprise sector maximises its profits by hiring production factors and selling its output to final users. Gross output consists of goods for private consumption, investment and exports. There are three production factors: labour hours, fixed capital services and intermediary consumption. Error correction mechanisms and partial adjustment schemes are used to model the short-run demand for the production factors. In these demand schemes, the long-run factor demand equations are derived from a Cobb-Douglas production function with constant returns to scale.

Prices and wages are not fully flexible and clear the markets only in the long run. Moreover, country blocs are engaged in multilateral trade where importers are price setters and exporters are price takers, except for the price of oil, which is determined outside the model. The (equilibrium) real wage rate is a weighted average of labour productivity and the reservation wage, while the natural rate of unemployment is

determined by the gap between the take-home wage and the reservation wage of the workers.

Government income is determined by endogenous tax bases and predetermined tax rates, while its expenditures are to a large extent determined by the business cycle and trend growth. The automatic fiscal stabilisers operate on the expenditure side mainly through unemployment benefits and interest payments on government gross debt and, on the revenue side, mainly through direct wage income taxes, profit taxes, social security contributions and indirect taxes.

Short-term interest rates are set according to a Taylor-type principle. This implies that the monetary authorities increase (decrease) the short-term nominal interest rate more than proportionally to increases (decreases) in inflation, thus increasing (decreasing) real interest rates when inflationary pressures arise (subside). It also implies that the monetary authorities keep the short-term interest rate below (above) the equilibrium interest rate if demand is below (above) potential output. Long-term interest rates are determined by the term structure theory of interest rates. Changes in nominal effective exchange rate are determined by changes in the interest rate differentials and the (expected) inflation differentials. The risk premiums in the financial markets are normally assumed to remain constant.



### 1. Case studies, technical variants and outlooks

Meyermans and Van Brusselen (2005.b) assessed the impact of an oil price shock on the world economy, while Meyermans and Van Brusselen (2005.d) studied the interactions between monetary policy, asset prices and economic growth in the world economy over the 1995-2004 period. Meyermans and Van Brusselen (2006.b) use stochastic simulation to assess the risks surrounding a medium-term projection for the world economy. Van Brusselen (2009) studied the effects of major fiscal stabilisation plans and their potential to mitigate the effects of the economic and financial crisis that materialised as of mid-2007. Finally, the NIME model is also used to produce regular medium-term world economic outlooks.

### 2. Selected NIME publications

Meyermans, Eric and Patrick Van Brusselen (2000.a), "The NIME Model: Specification and Estimation of the Demand Equations of the Household Sector", Working Paper 8-00, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2000.b), "The NIME Model: Specification and Estimation of the Enterprise Sector", Working Paper 10-00, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2001), "The NIME Model: A Macroeconometric World Model", Working Paper 3-01, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2005.a), "The NIME Outlook for the World Economy: 2005-2011. Also in this issue: The Lisbon Strategy", Working Paper 02-05, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2005.b), "The Macroeconomic Effects of an Oil Price Shock on the World Economy. A Simulation with the NIME Model", Working Paper 6-05, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2005.c), "The NIME Economic Outlook for the World Economy: 2005-2011. Focus: Monetary Policy, Asset Prices and Economic Growth", NEO 02-2005, Federal Planning Bureau, August.

Meyermans, Eric and Patrick Van Brusselen (2005.d), "Monetary Policy, Asset Prices and Economic Growth in the World Economy over the 1995-2004 Period. A Counterfactual Simulation with the NIME Model", Working Paper 17-05, Federal Planning Bureau.

Meyermans, Eric and Patrick Van Brusselen (2006.a), "The NIME Economic Outlook for the World Economy: 2006-2012. Focus: The macroeconomic effects of a shift from direct to indirect taxes in the euro area", NEO 01-2006, Federal Planning Bureau, Brussels, January.

Meyermans, Eric and Patrick Van Brusselen (2006.b), "An Evaluation of the Risks Surrounding the 2006-2012 NIME Economic Outlook. Illustrative Stochastic Simulations", Working Paper 2-06, Federal Planning Bureau.

Van Brusselen, Patrick (2006.c), "The NIME Outlook for the World Economy: 2006-2012. Focus: A Stochastic Appraisal of the NIME Outlook for the World Economy", NEO 02-2006, Federal Planning Bureau, Brussels, August.

De Smet, Jeroen and Patrick Van Brusselen (2007.a), "The NIME Outlook for the World Economy: 2007-2013", NEO 01-2007, Federal Planning Bureau, Brussels, January.

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Van Brusselen, Patrick (2008), "The NIME Outlook for the World Economy: 2008-2015. Focus: The US housing market crisis", NEO 02-2008, Federal Planning Bureau, Brussels, August.

Van Brusselen, Patrick (2009), "Fiscal Stabilisation Plans and the Outlook for the World Economy: Do counter-cyclical fiscal measures offer any hope of recovery for the world economy? An evaluation of fiscal policy effectiveness in the face of a global recession", NIME Policy Brief 01-2009, Federal Planning Bureau, Brussels, April.