OUTLOOK

NIME Outlook for the World Economy 2013-2024

Special topic: Fiscal consolidation and euro area growth perspectives

December 2013

Federal Planning Bureau
Economic analyses and forecasts

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Outlook

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Contributions

This document and all the model results it contains were prepared by Patrick Van Brusselen (pvb@plan.be).

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1. Introduction

The current update of the NIME outlook for the world economy comes at a difficult time for projections. Projections are naturally much easier to perform in a stable environment, whereas the current environment can be characterised by above-average volatility and unusual economic behaviour. Indeed, while a number of countries are performing well, exhibiting relatively strong real GDP growth or appearing to be on paths leading to stable trend growth, others are on clearly declining growth paths and are sometimes even exhibiting unsustainable dynamics.

Furthermore, projections for geo-political entities such as the euro area appeared to be reasonably unproblematic before the outbreak of the financial and economic crises of the post-2007 period because of assumptions of real convergence and real synchronisation. Now, such assumptions appear to be untenable for the current member states of the euro area. Hence, although the economic projections of an area model could have appeared appropriate for the pre-2008 euro area economy, such a representation becomes in itself a major conditional assumption in the projection process.

While the current euro area institutional setup legitimises the continued use of a euro area aggregate, it now appears that this setup should be presented as an underlying assumption on which the economic projection is built. The current projection is thus clearly conditional on the proper functioning of EU and euro area institutions. Furthermore, it is conditional on the assumption of continued economic integration, whereby the EU and euro area member states' economies see effective real convergence and greater synchronisation of economic cycles, and where common economic policies, be they fiscal, monetary or structural, are effectively optimal in the sense that one size does indeed finally fit all.

The resilience of the current institutional setup is not the only assumption that underlies this new world economic projection. Indeed, since the outbreak of the financial and economic crises, national public sector budgets have been left free to play the role of fiscal stabilisation instruments, thus cushioning the effects of the economic downturns on household incomes through rising transfers to the unemployed. At the same time, national budgets have been used in a number of countries as stopgap measures aimed at ensuring financial stability, as states stepped in to extend lender of last resort insurance to ailing banks or to provide tax-payer financed capital injections where domestic banks appeared to be threatened by regulatory insolvency.

As governments saw their expenditures and/or liabilities rise with the crisis, they also saw their fiscal incomes decline as tax bases were negatively affected by the economic crisis. Consequently, budget deficits and debt rose significantly in a number of EU and euro area countries, and were met by calls for immediate and tough fiscal consolidation. It is in such a context that the adoption of the EU's new Fiscal Compact, as well as the "Two-Pack" and "Six-Pack" agreements, should be understood.

The EU-wide move towards fiscal retrenchment, with its aims for Member States to reduce public deficits to below 3% of GDP, to implement structural budget balance, and to reduce gross public debt-to-GDP ratios to the 60% target, must be taken into account in any economic projection for the euro area. This is done in our new projection by running the projection under a constant policy assumption, whereby euro area member states collectively maintain the current tight fiscal policy

stance throughout the projection period, with a view to obtaining the rapid emergence of first primary and then general budget surpluses that allow for steady reductions in public sector debt-to-GDP ratios over the projection period. This rule is implemented for the period 2015-2024, while EU Commission budgetary assumptions and/or forecast data are used for fiscal stances in 2013 and 2014.

A similar long-term constant fiscal policy assumption is made for the US and Japan, also with a view to achieving medium-term reductions in fiscal deficits and debt ratios. However, for these two countries, medium-run budgetary balance is achieved under the supplemental assumption that government transfers to households do not continue to rise along their historical trend, but are stabilised in per cent of GDP at pre-crisis levels. For the US in particular, this was rendered necessary because of the sudden increase in the transfer-to-GDP ratio after 2007 due to the temporary hike in transfers to households that was implemented in reaction to the financial and economic crises. Without such an assumption regarding transfers, fiscal consolidation would have entailed increases in tax rates over the projection horizon that would probably have been politically unacceptable, and thus less likely.

In section 2 of our new projection, we provide the reader with a quick and non-technical presentation of the NIME model. In section 3, we briefly present the main features of the dynamics involved in our long-run economic projection. In section 4, we present the reader with a summary view of the world outlook. Then, in sections 5 to 9, we provide projection results for the main economic areas of our model, which are the euro area, the United States of America, Japan and an area identified as the Rest of the World, comprising advanced and developing economies. We also provide the reader with aggregate projection results for the world. Section 10 is devoted to a summary discussion of the uncertainties surrounding the current long-term projection for the world economy. In section 11, we provide readers with a special topical analysis. In this issue of the outlook, the analysis delves into the issue of the effects of alternative fiscal consolidation strategies on growth perspectives for the euro area. Section 12 contains tables with detailed results of the baseline projection for each of the major areas and for the world. It also presents tables containing the detailed underlying structural determinants of the projection for each area. Finally, in section 13, we provide a detailed overview of the core economic data that are used to define the long-run trends of the major economic areas of the world. Demographic trends, as well as trends in labour productivity, are defined and presented in graphical form for the major areas.

The baseline 2013-2024 projection for the world economy was finalised in mid-November 2013, using all relevant information available at that time.

2. NIME - An econometric model of the world economy

The NIME model is a system of simultaneously-determined macroeconometric area models developed at the Belgian Federal Planning Bureau[1]. The system is used to carry out projections for the world economy, as well as to study the effects of economic policies and of other exogenous economic shocks. The current version of the NIME system of models identifies seven areas[2] in the world economy, the four major ones consisting of the euro area[3], the United States of America, Japan and the Rest of the World[4]. All areas are interlinked through trade and financial flows.

In the euro, US and Japanese areas, we model a household sector, a private business sector, a general government sector and a monetary authority. A similar set of behavioural equations and accounting identities is specified for each sector across these four major areas, while the parameter values of the equations are obtained using econometric techniques applied to the aggregated annual data of these areas.

The household sector allocates its total available means over goods and services, real money balances, residential buildings and other financial assets as a function of the nominal interest rate, the real interest rate, the user cost of residential buildings and a scale variable. The scale variable consists of the household sector's assets, income from assets, current and expected future labour income and transfers received. A share of households is liquidity-constrained in the short-run, implying that a fraction of household expenditure is financed via disposable income.

The enterprise sector maximises profits on the output it produces by putting production factors to work. Real output is a homogeneous product that is delivered to final demand for private and public consumption, fixed capital investment and exports. In order to produce real output, firms use three production factors: labour services, capital services and imported intermediary inputs. The long-run factor demand equations are derived from a Cobb-Douglas production function with constant returns to scale.

Prices and wages follow Calvo-type dynamics and are thus not fully flexible in the short run. Moreover, economic areas engage in multilateral trade, where export prices are determined by a pricing-to-market assumption. The equilibrium real wage rate is a weighted average of labour productivity and the reservation wage, while the endogenous natural rate of unemployment is determined by structural factors such as a tax wedge and hysteresis effects.

[1] For a more thorough presentation of the NIME model, see Meyermans, Eric and Patrick Van Brusselen (2001), "The NIME Model, A Macroeconometric World Model", Working Paper 3-01, Federal Planning Bureau, June. Note that this document presents the first version of the NIME model, which no longer corresponds exactly to the currently used version. The most recent version of NIME will be the object of a forthcoming working paper.

[2] There are also two secondary area models for the Western non-euro EU Member States (Denmark, Sweden, United Kingdom) and for the Central and Eastern EU Member States (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovenia, Slovakia). Note that a detailed, full-scale model is also specified for Belgium, in which the bilateral exchange rate is the bilateral euro rate and the short-term policy interest rate is the ECB's euro area policy rate. A distinct model for China is currently under development.

[3] The twelve members of the euro area in 2001, which were: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain.

[4] The Rest of the World comprises, i.a.,: Algeria, Argentina, Brazil, Canada, China, Egypt, India, Indonesia, Iran, Korea, Mexico, Nigeria, Russia, Saudi Arabia, South Africa, Morocco, Switzerland and Turkey.

Government income is determined by endogenous tax bases and predetermined tax rates, while expenditures are to a large extent determined by the business cycle and long-run trends. 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 labour income taxes, corporate taxes, social security contributions and indirect taxes. Note that in its default configuration, NIME makes use of an endogenous tax rule for the major economic areas, whereby the tax rate on labour income changes so as to ensure that an area's debt-to-GDP ratio converges to a pre-determined ratio in the long run. This feature of long-run fiscal sustainability is not implemented in this outlook, where it is assumed that fiscal policy is implemented on the basis of constant policy.

The monetary authorities determine short-term nominal market interest rates by changing their policy rate according to a zero lower-bounded Taylor-type rule. Practical implementation of monetary policy in the model also makes use of an interest rate smoothing procedure, which allows marked discontinuities in the time paths of nominal short-term interest rates to be avoided. Note here that while the interest rate smoothing parameters are estimated coefficients in the default model, we chose to calibrate these coefficients in the baseline projection so as to avoid monetary policy leading to boom-bust cycles in real output, and to ensure a smooth convergence towards the areas' long-run equilibrium growth paths. For this, the smoothing parameters of most major areas were adjusted so that monetary policy would respond more quickly to current conditions. Indeed, the default estimated smoothing parameters led to lags in the reaction function of monetary policy which were at the origin of sometimes marked cyclical behaviour for output in the baseline projection.

The model's long-term nominal interest rates are forward-looking, determined in the short to medium run mainly by the expectations hypothesis of the term structure, and in the long run by an endogenous real natural (Wicksellian) rate of interest, which is itself linked to economies' rates of potential output growth.

As for the nominal effective exchange rates, they are modelled to follow a short-term uncovered interest parity condition, where they are determined by changes in international interest rate spreads and (forward-looking) expected inflation differentials, while converging to an equilibrium real effective exchange rate that ensures that countries' external accounts are balanced in the long run.

Expectations schemes in the NIME model are hybrid, with a share of expectations that is model-consistent (rational), reflecting the expectations of better-informed or rational agents who are more attentive to economic fundamentals than to incoming data, and a share that is adaptive, reflecting the expectations of agents who are more data-driven and who expect the future to be similar to the recently observed past. Expectations are not only present in interest and exchange rates, but also in a number of prices such as the user cost of capital, as well as in households' expected future labour income.

3. The long-run dynamics of the NIME model

Economics generally presents countries' economic growth in terms of both a stable long-run path and a more volatile business cycle component moving around the long-run trend.

Most modern economic models that are used for economic analyses and projections are built around the distinction between the trend component and the business cycle. Short-term business cycle analysis allows for forecasts on changes in the economy that stem from the presence of information asymmetries, imperfect information and the existence of rigidities in price formation, as well as from generally unpredictable random ("stochastic") shocks such as weather-related events or political incidents. However, though such factors can be informative for short-term economic developments, they generally are not very useful in explaining a country's past long-run growth performance or for assessing a country's future longer-run economic growth potential.

The medium-term to long-term economic performance of a country is usually analysed in the context of a long-run growth accounting framework, where historical data is presented in terms of trends and projected forward on the basis of assumed trend growth rates. The defining demographic trends that are usually needed to model long-run growth are the trend of total population, the trend of working-age population and the trend of the labour force participation rate. These variables then allow us to define the long-run labour force, which constitutes the "equilibrium" supply of labour in the context of a long-run general equilibrium analysis. To these first trends, we also need to add the crucial trend of average labour productivity, which can then be used in conjunction with the equilibrium labour supply to determine the equilibrium level of real output or GDP. Note that this relatively simple concept is itself sometimes broken down into a measure of the long-run capital stock and a measure of trend technical progress, but our method of projection does not use this break-down, which brings with it a number of major difficulties, both conceptually and in terms of measurement.

Once we have determined the core equilibrium variables of the countries that are modelled, and defined the way we will project these levels into the future, we then run the model to let it show us how each country's economy will adjust from the past and current short-term shocks to converge towards the longer-run equilibrium growth path that has been defined and cast out over the projection period.

In the appendices of section 13, we define and detail what the core equilibrium or steady-state variables of the NIME model are, briefly describing how they are computed and projected. We also provide a detailed graphical presentation of these core trends for the euro area, the United States of America, Japan and the Rest of the World area.

4. The 2013-2024 world outlook

As the world's major economies slowly exit from the downturn into which they fell due to the outbreak of the simultaneous financial and economic crises, real GDP growth should first be relatively strong as major economies pick up the slack and work away the negative output gaps of the crisis years. However, after an initial upswing in output growth rates, real growth is projected to slow due to two essential factors.

Table 1 **Summary of projection results for the world economy**
(growth rates, unless noted otherwise)

	Average 2000-2013	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Real GDP									
1. World (at market exchange rates)	3.03	2.6	2.6	2.6	4.1	4.2	3.9	3.2	2.3
2. Euro area	1.1	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.3
3. United States of America	1.8	2.2	1.9	3.1	2.7	1.6	0.8	0.6	1.5
4. Japan	1.0	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.2
5. Rest of the World	5.9	4.7	4.2	2.9	5.5	6.6	6.8	6.0	3.8
II. Deflators of private consumption									
1. Euro area	1.9	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.3
2. United States of America	2.1	2.2	1.9	3.1	2.7	1.6	0.8	0.6	1.5
3. Japan	-0.8	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.2
4. Rest of the World (GDP deflator)	6.0	5.0	4.3	4.2	4.2	4.2	4.3	4.3	4.4
5. Price of oil (Brent crude, level, USD/bbl)	64.5	112.0	105.0	114.0	119.1	121.1	121.7	123.4	147.0

First, "exit strategies" from previous economic stimulus plans, which are heavily tilted towards (sometimes front-loaded) fiscal austerity based on public spending cuts and tax increases, should lead to slower than necessary economic growth. This is expected to be the case in the United States, due to debates and/or outright political gridlock over budgets and federal debt ceilings, which are expected to continue to affect fiscal policy over the coming years. It is also expected to be the case in the euro area, whose new fiscal compact should ensure austerity through to 2024 and beyond. As for Japan, it remains to be seen how recent political declarations in favour of achieving long-run fiscal sustainability will play out in terms of effective policy implementation. Second, all of the major economic areas are projected to embark on paths of historically low trend output growth rates, be it due to low trend productivity growth, unfavourable demographics, or both.[5]

In this context, public sector borrowing requirements are projected to decline and primary surpluses to emerge, allowing at least temporary declines in public sector debt-to-GDP ratios. However, debt ratios should remain very sensitive to increases in interest rates, in unemployment rates and in dependency ratios, particularly in the euro area and Japan.

[5] See the projection assumptions regarding long-run trends for the major economic areas in the tables of section 12, pp. 66-81, or the graph illustrations of these trends in section 13.2, pp.89-115.

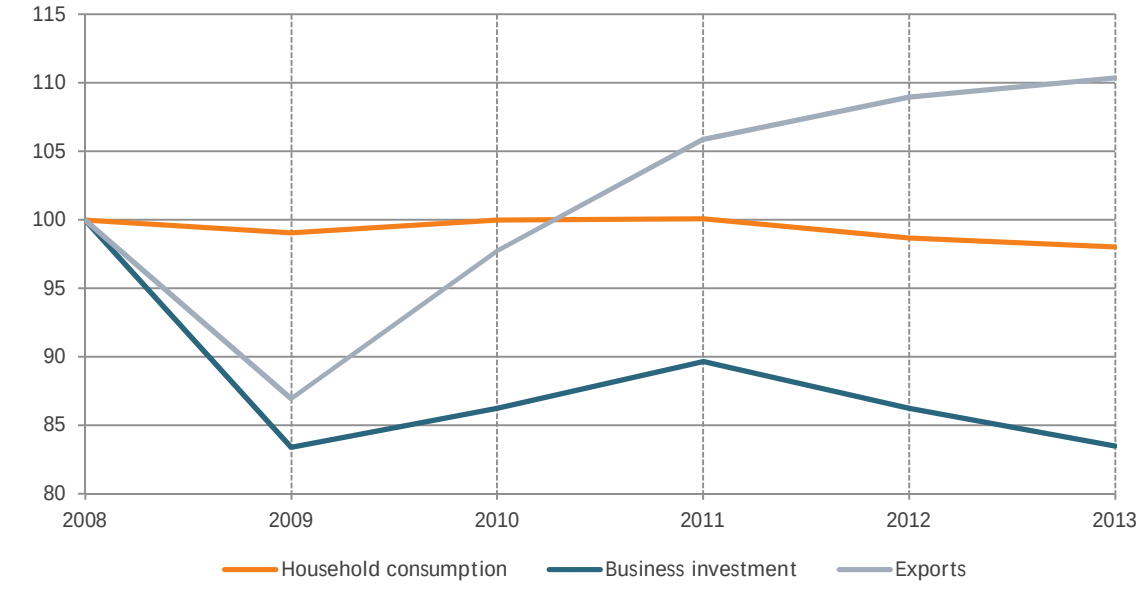
5. Projection results for the euro area

5.1. The short-term projection

5.1.1. The recent past

In 2009, after the outbreak of the economic and financial crises, the euro area economy was severely affected by a rise in counterparty default risk in credit markets, bringing about a liquidity shortage, and by particularly sharp budgetary consolidation that was set in place in a number of peripheral euro area economies. The synchronisation of the economic downturn on both sides of the Atlantic did not help to soften the blow. As the financial sector, non-financial corporates, households and public sectors began their simultaneous deleveraging, the euro area unemployment rate rose from 7.7% of the labour force in 2008 to 11.5% in 2012.

Graph 1 **Selected components of final demand**
(Chained volume indices, 2008=100; historical data for 2008-2012)



Source: AMECO; NIME

As businesses, households and governments adopted risk-off behaviors and generally attempted to increase their precautionary saving, fixed capital investment and household consumption expenditure were negatively affected. The international synchronisation of the downturn ensured that exports could be of only little relief in underpinning output growth.

Despite a marginal uptick in 2010, private household consumption expenditure in the euro area has been stagnating since 2008, exhibiting a decline of about -1.3% between 2008 and 2012. Similarly, business sector real gross investment fell by about -13% over the period 2008-2012. Exports plummeted by 13% in year-on-year average terms (yoy) in 2009 as external demand, global production chains and trade finance collapsed. However, they have since recovered, rising by 9% over the entire period

2008-2012. In 2012, real net exports provided a 1.3 percentage point (pp) contribution to real GDP growth, partly off-setting the -1.9 pp negative contribution from final domestic demand.

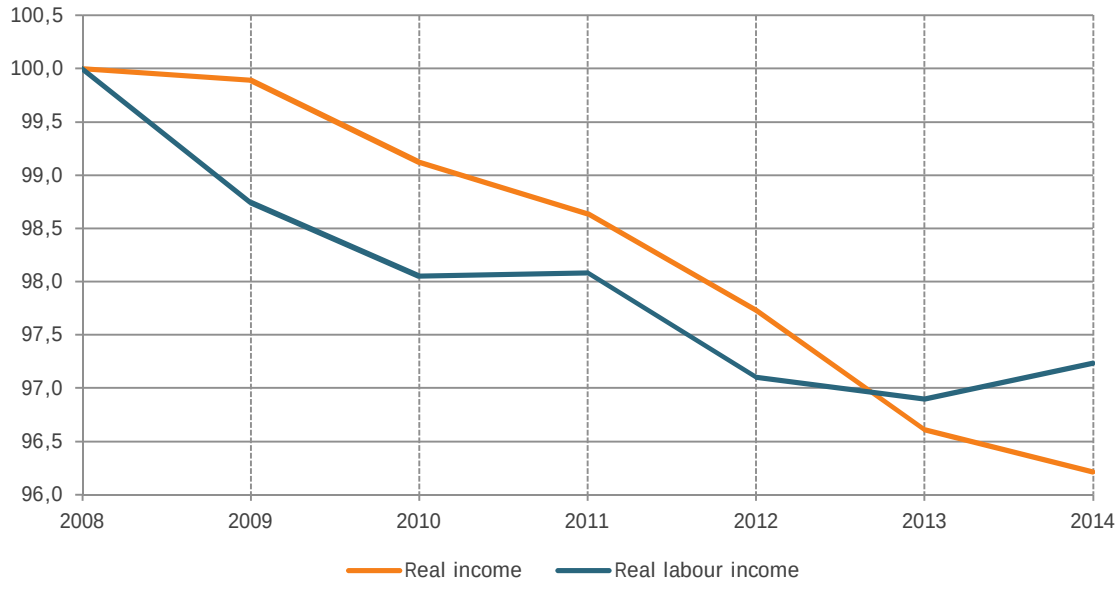
5.1.2. The short-term outlook: 2013 to 2015

a. The outlook for 2013

In 2013 and in year-on-year average terms, the economic situation of the euro area is not expected to brighten. The area's unemployment rate is forecast to continue to rise, reaching 12.1% for the year. This comes as both the public sector and the private business sector are expected to continue to cut personnel, leading to a decline of -0.6% in labour services for the economy as a whole.

At the same time, real take-home wage rates are expected to remain unchanged relative to 2012, while declining in the public sector. This evolution outpaces the yearly change in labour productivity, implying that real unit labour costs should rise, relative to 2012.

Graph 2 **Household real income and real labour income**
(Euros of 2005, Indices, 2008=100)



Source: AMECO; NIME

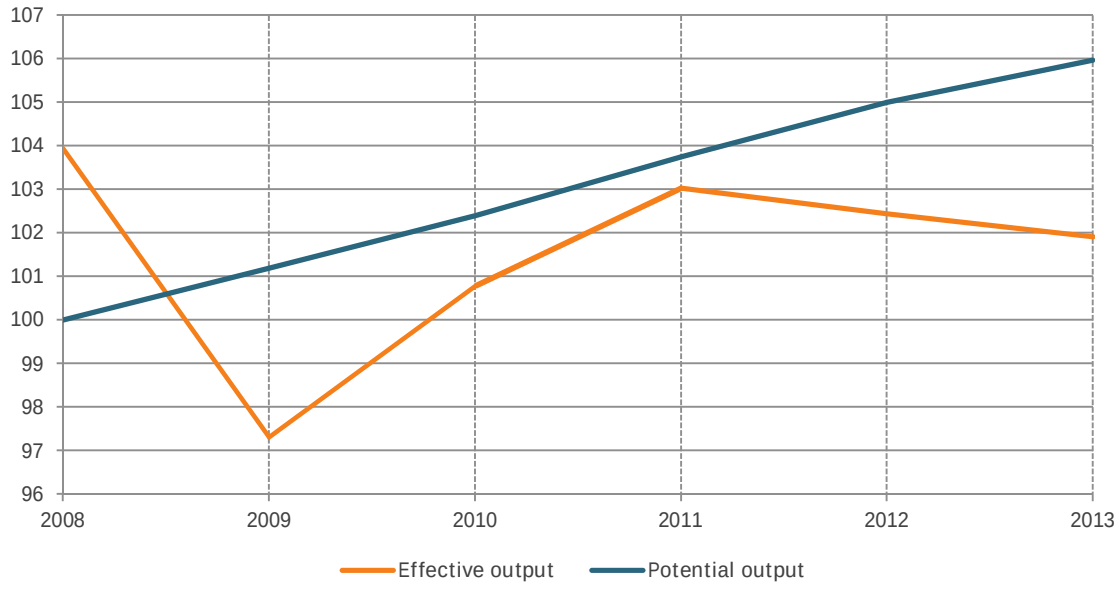
Employment and real wage developments combined to reduce household wage income by -0.2% in 2012, coming after a -1% decline in 2011. As for household real gross disposable income, it should decline by -1.1% in 2013, after a -0.9% fall in 2012. In 2013, the household sector's real disposable income should be -2.3% below its 2008 level.

Disposable income is also affected by the steady increase in tax rates in the euro area, where implicit tax rates on income and value added and rates of social contributions all combine to raise the overall tax take of government from 42% of GDP in 2009 to 44.4% of GDP in 2013.

While employment, wage and fiscal developments, as well as ongoing credit constraints amid lingering concerns over counterparty risk and solvency issues, all continue to weigh on the euro area's domestic demand, the area's foreign effective demand is expected to rise significantly in 2013, paving the way for a rise in export volumes. Foreign effective demand growth has been unstable since 2008, with years of robust growth in 2009 and 2011 giving way to years of weaker growth, as in 2010 and 2012. The year 2013 should see foreign effective demand progress by 3.5%, as compared with an increase of just 0.8% in 2012. This up-tick in growth of foreign demand in 2013 stems mainly from a rise in output in the non-euro EU Member States, as well as in Japan.

In 2013, final domestic demand is expected to fall by -1.1 yoy, with declines in all of its major components. Euro area real exports are forecast to rise by 1.3% in 2013. This rise comes as growth in foreign effective demand rebounds and in the wake of the significant effective exchange rate depreciation of the euro over the period 2010-2012. At the same time, real imports are expected to fall by -1% yoy in 2013. This leads to a contribution to real GDP growth of -1 pp for final domestic demand and of 0.3 pp from exports. However, given the decline in imports, the contribution to real GDP growth from net exports is 0.6 pp, leading to an overall yoy decline in the area's real GDP growth rate of -0.5%.

Graph 3 **Private business sector output gap**
(Chained volume indices, Potential of 2008=100)

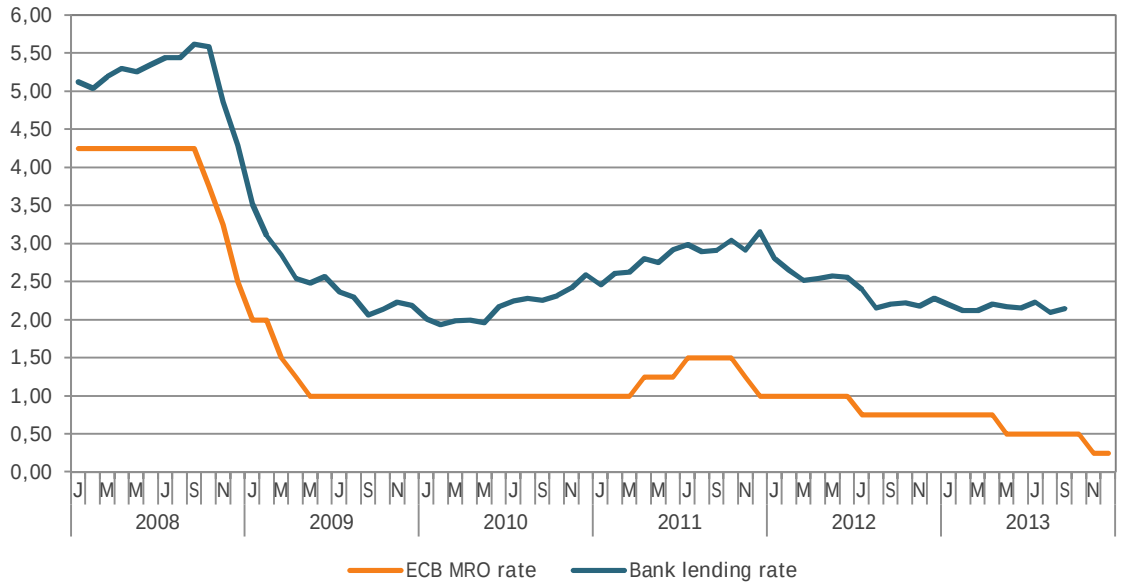


Source: NIME

The yearly average price of Brent crude oil is expected to reach 105 US dollars per barrel (USD/bbl), down from 112 USD/bbl in 2012. Given the euro exchange rate appreciation vis-à-vis the USD, this leads to a -7.2% decline in the price of oil expressed in euro. The euro's nominal effective appreciation tends to limit the rise in the price of imported inputs, as attested by the fact that the deflator of imports should rise in 2013 by just 0.9% yoy. As for labour costs, the prevailing high unemployment is expected to limit the rise in real wage rates, though the yoy percentage change in real unit labour costs reaches 1.2% in the private business sector. The rise in the business sector's output deflator at basic prices is expected to be just 0.4%, while the rise in terms of terms market prices should be 0.7% given the effects

of a rise in value added tax (VAT) rates. The deflator of private consumption expenditure at market prices is forecast to increase by 1.6% yoy in 2013, as compared to a rise of 2% in 2012.

Graph 4 **ECB policy rates and euro area bank lending rates**
(In %; ECB: MRO rate; Bank rate: average euro area bank lending rate on 1-year new loans of over 1 million euro to non-financial corporations)



Source: ECB; author's calculations for monthly averages

This decline in inflation is consistent with the weak domestic demand and high unemployment that has prevailed since 2011. Indeed, the lack of demand constrains firms' mark-up behavior and limits the rise in production costs. This situation of slack in production or of low rates of capacity utilisation is reflected in the euro area's output gap, which measures the percentage gap between the effective level of output and the ideal, full employment, level of output in the private business sector. Indeed, we estimate that in the euro area, the output gap was positive in the three years leading up to the crisis in 2008, indicating that the area's economy was growing rapidly and risking the emergence of inflationary pressures in product and labour markets. Business sector output in 2008 is estimated to have been 3.9% above its non-inflationary or "potential" level. However, in 2009, the abrupt economic downturn had reversed this gap, as real output fell to -3.8% below potential. This now negative output gap then tended to close as initial fiscal stimulus measures helped to cushion the blows to domestic demand and as exports progressed strongly. Indeed, exports benefitted greatly from a 10% nominal effective depreciation of the euro in 2010, which was obtained mainly relative to the Japanese yen and currencies that compose the synthetic currency of the Rest of the World area.

However, as the effects of fiscal consolidation began to kick in, as evidenced by the rise in the tax take as a share of GDP, domestic demand growth weakened once again in 2011 and demand then fell in 2012. Overall output growth is forecast to trail behind potential output growth in 2013 too, leading to a renewed negative widening of the output gap. Indeed, while the output gap was -2.4% in 2012, it is expected to reach -3.8% in 2013.

Box 1 The European Central Bank and euro area financial stability

The economic and financial crises brought about heightened uncertainty as to agents' overall creditworthiness, as the sometimes fine line between the notions of liquidity and solvency were blurred by the systemic, or highly correlated, nature of the financial crisis. Risk premiums on bank loans and bond yields rose rapidly, while reduced overall liquidity shut some agents out of credit markets completely. The re-pricing of risk thus precipitated a rise in interest rates throughout the euro zone, affecting households, corporates and sovereign borrowers, albeit to varying degrees.

The European Central Bank (ECB) resorted to a number of strategies aimed at the two pillars of its activities. These are, firstly, the conduct of monetary policy as defined by its inflation mandate and, secondly, its role in ensuring euro-area-wide financial stability through its roles of lender of last resort (LOLR) and market maker of last resort (MMLR). A more accommodative monetary policy stance was implemented, mainly by shifting from variable rate to fixed rate tenders in its main refinancing operations (MRO), by gradually reducing its main refinancing rate, by conducting its MRO under a full allotment procedure and by the creation of the 3-year full allotment Long Term Re-financing Operations (LTRO) facility. Financial stability was ensured via the creation of the Securities Market Programme (SMP), by modifying its collateral and risk assessment framework so as to allow a broader range of assets and assets of lower creditworthiness to be posted as eligible collateral for its credit operations, by the regular approval of recourse to Emergency Liquidity Assistance (ELA) by euro area national central banks and by the creation of the (still prospective) Outright Monetary Transactions (OMT) facility.

Regarding the ECB's MRO, the ECB cut its main refinancing rate from 4.25% to 3.75% in October 2008, switching at the same time from a minimum bid variable rate tender to a fixed rate full allotment tender. The rate continued to fall, reaching 1.00% in May 2009. In 2011, the ECB decided to raise its main policy rate, bringing it back up to 1.25% in April and then to 1.50% in July 2011. By late 2011, the ECB had revised its economic forecasts and recognised that, contrary to what it had thought, the euro area was not recovering. Indeed, while financial stability appeared to have been preserved, other risks linked to the transmission of monetary policy, to sovereign solvency issues and to outright re-denomination risks had brought renewed tensions in financial markets. The ECB reduced its main refinancing rate to 1.25% in November 2011. In November 2013, faced with the threat of significant disinflationary trends or even of outright deflation in a number of euro area Member States, the ECB further reduced its main policy rate to 0.25%.

While fears of euro area break-up and financial disruptions caused by fragile banking systems and "negative bank/sovereign feedback loops" have receded, here also it should be noted that the current relative calm could well be short-lived. Although EU and euro area governments and EU institutions have been busy creating new funds, facilities, mechanisms and agencies, and drafting new directives and regulations to ensure financial stability, much still needs to be done and credibility still needs to be established. In general, banking systems in the euro area seem to be much more retrenched behind national borders than before the crisis, bank balance sheets remain multiples of home-country GDP and bank balance sheets are also thought to continue to hold assets of questionable value due to regulatory forbearance and the large discretion provided to banks on risk assessment via the complex Internal Ratings Based (IRB) approach of the second pillar of Basel II guidelines on risk assessment. Furthermore, risks relative to bank/sovereign feedback loops have been increased as governments in numerous euro area countries have turned increasingly to "financial repression", requesting that their national banking sector underwrite and hold their debt obligations. In this light, it appears that while the mere existence of the ECB's OMT facility and ECB President Draghi's promise of 26 July 2012 "to do whatever it takes" has bought the euro area some time for effective financial reform, time is still running out.

Box 1 continued

In this context, the coming transfer of responsibility to the ECB for supervision of the euro area's major banks in the framework of the Single Supervisory Mechanism (SSM) is a source of hope. In the run-up to this transfer of responsibility, the ECB, assisted by national supervisors, is to carry out asset quality reviews (AQRs) and in-depth bank balance sheet assessments, on the basis of which the European Banking Agency (EBA) should then run stress tests for bank resilience. The ECB's supervisory credibility is at stake in this transfer and it is thus in its best interest to ensure that the AQRs and balance sheet assessments reveal the true state of bank balance sheets. Indeed, the ECB would have to take the ultimate responsibility if a bank were to unexpectedly need recapitalisation shortly after successfully passing the coming ECB and EBA assessments. Note, however, that these evaluations thus carry material risks for euro area countries, as under the currently proposed rules for the SSM and the nascent Single Resolution Mechanism (SRM), individual countries would be financially on the hook for any bank recapitalisation and/or resolution that would result from a negative assessment in the course of this procedure, as the costs exposed would be considered to result from "legacy asset" issues.

It is important for an economic and monetary union to possess the right institutions; hence their creation should be based on proper diagnoses of the economic and governance issues that are involved. The current wave of institutional change in the EU consists of largely piecemeal solutions achieving a minimum consensus within the European Council, rather than of wholehearted steps towards greater integration, mechanisms for achieving economic convergence and fiscal solidarity. The economic theory behind the optimal currency area[1] (OCA), in which there is full area-wide financial integration, indicates that in the absence of high labour mobility, the loss of an independent monetary policy by a country joining a currency union should be replaced at the minimum by a common area-wide social safety net. In this light, the current EU blue-prints for future financial integration and for fiscal solidarity fall short, failing to lay down sufficient steps towards efficient rules-based, euro-area-wide mechanisms for bank resolution, for macroeconomic stability and for any significant fiscal burden-sharing.

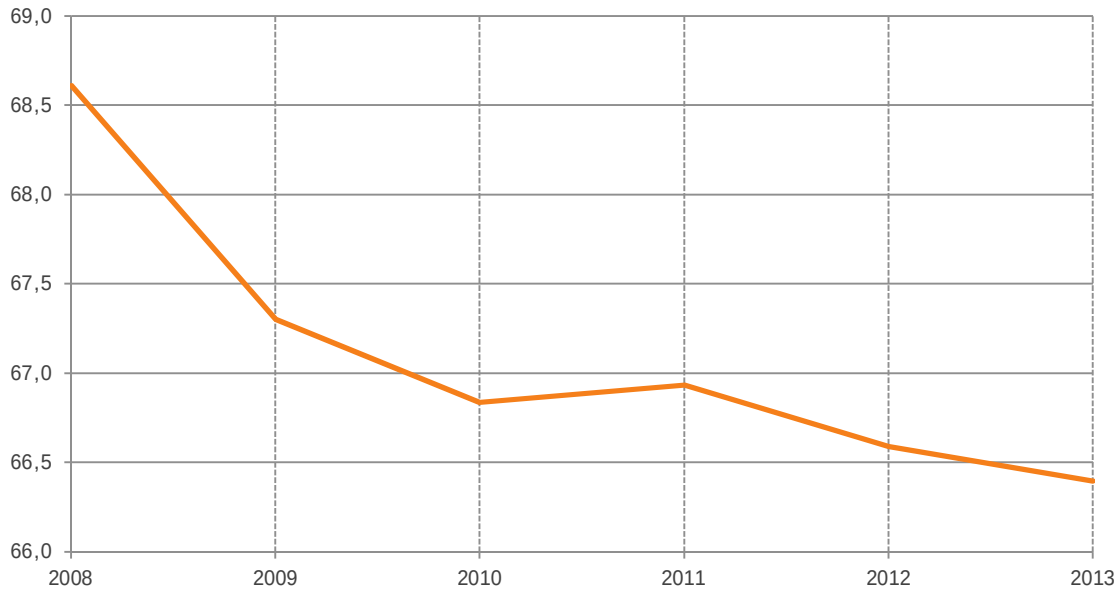
While the creation of the SSM and the first steps forward in the design of a future common resolution procedure are certainly positive developments in the institutional design of the euro area (or the EU), this should not obviate the need for further advances in discussions regarding the usefulness of either one of two possible approaches to increasing euro area resilience: one, the continued implementation of national countercyclical fiscal policies accompanied by medium-term balanced budget rules, strict no-bailout rules and the implied political acceptance of possible sovereign defaults; or two, the joint-and-several issuing of public sector debt obligations by a future euro area (EU) budgetary authority, operating within the framework of a strict medium-term balanced budget rule at the euro area (EU) level, and in which there is no longer any scope for sovereign default.

[1] See: Mundell, R.A. (1961), "A Theory of Optimal Currency Areas", American Economic Review 51 (4); Kenen, P. (1969), "The Theory of Optimum Currency Areas: An Eclectic View," in Robert Mundell and Alexander Swoboda (eds), Monetary Problems of the International Economy, Chicago, University of Chicago Press, pp.41-60; Kenen, P. (1992), "EMU after Maastricht", New York, Group of Thirty.

b. The outlook for 2014

In 2014, the euro area economy is expected to continue to stabilise and recover, conditional on the assumption of the end of financial deleveraging, the return of confidence in the soundness of euro area bank balance sheets and on sound institutions and governance at the EU level. Euro area real GDP growth is forecast to rise to 1.7% yoy, benefitting from both a rebound in final domestic demand and in real export volumes.

Graph 5 **Employment rate**
(Ratio of employment to working-age population, in %)



Source: AMECO; NIME

Household real disposable income from wages is forecast to rise by 0.3% yoy, following two consecutive years of decline. The household sector is also projected to see the value of its stock of real net assets rise, after significant declines since 2011. The evolution of household income is expected to still be highly dependent on government transfers, as real gross disposable income net of transfers would still decline by -1% on the year. Finally, while aggregate real household disposable wage income increases in 2014, real per capita total disposable income is still expected to fall by -0.7% on the year.

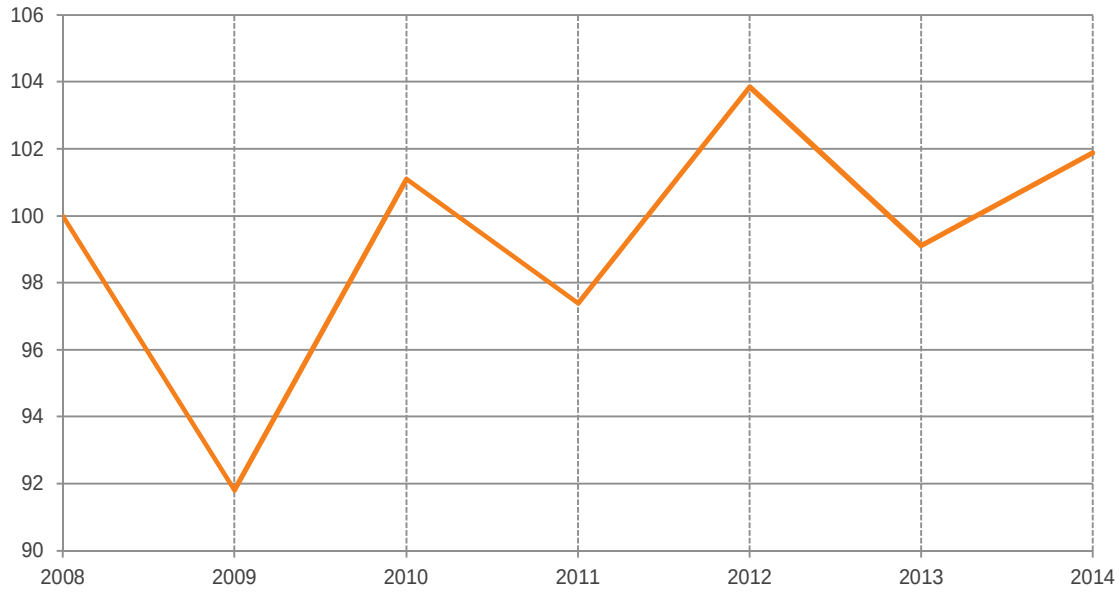
Private consumption expenditure is expected to stabilise, after two consecutive years of decline that have brought it back roughly to its 2008 level in aggregate terms but to its even lower 2004 level in per capita terms. This comes as employment rises by 0.9% on the year[6] in the private business sector. Total economy gross fixed capital formation is expected to turn around and post a 2.5% increase in 2014, boosted by an upturn in household residential investment and a 3.2% rise in business sector investment. All in all, final domestic demand is projected to rise by 0.8% yoy in 2014.

The largest contribution to growth is, however, expected to come from external demand, as euro area real exports are projected to increase by 4.9% yoy. This surge in exports should come about despite a

[6] In terms of the volume of hours worked per year

weakening in foreign effective demand as the Rest of the World area is hit by a strong effective appreciation of its currency; hence, the rise in exports will stem partly from the back-log of export orders of the previous year and partly from an increase in euro area price-competitiveness linked to the significant effective depreciation of the euro (EUR) in 2010, 2012 and 2014. The rise in euro area output in 2014 should lead to a rise in real imports, which thus limits the contribution of real net exports to GDP growth to 0.8 pp, while final domestic demand also provides a contribution of 0.8 pp.

Graph 6 **Nominal effective exchange rate**
(EURs per unit of foreign currency, index 2008=100; historical data for 2008-2012)



Source: NIME

The robust 1.9% increase in private sector output outpaces the expected 0.7% increase in the private business sector's potential output, leading to a reduction in the euro area's negative output gap. Indeed, the private sector output gap should decline from -3.8% of potential output in 2013 to -2.7% in 2014. This indicates that slack in the area's productive capacity is declining, and this can also be noted in the area's unemployment rate, which falls from 12.1% of the labour force in 2013 to 11.2% in 2014. Though the unemployment rate remains high, this apparently modest decline somewhat belies the extent of slack in the labour market as the euro area's NAIRU, or structural rate of unemployment, is projected to increase from 9.8% in 2013 to 10% in 2014. The increase in the NAIRU comes in the wake of, e.g., declining trend productivity growth, rising tax rates and heightened unemployment persistence, the latter of which tends to erode unemployed workers' skills and generate negative signaling and mismatch effects for the longer-term unemployed.

The remaining economic slack should lead to a slight new decline in real take-home wage rates in 2014, which allows a decline in private sector real unit labour costs, a tepid 1.3% rise in output prices and a 1.5% increase in the deflator of household final consumption. Note that as regards oil prices, the price of Brent crude oil expressed in EUR is expected to rise, as both the EUR and the US dollar (USD) are expected to depreciate against the currency of the Rest of the World.

Box 2 Economic adjustment programmes in EU Member States

In May 2010, the dire state of the Greek economy and public finances led to the creation of a Greek Loan Facility Agreement, whereby euro area member states and the IMF agreed to provide Greece with conditional financial assistance, initially set at 110 billion euro, to be disbursed between May 2010 and June 2013. The facility operated on the basis of bilateral state loans that were pooled through the European Commission. However, in March 2012, it was recognised that this first loan programme would be insufficient to meet the country's needs and a second Economic Adjustment Programme of an additional 130 million euro was decided. This second Programme also absorbed the funds remaining from the first Loan Facility Agreement, to rise to a total of 164.5 billion euro. This time, the loan package would be made not by individual euro area member states but by the European Financial Stability Facility (EFSF) and the IMF and would be disbursed in instalments between March 2012 and December 2014. At the same time, it was generally conceded that it was necessary to improve Greece's debt sustainability, and a number of measures were taken to reduce outstanding private sector claims on the Greek state through debt re-profiling, interest rate reductions and debt write-downs, leading to reductions in net present value (NPV) terms of gross outstanding government debt. This *de facto* debt default was officially presented as a voluntary write-down of claims by private creditors and the operation was dubbed "private sector involvement" (PSI).

Since the first Greek loan agreement, other euro area countries have required financial assistance. Ireland, Portugal, Spain and Cyprus have also entered into financial assistance programmes.

In Ireland, a combination of lending from the EFSF, the European Financial Stabilisation Mechanism (EFSM), the ESM, the IMF and the governments of Denmark, Sweden and the United Kingdom was provided. The programme was set up to provide 85 billion euro, over the period December 2010 to December 2013.

The Portuguese programme was set up to provide 78 billion euro, provided by the EFSF, the EFSM and the IMF, over the period May 2011 to July 2014. In April 2013, the limits to the adjustment programme and expected shortfalls in financing were recognised and Portugal's public sector debt was restructured through a seven-year maturity extension, corresponding to a debt reduction in NPV terms.

In July 2012, Spain was granted financial support of up to 100 billion euro through the EFSF, with a view to ensuring financial stability. The programme spans the period from July 2012 to December 2013 and has been transferred to the ESM. Two tranches, totalling 41.3 billion euro, were lent out through the FROB, Spain's bank resolution fund, in December 2012 and February 2013, respectively.

In May 2013, Cyprus was granted assistance through an economic adjustment programme of 10 billion euro agreed with the ESM and the IMF. The assistance programme covers the period from May 2013 to March 2016.

Notwithstanding the rising number of economic adjustment programmes and the efforts at budgetary consolidation, fiscal positions in "programme countries" are not always improving according to plan. Debt sustainability analyses indicate that debt stabilisation, let alone reduction, is often a long way off and is contingent on economic assumptions that could be viewed as overly optimistic, as well as on the continued political and social acceptance of austerity, which could prove to be elusive over the coming quarters or years.

Even though the euro area's output gap should remain negative and inflation subdued in 2014, euro area monetary authorities are expected to raise their main policy rate. The gradual normalisation of the policy rate should bring upward pressure to bear on nominal short-term market rates, raising them from a yearly average of 0.3% in 2013 to 1.3% in 2014. This would lead to a rise in real short-term rates from -1.3% to -0.1% over the same period, thus leaving real rates still slightly below zero.

Regarding the euro area's budgetary position, the rise in income tax, VAT and social contributions rates that occurred over the period 2010-2013 is expected to lead to an aggregate positive gross saving position of 0% of GDP for the general government sector. While the euro area should still post a general government net borrowing requirement of -2.4% of GDP in 2014, this is down from 3% in 2013 and should come with a primary surplus of 0.9% of GDP. Clearly, past efforts at fiscal consolidation are projected to bring about a significant rebalancing of the euro area's aggregate fiscal position. Interest payments on public sector debt are expected to stabilise at 3.3% of GDP.

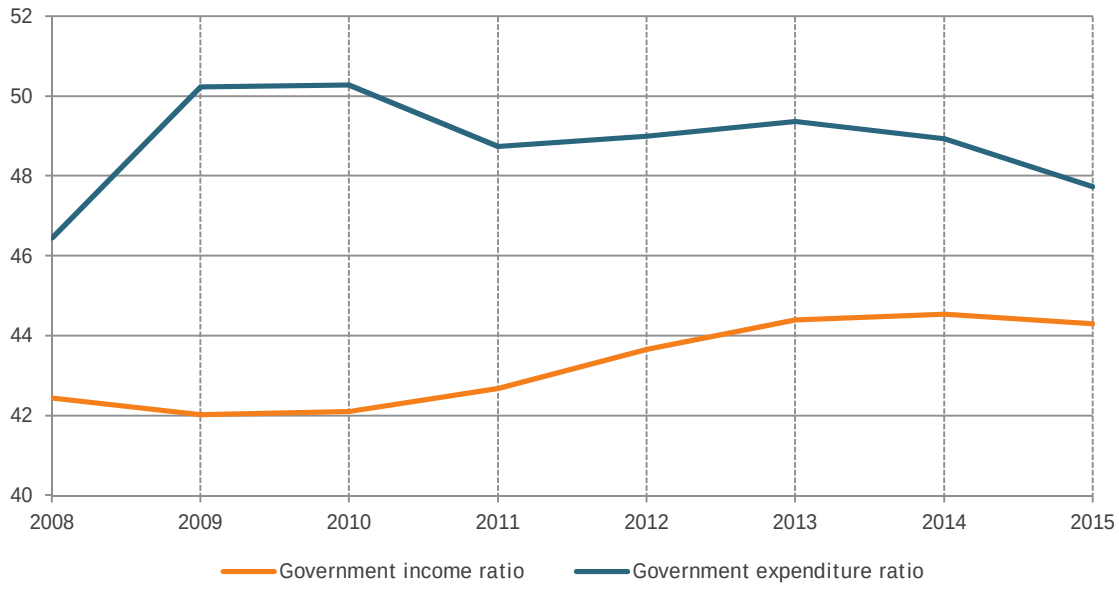
c. The outlook for 2015

The surge in exports of 2014 is expected to help underpin growth in domestic demand in 2015, as should the pent-up demand of the household sector, which has been held back by unfavorable wage and employment developments since the outbreak of the financial and economic crises in 2008. Household consumption is projected to rise in 2015 by a robust 2%. Domestic demand should also be underpinned by the upturn in business investment that materialised in 2014. At the same time, output is projected to benefit from strong foreign effective demand, which leads to a rise in exports of 5.2% in 2015. Exports should rise as the Rest of the World area recovers from its slowdown of 2014, and as price-competitiveness is boosted by the significant effective depreciation of the euro in 2014. Domestic expenditure in 2015 should provide a 1.9 pp contribution to real GDP growth, while net exports should provide a 1.1 pp contribution.

The robust increase in output in 2015 is accompanied by a 1.4% increase in labour services in the private business sector. As employment growth in the public sector is assumed to be nil over the projection horizon, this implies a total economy increase in the demand for labour services of 1.1% yoy. This pushes the unemployment rate down from 11.2% in 2014 to 10.4% in 2015. As the euro area's structural rate of unemployment, the NAIRU, is projected to rise to 10.3% in 2015, this would imply that supply-side conditions would no longer be affected by any significant slack. At the same time, real wage rates in the private sector are projected to rise by 0.4% on the year, such that the 1.7% rise in labour productivity should reduce real unit labour costs by -1.3%. Given the increase in employment, the aggregate household real income from wages is projected to rise by 1.7% in 2015.

The euro area's fiscal stance can be portrayed by the evolution of the share of government spending and revenue in per cent of euro area GDP. Looking at these indicators, we note that in 2015, the ratio of income to GDP is projected to rise from 42.4% in 2008 to 44.3% in 2015. At the same time, the ratio of expenditures to GDP, after rising in 2010 to 50.3% of GDP under the pressure of high unemployment, is projected to fall back to 47.7% of GDP.

Graph 7 **General government income and expenditure ratios**
(In % of GDP; historical data for 2008-2012)



Source: AMECO; NIME

The tightening of the fiscal stance is also visible in the euro area's net borrowing requirement, which is projected to recede from a high of -6.4% of GDP in 2009 to just -1.7% in 2015. The ratio of interest payments to GDP is also expected to remain stable at 3.3% of GDP in 2015. The stabilisation in interest due on gross public debt arises because the debt ratio declines from a maximum of 96.5% of GDP in 2014 to 93.8% in 2015, and because of the still moderate interest rates at which the euro area government sector can finance its annual borrowing requirements. Indeed, while short-term market rates are expected to increase quite strongly, from just 0.3% in 2013 to 2.6% in 2015, and long-term rates are also expected to rise significantly in 2015, this would still leave interest rates well below their average level of the last ten years.

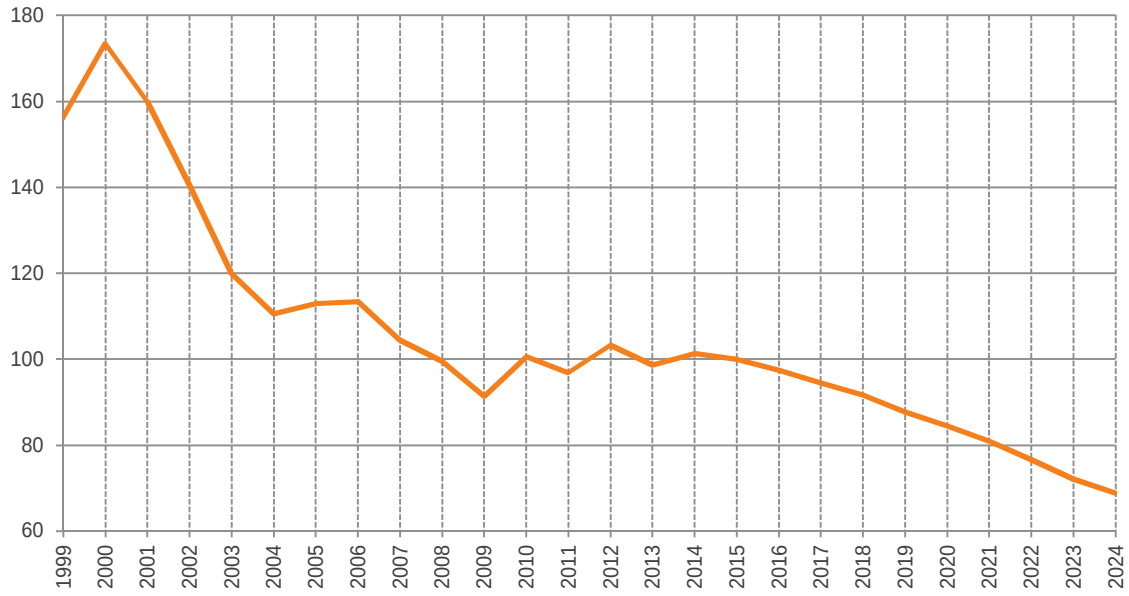
5.2. The medium-term projection

5.2.1. The core medium-term dynamics

The dynamics of the euro area economy are expected to reach a crucial turning point after 2015. Indeed, between 2013 and 2015, the area's economy should benefit from largely favorable external conditions, as the area's effective exchange rate depreciation over the period 2010-2015 allows exports to underpin output growth and off-set the initial weakness in domestic demand growth.

However, as of 2016, the picture changes markedly. Indeed, the euro area effective exchange rate embarks upon a medium-term appreciation just as foreign output growth weakens, thereby limiting the contribution that export growth will be able to provide to the area's GDP growth.

Graph 8 **Nominal effective exchange rate**
(EUR per unit of foreign currency, index 2015=100; historical data for 1999-2012)



Source: NIME

Furthermore, while the euro area's potential labour supply still trends upwards at an annual average rate of 0.4% over the period 2008-2015, boosting potential output, its potential supply of labour is projected to decline at an annual average rate of -0.1% over the period 2016-2024, thus providing a negative contribution to the euro area's potential output growth.

Furthermore, the euro area economy benefitted from a decline in nominal interest rates over the period 2008-2014, even leading to negative real short-term rates between 2010 and 2014. This tended to boost both private consumption and investment, providing initial conditions that were favorable to an economic recovery. Such support is expected to be absent over the period 2016-2024, as both short-term and long-term interest rates rise rapidly after 2014 and yield positive real short-term rates as of 2015.

Hence, over the period 2010-2015, the combination of a rise in structural unemployment, flagging growth in the labour supply and in trend labour productivity and moderate, essentially export-driven

growth in private sector output are expected to close the euro area's negative output gap. From that point on, private business sector real unit labour costs should tend to rise more quickly than labour productivity, curtailing the rise in demand for labour services. All of these factors are expected to produce a significant slowdown in euro area real output and GDP growth over the period 2016-2024.

5.2.2. The medium-term projection results

In 2016, the unemployment rate is projected to reach 10.3%, down from 21.1% in 2013. This would be just 0.1 pp below 2016's estimated NAIRU, which would indicate a stabilisation of the labour market. However, the improvement in unemployment noted over 2013-2015 is then expected to come to a halt and the unemployment rate should rise again as of 2017. This deterioration in the labour market is not caused by any excessive rise in real wages, as real unit labour costs in the business sector fall at an annual average rate of -0.2% over 2016-2024. Indeed, real take-home wage rates rise only modestly, in line with the decline in growth of business sector labour productivity over the period 2016-2022. Thus, while aggregate household real gross disposable income from wages increases by 1.7% in 2015, its rate of growth subsequently falls to 1.4% in 2016 and to 0.2% by 2019. This decline in the growth rate of real disposable wage income is then reversed over 2021-2024.

The reduction in the rate of growth of household real gross disposable income leads to a decline in the growth rate of household consumption, which falls from 1.2% in 2016 to just 0.1% in 2020. Thereafter, real household consumption growth is projected to pick up, reaching 0.7% in 2024.

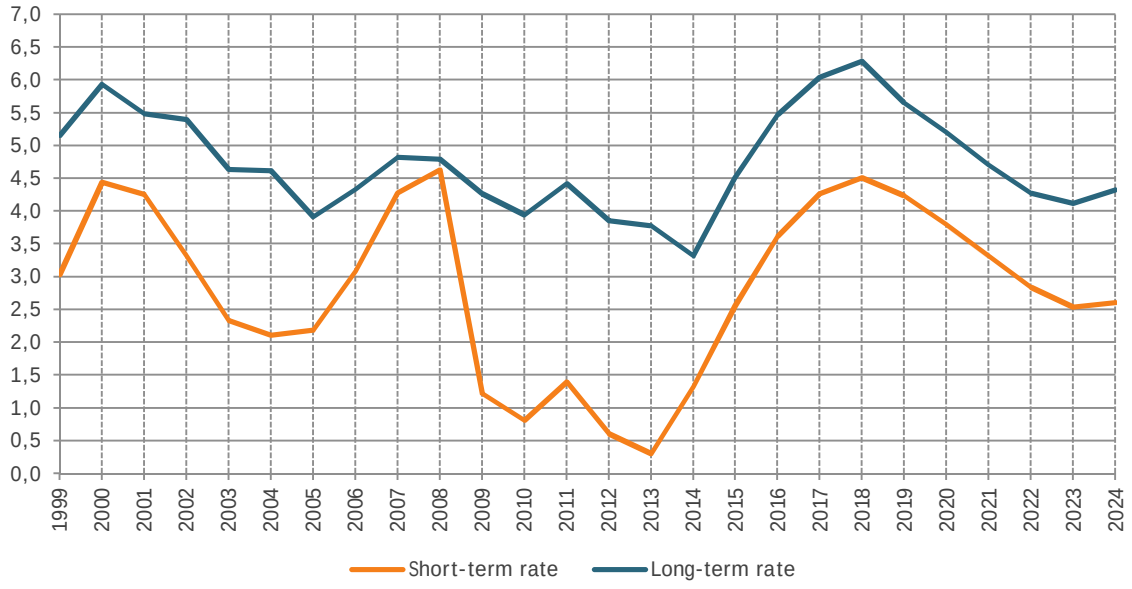
At the same time, euro area exports are projected to be hit by a trend appreciation of the euro's effective exchange rate, which should last throughout the projection period. The currency appreciation stems from international currency arbitrage, whereby international interest rate spreads and expected inflation differentials lead to changes in exchange rates. Consequently, real export growth should fall from 5.7% in 2016 to just 1.2% in 2022, before rising again to 3.5% in 2024. The contribution of real net exports to real GDP growth is also projected to fall off, from 1.2 pp in 2016 to 0.1 pp in 2022, before rising to 0.6 pp in 2024.

The weakening of growth of household consumption expenditure and real exports should limit the rise in euro area output and thus carry over onto business sector investment expenditure. Indeed, after massive declines in investment in the early years of the financial and economic crises, investment is expected to rebound over the period 2014-2016. However, as real interest rates rise, as the volume of labour services falls and as growth in the other components of final demand weakens over 2016-2024, total economy gross fixed investment is also projected to decline over this period.

Over 2016-2017, the euro area's positive output gap is projected to continue to widen, as growth in final demand slows but continues to outpace the tepid rise in potential output. However, as of 2019, the growth slowdown becomes more manifest and the area's positive output gap is projected to close once again. The continued economic slowdown leads to a negative output gap in 2020, which continues to widen through 2023.

The weak final demand that is expected to characterize the euro area economy over 2016-2022 leads to a renewed rise in unemployment. Indeed, the unemployment rate is projected to fall from a high of 12.1% in 2013 to 10.3% in 2016, but should then begin to rise and reach 11% in 2022, dragging the structural rate of unemployment up with it and thereby reducing long-run potential output growth.

Graph 9 **Nominal short- and long-term market interest rates**
(In %; historical data for 1999-2012)



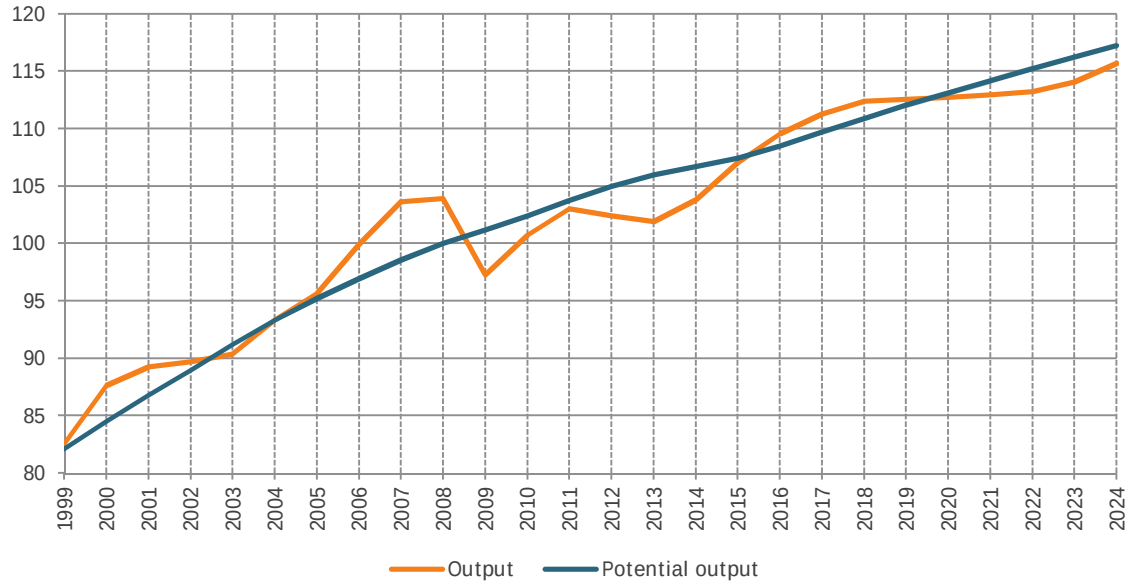
Source: ECB; NIME

The rise in unemployment is projected to reduce nominal wage growth in the private business sector from 2.8% in 2017 to 2.3% in 2023. Real unit labour costs also tend to decline again towards the end of the projection period. At the same time, the re-emergence of a negative and widening output gap in the euro area should lead its monetary authorities to reduce nominal short-term interest rates, driving down both short-term and long-term real rates over 2019-2023.

Over the period 2016-2024, the appreciation of the euro should off-set the rise in the price of imported intermediary inputs, including crude oil. The price of Brent crude is projected to fall from a high of 93 euro per barrel of oil (EUR/bbl) in 2016 to 80 EUR/bbl in 2024. This currency appreciation should thus contribute to limiting the rise in overall production costs, as reflected in the deflator of private sector output, whose rate of growth declines from 1.9% in 2018 to 1.7% in 2024. Consumer price inflation is also projected to be very limited, with inflation falling from a local high of 2% in 2018 to 1.6% in 2023.

The projection indicates that the economic downturn over the period 2016-2022 also has clear repercussions on the budgetary consolidation process. Indeed, while fiscal revenue should rise as a percentage of GDP between 2009 and 2014, it is projected to decline between 2015 and 2019 as domestic activity declines and as the contribution of exports to growth does not generate any revenue in the form of VAT. Furthermore, the economic downturn should lead to higher outlays in the form of unemployment benefits. Finally, the rise in interest rates that occurs between 2014 and 2018 affects the public sector's borrowing rate and tend to raise payments due on the gross public sector debt. Indeed, the debt interest payments-to-GDP ratio is projected to rise from 3.3% in 2013 to 3.9% in 2024.

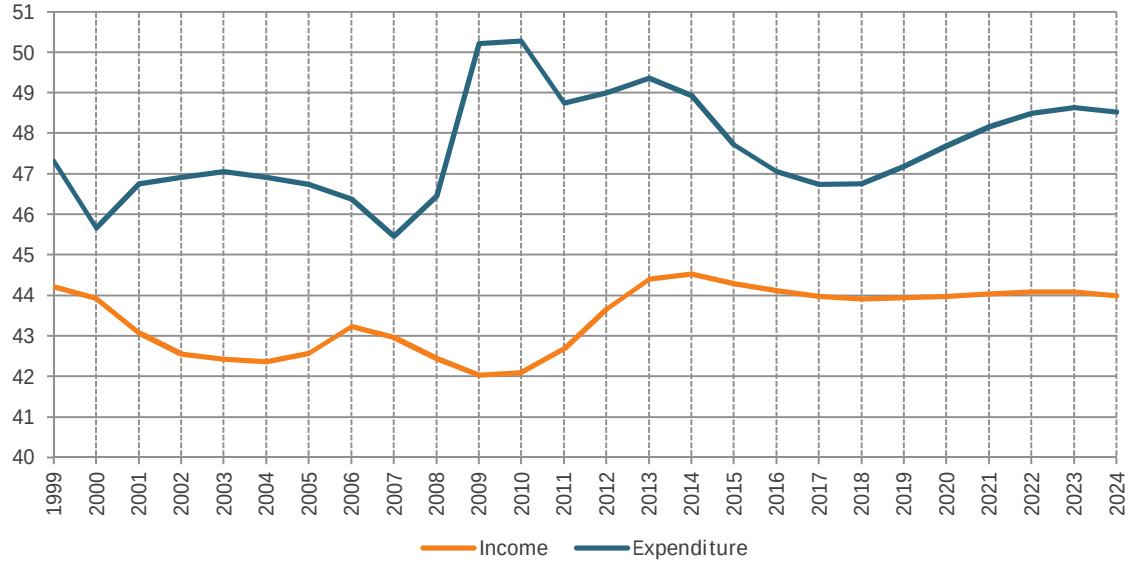
Graph 10 Private business sector output and potential output
(Indices, Potential of 2008=100; historical data for 1999-2012)



Source: NIME

The projection further indicates that the euro area's public sector net borrowing requirement should decline over the period 2013-2017, but rise again as of 2018 as the share of current expenditure-to-GDP rises between 2018 and 2023, due in part to the rise in transfer payments to households over this period. The euro area government sector primary fiscal balance, which is equal to the headline budgetary position excluding interest payments on debt, should remain in surplus throughout the period 2013-2024, indicating that the fiscal consolidation process is generally respected and that deviations from consolidation are essentially linked to interest payments due on public sector debt.

Graph 11 General government income and expenditure ratios
(% of GDP; historical data for 1999-2012)



Source: AMECO; NIME

Table 2 Selected point projection results for the euro area

	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)								
1. Private consumption	-1.4	-0.7	0.5	2.0	1.2	0.7	0.5	0.2
2. Public consumption	-0.1	-0.3	-0.8	0.3	0.5	0.6	0.6	0.5
3. Gross fixed capital formation	-3.9	-2.1	2.5	3.6	1.2	-1.4	-2.7	-1.7
4. Total domestic expenditure	-1.9	-1.1	0.8	2.0	1.1	0.3	-0.2	-0.1
5. Exports	2.9	1.3	4.9	5.2	5.7	5.4	4.4	2.1
6. Imports	-0.9	-1.0	1.8	0.9	1.2	0.6	0.6	1.0
7. Gross Domestic Product	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.3
8. Contributions to real GDP growth								
a. Total domestic expenditure	-1.9	-1.0	0.8	1.9	1.0	0.2	-0.1	-0.1
b. Net exports	1.3	0.6	0.8	1.1	1.2	1.3	1.1	0.4
II. Deflators (growth rates, unless noted otherwise)								
1. Private consumption	2.0	1.6	1.5	1.6	1.8	1.9	2.0	1.7
2. Gross Domestic Product	1.2	1.1	0.8	1.6	1.6	1.8	1.9	1.8
III. Financial markets (levels in %, unless noted otherwise)								
1. 3-month money market rate (Euribor, %)	0.6	0.3	1.3	2.6	3.6	4.3	4.5	3.2
2. Nominal effective exchange rate, growth rate (EUR per foreign currency unit, + is depreciation)	6.6	-4.6	2.8	-1.3	-2.6	-3.0	-3.0	-4.7
IV. Labour market (growth rates, unless noted otherwise)								
1. Unemployment rate (% civilian labour force, level)	11.5	12.1	11.2	10.4	10.3	10.4	10.5	10.8
2. Real unit labour costs, business sector	0.3	1.2	-1.2	-1.3	-0.7	-0.6	-0.3	0.0
V. Household sector (growth rates, unless noted otherwise; deflated by consumer prices)								
1. Real gross disposable income	-0.9	-1.1	-0.4	0.5	0.7	0.7	0.8	0.6
2. Net saving rate, household sector (in % of disp. income)	8.0	8.0	5.3	3.7	3.3	3.3	3.6	5.5
VI. Public sector (growth rates, unless noted otherwise)								
1. Net lending/borrowing (+/-) of general government, in % of GDP	-3.4	-3.0	-2.4	-1.7	-1.3	-1.2	-1.4	-2.7
2. Primary balance, in % of GDP	-0.2	0.3	0.9	1.6	2.0	2.2	2.0	1.0
3. Gross public debt, in % of GDP	93.9	96.4	96.5	93.8	91.6	89.7	88.6	91.0
VII. Miscellaneous (growth rates, unless noted otherwise)								
1. Trade balance, in % of GDP	2.4	2.7	3.0	3.8	4.7	5.7	6.6	7.4
2. Output gap (effective output, % deviation from potential)	-2.4	-3.8	-2.7	-0.4	1.0	1.4	1.4	-1.0

6. Projection results for the United States of America

6.1. The short-term forecast

6.1.1. The recent past

After the panic that hit financial markets in 2007, leading, e.g., to the collapse of Bear Stearns in March 2008 and Lehman Brothers in September 2008, to the buy-out of Merrill Lynch & Co. by Bank of America in September 2008 and to the bail-out of American Insurance Group (AIG) in September 2008 by the Federal Reserve and the US Treasury, the US Government took a number of initiatives to help restore financial stability, mainly in the form of the Troubled Assets Relief Program (TARP). TARP was set up in October 2008 to help financial institutions as well as industrial corporations such as General Motors and Chrysler recover from the crisis. Through this programme, financial institutions could unload both illiquid and hard to value (toxic) assets and impaired (bad) assets to the Treasury, with a view to ensuring for themselves greater liquidity and/or solvency. This programme is deemed to have been quite successful, turning a profit for the Treasury and leading to relatively rapid bank recapitalisation and restoration of financial stability, accompanied by the normalisation of credit conditions and lending rates throughout the United States.

Due to the rapid implementation of financial stabilisation measures, accompanied by the American Recovery and Reinvestment Act (ARRA), the US economic stabilisation plan of February 2009, the US economy began to emerge from the financial and economic crises as of 2010. In 2011, both private sector output and real GDP had exceeded their pre-crisis levels of 2007, whereas euro area real GDP is only expected to rise above its historical maximum level of 2008 in the course of 2014.

After declining by -0.6% in 2008 and then by a further -1.9% in 2009, US real household consumption expenditure[7] returned to growth in 2010, rising by 1.8% yoy. Consumption has since continued to rise at a moderate pace, progressing in 2013 by 8.2% from its trough of 2009. The upswing in economic activity has been broad-based since 2010, with all components of final demand contributing to growth, with the exception of the general government sector. Indeed, while public consumption rose in real terms over the period 2008-2011, it fell in 2012 and should do likewise in 2013. Public sector investment increased over 2008-2009 but then fell markedly in the period 2010-2012. Public spending tended to rise as unemployment rose over the first years of the crisis, because the payment of unemployment benefits increased, and as public spending under the provisions of ARRA played its role in the stabilisation of the US economy. However, as ARRA was phased out, it began to contribute negatively to real GDP growth. Then, in the wake of the 2011 Simpson-Bowls commission debates surrounding the federal budget deficit and the US debt ceiling limit, the Budget Control Act of 2011 was signed into law, the provisions of which then combined with the winding down of military operations abroad to further reduce government spending.

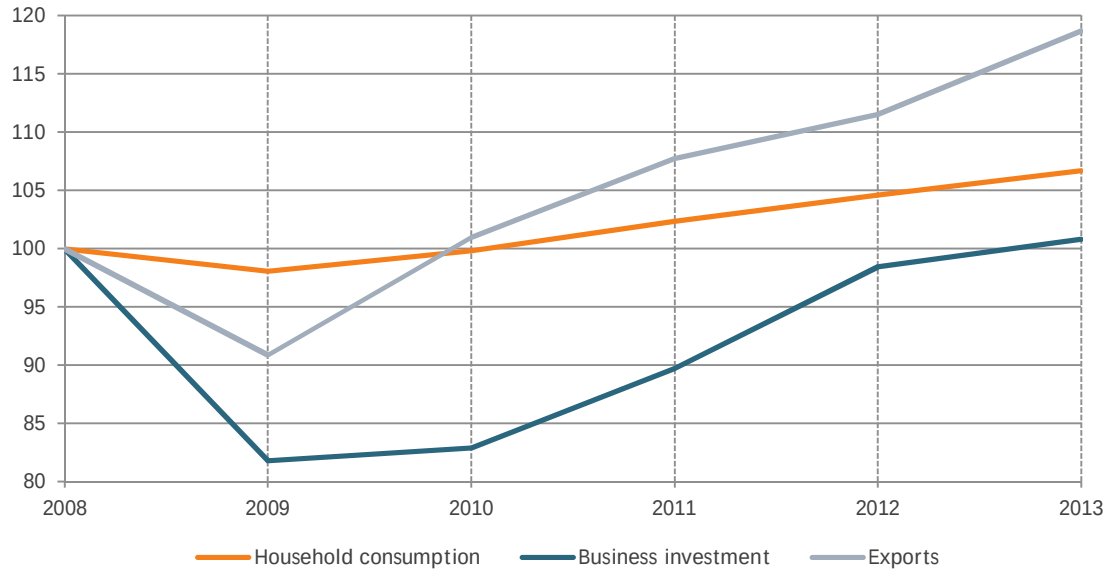
[7] The US data in this outlook is still based on NIPA definitions, which predate the latest NIPA comprehensive benchmark revision of 31st July 2013, which brought significant changes to the definition of gross fixed capital formation and intermediate consumption.

6.1.2. The short-term outlook: 2013 to 2015

a. The outlook for 2013

In 2013, household consumption expenditure is expected to rise by 2% yoy. While this is not a stellar achievement from a historical perspective, and could be viewed as disappointing when compared with the growth rates of 2011-2012, it still allows private consumption to make a positive contribution to real GDP growth in 2013. Note that the moderate growth in household consumption is, however, expected to be accompanied by a strong rebound in residential investment. This indicates that household resources not directed towards consumption are invested in residential buildings, thereby also underpinning overall growth in domestic demand, which is forecast to increase in 2013 by 1.7% yoy.

Graph 12 Selected components of final demand
(Chained volume indices, 2008=100; historical data for 2008-2013)



Source: AMECO; NIME

Household expenditure should be underpinned in 2013 by low but positive nominal interest rates, which should even remain negative in real terms on the shorter end of the yield curve. Household real income in 2013 should benefit from a rise in employment and the overall volume of hours worked, as well as by a significant 1.7% increase in the real take-home wage rate in the private business sector. All in all, this should boost aggregate household real labour income by 3.3% in 2013, after yearly average increases of just 1.4% over the period 2010-2012.

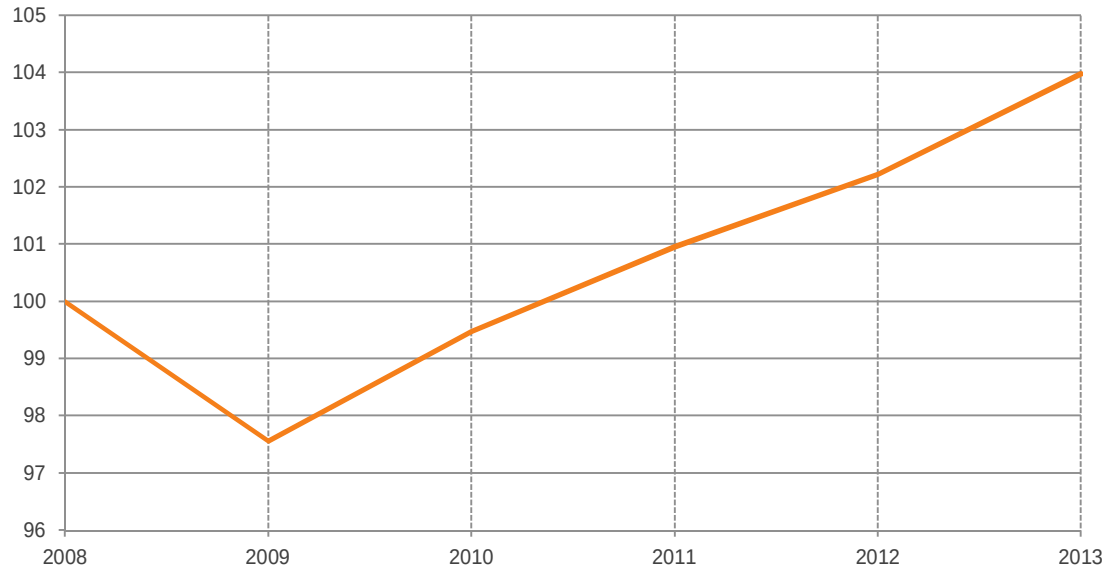
The low - or even negative - real interest rates for the private business sector, accompanied by rising final demand and a still negative but rapidly closing output gap, are expected to increase business sector investment in 2013.

All in all, final domestic demand should increase by 1.7% for the year. Domestic demand growth is accompanied by a continued robust rise in real exports, despite the effective exchange rate appreciation of the USD over 2012-2013. However, the currency appreciation is more limited in real than in nominal terms, due to the very small increases in export prices that were noted over the same period. While real

exports are expected to provide a positive contribution of 0.9 pp to real GDP growth in 2013, the 2.6% rise in real imports should lead to a contribution to real GDP growth of just 0.5 pp for real net exports.

As for the public sector, growth in general government sector[8] employment and investment is expected to progress only very slightly in 2013, while real public consumption of goods and services should decline, producing an overall negative contribution to real GDP growth.

Graph 13 Household real gross disposable income
(Dollars of 2005, Index 2008=100; historical data for 2008-2013)



Source: NIME

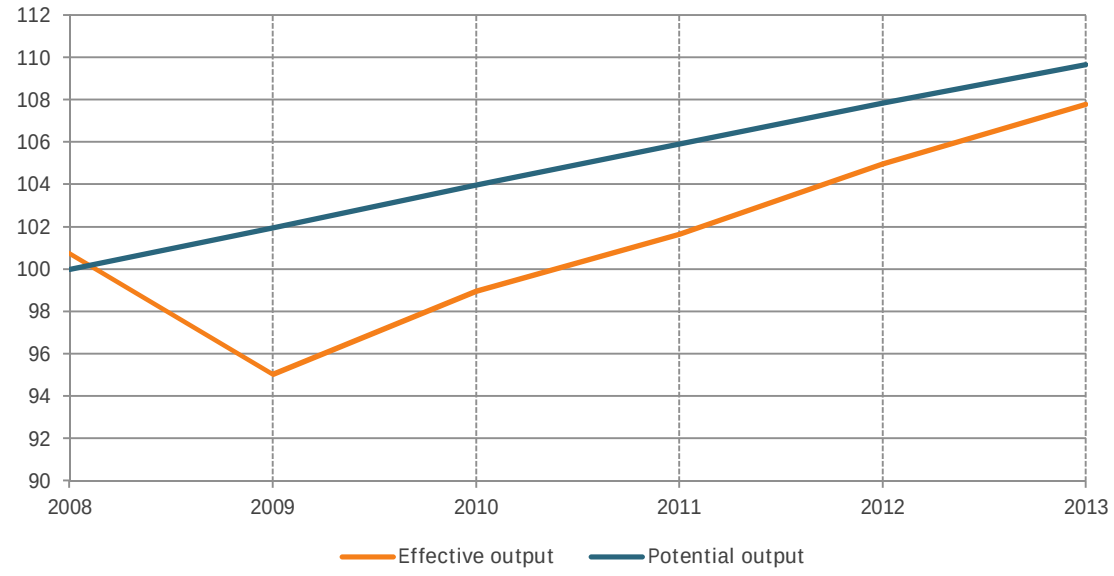
In 2013, real private sector output is forecast to rise by 2.7% yoy, while the sector's potential output is expected to increase by 1.7% on the year. Hence, the US's negative output gap should close by a further 1 pp on the year, moving from an estimated gap of -2.7% in 2012 to -1.7% in 2013. The rise in US real output occurs along with a decline in the unemployment rate, which falls from 8.2% of the labour force in 2012 to 7.9% in 2013, in yearly average terms. At the same time, the estimated NAIRU for the US is expected to decline from 7.9% in 2012 to 6.9% in 2013, generating a rise in the country's unemployment gap and providing a positive contribution to potential output growth.

The persistent negative output gap and positive unemployment gap in 2013 indicate that the US economy will still be producing at a level that is below its level of potential output. This is further attested by the continued decline in the rate of consumer price inflation and by the limited increase in real unit labour costs. Indeed, the deflator of household consumption expenditure is forecast to rise in 2013 by just 1.4% yoy, falling from 1.8% in 2012. The rise in output prices should be a little higher, at 2.5% in 2013, due to a slight rise in real unit labour costs, in the price of intermediary inputs and in the user cost of capital.

Hence, despite the rapid closing of the output gap, some slack should remain in the US economy, explaining the continued low nominal interest rates, which also remain negative in real terms.

[8] The general government comprises federal, state and local authorities, as well as social security administrations.

Graph 14 Private business sector output gap
(Chained volume indices, Potential of 2008=100; historical data for 2008-2012)



Source: NIME

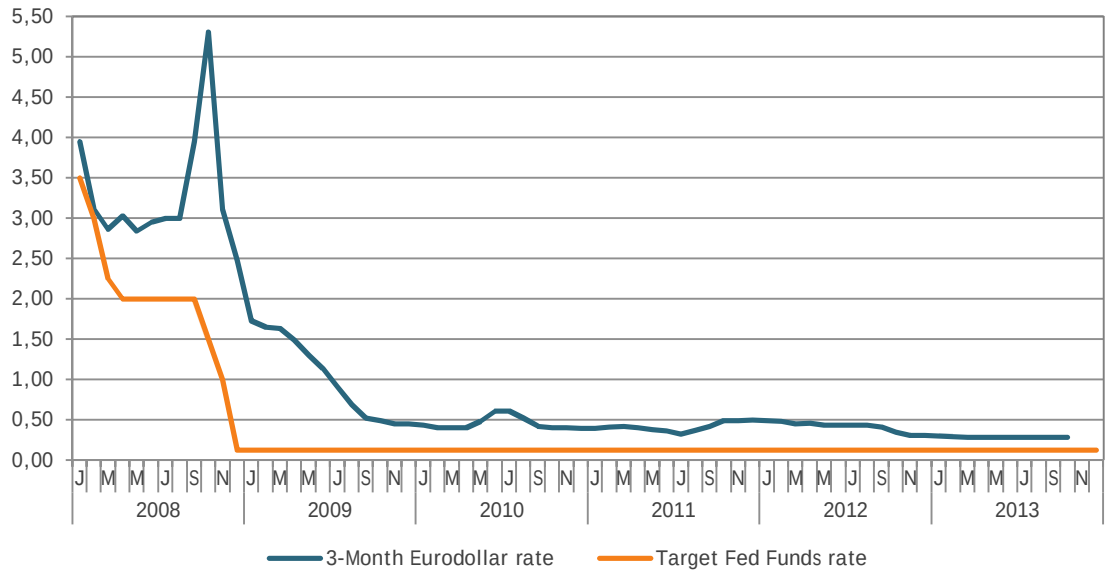
The US's implicit tax rate is expected to continue to rise in 2013, contributing to the rising ratio of tax revenue to GDP. Indeed, while total public sector revenue to GDP was 28.4% in 2009, it should rise to 30.7% in 2013 as a combination of higher tax rates and higher growth boost the overall tax take. At the same time, total public spending in the economy is expected to continue to fall, declining from 41.7% of GDP in 2009 to 39.2% of GDP in 2013. The overall unified net borrowing requirement of general government is thus expected to decline from a high of -11.9% of GDP in 2009 to -7.1% of GDP in 2013. Debt interest payments should, however, continue to rise in percentage terms, increasing from 2.9% of GDP in 2012 to 3.1% of GDP in 2013. Given the expected net borrowing requirement of 2013, the US's gross general public sector debt-to-GDP ratio should rise from 109.6% in 2012 to 111.8% in 2013.

b. The outlook for 2014

As the US general government is assumed to pursue its efforts at fiscal consolidation, tax rates on labour income are expected to rise, widening the gap between the business sector cost wage rate and households' take-home or pocket wage rate. Indeed, the producer real wage rate is forecast to increase by 2.2% in 2014 while the take-home real wage rate should rise by only 0.9% on the year. The rise in real wages still allows for a -0.2% decline in real unit labour costs in the private sector, increasing the amount of labour services demanded by the private sector. Business sector labour demand rises by 1.5% in 2014, while government sector labour demand progresses by 1.1% on the year, bringing the rise in total labour demand up to 1.4% yoy. The simultaneous rises in real wage rates and in employment raise the household sector's aggregate labour income by 2.7% in 2014.

The rise in household income allows a 2.4% rise in household consumption, accompanied by another strong rise in residential investment. Note that household expenditure is also underpinned by the still relatively low level of interest rates, by a decline in real money balances and by a rise in the household sector's aggregate real wealth, as well as by a decline in the household saving rate.

Graph 15 Federal Reserve target Fed Funds rate and 3-month Eurodollar rate
(In %)



Source: US Federal Reserve

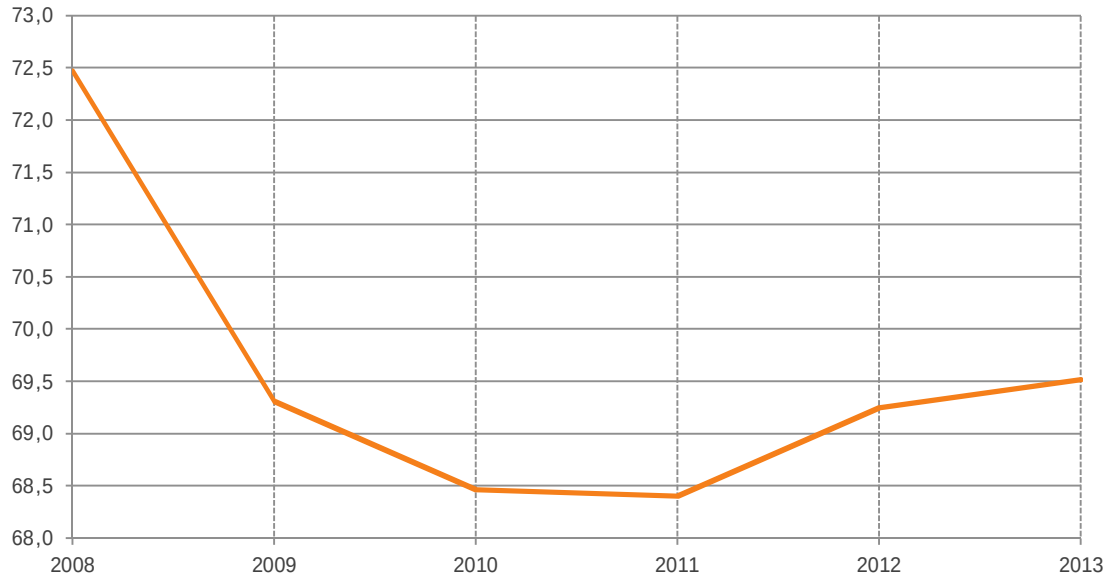
Business sector investment is forecast to continue to rise, posting an increase of 5.8% yoy as the US economy's output gap turns positive and as the real GDP growth rate rises.

All in all, US final domestic demand is expected to rise by 3% yoy, providing a positive contribution of 3.1 pp to real GDP growth.

Real exports also continue to rise in 2014, progressing by 7.4% for the year. Exports should rise despite a growth slowdown in foreign effective demand, which is due to a significant slowdown in economic activity in the Rest of the World area. Nevertheless, export growth should be boosted by a significant effective depreciation of the USD, occurring mainly against the Rest of the World currency and against the Japanese yen (JPY). As of 2014, the USD embarks upon a long-run trend depreciation, which will allow the US to run up current account surpluses over the latter half of the projection period. In 2014, exports are expected to provide a positive contribution to real GDP growth of 1.1 pp. However, as imports are forecast to rise strongly in 2014, the contribution of net exports should be a modest 0.1 pp on the year.

In 2014, the strong rise in final domestic demand should push effective private sector output above the sector's level of potential output, implying that any slack in terms of resource utilisation will then have disappeared. We estimate that the private business sector output gap will swing from a negative gap of -1.7% in 2013 to a positive gap of 0.2% in 2014. Furthermore, in 2014 the US economy's unemployment gap is also expected to nearly close, with the unemployment rate falling to 7.2%, marginally above the 6.9% level of the NAIRU. Growth in output prices are, however, expected to remain limited, reaching just 1.1% in 2014, as real unit labour costs decline and as real interest rates remain low. However, the price of Brent crude oil imports rises in 2014, jumping from 105 USD/bbl in 2013 to 114 USD/bbl in 2014 due to the depreciation of the USD against the currency of the Rest of the World. This rise brings some upward pressure to bear on unit production costs.

Graph 16 Employment rate
(In % of working-age population)



Source: AMECO; NIME

As a positive output gap emerges in 2014, US monetary authorities are expected to change their policy stance and begin raising their target policy rate, the overnight Federal Funds rate, with a view to gradually raising interest rates across the yield curve. The nominal short-term market rate[9] is expected to rise from a yearly average level of about 0.3% in 2013 to 1.2% in 2014, with a simultaneous increase in the real short-term rate from -1.1% to -0.3% over the same period.

In 2014, the continued rise in tax rates, declining public consumption and flat public sector investment are expected to reduce further the US general government net borrowing requirement. The total tax take should rise as rates on household labour income and social contributions rates increase, and as tax bases rise with the greater growth momentum. Total revenue should rise from 30.7% of GDP in 2013 to 31.9% of GDP in 2014, while total expenditure should fall from 39.2% of GDP to 39% over the same period. The primary budgetary position is forecast to fall from a net borrowing requirement of -4% of GDP in 2013 to -2.6% in 2014, while the headline borrowing requirement, which includes interest payments on debt, falls to 5.6% of GDP. Given the renewed borrowing, the gross public sector debt should rise by 1.1 pp in 2014, bringing the debt ratio to 112.9% of GDP. Note that the US fiscal stance presented here does not reflect possible tightening that could occur in the context of the looming renewed debate surrounding the US debt ceiling that should take place as of February 2014.

[9] The 3-month Eurodollar Libor rate

Graph 17 Household real income and real labour income
(Dollars of 2005, Indices, 2008=100; historical data for 2008-2012)

Source: AMECO; NIME

c. The outlook for 2015

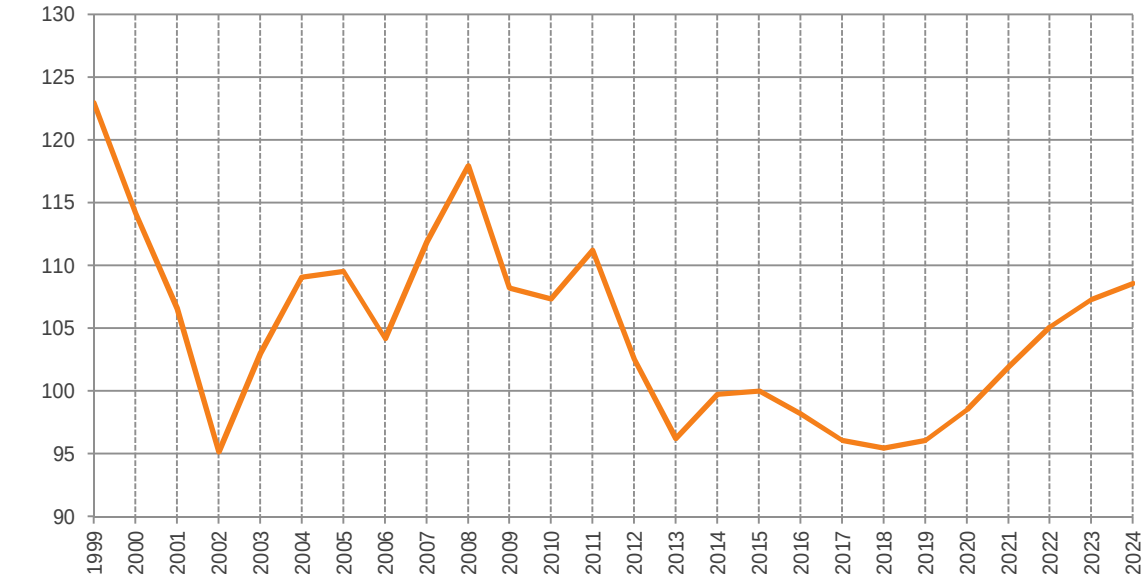
In 2015, growth in real household consumption expenditure is projected to reach 2% yoy, down from 2.4% in 2014 but still a robust figure. Total domestic expenditure should rise by 2% on the year. The rise in domestic expenditure in the preceding years was underpinned by significant transfers from general government to the household sector, but these transfers are expected to be significantly reduced as of 2015. Household spending is projected to be underpinned by a 2.1% rise in real take-home wage rates, accompanied by a 1.7% increase in the demand for labour in the private business sector. The higher wage rates and employment lead to a 3.5% rise in household real labour income.

The higher real wage rates are accompanied by a rise in private sector labour productivity, such that real unit labour costs decline by -0.3% in 2015. The rise in wage costs is further accompanied by a rise in the user cost of capital, as well as by a 4.5% rise in the dollar price of imported Brent crude oil, which combine to raise output prices by 2.4% on the year. However, the rise in nominal interest rates and the re-emergence of positive short-term real rates should act to curtail growth in demand and thus limit the rise in consumer prices, which increase by just 1.7% in yoy terms.

Real exports in 2015 are projected to rise by a strong 10%, benefitting from significant effective depreciation over 2014-2015. Furthermore, the US's foreign effective demand in 2015 progresses by a strong 5.1% yoy, also boosting US export volumes, which contribute 1.5 pp to the year's rate of real GDP growth. However, a 4.4% rise in US imports then limits the contribution to growth of real net exports to just 0.7 pp on the year. The positive net exports that are expected to emerge over the period 2013-2015 and the parallel rise in the country's terms of trade[10] should reduce the US's current account deficit ratio, which falls from -3.5% of GDP in 2013 to just -2% of GDP in 2015.

[10] Defined as the ratio of export prices to import prices

Graph 18 Nominal effective exchange rate
(USD per unit of foreign currency, index 2015=100; historical data for 1999-2012)



Source: NIME

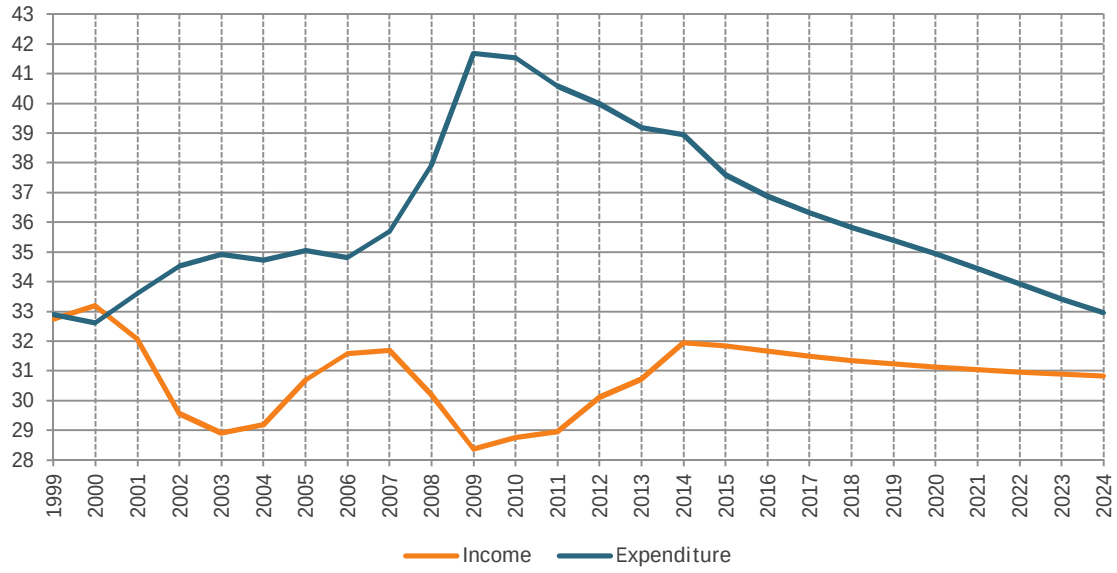
Finally, the US's general government net borrowing requirement is expected to fall from -5.6% of GDP in 2014 to -4.7% in 2015, under the assumption of a decline in real transfers to households, declining growth in real public consumption and a zero growth rate in public sector employment. The declining borrowing requirement and the strong rise in nominal GDP in 2015 should then lead to a decline in the gross public sector debt-to-GDP ratio, which comes out at 111.9% of GDP.

6.2. The medium-term projection

6.2.1. The core medium-term dynamics

By 2016, the US economy's effective output is expected to have exceeded the country's level of potential output, but should embark on a declining path back towards potential. Indeed, the US's output gap in 2016 is projected to be positive at 1.4% of potential output, a level at which US monetary authorities are projected to intervene by raising interest rates so as to rein in real GDP growth, with a view to bringing effective output back into line with potential output levels.

Graph 19 General government income and expenditure
(In % of GDP; historical data for 1999-2012)



Source: AMECO; NIME

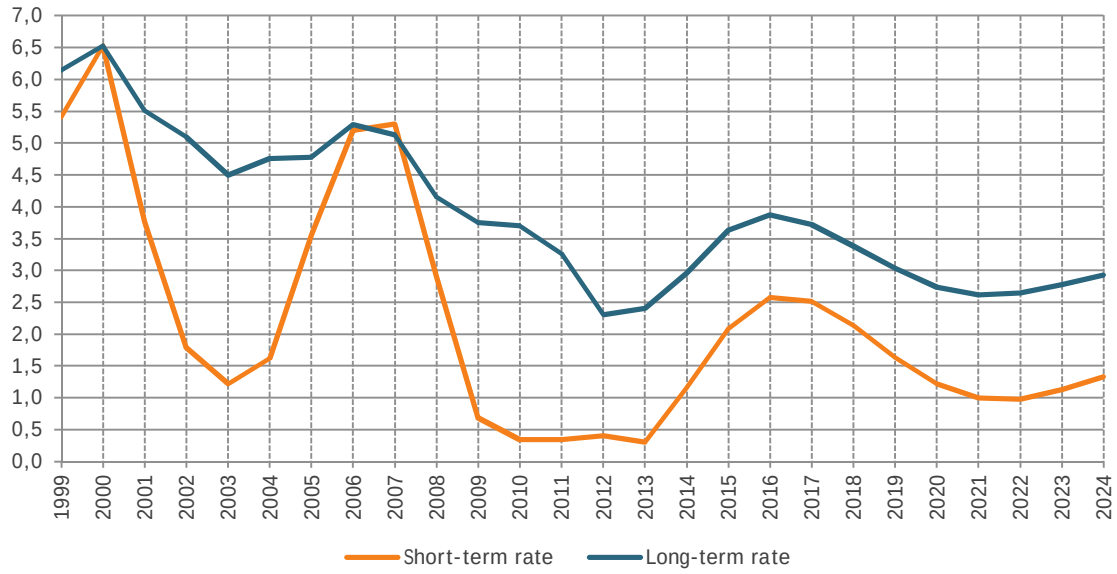
Over 2016-2018, the dollar's nominal effective exchange rate appreciation should lead to a decline in the contribution to growth stemming from real net exports. This loss of external demand should lead the Fed to off-set this by allowing a rise in the contribution to growth from domestic sources, which would require a decline in policy rates over the period 2017-2021. Then, as domestic demand picks up and begins to off-set the loss of support from exports, policy rates should rise once again as of 2023.

Such demand management via monetary policy should allow real private sector output to progress at an annual average rate of 1.9% over 2016-2024, while the US's potential output should rise on average by 2.2% per annum over the same period. As the loss in support to growth from real net exports would not be totally off-set by final domestic demand, an average negative output gap of -0.8% should prevail over the period 2016-2024.

6.2.2. The medium-term projection results

After a brief interruption over the period 2016-2018, the USD exchange rate is projected to pursue its trend effective depreciation from 2019 through 2024. The currency depreciation is projected to be broad-based, occurring simultaneously against the euro, the yen and the aggregate currency of the Rest of the World area. While real exports are expected to continue to rise through 2024, the pace of growth should fall off, converging towards the growth rate of foreign effective demand. At the same time, a relatively strong rise in export prices should limit possible competitiveness-induced gains in export volumes. All in all, the contribution to real GDP growth from real net exports should decline gradually, from 0.5 pp in 2016 to nil in 2024.

Graph 20 Nominal short- and long-term market interest rates
(In %; historical data for 1999-2012)



Source: US Federal Reserve; NIME

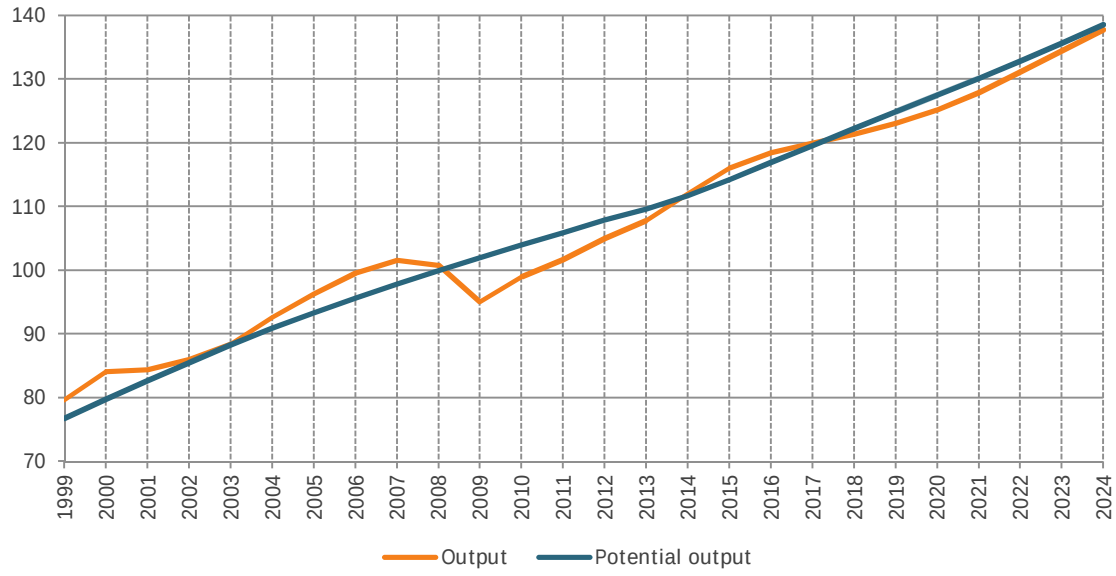
While the Fed is projected to raise rates in the first half of the projection period, nominal rates are expected to fall as of 2017 with a view to boosting future domestic demand and off-setting a decline in real export growth. Household real consumption expenditure growth is projected to fall from 2.4% in 2014 to 0.7% in 2017, but the decline should be arrested thereafter by a more accommodative monetary policy stance. Real consumption growth should hit a trough at 0.5% in 2018 and then pick up, rising back up to 2.2% in 2024. Business sector investment should follow the rise in household demand and benefit from the more favorable financing conditions and general decline in the user cost of capital, progressing quite strongly over the period 2020-2024.

The pick-up in the growth of final domestic demand over the period 2019-2024 is projected to lead to a decline in the unemployment rate, which, after rising from 6.7% in 2016 to 7.8% in 2020, should fall back down to 6.8% in 2024. The decline in the unemployment rate should bring the unemployment rate down to below the country's structural rate of unemployment over the period 2017-2024, opening the way to steady increases in real take-home wage rates in the private business sector. The rising real wages and employment should then raise the household sector's aggregate real income from wages,

which is projected to rise at an annual average rate of 2.7% over the period 2016-2024. The rise in real wage rates should not, however, lead to any significant rise in real unit labour costs as they should remain well in line with the rise in business sector labour productivity.

The declining contributions to real GDP growth from real net exports over 2020-2024 should be accompanied by significant increases in the US's terms of trade, so that the country's current account position should post significant and rising surpluses as of 2018.

Graph 21 Private business sector output and potential output
(Chained volume indices, Potential of 2008=100; historical data for 1999-2012)



Source: NIME

Turning to the results for the general government fiscal position and debt ratio, the projection results indicate that the freeze in public consumption of goods and services, the moderation in public investment, the freeze in public employment and the reduction in the share of transfers to households relative to GDP should all combine to produce a primary surplus in the general government unified budget as of 2021. Over 2013-2024, the fiscal consolidation, combined with low interest rates on public borrowing, leads to a trend decline in the ratio of debt interest payments-to-GDP. All of this allows a decline in the general government debt-to-GDP ratio, which is projected to fall from a high of 112.7% in 2018 to about 99.4% in 2024.

Table 3 Selected point projection results for the United States of America

	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)								
1. Private consumption	2.2	2.0	2.4	2.0	1.3	0.7	0.5	1.3
2. Public consumption	-2.6	-1.6	-1.6	2.8	1.5	1.0	0.4	-0.3
3. Gross fixed capital formation	6.9	2.5	5.9	2.1	0.1	-1.9	-1.2	2.1
4. Total domestic expenditure	1.9	1.7	3.0	2.0	1.1	0.3	0.2	1.2
5. Exports	3.5	6.4	7.4	10.0	8.0	6.4	6.0	5.1
6. Imports	2.4	2.6	5.8	4.4	4.4	3.4	3.4	4.2
7. Gross Domestic Product	2.2	1.9	3.1	2.7	1.6	0.8	0.6	1.5
8. Contributions to real GDP growth								
a. Total domestic expenditure	2.0	1.7	3.1	2.0	1.1	0.3	0.2	1.1
b. Net exports	-0.1	0.5	0.1	0.7	0.5	0.5	0.5	0.4
II. Deflators (growth rates, unless noted otherwise)								
1. Private consumption	1.8	1.4	1.5	1.7	1.7	1.6	1.5	1.2
2. Gross Domestic Product	1.9	3.2	1.1	2.6	2.2	2.4	2.2	2.6
III. Financial markets (levels in %, unless noted otherwise)								
1. 3-month money market rate (Libor, %)	0.4	0.3	1.2	2.1	2.6	2.5	2.1	1.2
2. Nominal effective exchange rate, growth rate (USD per foreign currency unit, + is depreciation)	-7.8	-6.2	3.6	0.3	-1.8	-2.1	-0.7	2.2
IV. Labour market (growth rates, unless noted otherwise)								
1. Unemployment rate (% civilian labour force, level)	8.2	7.9	7.2	6.6	6.7	7.1	7.4	7.4
2. Real unit labour costs, business sector	0.3	0.2	-0.2	-0.3	0.3	0.3	0.1	-0.1
V. Household sector (growth rates, unless noted otherwise; deflated by consumer prices)								
1. Real gross disposable income	1.3	1.7	1.1	2.2	1.5	1.2	1.1	2.6
2. Net saving rate, household sector (in % of disp. income)	3.7	3.1	1.6	2.0	2.2	2.6	3.0	6.6
VI. Public sector (growth rates, unless noted otherwise)								
1. Net lending/borrowing (+/-) of general government, in % of GDP	-8.5	-7.1	-5.6	-4.7	-4.2	-3.8	-3.4	-2.1
2. Primary balance, in % of GDP	-5.5	-4.0	-2.6	-1.7	-1.2	-0.9	-0.7	0.4
3. Gross public debt, in % of GDP	109.6	111.8	112.9	111.9	112.1	112.4	112.7	107.1
VII. Miscellaneous (growth rates, unless noted otherwise)								
1. Trade balance, in % of GDP	-3.7	-2.9	-2.7	-1.6	-0.7	0.2	1.2	5.7
2. Output gap (effective output, % deviation from potential)	-2.7	-1.7	0.2	1.5	1.4	0.3	-0.7	-1.3

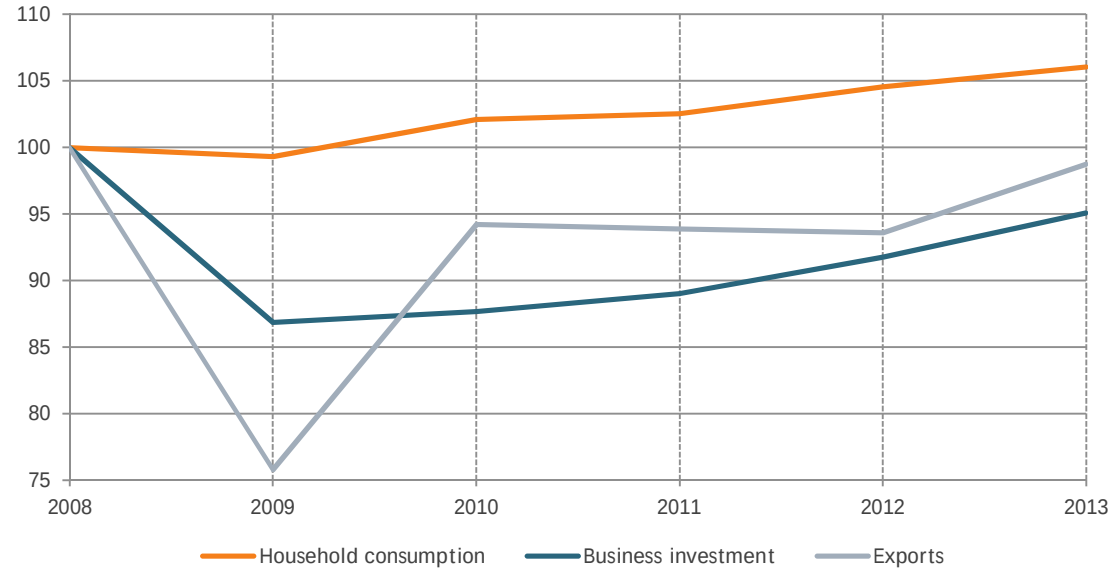
7. Projection results for Japan

7.1. The short-term forecast

7.1.1. The recent past

The Japanese economy came into the global financial and economic crises in a relatively healthy state, with the notable caveat of its out-of-control public finances and its structural demographic difficulties. Real GDP growth in 2007 reached 2.2% yoy, which is a strong performance for a country faced with a demographic decline. However, this achievement was only made possible by a 1.1 pp contribution to real GDP growth from the country's net exports, adding to the country's string of current account surpluses, which cannot be considered as sustainable, or even desirable, from a long-run perspective.

Graph 22 Selected components of final demand
(Chained volume Indices, 2008=100; historical data for 2008-2012)



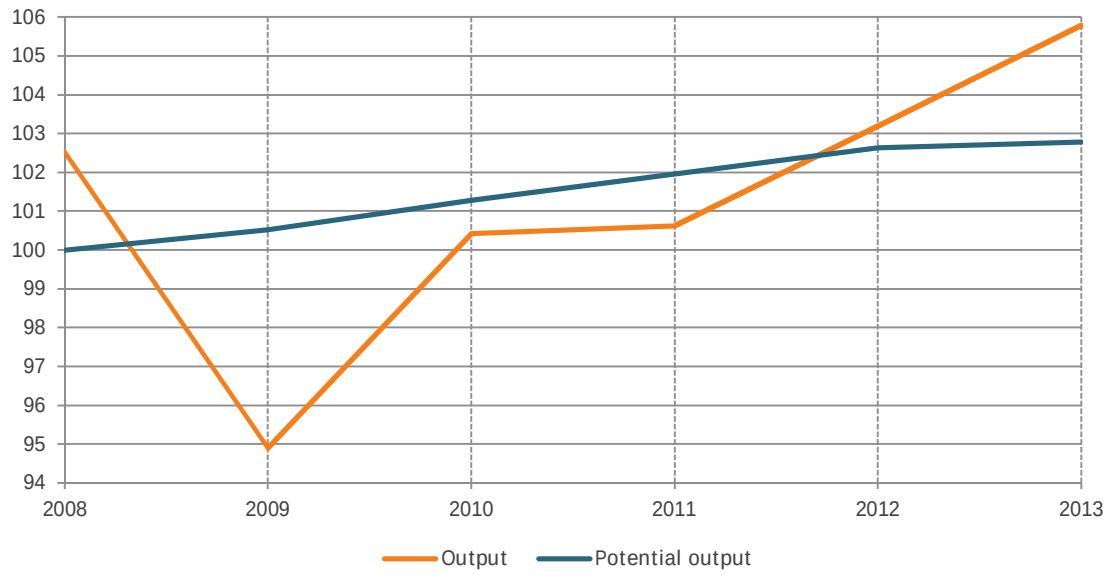
Source: AMECO; NIME

In 2008, Japan's real export growth fell to 1.4% yoy, compared to an 8.7% increase in 2007. As the economic and financial crisis developed in the United States and Europe, domestic demand in these two major areas fell, negatively affecting Japan's exports, while the financial crisis further affected the availability of credit to finance international trade flows to many emerging market economies. Through its effects on Japan's exports and investment plans, what was essentially a North Atlantic financial crisis also began to affect Japan's final domestic demand, just as Japan's total population embarked on a long-run declining trend.

While Japan's relatively robust economic growth since the beginning of the 2000s had brought it to the verge of shaking off its deflation, the spread of the financial and economic crises tipped the country back into recession, as real GDP fell by -1.1% in 2008.

In 2009, Japan's real GDP growth fell by a massive -5.5% yoy. However, the country's economy rebounded strongly as of 2010, rising by 4.7% yoy, with final domestic demand contributing 2.8 pp to real GDP growth. In March 2011, the country was hit by the Tōhoku earthquake and tsunami, which led to massive destruction, terrible loss of life and the catastrophic destruction of the Fukushima Daiichi nuclear power plant. Real GDP fell by -0.6% yoy, as final domestic demand increased only slowly and as imports progressed strongly. Real GDP then turned around and rose by 2% in 2012 as household spending picked up and as spending on reconstruction increased investment.

Graph 23 Private business sector output gap
(Chained volume indices, Potential of 2008=100; historical data for 2008-2012)



Source: NIME

7.1.2. The short-term outlook: 2013 to 2015

a. The outlook for 2013

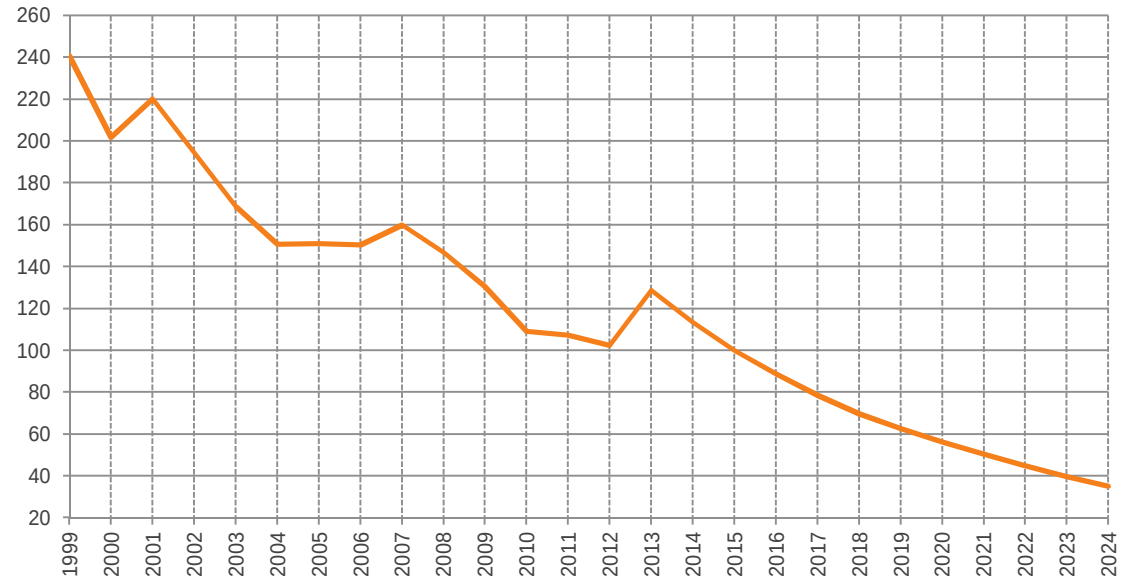
In 2013, the combination of continued spending on reconstruction, fiscal support from the economic stimulus plan of January 2013 and massive monetary policy accommodation through the Bank of Japan's (BoJ) new Quantitative and Qualitative Monetary Easing (QQME) programme are all expected to allow Japan's real GDP to rise by 1.7% in yoy average terms. Economic growth is expected to be underpinned by both domestic and external final demand. Domestic final demand is forecast to contribute 1.5 pp to the year's real GDP growth rate, driven mainly by public sector support and business sector gross fixed capital investment. After declining in 2011 and 2012, due in part to the yen's uninterrupted nominal effective appreciation since 2008, real exports are expected to benefit from the 25% depreciation brought about in 2013 by the BoJ's new monetary policy and to rise by 5.5% yoy. This would allow net exports to contribute 0.5 pp to the year's rate of real GDP growth.

The strong growth in 2013 is expected to raise output levels up above Japan's estimated level of potential output, laying the foundations for a durable return to increases in domestic price levels. The strong output growth and high levels of capacity utilisation should lead to the emergence of supply constraints, as indicated by the unemployment rate, which falls below the country's estimated natural

rate of unemployment. The high level of capacity utilisation and the large increase in the yen-denominated price of oil imports should lead to the first significant rise in production prices since 1997. The first signs of the re-emergence of inflation should not lead to any restrictive reaction of monetary policy, though short-term market interest rates are expected to rise marginally.

On the fiscal front, the public sector's efforts towards reconstruction and the government's fiscal support programme of January 2013 should lead to a net borrowing requirement of -6.9% of GDP, down slightly from -8.3% of GDP in 2012.

Graph 24 Nominal effective exchange rate
(JPY per unit of foreign currency, index 2015=100; historical data for 1999-2012)



Source: NIME

b. The outlook for 2014

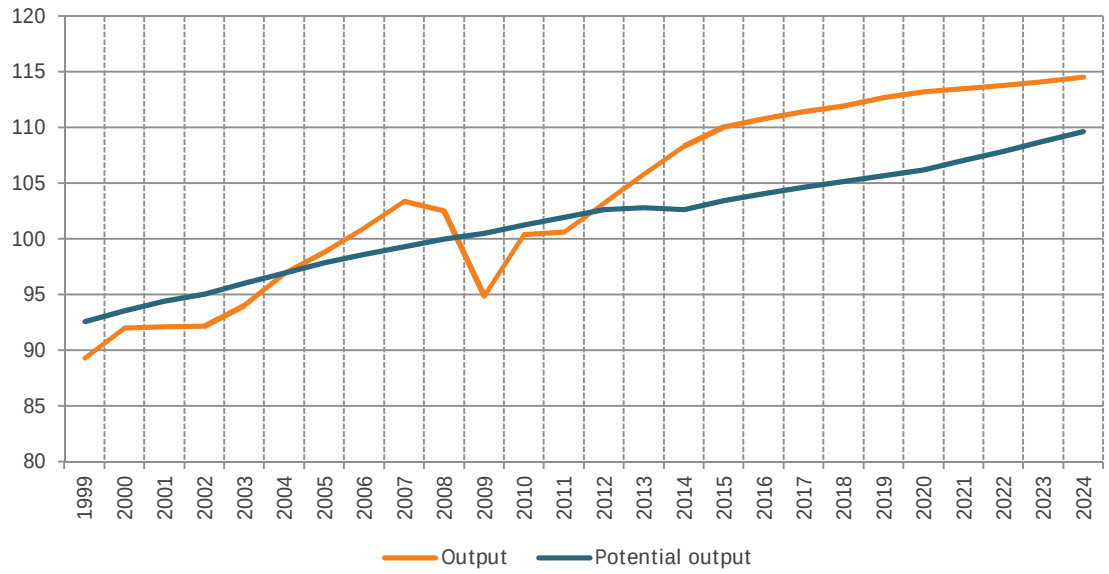
In 2014, real GDP growth is expected to rise to 2.4% yoy, based on a moderate increase in final domestic demand and on a strong progression of real exports. The rise in domestic demand should be based mainly on an increase in business sector investment, while household consumption expenditure should progress moderately and public spending should not make any significant contribution to the year's GDP growth rate.

Japan's net exports should provide a 1.3 pp contribution to the growth rate of real GDP in 2014, as real exports are forecast to rise very strongly in the wake of the massive effective exchange rate depreciation of 2013.

The robust increase in Japanese output since 2012 should leave the country's effective output level well above its potential output level, with the now positive output gap rising from 2.9% of potential in 2013 to 5.6% of potential in 2014. The strong rise in Japanese output should lead to reductions in the unemployment rate, which is forecast to fall from 4.2% of the labour force in 2013 to 4% in 2014. This decline in the unemployment rate would leave it -0.5 pp below the country's natural rate of unemployment, a level at which labour market tightness could be expected to begin to generate

demands for real wage increases. Real take-home wage rates in the private business sector should rise by 2% in 2014 but a strong rise in labour productivity should lead to a continued decline in the private business sector's real unit labour costs. As the price of imports is expected to decline in 2014, private sector output prices should rise by no more than 0.4% yoy.

Graph 25 Private business sector output and potential output
(Chained volume indices, Potential of 2008=100; historical data for 1999-2012)



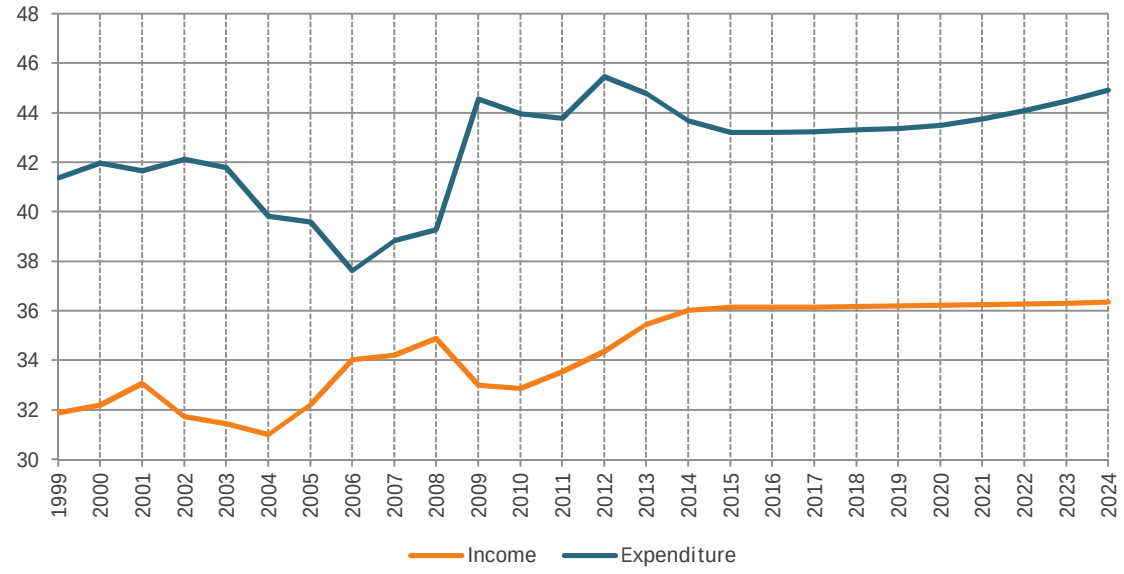
Source: NIME

In 2014, high levels of capacity utilisation, combined with the pursuit of very accommodative monetary policy under the BoJ's QQME programme, should lead to a rise in the general price level. Indeed, the deflator of private consumption should rise by 1.2% yoy, though this includes a 0.4 pp increase due to a rise in Japan's sales tax. In normal circumstances, the relatively tight labour market and up-tick in inflation would lead a central bank following a standard Taylor-type monetary policy rule to raise nominal short-term interest rates. However, the current projection for Japan is run under the assumption that the BoJ will take great care not to tip the country back into recession and deflation. In operational terms, this means that the BoJ is assumed to target a positive rate of inflation and non-negative real output growth, with greater emphasis on its growth target than on its price stability objective in the short to medium term. Hence, the policy rate is not expected to rise significantly in 2014, leaving the short-term market rate at a yearly average level of 0.7%. Such a rate further implies that, for the first time since deflation took hold in Japan, the BoJ would achieve a negative real rate of interest[11] to underpin inflation and real output growth.

Finally, it is noteworthy that the projection indicates that the strong nominal growth rate of Japanese GDP in 2013 and 2014, combined with the renewed push for fiscal sustainability, should reduce the general government's net borrowing requirement in 2014. Furthermore, even though the fiscal deficit is not expected to be eliminated, Japan's gross public sector debt-to-GDP ratio is projected to fall, due mainly to the 3.5% and 3.8% increases in nominal GDP in 2013 and 2014, respectively.

[11] Measured as the nominal 3-month money market rate minus the expected percentage change in the private consumption deflator

Graph 26 General government income and expenditure
(In % of GDP; historical data for 1999-2012)



Source: AMECO; NIME

c. The outlook for 2015

In 2015, the residual efforts aimed at reconstruction and disaster prevention are no longer expected to provide any significant support to real GDP growth; at the same time, a new hike in Japan's sales tax is assumed to be implemented. Furthermore, consumer price inflation in 2015 is forecast to rise to 2.6% yoy and inflation should thus begin to play its normal role of reducing real income and wealth in an environment where prices are not fully flexible. Finally, while Japan should benefit from a large export boost in 2014 due to massive currency depreciation in 2013, exports in 2015 are expected to be faced with significant effective exchange rate appreciation. Hence, in contrast with 2014, net exports are forecast to provide a nil contribution to the year's rate of real GDP growth.

In 2015, the rise in real take-home wage rates in the private business sector should begin to decline, as unemployment rises in the face of declining rates of real output growth. As productivity growth remains strong, real unit labour costs should continue to decline and rising wage rates should thus not lead to any rise in production costs. Turning to the effects of import costs, the significant effective appreciation of the JPY that is forecast to begin in 2014 should lead to an overall decline in import prices, including a decline in the price of JPY-denominated crude oil imports.

Real output growth and inflation, combined with the 2015 increase in the sales tax, are expected to lead to a new decline in the public sector net borrowing requirement, which should reach 5% of GDP. Inflation, combined with very low or even negative real interest rates, should lead to a new decline in the gross public sector debt-to-GDP ratio, which is expected to fall from 237.4% in 2014 to 233.9% of GDP in 2015.

Box 3 Abenomics and the three arrows of economic policy

Following its "*baburu keizai*" (bubble economy) period over the second half of the 1980s, Japan was confronted with a phenomenon of deflation that set in in 1993 for private sector production prices and in 1995 for consumer prices and the GDP deflator. Gross general government debt has been rising steadily since 1992, reaching about 192% of GDP in 2008, at the onset of the global financial crisis. Productivity growth, measured in terms of real output per hour worked, also fell significantly over recent decades. Indeed, between 1990 and 2008, productivity growth averaged 2% per annum, whereas productivity growth increased at an annual average rate of 4.6% between 1970 and 1990. In Japan, the dependency ratio (the ratio of non-working age population to working age population) rose from 44.9% in 1970 to 55.2% in 2008. At the same time, the number of persons of working age (aged between 15 and 64 years) has been declining since 1996 and this decline is expected to continue over the foreseeable future. Japan is thus faced with difficulties linked to fiscal sustainability, trend productivity growth, population ageing and rising dependency ratios, as well as that of persistent deflation.

In December 2012, Japan's Liberal Democratic Party (LDP) and Kōmeitō party formed a coalition government, led by Prime Minister Shinzo Abe, whose priorities are to end deflation, set Japan on a fiscally sustainable path and raise the economy's rate of growth. Prime Minister Abe announced a medium-term plan, often referred to as "Abenomics", based on three distinct but combined strategies: Abe's "three arrows". The "three arrows" analogy, taken from Akira Kurosawa's movie *Ran*, is meant to convey the idea that while an individual arrow or tool can be broken or prove to be too weak to achieve its goal, three arrows or tools implemented *together* can provide a forceful solution to Japan's economic plight.

The first of Prime Minister Abe's three arrows is expansionary monetary policy, which aims to bring an end to Japan's entrenched deflation. The second arrow is fiscal policy, which is aimed at reining in the rise in Japan's gross public sector debt. The third arrow is structural reform, which is aimed at raising Japan's rate of economic growth and reducing the country's dependency ratio.

The first arrow: Monetary policy

In February 2013, the Abe government nominated Haruhiko Kuroda as Governor of the Bank of Japan (BoJ). Governor Kuroda was charged with the task of devising and implementing a new monetary policy, dubbed "Quantitative and Qualitative Monetary Easing" (QQME), which would break Japan loose from the deflation it has been mired in since 1993. As the BoJ's main policy rate was faced with a longstanding zero lower bound, this meant putting in place an unconventional monetary policy based on managing expectations and on conducting massive unsterilized purchases of assets, mainly new issues of long-term government bonds. In April 2013, the BoJ raised its inflation target from 1% to 2% and announced that it would double the country's monetary base from December 2012 to December 2014, requiring purchases of 60 to 70 trillion yen (JPY) per year. This is an expansion of the monetary base of 12% of GDP to 15% for at least two years.

The change in monetary policy, as well as in expectations in late 2012 as to the coming change in policy, had significant effects on the Japanese economy in 2013. From December 2012 to October 2013, the JPY depreciated by about 17% against the USD; the depreciation in nominal effective terms was about 15% over the January to September period. The depreciation in the JPY and the rise in the monetary base have both brought about a rise in inflation, even though a part of this rise can be attributed to the rising price of imports, including energy products.

Finally, the aim of this first "arrow" should also be viewed in combination with the planned changes in fiscal policy. In this context, the loosening of monetary policy comes as a measure aimed at dampening the effects of two expected increases in the sales tax, which are scheduled for April 2014 and October 2015 respectively.

Box 3 - continued

The second arrow: Fiscal policy

Abenomics' second arrow comes in two distinct steps. A first step is meant to provide short-term support to economic growth, to help the economy in the face of the impending transition from deflation to inflation and the simultaneous negative shocks from planned increases in the consumption tax in 2014 and 2015. A second step is then meant to remove fiscal accommodation in an attempt to cut back public deficits and to reduce the gross public sector debt-to-GDP ratio to a more sustainable long-run level.

In January 2013, the Abe government announced a JPY10.3 trillion infrastructure spending plan. About JPY4 trillion was earmarked for disaster prevention and reconstruction following the March 2011 earthquake, tsunami and ensuing destruction of the Fukushima Daiichi nuclear power plant. The remainder of the fiscal boost was aimed at underpinning business investment, social spending and aid to Japan's regions. In October 2013, the government announced a further fiscal plan of about JPY5 trillion, which is expected to be used for infrastructure spending in preparation for the Tokyo Olympic Games of 2020. The spending is further accompanied by JPY1 trillion in tax cuts for Japanese businesses. All in all, federal fiscal policy should thus provide a boost of about 3% of Japan's real GDP over the period 2013-2014.

These fiscal stimulus measures are aimed at helping the economy weather the impact of two consecutive increases in the country's consumption tax rate. The first increase is scheduled to raise the tax rate from the current level of 5% to 8% in April 2014. The second increase should then raise the rate to 10% in October 2015. These two increases in the consumption tax signal the beginning of the second step in the implementation of the second arrow, the aim of which is effective long-term fiscal sustainability. Concrete measures aimed at achieving this long-term fiscal adjustment have, however, still to be spelled out.

The third arrow: Structural reforms

The third and final "arrow" of Abenomics is structural reform, aimed at achieving a lasting increase in Japan's real GDP growth rate.

Indeed, Japan's economy has been suffering from declining real GDP growth rates, deflation, ageing and the subsequent rise in the country's dependency ratio. Furthermore, the country's working-age population has been declining since the late 1990s and its total population has been declining since the late 2000s. Given the very high and rising public sector debt, this implies an ever increasing debt burden being shouldered by a steadily declining number of workers.

Abenomics' third arrow aims to raise Japan's rate of economic growth by a combination of societal, labour market and product market reforms. Such reforms could be aimed at increasing female labour market participation rates; increasing overall labour market flexibility by discouraging guaranteed life-time employment in Japan's large corporations and reducing the associated labour hoarding; easing restrictions on immigration; deregulating and increasing competition in Japan's (traded) services sector; deregulating and encouraging foreign direct investment (FDI) in the country's non-traded services sector; deregulating and opening up the country's agriculture to foreign competition.

The rise in Japan's trend rate of real GDP growth would combine with a return to inflation and medium-term fiscal austerity to reduce the combined burdens of debt and of ageing on the country's future labour force. Though the possibilities for structural reforms are numerous, the Abe government has yet to put any substantive reform measures on its policy agenda.

7.2. The medium-term projection

7.2.1. The core medium-term dynamics

Over the medium term, the projection is run so as to bring Japan's level of effective output gradually towards the country's level of potential output, closing the output gap in the long run. This is achieved through changes in real interest rates, which are calibrated to be small enough to neither push the country into recession nor push the country back into deflation, while still ensuring that the BoJ's medium-term inflation objective remains credible. Thus, policy rates are projected to rise only very gradually between 2013 and 2024, leading to only minimal increases in market interest rates and producing negative real short-term rates throughout the projection period.

7.2.2. The medium-term projection results

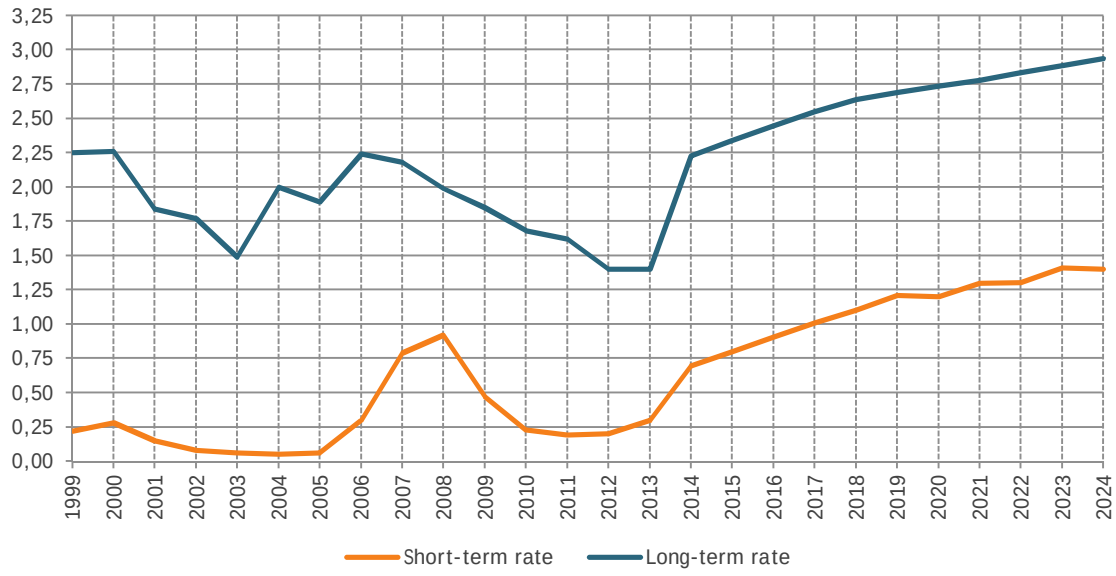
As of 2016, Japanese real final domestic demand is not expected to rise by more than about 0.5% in yoy average terms. This slow progression of domestic demand is due to the country's structural issues, such as declining population and working-age population, as well as to the efforts of the BoJ to steer the economy's level of effective output slowly but firmly back in the direction of the country's potential output level. Indeed, Japan's relatively rapid real output growth over 2010-2015 is estimated to have closed the country's negative output gap and generated a significant positive output gap, with the gap swinging from -5.6% of private business sector potential output in 2009 to 6.4% of potential in 2015. Note that as real short-term rates are negative over the period 2014-2018, the rise in real short-term rates effectively only means that these negative real rates are gradually brought up towards zero over the projection period. The rise in short-term rates then affects other maturities over the yield curve, raising the nominal long-term interest rate from 2.3% in 2015 to 2.9% in 2024.

Aggregate private consumption growth rose strongly over 2010-2013 and should then decline over 2013-2016 as inflation sets in, as the sales tax rises in 2014 and 2015 and as total population continues to contract. However, real household consumption growth is projected to rise slowly from nil in 2017 to 0.7% in 2024. In per capita terms, consumption growth should be somewhat more robust, and rise from 0.1% in 2017 to 1% in 2024. Consumption is projected to benefit from the return of initially high inflation, which should average about 4.1% per year over 2017-2024. This high inflation, accompanied by our working assumption of a BoJ that aims to keep the economy from falling into recession, leads to strongly negative real short-term interest rates, which underpin consumption growth as well as investment. Furthermore, over 2017-2024, Japan's unemployment rate remains in line with the country's structural rate of unemployment, implying that both nominal and real take-home wage rates will rise, albeit modestly, without leading to any significant rise in real unit labour costs. This allows real per capita income from wages to rise, even though aggregate real labour income should fall over 2017-2024 due to a strongly declining labour supply.

All in all, the accommodative monetary policy and subsequent emergence of significant inflation should allow Japan's aggregate final domestic demand to progress regularly over 2016-2024, reaching an annual average growth rate of about 0.5%.

Over the period 2015-2024, Japan's nominal effective exchange rate is projected to appreciate strongly, as a result of arbitrage that acts on yield spreads and expected inflation differentials. The currency appreciation, combined with a decline in foreign output growth, should steadily reduce Japanese real export growth between 2015 and 2022. Thereafter, foreign output growth is projected to pick up, allowing a rise in export volumes in 2023 and 2024. These developments are expected to lead to negative contributions to real GDP growth from Japan's real net exports over 2018-2024, accompanied by a deficit in Japan's external accounts at the end of the projection period.

Graph 27 Nominal short- and long-term market interest rates
(In %; historical data for 1999-2012)



Source: Japan Cabinet Office; NIME

Turning to Japan's public finances, we note that under the constant fiscal policy assumptions that have been implemented in this projection, Japan's primary fiscal deficit should decline from -2.6% of GDP in 2015 to -1.8% in 2024. However, the country's headline public sector borrowing requirement would fall only from -6.9% in 2013 to -5% in 2016, subsequently rising to -6.4% in 2024 as the rise in nominal interest rates that is expected to appear over 2016-2024 leads to a significant increase in debt interest payments. Indeed, interest payments on Japan's gross public sector are projected to rise from 2% of GDP in 2013 to 4.6% of GDP in 2024. Notwithstanding the rise in the country's net borrowing requirement, Japan's nominal growth rate over the projection period should allow a reduction in the debt-to-GDP ratio, which should fall from 230.4% of GDP in 2016 to 214.4% of GDP in 2024.

Table 4 Selected point projection results for Japan

	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)								
1. Private consumption	2.0	1.4	0.4	0.4	-0.1	0.0	0.1	0.6
2. Public consumption	2.0	1.6	-0.2	-0.6	0.3	0.5	0.6	0.6
3. Gross fixed capital formation	4.4	2.1	4.6	4.2	2.2	1.6	1.0	0.1
4. Total domestic expenditure	2.6	1.4	1.1	1.2	0.5	0.5	0.4	0.5
5. Exports	-0.3	5.5	10.3	2.0	2.3	2.1	1.5	0.5
6. Imports	5.3	1.6	1.4	1.8	1.4	1.8	2.1	2.8
7. Gross Domestic Product	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.2
8. Contributions to real GDP growth								
a. Total domestic expenditure	2.6	1.5	1.1	1.2	0.5	0.5	0.4	0.5
b. Net exports	-0.6	0.5	1.3	0.0	0.2	0.1	-0.1	-0.3
II. Deflators (growth rates, unless noted otherwise)								
1. Private consumption	0.0	-0.0	1.2	2.6	3.6	4.0	4.2	4.2
2. Gross Domestic Product	-1.6	1.5	1.3	2.5	3.1	3.3	3.3	3.2
III. Financial markets (levels in %, unless noted otherwise)								
1. 3-month money market rate (Tibor, %)	0.2	0.3	0.7	0.8	0.9	1.0	1.1	1.3
2. Nominal effective exchange rate, growth rate (JPY per foreign currency unit, + is depreciation)	-4.6	25.6	-11.8	-11.8	-11.5	-11.2	-11.2	-10.8
IV. Labour market (growth rates, unless noted otherwise)								
1. Unemployment rate (% civilian labour force, level)	4.3	4.2	4.0	4.7	4.5	4.5	4.8	5.2
2. Real unit labour costs, business sector	-1.0	-2.4	-1.1	-0.9	0.9	0.2	0.4	0.2
V. Household sector (growth rates, unless noted otherwise - deflated by consumer prices)								
1. Real gross disposable income	1.7	1.3	0.4	-0.1	0.1	-0.7	-0.7	-0.9
2. Net saving rate, household sector (in % of disp. income)	1.0	-1.5	-1.6	-1.8	-1.3	-1.9	-2.5	-6.8
VI. Public sector (growth rates, unless noted otherwise)								
1. Net lending/borrowing (+/-) of general government, in % of GDP	-8.3	-6.9	-5.3	-5.0	-5.0	-5.1	-5.1	-5.6
2. Primary balance, in % of GDP	-6.2	-4.8	-3.1	-2.6	-2.4	-2.3	-2.2	-1.9
3. Gross public debt, in % of GDP	240.6	240.8	237.4	233.9	230.4	227.0	224.1	216.6
VII. Miscellaneous (growth rates, unless noted otherwise)								
1. Trade balance, in % of GDP	-2.2	-2.1	-0.2	0.1	0.5	0.7	0.7	-0.6
2 .Output gap (effective output, % deviation from potential)	0.6	2.9	5.6	6.4	6.4	6.5	6.4	5.7

8. Projection results for the Rest of the World

8.1. Composition and role of the Rest of the World aggregate

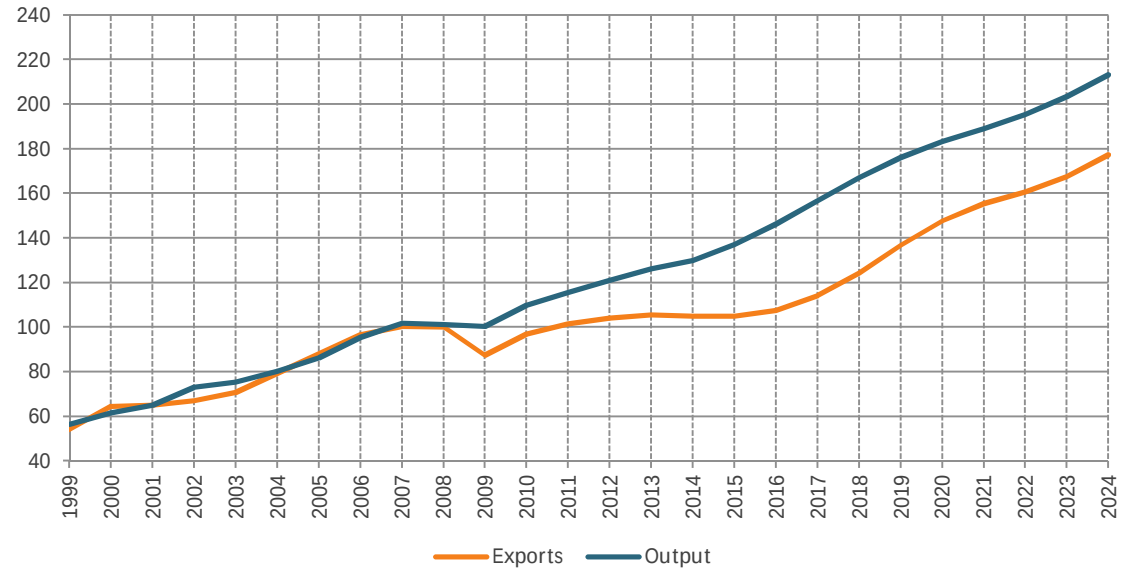
The Rest of the World area is an aggregate comprising a large number of heterogeneous countries, including Argentina, Australia, Brazil, Canada, China, Egypt, India, Indonesia, Iran, Korea, Mexico, Russia, Saudi Arabia, South Africa and Switzerland. It is an essential part of the NIME model as it closes the world economy and its trade and financial flows.

The Rest of the World is endogenous in its private sector output and imports, as well as their respective price indexes. As for the area's real exports and export prices, they are the residuals that ensure coherence between volumes and prices at the level of the world economy aggregate.

8.2. The projection results: 2013-2024

From the beginning of the 2000s up to the outbreak of the financial and economic crises in the US and Europe in 2008, real GDP of the Rest of the World area progressed at an annual average rate of about 7.5%. As the area's population rose at a yearly average rate of about 1.4% per year, this led to a rise in real per capita GDP of about 6% per year over the period 2000-2007.

Graph 28 Output and exports of the Rest of the World
(Chained volume indices, 2008=100; historical data for 1999-2012)



Source: NIME

In 2008, growth faltered in the major developed economies and trade financing was hit by increased risk aversion and liquidity constraints. The Rest of the World's real exports were affected and declined by -0.5% yoy, while import growth fell from 8.1% in 2007 to 4.4% in 2008. This resulted in a -1.6% fall in the area's aggregate real GDP. In 2009, real exports fell by a massive -12.7% yoy, but the simultaneous -12.5% decline in imports allowed a rise in real GDP of 1.6% for the year. As of 2010, real output growth

had stabilised and begun to pick up in the major advanced economies, and the Rest of the World's real GDP also returned to growth.

In 2013, real GDP is forecast to progress by 4.2% yoy. Then, in 2014, the area's real GDP is projected to rise by just 2.9%, as exports to the major advanced economies are expected to be hindered by effective exchange rate appreciation, a rising current account surplus in the euro area and a declining trade deficit in Japan. Exports are projected to post a new slight decline in 2015 but real GDP growth should still manage to reach 5.5% yoy on the year, given robust domestic demand.

Table 5 Selected point projection results for the Rest of the World

	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)								
1. Private sector output	4.7	4.2	2.9	5.5	6.7	7.1	6.4	4.2
2. Exports	2.4	1.4	-0.4	-0.3	2.6	6.2	8.9	6.1
3. Imports	5.0	4.5	3.4	5.7	7.5	9.0	8.8	6.1
4. Gross Domestic Product	4.7	4.2	2.9	5.5	6.6	6.8	6.0	3.8
II. Deflators (growth rates, unless noted otherwise)								
1. Exports	2.4	3.9	3.8	3.9	3.0	0.9	-0.2	2.0
2. Imports	-0.0	4.8	5.5	5.6	5.4	5.0	4.7	4.4
3. Crude oil (domestic currency units/bbl)	5.0	0.3	4.4	4.4	4.4	4.4	4.4	4.4
III. Financial markets (growth rates, unless noted otherwise)								
1. Nominal short-term interest rate, level, in %	4.2	3.5	2.8	2.5	2.3	2.4	2.5	2.4
2. Nominal effective exchange rate (domestic currency units per foreign currency unit, + is depreciation)	-4.3	7.5	-2.4	0.8	3.7	6.7	7.8	3.8
IV. Miscellaneous (growth rates, unless noted otherwise)								
1. Trade balance, in % of GDP	1.2	0.6	-0.2	-1.3	-2.3	-3.3	-4.0	-5.3
2. Gross Domestic Product, per capita	3.4	2.9	1.7	4.3	5.4	5.6	4.9	2.8
3. Population	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.0

Over the period 2016-2024, real output for final demand is projected to progress at an annual average pace of 5%, while real GDP should rise at an average rate of 4.7%. Output growth should decline slowly over 2013-2024 as population growth falls from 1.2% in 2013 to 1% in 2024 and as trend labour productivity growth is projected to fall from 3.7% in 2013 to 3.4% in 2024. Furthermore, over 2016-2024, the area's real exports are projected to rise at a somewhat slower pace than its real imports, despite the area's trend exchange rate depreciation, due to the slowdown in foreign effective demand and current account surpluses in the euro area and the US. This should lead to a turnaround in the Rest of the World's current account, which had been in surplus over the period 1998-2014 but which should post increasingly large deficits over 2015-2024.

9. Results for the world economy

Over the period 2000-2007, the world economy grew in real terms at an annual average rate of about 3.9%. Given that over the same period, world population progressed at an annual average pace of 1.2% per annum, this left real per capita growth over 2000-2006 at about 2.6%. Over this period, the Rest of the World area[12] progressed most rapidly, as its real per capita GDP increased at an annual average rate of 6.0%, compared with 1.6%, 1.5% and 1.4% for the United States, the euro area and Japan, respectively. This rapid growth allowed the Rest of the World area's share in world GDP to rise from 28.6% in 2000 to 36.6% by 2006, mainly at the expense of Japan, whose share of world GDP fell from 14.6% in 2000 to 7.8% in 2007. At the same time, the Rest of the World's real per capita GDP began once again to narrow the gap with the US level, after losing ground over 2007-2009 due to the effects of the Asian and Russian financial crises. While the Rest of the World's per capita real GDP stood at 5.1% of the US level in 2000, this is expected to have risen to 8% in 2013.

Table 6 Selected projection results for the world economy
(growth rates, unless noted otherwise)

	Average 2000-2007	2012	2013	2014	2015	2016	2017	2018	Average 2019-2024
I. Real GDP growth rates									
1. World	3.9	2.6	2.6	2.6	4.1	4.2	3.9	3.2	2.3
2. Euro area[1]	2.1	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.3
3. United States of America	2.6	2.2	1.9	3.1	2.7	1.6	0.8	0.6	1.5
4. Japan	1.5	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.2
5. Rest of the World	7.5	4.7	4.2	2.9	5.5	6.6	6.8	6.0	3.8
II. World trade (real)	7.0	3.2	2.0	3.6	4.6	5.4	5.4	5.0	3.8
.in % of world GDP (nominal)	37.6	37.7	37.4	37.6	37.5	37.8	38.2	38.8	40.5
III. Price of oil (bbl, Brent crude)									
.level, in USD	42.2	112.0	105.0	114.0	119.1	121.1	121.7	123.4	147.0
.% change	--	0.9	-6.2	8.6	4.5	1.7	0.5	1.4	5.3
IV. World population									
.in billions	6.4	7.0	7.1	7.2	7.3	7.3	7.4	7.5	7.7
.% change	1.2	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0

[1] Euro area comprising twelve countries, following the NIME model's definition

In 2008, with the onset of the financial and economic crises in the United States and Europe, world real GDP suddenly declined by -0.7% yoy and real per capita GDP fell by -1.8%. While the Rest of the World area rebounded quickly, it has so far failed to return to real growth rates on a par with its pre-crisis 2000-2007 average of 6% per year. The US and Japan were initially more affected than the euro area, but both have posted relatively strong average growth rates since 2010. The euro area, on the other hand, rebounded in 2010-2011 only to relapse into recession as of 2011, due to a premature tightening of

[12] For the definition of this area, see section 8 on page 45 of this document

monetary policy and the simultaneous implementation of “exit strategies” based on stringent and often front-loaded fiscal consolidation plans.

Over the period 2013-2024, world real GDP growth is projected to reach 2.9% per annum, which is 1 pp lower than over 2000-2007. Given that world population is projected to rise at an annual average rate of 1% over the period, this leads to an average rise in world per capita real GDP of 1.8% over 2013-2024. Over this same period, the Rest of the World area should grow, in per capita terms, at an annual average rate of 3.4% per year while Japan, the US and the euro area should achieve average per capita growth rates of just 0.9%, 0.7% and 0.7%, respectively. Hence, as compared with outcomes noted over the period 2000-2007, real growth rates and per capita growth rates are expected to decline for all major areas of the world economy.

Despite its relatively weaker performance as compared with the period 2000-2007, the Rest of the World area should continue to be the main contributor to the world’s rate of real GDP growth over 2013-2024. Indeed, in annual average terms, this area is projected to contribute about 2.2 pp to growth over the period, which is on par with its average contribution over 2000-2007. The United States, the euro area and Japan, however, should see their contributions fall as compared with the period 2000-2007, reaching just 0.3 pp, 0.1 pp and 0.1 pp, respectively.

The slowdown in real GDP growth rates over the period 2013-2024 is projected to be accompanied by a parallel slowdown in the growth of world trade. Indeed, over 2000-2007, world real export volumes progressed at an annual average rate of 7% and exports, measured as a share of world GDP, rose from 17.9% in 2000 to 20.9% in 2008. The export ratio then fell back to 17.6% of world GDP in 2009 as export volumes fell by 12.5% yoy, due to the recessive effects of the financial and economic crises and the contraction in trade finance that was brought about by heightened fears of counterparty credit risk. World export volumes rebounded strongly in 2010, but the rate of export growth through 2013 has remained well below its 2000-2007 average. Going forward, export volumes are projected to rise at an annual average rate of 4.1% over 2013-2024. This would ensure that the ratio of world exports to GDP would continue to rise, albeit very slowly. Indeed, the export ratio is expected to be 18.7% in 2013 and to rise slowly to 20.5% in 2024. In 2024, the export ratio would thus still not have returned to its pre-crisis level of 20.9% of world GDP.

The relatively modest performance of real exports should be accompanied by a shift in area shares in world trade. Indeed, on average over the period 2000-2007, the Rest of the World area accounted for 37% of world trade, well ahead of the euro area, the US and Japan, whose shares reached 22.1%, 19.7% and 7.2%, respectively. Over the period 2013-2024, the Rest of the World area should see its trade share rise to 38.3%. Japan’s share should progress slightly, posting a period average of 7.8%, while the shares of both the euro area and the US are projected to decline.

10. Uncertainties surrounding world growth perspectives

Like all forecasts and projections, this outlook for the period 2013-2024 is to be viewed as surrounded by risks and uncertainties of various natures.

First, for reasons linked to simplicity of presentation, this document only reports on point projection results, whereas the NIME model can provide projection intervals for macroeconomic variables, of which the point projection results are simply the interval mid-points. When we provide intervals rather than point predictions, these intervals stem from model out-of-sample simulation using random shocks based on the estimated variances of equations' error terms. This type of risk-based stochastic projection thus allows for projections that take into account issues related to model (mis-)specification as well as to parameter risk, linked to data quality issues or limitations.

Second, the projection must be viewed as conditional, as its results are predicated on a number of out-of-model assumptions. For instance, the projection results are conditional on underlying long-run (trend) assumptions regarding demographic growth, labour force participation rates, hours worked and average labour productivity growth. Furthermore, the projection results are conditional on assumptions regarding fiscal and monetary policy. With respect to fiscal policy, the model projection is run on the basis of a constant policy assumption rather than a constant legislation assumption. For the euro area, this means that rather than making a projection where euro area member states comply strictly to EU or euro area budgetary requirements, including the new Fiscal Compact, we assume that the complacency and forbearance that have been the norm since the creation of the euro area will prevail and that euro area countries will have some leeway in their observance of EU fiscal guidelines so as to avoid socially and politically unacceptable levels of austerity. As regards monetary policy, the projection was made assuming that monetary authorities will continue to set the policy stance according to a Taylor-type rule. However, the projection was run with calibrated smoothing parameters for monetary policy rates, assuming that policy will be more reactive than in the past to contemporaneous conditions relating to inflation and economic slack, thus ensuring that economic trajectories are as smooth as possible in converging towards long-run equilibrium growth paths.

Third, the projection takes current institutional features as a given. This means that, e.g., it is assumed that EU institutions, including the euro area with its current membership, will continue to exist and function throughout the projection period. This means that it is implicit in the projection that all peripheral euro area member states will remain within the euro area and that trade and financial flows will not adversely affect area-wide growth conditions.

Lastly, the projection is also conditional on the absence of any major economic shock to the world economy, be it through natural or health disasters, political or armed conflict, or unexpected and sudden changes in the availability and use of natural resources and production technologies (supply shocks). In particular, we assume that Chinese economic growth will not be significantly different from average growth rates of the recent past, even though this does not reflect our assessment of the future of this economy and constitutes an upward bias in the projection for the Rest of the World area.

11. Special topic: Fiscal consolidation and euro area growth perspectives

The euro area's fiscal stance in our new baseline projection can be considered to be quite restrictive. Indeed, tax rates have been raised over 2010-2012 and are assumed to rise further in 2013-2014. Thereafter tax rates should remain constant at their high levels of 2014.

Furthermore, the baseline projection assumes strict restraint in real public sector spending on consumption of goods and services and on investment, as well as a freeze in public sector employment.

Given this set of budgetary policy assumptions, the model indicates that, for 2024, euro area governments should be able to reduce headline budget deficits, generate primary budgetary surpluses and reduce the debt-to-GDP ratio, compared to 2013.

The model's baseline projection for the euro area also indicates, however, that the currently projected fiscal stance would not allow the area to escape from a rise in the deficit over the period 2018-2024. Indeed, over this period, the area's general government net borrowing requirement should rise due to an increase in the unemployment rate and the associated rise in transfer payments, and also to a rise in interest payments on public sector debt following the tightening of monetary policy and the subsequent rise in market interest rates throughout the yield curve.

In this section, we examine the effects of measures that could be implemented with a view to achieving greater fiscal consolidation over the projection horizon. We will evaluate the effects of a rise in labour income tax rates and the effects of a cut in public sector employment. Given the ongoing debates regarding exit strategies and fiscal consolidation in the face of persistent large output gaps, we also examine whether it could be optimal to link the timing of further tax hikes to economic recovery. Furthermore, in light of the debates surrounding the effects of public spending and taxation in a zero lower bound (ZLB) environment, we also test the effects of a rise in public sector investment to see if a rise in public spending could be beneficial for growth, employment and public finances simultaneously. Finally, we also present the effects of a shock that is not strictly policy-driven and consists of a rise in the euro area's trend average labour productivity over the period 2014-2024.

The section concludes with a comparison of the results obtained with the various variants, highlighting that whenever possible, concerns about long-run fiscal sustainability should be pursued inasmuch as the economy is not producing below potential, so that monetary policy can off-set as much as possible any negative effects of fiscal contraction on employment and output.

11.1. Effects of fiscal consolidation

The NIME model is first used to test the medium- to long-term effects of an increase in labour income tax rates as well as the effects of a cut in public sector employment, relative to the baseline projection that is presented in the section 5.

11.1.1. Effects of a rise in labour income tax rates

In this first policy variant, the NIME model is used to simulate the effects of an increase in euro area labour income tax rates over the period 2013-2024.

The measure is implemented as follows: we raise the euro area's labour income tax rate for each year over the period 2013-2024, so as to raise the relevant tax take by 1% of nominal GDP of each year, ex ante, relative to the NIME baseline projection. The model is then run over the period 2013-2024 to compute the macroeconomic effects of the tax hike.

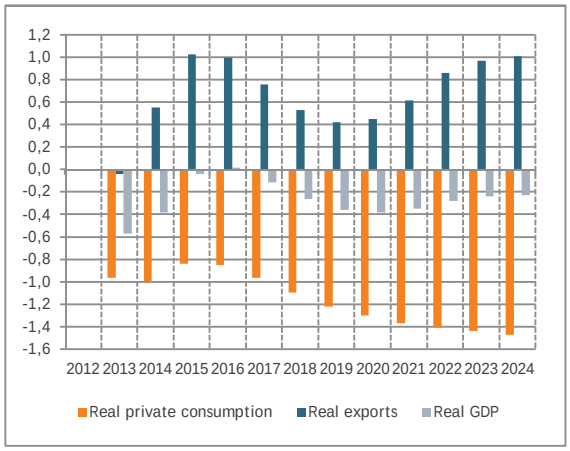
Table 7 **Variant 1: Effects of a rise in euro area labour income tax rates**
(2013-2024 cumulative % deviation from baseline, unless noted otherwise)

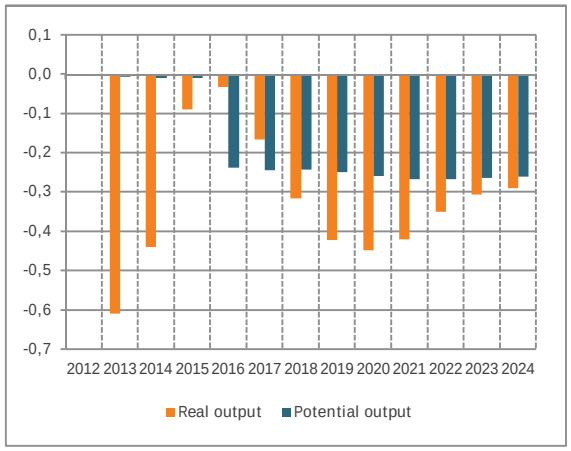
	On impact 2013	Cumulative 2013-2024
Real final domestic demand	-0.68	-0.62
Real exports	-0.04	+0.70
Real private sector output	-0.61	-0.32
Real GDP	-0.57	-0.26
Real potential output	-0.01	-0.20
Unemployment	+1.18	+1.45
	2013	2024
Debt-to-GDP ratio (pp deviation from baseline ratio)	-0.22	-11.48

On impact in 2013, the labour income tax rate rises by 1.20 pp relative to its baseline level, to raise tax revenue on labour income by 1% of GDP. The model results show that the rise in tax rates reduces household disposable income from wages and thus reduces aggregate final domestic demand relative to the baseline. This comes mainly via a strong and increasing reduction in real household consumption relative to the baseline level. The decline in demand has an immediate negative impact on the level of real private business sector output.

The rise in the tax rate increases the tax wedge, i.e., the difference between income from labour and the replacement income (such as the unemployment benefit), thus generating a substitution effect from labour to leisure that raises the area's natural rate of unemployment. Furthermore, the immediate recessive effects of the tax increase reduce final domestic demand, thus raising unemployment. This demand-driven rise in unemployment then also gradually leads to hysteresis effects, which subsequently also raise the natural rate of unemployment.

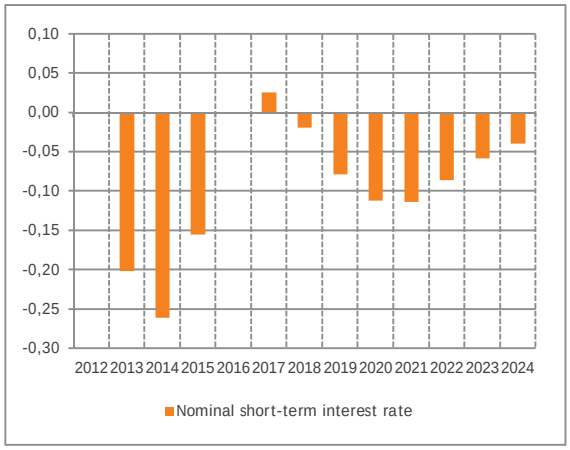
Graph 29 Effects on selected macroeconomic aggregates
(% deviation from baseline)

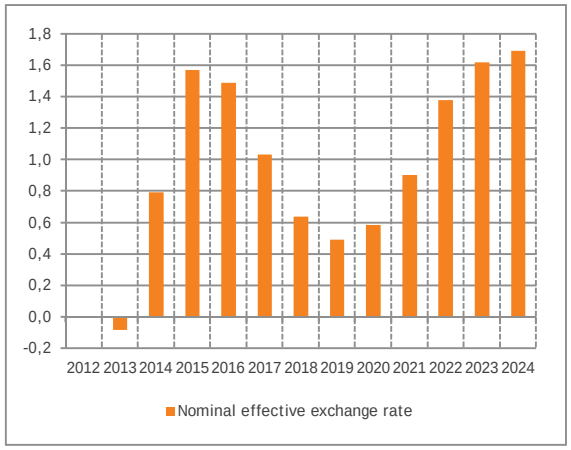




Source: NIME

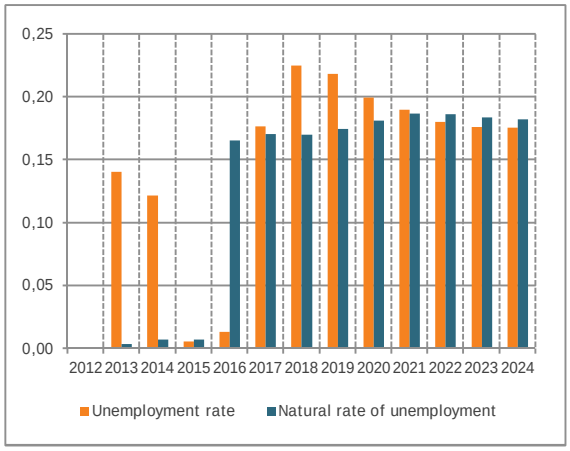
Graph 30 Effects on nominal short-term interest rates and nominal effective exchange rates
(Interest rates: deviations from baseline in pp; Exchange rates: deviations from baseline in %, EUR per unit of foreign currency, + is depreciation)

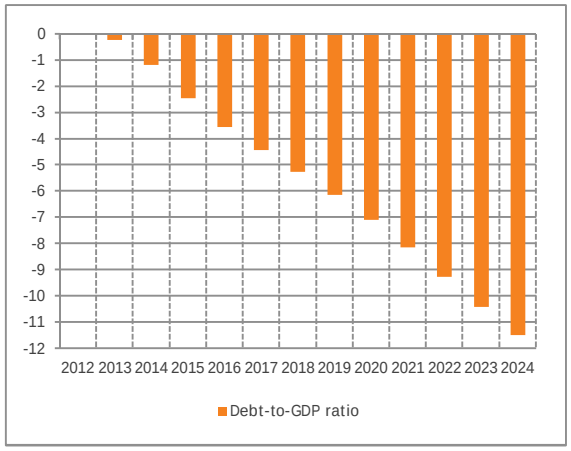




Source: NIME

Graph 31 Effects on the unemployment rate and public sector debt-to GDP ratio
(Deviations from baseline in pp)





Source: NIME

Though the measure does not have any significant effect on potential output before 2016, the tax hike reduces final domestic demand on impact, thus leading to a widening of the area's still large and negative output gap. On impact, the measure also slightly reduces the rate of consumer price inflation. The initial increase in economic slack and the disinflationary pressure lead monetary authorities to bring down nominal short-term interest rates. However, in the ZLB environment of 2013, the scope for nominal interest rate reductions is limited and short-term rates quickly hit the lower bound.

As of 2016, the area's natural rate of unemployment increases significantly relative to the baseline. Furthermore, the output gap in 2016-2017 becomes positive just as the rise in the NAIRU reduces potential output, raising the now positive output gap relative to the baseline. At that point, monetary authorities should acknowledge the decline in potential output and, accordingly, quickly raise interest rates so as to return to a stance more in line with the state of the area's now positive output gap.

The effects of the decline in domestic demand on total output are mitigated by a rise in exports. Indeed, as of the second year of the tax hike, the lowering of nominal interest rates induces a nominal effective exchange rate depreciation that raises external price competitiveness and boosts export volumes. However, the rise in exports is insufficient to completely off-set the effects of the decline in final domestic demand on real output over the simulation period.

Finally, the model indicates that the euro area's general government net borrowing requirement would decline relative to the baseline, due to the rise in tax revenue caused by the tax hike and due also to a decline in the interest payments due on public sector debt following the fall in nominal interest rates. Note, however, that at the same time, the rise in tax rates has negative effects on tax revenue, as the unemployment rate and the structural rate of unemployment rise, leading to higher outlays in the form of unemployment benefits, and as potential output and effective output decline relative to baseline, leading to less taxable income and less VAT revenue on final domestic sales. Finally, note that although real exports rise relative to the baseline, exports do not directly generate any tax revenue as they are not subject to any euro area value added tax.

The decline in public sector net borrowing requirements leads to significant reductions in the euro area's gross public sector debt-to-GDP ratio, which falls by 11.5 pp relative to baseline projection. This better outcome in terms of the debt ratio comes at a price, however, as cumulative unemployment over the period 2013-2024 rises by 1.45% relative to baseline, which is equal to about 2.9 million persons. In terms of lost output, the cost is of -0.32% of 2013-2024 cumulative output, equal to about EUR382 billion in 2005, or EUR432 billion in 2013, which is equal to 4.7% of euro area nominal GDP, as forecast for 2013.

11.1.2. Effects of a delayed rise in labour income tax rates

In the wake of the financial crisis and the exit of major economies from economic stimulus programmes, there has been lively debate on when and how to remove policy support and ensure fiscal sustainability. One of the sticking points in the debate is the question of the opportunity for removing fiscal support in the face of persistent large output gaps (PLOGS)[13].

In this second variant, the NIME model is used to simulate the effects of an increase in euro area labour income tax rates over the period 2016-2027. The measure is identical to that of the preceding variant 1, but is delayed until 2016, when the euro area output gap is expected to become positive once again. This leaves more room for monetary policy to lower nominal interest rates so as to off-set the recessive effects of the tax hike. The tax hike is simulated up to 2027, so as to be able to assess the effects of the tax hike over a twelve-year period, as in variant 1.

Table 8 Variant 2: Effects of a rise in euro area labour income tax rates as of 2016
(2016-2027 cumulative % deviation from baseline, unless noted otherwise)

	On impact 2016	Cumulative 2016-2027
Real final domestic demand	-0.45	-0.63
Real exports	+0.27	+0.90
Real private sector output	-0.32	-0.25
Real GDP	-0.28	-0.20
Real potential output	-0.01	-0.20
Unemployment	+0.34	+1.36
	2016	2027
Debt-to-GDP ratio (pp deviation from baseline ratio)	-0.40	-11.68

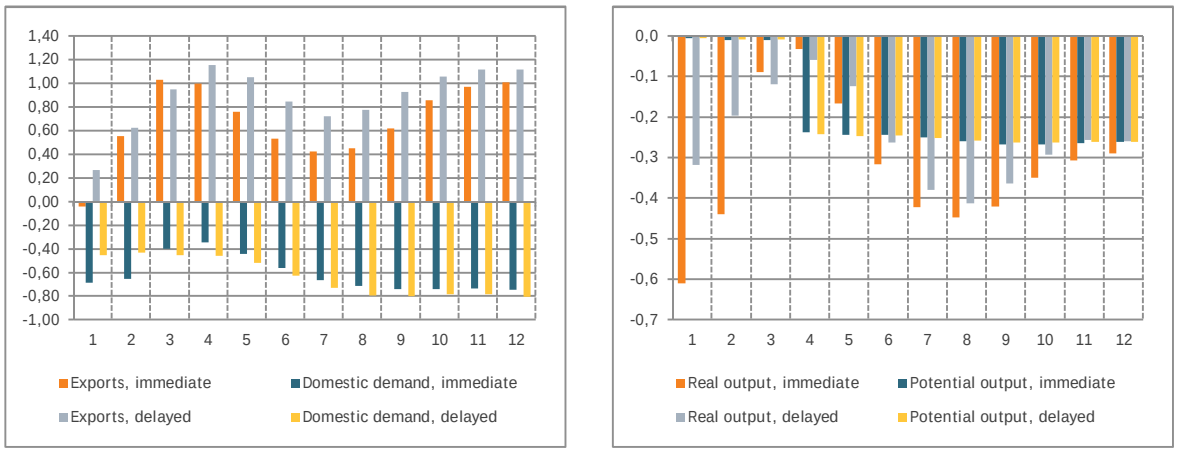
The measure is implemented as follows: we raise the euro area's labour income tax rate for each year over the period 2016-2027, such that it raises the relevant tax take by 1% of nominal GDP of each year, ex ante, relative to the NIME baseline projection. The model is then run over the period 2016-2027 to compute the macroeconomic effects of the tax hike.

On impact in 2016, the labour income tax rate rises by 1.23 pp relative to its baseline level, to raise tax revenue on labour income by 1% of GDP, ex ante. The model results show that the rise in tax rates brings about a significant reduction in household disposable income from wages and final domestic demand relative to the baseline. In 2016, as the tax hike takes effect, the euro area output gap is positive, at 1% of potential, indicating that the area's economy is operating slightly above optimal capacity; in this situation, the stance of monetary policy should be moderately tight in order to keep real output in line with potential over the coming years. Note that while in variant 1 the nominal short-term interest rate stood at just 0.3% before the tax hike was implemented, in this second variant the short-term rate of 2016 is projected to stand at 3.6% before the delayed implementation of the tax

[13] See André Meier (2010), "Still Minding the Gap – Inflation Dynamics during Episodes of Persistent Large Output Gaps", IMF Working Paper WP/10/189, International Monetary Fund, August. See also: Blanchard, Olivier and Daniel Leigh (2013), "Growth Forecast Errors and Fiscal Multipliers", IMF Working Paper WP/13/1, International Monetary Fund, January.

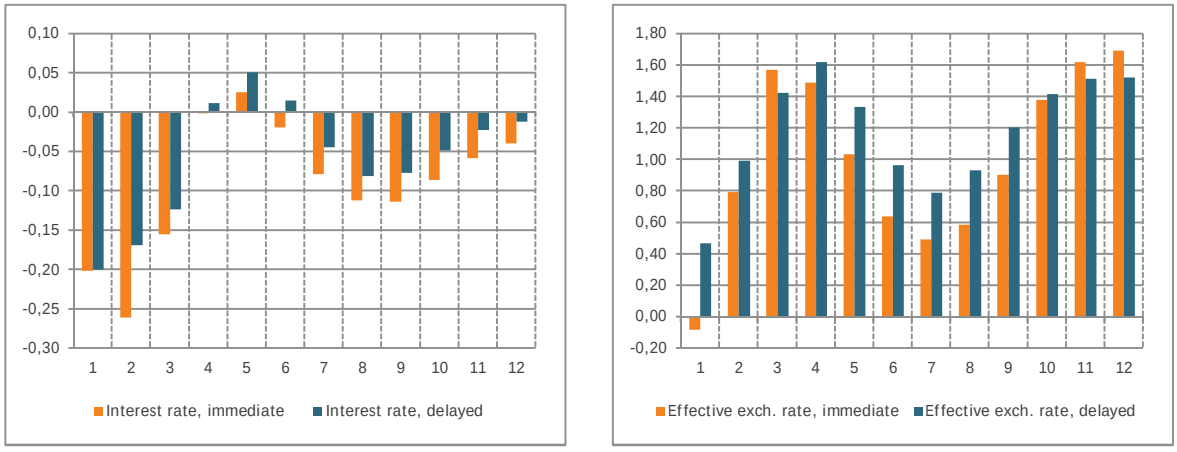
hike. Though the implementation of the tax increase in 2016 depresses domestic demand and output relative to the baseline, the output gap remains positive, albeit lower, at +0.4% of potential output. At the same time, the area's unemployment rate in 2016 remains in line with the estimated natural rate of unemployment and consumer price inflation reaches 1.7%, which is relatively close to the ECB's medium-term inflation objective. Hence, though monetary authorities intervene to reduce the nominal short-term interest rate relative to the baseline, the decline in the short-term market rate is a very limited -0.20 pp.

Graph 32 Effects on selected macroeconomic aggregates, variant 1 "immediate" and variant 2 "delayed"
(Deviations in % relative to baseline)



Source: NIME

Graph 33 Effects on nominal short-term interest rates and on nominal effective exchange rates, variant 1 "immediate" and variant 2 "delayed"
(Interest rates: deviations from baseline in pp; Exchange rates: deviations from baseline in %, EUR per unit of foreign currency, + is depreciation)



Source: NIME

Despite the only limited decline in nominal interest rates, changes in international yield spreads and expected inflation differentials lead to an immediate 0.5% relative depreciation of the euro's nominal effective exchange rate. This depreciation is then sustained throughout the simulation period. Recall that in variant 1, in the case of a tax hike in 2013, the on-impact effect on the effective exchange rate is insignificant. Thus, in this delayed variant, the effects on output of the decline in domestic demand over the first years are now largely off-set by a rise in real exports.

Notwithstanding this rise in exports, total euro area output still falls in 2016 by -0.32% relative to the baseline. Over the period 2016-2019, the euro area's output gap is reduced relative to the baseline. However, the output gap remains positive over this period, limiting both the scope and the need for monetary policy to off-set the effects of the fiscal tightening. Over the period 2020-2027, the output gap turns negative in the baseline projection; negative gaps also emerge in this delayed variant and are even somewhat reinforced due to the tax hike. Hence, as of 2022, monetary authorities once again push nominal interest rates down below their baseline levels.

Finally, the model indicates that despite the negative effects of the tax hike on the area's unemployment rate and output, the general government net borrowing requirement would decline relative to baseline due to both the rise in tax revenue and to a decline in the interest due on public sector debt, following the decline in nominal interest rates.

Comparing the effects of a hike in tax rates as of 2013, when the initial output gap is still large and negative, with an identical measure implemented as of 2016, when the initial output gap is positive, we note that the delayed tax hike is less negative in terms of output lost, most clearly in the short run.

Indeed, while private sector output falls on impact by -0.61% relative to baseline in the case of immediate implementation in variant 1, it falls by just -0.32% when delayed implementation allows for changes in interest rates and exchange rates to raise exports and better off-set the negative effects of the tax hike on domestic demand. Over the entire twelve-year period of simulation, immediate implementation leads to a cumulative output loss of -0.32% of output relative to the baseline, while delayed implementation leads to a cumulative loss of just -0.25% relative to the baseline.

We also note that immediate implementation in the face of a binding ZLB does not allow an interest rate reduction of sufficient magnitude to produce an immediate depreciation of the exchange rate and increase exports. Indeed, real exports do not increase on impact under immediate implementation, while they increase on impact by +0.27% relative to the baseline under delayed implementation. Furthermore, the positive impact on exports is greater throughout the simulation period in the case of delayed implementation, as is shown by the effects on cumulative exports over the 12-year period. Indeed, cumulative exports rise by 0.70% above baseline in the case of immediate implementation and by 0.90% above baseline in the case of delayed implementation.

Finally, the results indicate that over a twelve-year consolidation period, it may be somewhat more efficient to carry out fiscal consolidation from a position where the output gap has been closed, though the purely fiscal results of the two variants are very similar.

11.1.3. Effects of a cut in public sector spending on employment

In this third variant, the NIME model is used to simulate the effects of a cut in public sector spending on employment over the period 2013-2024. The measure is implemented as follows: we cut the euro area's public sector employment in each year over the period 2013-2024, such that it reduces the public sector wage bill by 1% of nominal GDP of each year, ex ante, relative to the NIME baseline projection. The model is then run over the period 2013-2024 to compute the macroeconomic effects of the cut in public sector spending on employment.

On impact in 2013, public sector employment falls by 9.5% relative to its baseline level, reducing the public sector wage bill by 1% of GDP. Unemployment immediately rises by 13% relative to the baseline, leading to a sharp fall in household gross disposable income and in final domestic demand. Real exports exhibit a slight on-impact decline relative to the baseline, which is then maintained until 2020 due to an initial nominal effective exchange rate appreciation that is linked to expected changes in international inflation differentials and changes in real equilibrium exchange rates. As of 2020, the euro exchange rate depreciates, however, allowing for a rise in export volumes over the period 2020-2024.

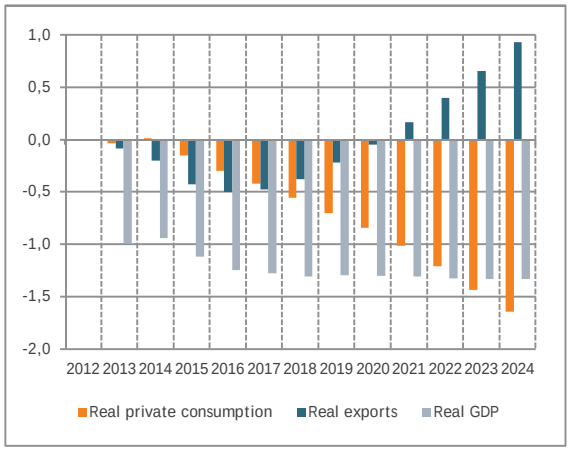
Table 9 **Variant 3: Effects of a cut in public sector spending on employment in euro area**
(2013-2024 cumulative % deviation from baseline, unless noted otherwise)

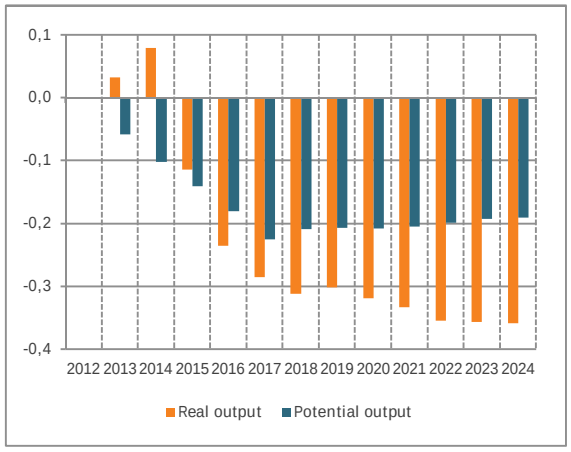
	On impact 2013	Cumulative 2013-2024
Real final domestic demand	-1.02	-1.48
Real exports	-0.08	+0.02
Real private sector output	+0.03	-0.24
Real GDP	-0.99	-1.23
Real potential output	-0.06	-0.18
Unemployment	+12.98	+10.37
	2013	2024
Debt-to-GDP ratio (pp deviation from baseline ratio)	-0.55	-0.41

The natural rate of unemployment is affected by the rise in unemployment, via hysteresis effects. The rise in the NAIRU leads to a decline in potential output, which is insufficient to off-set the effects of the fall in demand on the output gap. Hence, as of 2017, the presence of more slack than in the baseline leads to a relatively more negative output gap and prompts monetary authorities to intervene, pushing nominal interest rates down below baseline levels.

The cut in public sector employment leads to an immediate decline in the public sector net borrowing requirement relative to the baseline, which lasts until 2022. However, the recessive effects of the measure reduce final domestic demand, which reduces tax revenue. At the same time, the rise in unemployment increases government transfer payments to households. Hence, by 2023, the initially positive effect on public finances gives way to a general government net borrowing requirement that begins to exceed its baseline level. However, given the initial positive effects on public borrowing, gross public sector debt is lower than in the baseline throughout 2013-2024, and as the fall in debt exceeds that of nominal GDP, this allows for a decline in the debt-to-GDP ratio relative to the baseline.

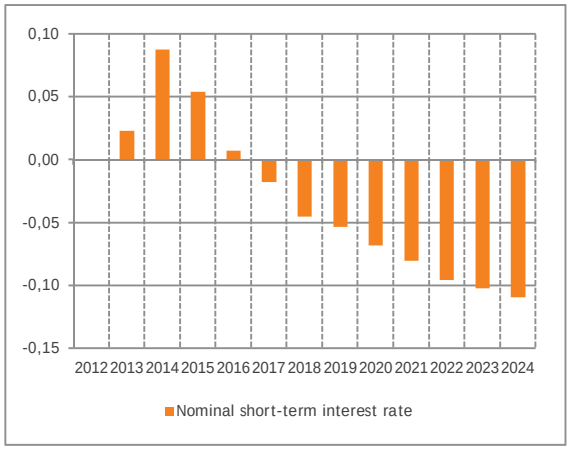
Graph 34 Effects on selected macroeconomic aggregates
(% deviation from baseline)

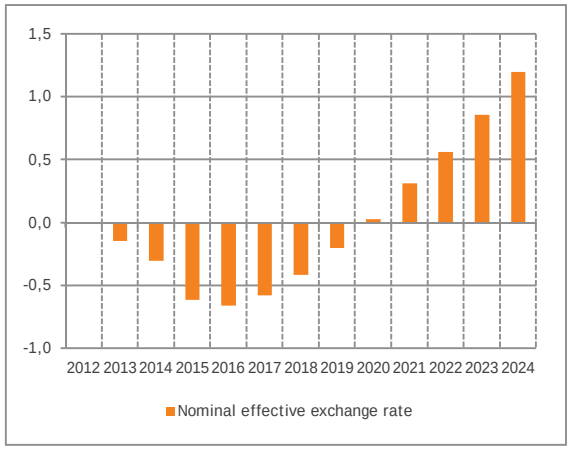




Source: NIME

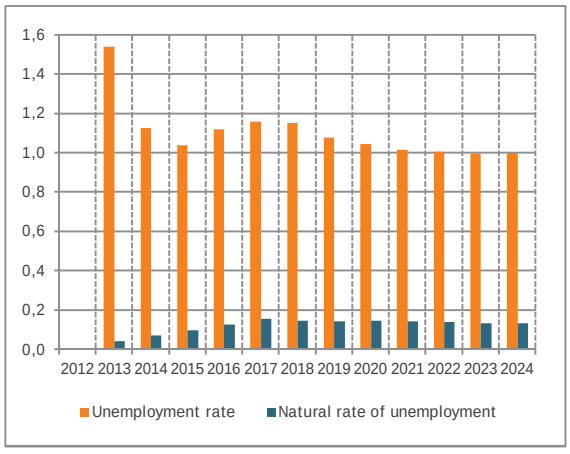
Graph 35 Effects on nominal short-term interest rates and nominal effective exchange rates
(Interest rates: deviations from baseline in pp; Exchange rates: deviations from baseline in %, EUR per unit of foreign currency, + is depreciation)

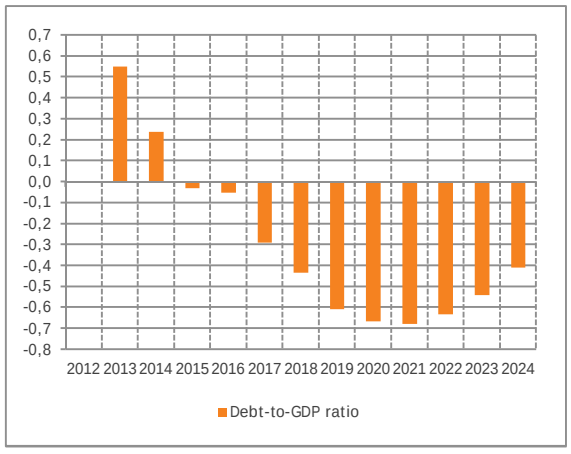




Source: NIME

Graph 36 Effects on the unemployment rate and public sector debt-to GDP ratio
(Deviations from baseline in pp)





Source: NIME

11.2. Fiscal effects of public-investment-led growth initiatives

In this fourth variant, the NIME model is used to evaluate the effects of an increase in public sector investment over the period 2013-2024. The aim is to ascertain whether fiscal stimulus could be self-financing and have net positive effects on output levels when output gaps are thought to be large and negative, as we assume to be the case for the euro area in 2013.

The measure is implemented as follows: we increase the euro area's public sector investment in each year over the period 2013-2024, so as to raise public sector investment spending by 1% of nominal GDP of each year, ex ante, relative to the NIME baseline projection. The model is then run over the period 2013-2024 to compute the macroeconomic effects of the measure.

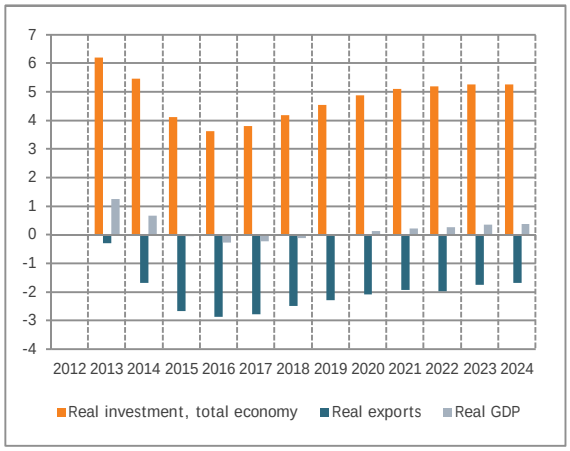
Table 10 Variant 4: Fiscal effects of public investment-led growth initiatives
(2013-2024 cumulative % deviation from baseline, unless noted otherwise)

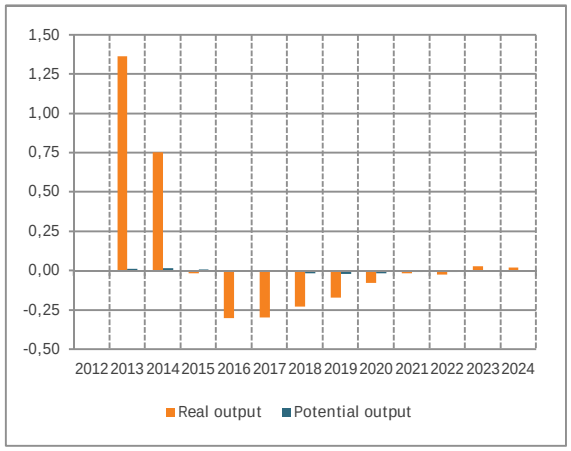
	On impact 2013	Cumulative 2013-2024
Real final domestic demand	+1.64	+1.04
Real public investment	+48.17	+51.70
Real investment, total economy	+6.22	+5.74
Real exports	-0.31	-3.07
Real private sector output	+1.37	-0.12
Real GDP	+1.27	+0.05
Real potential output	+0.01	+0.01
Unemployment	-2.63	+0.07
	2013	2024
Debt-to-GDP ratio (pp deviation from baseline ratio)	-0.76	+12.7

On impact in 2013, given the relatively small budgets that are allocated to public investment in the euro area, the 1% of GDP increase in public investment raises public sector investment by 48% relative to its baseline level, raising the total economy investment spending by 6.2%. This rise in public sector capital expenditure constitutes a sustained positive shock to final domestic demand and output. This produces a strong initial jump in the 2013 yoy growth rate of real investment but after this initial shock, investment growth rates revert to their baseline paths.

The rise in investment raises overall output levels in 2013 and 2014, leading to significantly smaller negative output gaps relative to the baseline and thus paving the way for a relative tightening of monetary policy. Indeed, in this variant, short-term rates are higher in 2013-2014 than their baseline levels as monetary authorities react to the closing output gaps, lower unemployment rates and marginally higher inflation by raising nominal short-term market rates.

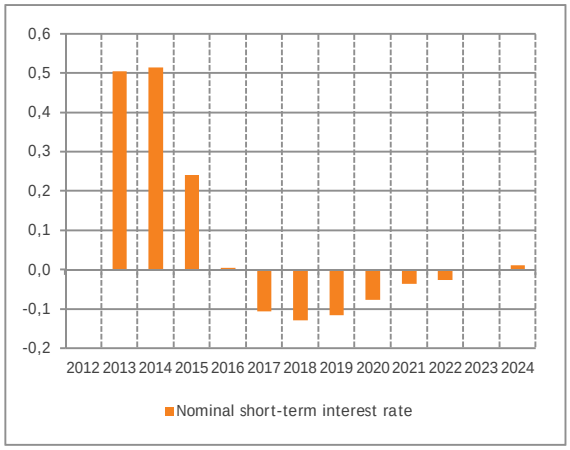
Graph 37 Effects on selected macroeconomic aggregates
(% deviation from baseline)

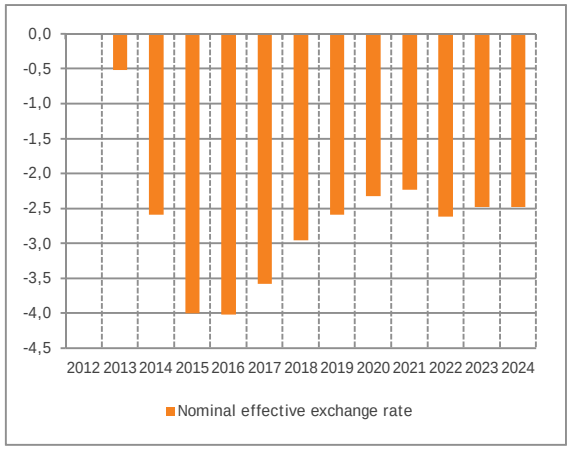




Source: NIME

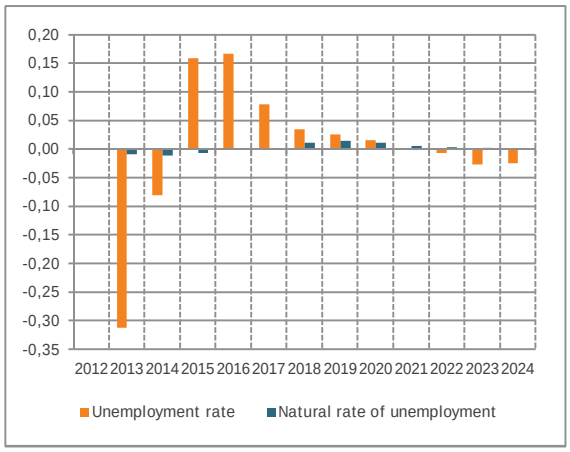
Graph 38 Effects on nominal short-term interest rates and nominal effective exchange rates
(Interest rates: deviations from baseline in pp; Exchange rates: deviations from baseline in %, EUR per unit of foreign currency, + is depreciation)

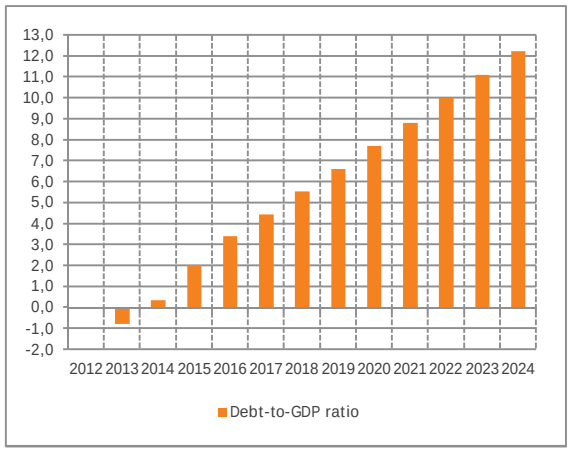




Source: NIME

Graph 39 Effects on the unemployment rate and public sector debt-to GDP ratio
(Deviations from baseline in pp)





Source: NIME

The rise in output in 2013-2014 leads to higher employment as well as to somewhat higher private business sector wage rates, which combine to increase household disposable income and raise private consumption expenditure. However, the simultaneous rise in nominal interest rates brings downward pressure to bear on private sector investment and private consumption, and also leads to a lasting relative appreciation of the euro area's nominal effective exchange rate. This currency appreciation reduces external price competitiveness and export volumes relative to the baseline, which then off-sets part of the initially positive effects of the surge in investment on total output. Thus, after an initial increase in output over 2013-2014 driven by final domestic demand, output levels more or less return to their baseline levels in the wake of a relative decline in real exports.

The initial modest rise in prices and strong rise in nominal interest rates leads to a strong appreciation in the nominal effective exchange rate, which produces a significant and sustained decline in real exports relative to the baseline. As of 2015, the fall in exports off-sets the rise in investment and the euro area's output falls below the baseline. This relative decline fades gradually and output returns to baseline by 2024. As the measure has no lasting and unambiguous effect on unemployment, there is also no clear-cut and significant effect on the natural rate of unemployment. Furthermore, as the measure has no effect on tax rates, there is no change in the household sector's trade-off between labour and leisure and thus no effect on the natural rate of unemployment. Hence, this significant rise in public investment does not lead to any significant change in the euro area's potential output.[14]

All in all, in cumulative terms over the period 2013-2024, such a fiscal stimulus would raise final domestic demand through the rise in public sector investment, but this would come at the expense of private business sector investment. Furthermore, the exchange rate effects stemming from the rise in euro area nominal interest rates would also curtail real exports. All in all, this would leave real output levels more or less unchanged relative to the baseline in the long run. In cumulative terms, the sum of short-term output losses would leave cumulative real output over 2013-2024 lower than in the baseline.

Finally, the sustained higher spending on public investment over the period 2013-2024 would be quite detrimental to the area's fiscal position, raising its net borrowing requirement by nearly 1.2 pp by 2024. This series of higher deficits relative to the baseline would then be reflected in the area's public sector debt-to-GDP ratio, which would rise by about 12 pp in 2024 relative to its baseline level. The model results thus provide no evidence that any significant fiscal consolidation can be achieved by this type of increase in public spending, quite the contrary. However, short-term benefits can be reaped in terms of higher employment, domestic demand and real GDP.

[14] This is the result of the separation in the NIME model of the public sector and private business sector capital stocks. It can however be deemed very plausible that such a large rise in public investment would translate into an increase in total factor productivity or, equivalently, in the average productivity of labour in the private business sector. In such a case, the long-run positive effects of the rise in public investment would be significantly underestimated in this simulation.

11.3. Fiscal effects of rise in trend labour productivity

In this fifth variant, the NIME model is used to evaluate the effects of an increase in trend average hourly labour productivity over the period 2013-2024. The fundamental determinants of economic growth are thought to be more or less identified as population growth, the rule of law, enforceable property rights, entrepreneurial freedom, institutional stability, education and access to finance for investment projects. However, it is also widely recognised that output growth is not a policy variable: economic growth does not materialise by decree. In the euro area, fostering higher output growth is the aim of the EU's structural reforms programmes, as expressed by the late and ill-fated Lisbon Strategy and by its successor, the EU's 2020 Strategy[15]. These programmes stem from the premise that reforms at the level of labour markets, at the level of product markets, in the provision of marketable services (including financial services) and in the functioning of institutions can lead to a durable rise in standard measures of average labour productivity and thus in sustainable real GDP growth rates.

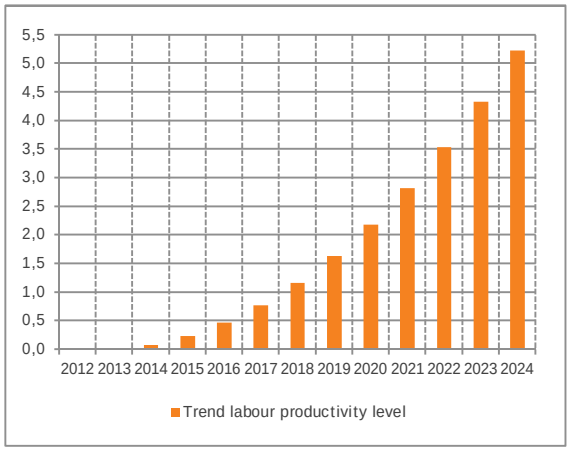
Table 11 Variant 5: Fiscal effects of a rise in trend labour productivity
(2014-2024 cumulative % deviation from baseline, unless noted otherwise)

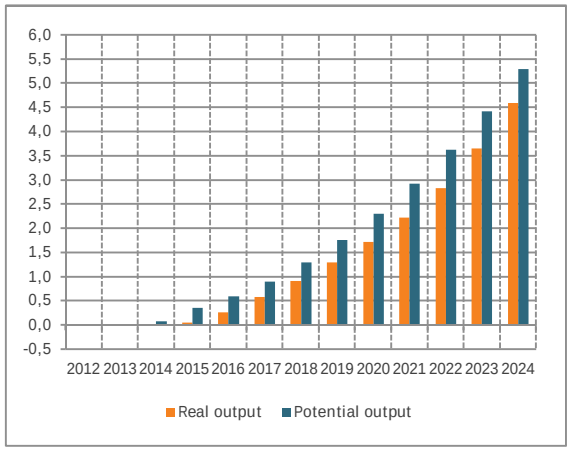
	On impact 2014	Cumulative 2013-2024
Real final domestic demand	-0.00	+0.93
Real exports	-0.01	+2.92
Real private sector output	-0.01	+1.56
Real GDP	-0.01	+1.46
Real potential output	+0.08	+2.02
Unemployment	+0.02	-0.75
	2013	2024
Trend productivity level (% deviation from baseline level)	+0.08	+5.22
Nominal effective exchange rate (EUR per unit of foreign currency, % deviation from baseline level)	-0.02	+11.36
Debt-to-GDP ratio (pp deviation from baseline ratio)	+0.02	-6.93

It is well beyond the scope of this paper to analyse the sources and causes that are presumed to drive economic growth, or to evaluate the growth potential of the EU's structural reform programmes. However, in assuming that these programmes are capable of delivering an increase in trend productivity, we simulate the effects of such an increase on the euro area's economy and on fiscal outcomes.

[15] See: EU Commission, "Communication from the Commission, Europe 2020, a strategy for smart, sustainable and inclusive growth", COM(2010) 2020 final, 3.3.2010, Brussels. See also: European Council, "European Council, June 17 2010, Conclusions", EUCO 13/10.

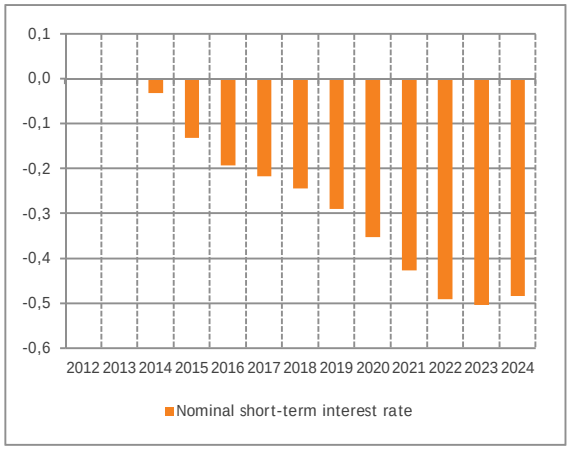
Graph 40 Effects on selected macroeconomic aggregates
(% deviation from baseline)

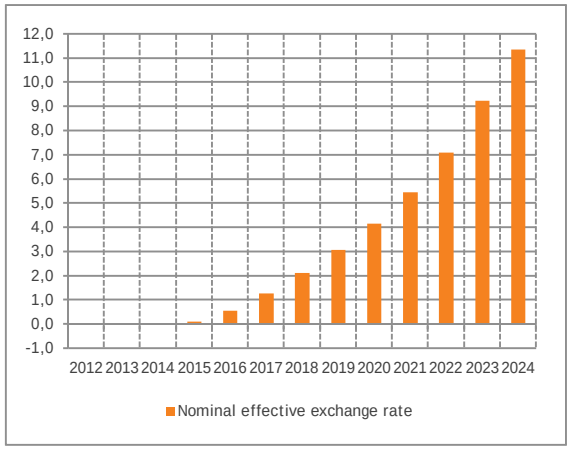




Source: NIME

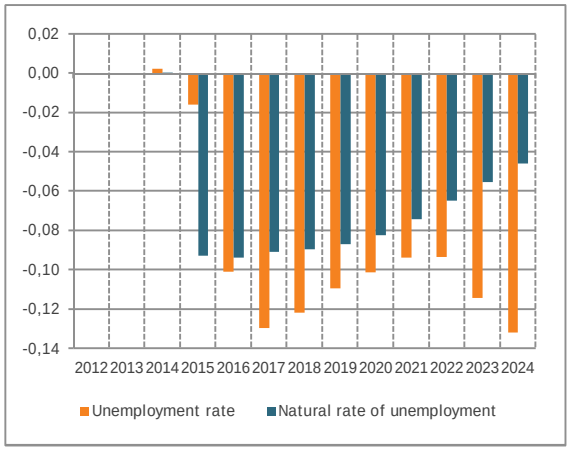
Graph 41 Effects on nominal short-term interest rates and nominal effective exchange rates
(Interest rates: deviations from baseline in pp; Exchange rates: deviations from baseline in %, EUR per unit of foreign currency, + is depreciation)

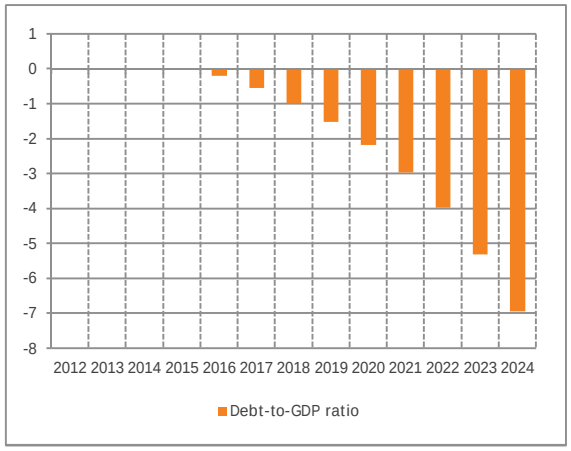




Source: NIME

Graph 42 Effects on the unemployment rate and public sector debt-to GDP ratio
(Deviations from baseline in pp)





Source: NIME

The measure we simulate is implemented as follows: while private sector trend hourly labour productivity is assumed to grow at a constant rate of 1.14% yoy over the period 2013-2024 in the baseline projection, we now increase growth linearly from 1.14% yoy in 2013 to 2.00% yoy in 2024. Hence, in 2024, labour productivity growth will be 0.86 pp higher than in the baseline. The model is then run over the period 2013-2024 to compute the macroeconomic effects of this rise in productivity.

The simulation results indicate that the rise in business sector potential output as of 2014 leads to an immediate widening of the initially negative output gap, which is the difference between the effective production level and the optimal production level. This indicates that economic slack increases as firms become able to produce an increasing quantity of goods and services, for which there is initially no effective demand. The initial rise in overall production capacity leads to an incipient rise in unemployment and a decline in output prices, as firms realise that following the rise in productivity, they have an excess of workers, given the higher productivity level and the unchanged level of effective demand. The upward pressure on unemployment and the general disinflationary environment then lead to a cut in nominal short-term interest rates as the monetary authorities step in to boost output levels up in the direction of the rising levels of potential output.

As of 2016, output growth picks up relative to the baseline as the higher productivity and initial wage moderation allow firms to raise wages, hire more labour and increase capital expenditure. The rises in employment and real wage rates combine to increase labour income, which leads to a rise in household consumption relative to baseline. From that point on, final domestic demand, effective output and employment all rise above their baseline levels as the economy continues to adapt to its steadily rising long-run equilibrium growth path through 2024.

All in all, the rise in trend productivity growth leads to a significant cumulative rise in final effective demand and output and reduces unemployment over the period 2014-2024. The positive shock to trend productivity also raises the euro area's real exports in the short term, as the widening of the initially negative output gap leads to significant reductions in nominal market interest rates, which reduce the attractiveness of euro-denominated financial products. This tends to lead to a medium-term depreciation[16] of the euro that raises euro area price-competitiveness and, hence, real export volumes.

Finally, the results also indicate that such a productivity shock would be highly beneficial to public finances, raising tax revenue and reducing transfer payments, while also leading to a relative reduction in nominal interest rates on public sector borrowing. Hence, by 2024, the positive productivity shock would reduce the gross public sector debt-to-GDP ratio by 6.9 pp relative to the baseline debt ratio.

[16] Note that the model's long-run equilibrium exchange rate (which balances the current account) appreciates following a rise in trend productivity growth, but this effect affects the short-run nominal effective exchange rate only very gradually.

11.4. Policy implications of the simulation results

The five euro area fiscal policy variants that were simulated all indicate that contractionary fiscal policies are indeed contractionary. An increase in income taxes reduces final domestic demand via its effects on household consumption. While it does lead to an increase in real exports, the higher exports do not off-set the loss in output stemming from domestic demand. Furthermore, a higher level of taxation increases the tax wedge, i.e. the gap between pre-tax and post-tax household (disposable) income, reducing the incentive of work versus leisure. This raises the euro area's natural rate of unemployment and thereby reduces the level of potential output. The decline in potential output goes a long way to closing the negative output gap that is generated by the initial fall in final demand and thus reduces the scope for possible support from monetary policy easing.

In terms of the cumulative loss of employment and real GDP, the worst outcome clearly materialises in the case of a cut in public employment. Indeed, cuts in public employment and the ensuing rise in unemployment do not generate an immediate fall in real household consumption, as the effect on consumption is initially off-set by a decline in the household saving rate. It is only after 2016 that the decline in domestic demand leads to a cut in interest rates, which produces a depreciation of the euro and a rise in exports as of 2021.

Notwithstanding the sacrifices that it entails in terms of employment and GDP, the cut in public employment does not achieve any significant reduction in the public debt-to-GDP ratio. In terms of effectiveness in reducing debt burdens, it is the delayed tax hike that offers the most promising results due to its less destructive effects on real output and employment and due also to its large positive off-setting effects on real exports. Alternatively, an attempt to reduce debt burdens by boosting GDP growth through higher public investment spending and counting on a rise in nominal GDP to reduce the debt-to-GDP ratio does not appear to be a feasible option for debt reduction as the rise in public investment spending would not be accompanied by a sufficiently large increase in tax receipts to allow a decline in the debt burden.

All in all, the five variants reveal that if the primary objective of euro area authorities is to reduce public borrowing and debt loads, the least damaging policy option would be to implement tax increases rather than spending cuts, least of all cuts that directly affect public sector employment.

However, the overarching dominant strategy would be to attempt to foster increases in trend (labour) productivity, as such measures can be viewed as generally welfare-enhancing and are the surest road to debt reduction and long-run fiscal sustainability. Nevertheless, going beyond general framework conditions, the sources of growth are usually difficult to identify with any degree of certainty and the means of achieving lasting increases in productivity growth are difficult to implement.

12. Detailed tables for the 2013-2024 baseline projection

Table 12 Detailed point projection results for the Euro Area

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)													
1. Private consumption	-1.4	-0.7	0.5	2.0	1.2	0.7	0.5	-0.1	0.1	0.1	0.1	0.4	0.7
2. Public consumption	-0.1	-0.3	-0.8	0.3	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.4
3. Gross fixed capital formation	-3.9	-2.1	2.5	3.6	1.2	-1.4	-2.7	-3.6	-2.9	-2.1	-1.3	-0.4	0.2
4. Total domestic expenditure	-1.9	-1.1	0.8	2.0	1.1	0.3	-0.2	-0.6	-0.4	-0.2	-0.1	0.2	0.6
5. Exports	2.9	1.3	4.9	5.2	5.7	5.4	4.4	2.6	2.0	1.5	1.2	1.9	3.5
6. Imports	-0.9	-1.0	1.8	0.9	1.2	0.6	0.6	0.3	0.6	0.8	1.0	1.4	2.1
7. Gross Domestic Product	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.1	0.1	0.1	0.1	0.5	1.1
8. Private sector output for final demand	-0.6	-0.5	1.9	3.1	2.3	1.6	1.0	0.1	0.2	0.2	0.3	0.7	1.4
9. Contributions to real GDP growth													
a. Total domestic expenditure	-1.9	-1.0	0.8	1.9	1.0	0.2	-0.1	-0.6	-0.3	-0.2	-0.1	0.2	0.5
b. External trade													
.exports	0.7	0.3	1.2	1.4	1.5	1.5	1.3	0.7	0.6	0.4	0.4	0.6	1.1
.net exports	1.3	0.6	0.8	1.1	1.2	1.3	1.1	0.7	0.4	0.3	0.1	0.3	0.6
II. Deflators (growth rates, unless noted otherwise)													
1. Private consumption	2.0	1.6	1.5	1.6	1.8	1.9	2.0	1.9	1.8	1.8	1.7	1.6	1.7
2. Gross fixed capital formation	1.4	0.9	1.7	2.2	2.4	2.6	2.8	2.9	3.0	3.1	3.2	3.3	3.3
3. Exports	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.2	1.2
4. Imports	2.6	0.9	3.3	2.2	2.1	2.0	1.9	1.7	1.9	2.0	2.0	1.9	2.1
5. Gross Domestic Product	1.2	1.1	0.8	1.6	1.6	1.8	1.9	1.9	1.8	1.8	1.7	1.7	1.6
6. Private sector output	1.5	0.7	1.3	1.7	1.7	1.8	1.9	1.8	1.8	1.8	1.8	1.7	1.7
7. Oil, Brent crude, level (EUR/barrel)	86.8	80.5	88.1	92.0	93.3	91.6	88.4	84.0	81.7	81.1	81.2	80.6	80.3
III. Financial markets (levels in %, unless noted otherwise)													
1. 3-month Euribor (%)													
a. Nominal rate	0.6	0.3	1.3	2.6	3.6	4.3	4.5	4.2	3.8	3.3	2.8	2.5	2.6
b. Real rate	-1.4	-1.3	-0.1	1.0	1.8	2.4	2.6	2.4	2.0	1.6	1.2	0.9	1.0
2. 10-year AAA Corporate bond yield (%)													
a. Nominal rate	3.9	3.8	3.3	4.5	5.5	6.0	6.3	5.7	5.2	4.7	4.3	4.1	4.3
b. Real rate	2.1	2.0	1.5	2.7	3.6	4.2	4.4	3.7	3.2	2.7	2.3	2.1	2.3
3. Nominal effective exchange rate, growth rate (+ is depreciation)	6.6	-4.6	2.8	-1.3	-2.6	-3.0	-3.0	-4.3	-3.8	-4.1	-5.4	-5.9	-4.5
4. Real effective exchange rate, growth rate (+ is depreciation)	7.5	-2.1	5.1	0.5	-0.7	-1.1	-1.1	-2.4	-2.0	-2.5	-3.7	-4.2	-2.6

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
IV. Labour market (growth rates, unless noted otherwise)													
1. Labour supply, in persons	0.6	0.2	-0.0	0.3	0.4	0.1	-0.1	-0.3	-0.3	-0.2	-0.1	-0.1	-0.1
2. Volume of labour services (hours/year)													
a. Business sector	-1.4	-0.6	1.0	1.4	0.5	-0.0	-0.3	-0.6	-0.5	-0.4	-0.3	-0.1	0.1
b. Public sector	-0.7	-0.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Total economy	-1.3	-0.6	0.9	1.1	0.4	-0.0	-0.2	-0.5	-0.4	-0.3	-0.2	-0.1	0.1
3. Unemployment rate (% civilian labour force, level)	11.5	12.1	11.2	10.4	10.3	10.4	10.5	10.7	10.8	10.9	11.0	11.0	10.8
4. Real rates of labour compensation (gross, hourly, incl. social contributions)													
a. Take-home rate, business sector	-0.0	0.0	-0.5	0.5	1.0	0.9	0.9	0.8	0.7	0.7	0.7	0.7	0.8
b. Take-home rate, public sector	-2.2	-0.2	-0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
5. Labour productivity													
a. Business sector	0.8	0.1	0.8	1.7	1.8	1.6	1.3	0.7	0.7	0.6	0.6	0.8	1.3
b. Total economy	0.7	0.0	0.7	1.5	1.6	1.4	1.1	0.6	0.6	0.5	0.5	0.7	1.2
6. Real unit labour costs													
a. Business sector	0.3	1.2	-1.2	-1.3	-0.7	-0.6	-0.3	0.1	0.0	0.0	0.0	-0.2	-0.6
b. Total economy	0.1	1.1	-1.2	-1.1	-0.6	-0.5	-0.2	0.2	0.0	0.1	0.0	-0.2	-0.5
V. Household sector (growth rates, unless noted otherwise - deflated by consumer prices)													
1. Total real means	0.7	1.2	0.8	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9
a. Real gross disposable income	-0.9	-1.1	-0.4	0.5	0.7	0.7	0.8	0.7	0.6	0.5	0.5	0.5	0.6
.o/w wage income	-1.0	-0.2	0.3	1.7	1.4	0.8	0.6	0.2	0.2	0.3	0.4	0.6	0.9
.o/w transfer income	0.2	0.7	1.3	0.4	0.7	1.2	1.7	2.0	1.9	1.6	1.3	1.1	0.8
b. Stock of real net assets	-1.0	-0.6	0.2	0.0	-0.2	-0.2	-0.1	0.3	0.7	1.0	1.3	1.4	1.4
.o/w real money balances	-1.3	-0.0	-2.2	-6.6	-4.0	-2.3	-1.3	0.4	0.6	1.3	1.4	1.1	0.1
2. Net saving rate, household sector (in % of disp. income)	8.0	8.0	5.3	3.7	3.3	3.3	3.6	4.4	4.9	5.3	5.7	5.8	5.7
VI. Public sector (growth rates, unless noted otherwise)													
1. Net lending/borrowing (+/-) of general government, in % of GDP	-3.4	-3.0	-2.4	-1.7	-1.3	-1.2	-1.4	-1.8	-2.3	-2.8	-3.0	-3.2	-3.2
.primary balance, in % of GDP	-0.2	0.3	0.9	1.6	2.0	2.2	2.0	1.7	1.3	1.0	0.7	0.6	0.7
2. Interest payments, in % of GDP	3.2	3.3	3.3	3.3	3.3	3.4	3.4	3.5	3.6	3.7	3.8	3.8	3.9
3. Gross public debt, in % of GDP	93.9	96.4	96.5	93.8	91.6	89.7	88.6	88.7	89.4	90.5	91.9	93.1	93.8
4. Share of general government in GDP													
a. Total revenue, in % of GDP	43.7	44.4	44.5	44.3	44.1	44.0	43.9	43.9	44.0	44.0	44.1	44.1	44.0
b. Total expenditure, in % of GDP	49.0	49.4	48.9	47.7	47.1	46.7	46.8	47.2	47.7	48.2	48.5	48.6	48.5

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
VII. Miscellaneous (growth rates, unless noted otherwise)													
1. Trade balance, in % of GDP	2.4	2.7	3.0	3.8	4.7	5.7	6.6	7.1	7.4	7.4	7.4	7.4	7.7
2. Potential output, private sector	1.2	0.9	0.7	0.7	1.0	1.1	1.1	1.0	1.0	0.9	0.9	0.9	0.9
.output gap	-2.4	-3.8	-2.7	-0.4	1.0	1.4	1.4	0.5	-0.3	-1.1	-1.7	-1.9	-1.3
3. Population	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
.aged 15 to 64	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2

Table 13 Euro Area: Structural variables underlying the projection
(growth rates, unless noted otherwise)

	Average 1997-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Total population	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
2. Working-age population (15-64)	0.3	0.4	0.1	0.1	0.0	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2
3. Trend labour force participation rate	0.6	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4. Trend working time (hours/person/year), private business sector	-0.3	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
5. Equilibrium labour supply (persons)	1.0	0.7	0.6	0.5	0.5	0.5	0.1	0.0	0.0	0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2
6. Natural rate of unemployment (level)	8.8	8.9	9.2	9.6	10.0	10.5	9.8	10.0	10.3	10.4	10.3	10.3	10.4	10.5	10.5	10.6	10.7	10.7
7. Equilibrium labour demand (hours/year), public sector	0.9	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. Equilibrium labour demand (hours/year), private business sector	0.5	0.2	0.0	0.0	0.2	0.1	-0.2	-0.5	-0.4	-0.2	-0.0	-0.1	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3
9. Equilibrium labour demand (hours/year), total economy	0.6	0.2	0.1	0.1	0.1	0.1	-0.2	-0.4	-0.3	-0.1	-0.0	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.3
10. Trend hourly labour productivity, private business sector	2.0	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
11. Trend hourly labour productivity, total economy	1.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
12. Equilibrium output, private business sector	2.5	1.4	1.2	1.2	1.3	1.2	0.9	0.7	0.7	1.0	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.8
13. Equilibrium output, total economy	1.9	1.0	0.8	0.8	0.8	0.8	0.5	0.3	0.4	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4
14. Equilibrium (target) rate of inflation (consumption deflator)	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
15. Equilibrium real rate of interest	2.5	1.4	1.2	1.2	1.3	1.2	1.2	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Table 14 Detailed point projection results for the United States of America

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)													
1. Private consumption	2.2	2.0	2.4	2.0	1.3	0.7	0.5	0.5	0.7	1.1	1.6	2.0	2.2
2. Public consumption	-2.6	-1.6	-1.6	2.8	1.5	1.0	0.4	0.2	-0.0	-0.2	-0.4	-0.5	-0.6
3. Gross fixed capital formation	6.9	2.5	5.9	2.1	0.1	-1.9	-1.2	-0.0	1.3	2.3	2.9	3.1	2.8
4. Total domestic expenditure	1.9	1.7	3.0	2.0	1.1	0.3	0.2	0.3	0.7	1.1	1.5	1.7	1.8
5. Exports	3.5	6.4	7.4	10.0	8.0	6.4	6.0	6.0	6.0	5.8	5.1	4.3	3.6
6. Imports	2.4	2.6	5.8	4.4	4.4	3.4	3.4	3.5	3.7	4.0	4.4	4.7	4.8
7. Gross Domestic Product	2.2	1.9	3.1	2.7	1.6	0.8	0.6	0.9	1.2	1.6	1.8	1.8	1.7
8. Private sector output for final demand	3.3	2.7	3.9	3.6	2.1	1.2	1.2	1.4	1.8	2.2	2.5	2.6	2.5
9. Contributions to real GDP growth													
a. Total domestic expenditure	2.0	1.7	3.1	2.0	1.1	0.3	0.2	0.3	0.6	1.0	1.4	1.6	1.7
b. External trade													
.exports	0.5	0.9	1.1	1.5	1.3	1.1	1.1	1.2	1.3	1.3	1.2	1.1	1.0
.net exports	-0.1	0.5	0.1	0.7	0.5	0.5	0.5	0.5	0.6	0.5	0.4	0.2	0.0
II. Deflators (growth rates, unless noted otherwise)													
1. Private consumption	1.8	1.4	1.5	1.7	1.7	1.6	1.5	1.3	1.2	1.1	1.1	1.1	1.2
2. Gross fixed capital formation	1.9	2.7	2.0	2.2	2.2	2.1	2.1	2.0	1.9	1.8	1.6	1.5	1.3
3. Exports	0.7	0.9	1.7	2.5	3.2	3.7	4.1	4.5	5.1	5.8	6.4	6.9	7.2
4. Imports	0.6	0.1	1.3	1.0	0.9	1.0	1.2	1.4	1.7	1.9	2.0	2.0	2.1
5. Gross Domestic Product	1.9	3.2	1.1	2.6	2.2	2.4	2.2	2.2	2.2	2.4	2.7	2.9	3.1
6. Private sector output	1.3	2.5	1.1	2.4	2.0	2.2	2.0	2.1	2.2	2.4	2.6	2.8	2.9
7. Oil, Brent crude, level (USD/barrel)	112.0	105.0	114.0	119.1	121.1	121.7	123.4	126.6	133.0	142.1	151.9	160.6	168.0
III. Financial markets (levels in %, unless noted otherwise)													
1. 3-month Libor (%)													
a. Nominal rate	0.4	0.3	1.2	2.1	2.6	2.5	2.1	1.6	1.2	1.0	1.0	1.1	1.3
b. Real rate	-1.4	-1.1	-0.3	0.4	0.9	0.9	0.7	0.3	0.1	-0.1	-0.1	-0.0	0.1
2. 10-year AAA Corporate bond yield (%)													
a. Nominal rate	2.3	2.4	3.0	3.6	3.9	3.7	3.4	3.0	2.7	2.6	2.6	2.8	2.9
b. Real rate	0.1	0.2	0.8	1.5	1.8	1.7	1.3	1.0	0.8	0.6	0.7	0.8	0.9
3. Nominal effective exchange rate, growth rate (+ is depreciation)	-7.8	-6.2	3.6	0.3	-1.8	-2.1	-0.7	0.7	2.6	3.5	3.1	2.1	1.2
4. Real effective exchange rate, growth rate (+ is depreciation)	-5.7	-4.8	6.4	1.8	0.1	-0.3	1.3	2.6	4.4	5.1	4.4	3.2	2.2

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
IV. Labour market (growth rates, unless noted otherwise)													
1. Labour supply, in persons	0.9	0.4	0.7	0.8	0.5	0.3	0.3	0.4	0.5	0.5	0.6	0.5	0.5
2. Volume of labour services (hours/year)													
a. Business sector	2.4	1.4	1.5	1.7	0.6	-0.1	-0.1	0.1	0.5	0.8	1.0	1.0	0.9
b. Public sector	1.7	0.7	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Total economy	2.3	1.3	1.4	1.4	0.5	-0.1	-0.1	0.1	0.4	0.7	0.8	0.9	0.8
3. Unemployment rate (% civilian labour force, level)	8.2	7.9	7.2	6.6	6.7	7.1	7.4	7.7	7.8	7.6	7.4	7.0	6.8
4. Real rates of labour compensation (gross, hourly, incl. social contributions)													
a. Take-home rate, business sector	0.1	1.7	0.9	2.1	2.1	2.2	1.9	2.0	2.2	2.4	2.7	3.0	3.2
b. Take-home rate, public sector	-6.3	-2.4	-3.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
5. Labour productivity													
a. Business sector	0.8	1.2	2.4	1.8	1.5	1.4	1.3	1.3	1.3	1.3	1.4	1.5	1.5
b. Total economy	-0.1	0.9	2.1	1.5	1.5	1.3	1.2	1.2	1.2	1.3	1.4	1.4	1.5
6. Real unit labour costs													
a. Business sector	0.3	0.2	-0.2	-0.3	0.3	0.3	0.1	-0.0	-0.1	-0.2	-0.2	-0.1	-0.1
b. Total economy	-0.1	-0.1	-0.4	-0.1	0.2	0.2	0.0	-0.1	-0.2	-0.2	-0.3	-0.2	-0.2
V. Household sector (growth rates, unless noted otherwise - deflated by consumer prices)													
1. Total real means	1.3	1.3	1.7	1.9	1.9	1.9	1.8	1.8	1.8	2.0	2.0	2.1	2.2
a. Real gross disposable income	1.3	1.7	1.1	2.2	1.5	1.2	1.1	1.4	1.9	2.5	3.0	3.3	3.4
.o/w wage income	2.0	3.3	2.7	3.5	2.5	1.9	1.7	2.0	2.4	3.0	3.4	3.7	3.7
.o/w transfer income	-0.1	2.4	3.2	-0.9	-1.5	-1.3	-0.7	0.1	1.1	2.0	2.7	3.1	3.2
b. Stock of real net assets	1.4	2.5	2.8	1.9	1.4	1.2	1.2	1.5	1.8	2.1	2.5	2.8	3.0
.o/w real money balances	11.1	3.5	-9.6	-9.3	-6.1	-2.5	0.1	1.6	2.0	0.7	-0.8	-1.9	-2.2
2. Net saving rate, household sector (in % of disp. income)	3.7	3.1	1.6	2.0	2.2	2.6	3.0	3.8	4.8	6.0	7.2	8.5	9.6
VI. Public sector (growth rates, unless noted otherwise)													
1. Net lending/borrowing (+/-) of general government, in % of GDP	-8.5	-7.1	-5.6	-4.7	-4.2	-3.8	-3.4	-3.1	-2.8	-2.4	-1.9	-1.4	-1.1
.primary balance, in % of GDP	-5.5	-4.0	-2.6	-1.7	-1.2	-0.9	-0.7	-0.4	-0.1	0.2	0.6	1.0	1.3
2. Interest payments, in % of GDP	2.9	3.1	3.1	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4
3. Gross public debt, in % of GDP	109.6	111.8	112.9	111.9	112.1	112.4	112.7	112.5	111.4	109.5	106.6	103.1	99.4
4. Share of general government in GDP													
a. Total revenue, in % of GDP	30.1	30.7	31.9	31.8	31.7	31.5	31.4	31.2	31.1	31.0	31.0	30.9	30.8
b. Total expenditure, in % of GDP	40.0	39.2	39.0	37.6	36.9	36.3	35.8	35.4	34.9	34.5	33.9	33.4	33.0

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
VII. Miscellaneous (growth rates, unless noted otherwise)													
1. Trade balance, in % of GDP	-3.7	-2.9	-2.7	-1.6	-0.7	0.2	1.2	2.4	3.7	5.0	6.4	7.7	8.9
2. Potential output, Private sector	1.9	1.7	1.9	2.2	2.3	2.3	2.2	2.2	2.1	2.1	2.1	2.1	2.1
.output gap (effective output, % deviation from potential)	-2.7	-1.7	0.2	1.5	1.4	0.3	-0.7	-1.5	-1.8	-1.7	-1.3	-0.9	-0.6
3. Population	0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
.aged 15 to 64	0.4	0.3	0.4	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4

Table 15 The United States of America: Structural variables underlying the projection
(growth rates, unless noted otherwise)

	Average 1997-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Total population	1.0	0.9	0.8	0.8	0.7	0.6	0.8	0.8	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9
2. Working-age population (15-64)	1.2	0.8	0.7	0.7	0.6	0.4	0.3	0.4	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4
3. Trend labour force participation rate	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
4. Trend working time (hours/person/year), private business sector	-0.3	-0.4	-0.3	-0.2	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
5. Equilibrium labour supply (persons)	1.0	0.7	0.6	0.5	0.5	0.5	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4
6. Natural rate of unemployment (level)	5.1	6.3	6.7	7.2	7.6	7.9	6.9	6.8	6.8	6.7	6.7	6.7	6.8	6.9	7.0	7.0	7.0	6.9
7. Equilibrium labour demand (hours/year), public sector	0.9	0.2	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. Equilibrium labour demand (hours/year), private business sector	0.7	0.3	0.2	0.3	0.2	0.2	0.1	0.3	0.6	0.7	0.6	0.6	0.5	0.4	0.4	0.5	0.5	0.6
9. Equilibrium labour demand (hours/year), total economy	0.7	0.3	0.2	0.2	0.2	0.2	0.1	0.3	0.5	0.6	0.5	0.5	0.4	0.3	0.3	0.4	0.4	0.5
10. Trend hourly labour productivity, private business sector	2.7	1.9	1.8	1.7	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
11. Trend hourly labour productivity, total economy	2.1	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
12. Equilibrium output, private business sector	3.4	2.2	2.0	2.0	1.9	1.9	1.7	1.9	2.2	2.3	2.2	2.2	2.1	2.0	2.0	2.1	2.1	2.2
13. Equilibrium output, total economy	2.8	1.8	1.6	1.6	1.4	1.4	1.2	1.4	1.7	1.7	1.7	1.6	1.5	1.5	1.5	1.6	1.6	1.7
14. Equilibrium (target) rate of inflation (consumption deflator)	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	2.0	2.0
15. Equilibrium real rate of interest	3.3	2.1	1.9	2.0	1.8	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0

Table 16 Detailed point projection results for Japan

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)													
1. Private consumption	2.0	1.4	0.4	0.4	-0.1	0.0	0.1	0.4	0.5	0.5	0.6	0.7	0.7
2. Public consumption	2.0	1.6	-0.2	-0.6	0.3	0.5	0.6	0.6	0.6	0.7	0.6	0.6	0.6
3. Gross fixed capital formation	4.4	2.1	4.6	4.2	2.2	1.6	1.0	1.7	0.3	-0.1	-0.4	-0.4	-0.6
4. Total domestic expenditure	2.6	1.4	1.1	1.2	0.5	0.5	0.4	0.7	0.5	0.4	0.4	0.4	0.4
5. Exports	-0.3	5.5	10.3	2.0	2.3	2.1	1.5	1.3	0.8	0.1	-0.1	0.3	0.8
6. Imports	5.3	1.6	1.4	1.8	1.4	1.8	2.1	2.5	2.6	2.7	2.8	3.0	3.1
7. Gross Domestic Product	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.5	0.2	0.1	0.0	0.1	0.1
8. Private sector output for final demand	2.6	2.5	2.4	1.6	0.7	0.6	0.4	0.7	0.4	0.3	0.2	0.3	0.4
9. Contributions to real GDP growth													
a. Total domestic expenditure	2.6	1.5	1.1	1.2	0.5	0.5	0.4	0.7	0.5	0.4	0.4	0.4	0.4
b. External trade													
.exports	-0.0	0.8	1.5	0.3	0.4	0.3	0.2	0.2	0.1	0.0	-0.0	0.0	0.1
.net exports	-0.6	0.5	1.3	0.0	0.2	0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.4	-0.3
II. Deflators (growth rates, unless noted otherwise)													
1. Private consumption	0.0	-0.0	1.2	2.6	3.6	4.0	4.2	4.2	4.3	4.3	4.2	4.0	3.8
2. Gross fixed capital formation	-1.9	0.1	-0.2	0.6	1.0	1.1	1.2	1.3	1.4	1.5	1.5	1.6	1.6
3. Exports	-2.0	-1.0	0.4	0.7	0.4	0.1	-0.3	-0.7	-1.1	-1.4	-1.8	-2.1	-2.4
4. Imports	2.0	0.4	-3.0	-1.0	-0.9	-0.9	-1.0	-0.8	-0.7	-0.7	-0.7	-0.7	-0.7
5. Gross Domestic Product	-1.6	1.5	1.3	2.5	3.1	3.3	3.3	3.4	3.3	3.4	3.3	3.1	3.0
6. Private sector output	-1.3	1.0	0.7	2.0	2.6	2.7	2.8	2.8	2.8	2.9	2.8	2.7	2.6
7. Oil, Brent crude, level ('000 JPY/barrel)	8.8	10.2	9.6	8.9	8.1	7.4	6.7	6.1	5.7	5.3	4.9	4.6	4.2
III. Financial markets (levels in %, unless noted otherwise)													
1. 3-month Tibor (%)													
a. Nominal rate	0.2	0.3	0.7	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.3	1.4	1.4
b. Real rate	0.2	0.3	-0.5	-1.7	-2.6	-2.9	-3.0	-2.9	-3.0	-2.9	-2.8	-2.5	-2.3
2. 10-year AAA Corporate bond yield (%)													
a. Nominal rate	1.4	1.4	2.2	2.3	2.4	2.6	2.6	2.7	2.7	2.8	2.8	2.9	2.9
b. Real rate	2.5	0.9	1.2	0.9	0.6	0.6	0.7	0.7	0.8	0.8	0.9	0.9	1.0
3. Nominal effective exchange rate, growth rate (+ is depreciation)	-4.6	25.6	-11.8	-11.8	-11.5	-11.2	-11.2	-10.2	-10.2	-10.5	-11.0	-11.3	-11.4
4. Real effective exchange rate, growth rate (+ is depreciation)	-0.4	27.9	-9.7	-10.6	-10.8	-10.6	-10.6	-9.7	-9.7	-10.0	-10.4	-10.5	-10.4

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
IV. Labour market (growth rates, unless noted otherwise)													
1. Labour supply, in persons	-0.3	0.0	-1.2	-0.6	-1.0	-0.8	-0.6	-0.9	-0.7	-0.4	-0.6	-0.6	-0.6
2. Volume of labour services (hours/year)													
a. Business sector	-0.8	-0.2	-1.5	-1.8	-1.1	-1.0	-1.2	-1.1	-1.1	-1.1	-0.7	-0.6	-0.7
b. Public sector	-0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
c. Total economy	-0.7	-0.1	-1.2	-1.5	-0.9	-0.9	-1.0	-0.9	-0.9	-0.9	-0.6	-0.5	-0.6
3. Unemployment rate (% civilian labour force, level)	4.3	4.2	4.0	4.7	4.5	4.5	4.8	4.8	5.0	5.5	5.5	5.4	5.3
4. Real rates of labour compensation (gross, hourly, incl. social contributions)													
a. Take-home rate, business sector	0.7	0.8	2.0	1.9	1.8	0.6	0.7	0.8	0.3	0.2	-0.0	-0.4	-0.2
b. Take-home rate, public sector	0.2	0.7	-0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
5. Labour productivity													
a. Business sector	3.4	2.7	4.0	3.5	1.8	1.6	1.6	1.8	1.6	1.4	1.0	1.0	1.1
b. Total economy	3.3	2.1	3.5	2.9	1.7	1.6	1.5	1.7	1.5	1.3	1.0	1.0	1.0
6. Real unit labour costs													
a. Business sector	-1.0	-2.4	-1.1	-0.9	0.9	0.2	0.4	0.3	0.1	0.2	0.3	-0.1	-0.0
b. Total economy	-1.1	-2.0	-1.0	-0.6	0.9	0.2	0.4	0.3	0.2	0.2	0.3	-0.0	0.0
V. Household sector (growth rates, unless noted otherwise - deflated by consumer prices)													
1. Total real means	0.3	-0.1	0.1	0.8	0.3	0.2	0.1	0.2	0.4	0.2	0.2	0.2	0.1
a. Real gross disposable income	1.7	1.3	0.4	-0.1	0.1	-0.7	-0.7	-0.6	-1.0	-1.0	-0.9	-1.0	-0.9
.o/w wage income	0.3	1.1	0.8	0.1	0.7	-0.3	-0.4	-0.3	-0.7	-0.8	-0.7	-0.9	-0.7
.o/w transfer income	5.0	5.0	3.8	0.7	-0.0	-0.3	-0.6	-0.4	-0.7	-0.9	-0.9	-0.8	-0.7
b. Stock of real net assets	1.5	1.2	-0.9	-2.4	-3.2	-3.6	-3.8	-4.0	-4.2	-4.5	-4.7	-4.9	-5.1
.o/w real money balances	0.3	-0.1	-5.7	-0.6	-1.6	-3.9	-2.7	-2.2	-2.4	-3.2	-3.5	-4.1	-3.6
2. Net saving rate, household sector (in % of disp. income)	1.0	-1.5	-1.6	-1.8	-1.3	-1.9	-2.5	-3.3	-4.6	-6.0	-7.4	-9.1	-10.5
VI. Public sector (growth rates, unless noted otherwise)													
1. Net lending/borrowing (+/-) of general government, in % of GDP	-8.3	-6.9	-5.3	-5.0	-5.0	-5.1	-5.1	-5.1	-5.2	-5.4	-5.7	-6.0	-6.4
.primary balance, in % of GDP	-6.2	-4.8	-3.1	-2.6	-2.4	-2.3	-2.2	-2.0	-1.9	-1.9	-1.9	-1.9	-1.8
2. Interest payments, in % of GDP	2.1	2.0	2.2	2.4	2.6	2.8	2.9	3.1	3.2	3.5	3.8	4.1	4.6
3. Gross public debt, in % of GDP	240.6	240.8	237.4	233.9	230.4	227.0	224.1	220.8	218.3	216.4	215.2	214.5	214.4
4. Share of general government in GDP													
a. Total revenue, in % of GDP	34.4	35.4	36.0	36.2	36.2	36.2	36.2	36.2	36.2	36.3	36.3	36.3	36.4
b. Total expenditure, in % of GDP	45.5	44.8	43.7	43.2	43.2	43.2	43.3	43.4	43.5	43.8	44.1	44.5	44.9

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
VII. Miscellaneous (growth rates, unless noted otherwise)													
1. Trade balance, in % of GDP	-2.2	-2.1	-0.2	0.1	0.5	0.7	0.7	0.5	0.2	-0.3	-0.8	-1.3	-1.7
2. Potential output, Private sector	0.7	0.2	-0.2	0.8	0.6	0.6	0.5	0.5	0.5	0.8	0.8	0.8	0.8
.output gap (effective output, % deviation from potential)	0.6	2.9	5.6	6.4	6.4	6.5	6.4	6.7	6.6	6.0	5.4	4.9	4.5
3. Population	-0.2	-0.2	-0.2	0.4	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3
.aged 15 to 64	-1.4	-1.5	-1.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.9	-0.6	-0.6	-0.6	-0.6

Table 17 Japan: Structural variables underlying the projection
(growth rates, unless noted otherwise)

	Average 1997-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Total population	0.1	-0.1	-0.1	-0.3	-0.2	-0.2	-0.2	-0.2	0.4	-0.2	-0.2	-0.2	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3
2. Working-age population (15-64)	-0.4	-0.9	-1.0	-0.6	-0.5	-1.4	-1.5	-1.5	-0.7	-0.9	-0.9	-0.9	-0.9	-0.9	-0.6	-0.6	-0.6	-0.6
3. Trend labour force participation rate	0.3	0.7	0.8	0.8	0.9	0.9	0.6	0.4	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
4. Trend working time (hours/person/year), private business sector	-0.7	-0.7	-0.7	-0.8	-0.8	-0.8	-0.5	-0.3	-0.2	-0.2	-0.1	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
5. Equilibrium labour supply (persons)	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	-0.9	-1.1	-0.4	-0.7	-0.8	-0.8	-0.8	-0.9	-0.6	-0.6	-0.6	-0.6
6. Natural rate of unemployment (level)	4.3	4.5	4.4	4.4	4.3	4.3	4.4	4.5	4.5	4.6	4.7	4.8	5.0	5.1	5.2	5.4	5.5	5.6
7. Equilibrium labour demand (hours/year), public sector	1.4	0.7	0.5	0.4	0.3	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. Equilibrium labour demand (hours/year), private business sector	-1.2	-0.9	-1.1	-0.8	-0.9	-0.9	-1.4	-1.7	-0.7	-1.1	-1.1	-1.2	-1.3	-1.2	-0.9	-0.9	-0.9	-0.9
9. Equilibrium labour demand (hours/year), total economy	-0.9	-0.7	-0.8	-0.7	-0.7	-0.7	-1.2	-1.4	-0.6	-0.9	-0.9	-1.0	-1.0	-1.0	-0.7	-0.7	-0.7	-0.7
10. Trend hourly labour productivity, private business sector	2.2	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
11. Trend hourly labour productivity, total economy	1.7	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
12. Equilibrium output, private business sector	1.0	0.7	0.5	0.8	0.7	0.7	0.2	-0.1	0.8	0.5	0.5	0.4	0.3	0.4	0.7	0.7	0.7	0.7
13. Equilibrium output, total economy	0.8	0.5	0.4	0.5	0.5	0.5	0.0	-0.2	0.6	0.3	0.3	0.2	0.2	0.2	0.5	0.5	0.5	0.5
14. Equilibrium (target) rate of inflation (consumption deflator)	-0.6	-1.0	-1.1	-1.1	-1.1	-1.1	-1.1	-0.7	-0.2	0.2	0.7	1.1	1.6	2.0	2.0	2.0	2.0	2.0
15. Equilibrium real rate of interest	1.0	0.7	0.5	0.7	0.7	0.7	0.7	0.6	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6

Table 18 Detailed point projection results for the Rest of the World

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I. Supply and demand, in chained volumes (growth rates, unless noted otherwise)													
1. Private sector output	4.7	4.2	2.9	5.5	6.7	7.1	6.4	5.7	4.1	3.2	3.2	4.2	4.7
2. Exports	2.4	1.4	-0.4	-0.3	2.6	6.2	8.9	10.0	8.1	5.1	3.4	4.2	5.9
3. Imports	5.0	4.5	3.4	5.7	7.5	9.0	8.8	8.1	6.7	5.5	5.1	5.5	5.7
4. Gross Domestic Product	4.7	4.2	2.9	5.5	6.6	6.8	6.0	5.2	3.6	2.7	2.9	4.0	4.5
II. Deflators (growth rates, unless noted otherwise)													
1. Exports													
a. In domestic currency units	2.4	3.9	3.8	3.9	3.0	0.9	-0.2	-0.1	1.6	2.9	3.4	2.5	1.6
b. In EUR	6.6	-3.9	8.7	4.0	-0.0	-5.1	-7.7	-9.1	-5.4	-2.1	-0.8	-2.5	-3.0
c. In USD	-1.6	-2.8	8.0	4.0	0.3	-2.9	-3.1	-1.9	2.3	5.3	6.0	3.9	1.8
2. Imports													
a. In domestic currency units	-0.0	4.8	5.5	5.6	5.4	5.0	4.7	4.5	4.4	4.3	4.3	4.3	4.3
b. In EUR	4.1	-3.1	10.6	5.8	2.4	-1.2	-3.2	-4.9	-2.8	-0.8	0.1	-0.7	-0.4
c. In USD	-3.9	-2.0	9.8	5.8	2.7	1.1	1.7	2.6	5.1	6.7	6.9	5.7	4.6
3. Gross Domestic Product	5.0	4.3	4.2	4.2	4.2	4.3	4.3	4.3	4.4	4.4	4.4	4.4	4.4
4. Crude oil (domestic currency units/bbl)	5.0	0.3	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
III. Financial markets (growth rates, unless noted otherwise)													
1. Nominal short-term interest rate, level, in %	4.2	3.5	2.8	2.5	2.3	2.4	2.5	2.6	2.6	2.5	2.3	2.1	2.0
2. Nominal effective exchange rate (+ is depreciation)	-4.3	7.5	-2.4	0.8	3.7	6.7	7.8	7.9	5.2	2.7	1.4	2.2	3.1
3. Real effective exchange rate (+ is depreciation)	-7.6	4.8	-5.2	-1.3	1.5	4.6	5.7	5.8	3.1	0.6	-0.6	0.3	1.3
IV. Miscellaneous (growth rates, unless noted otherwise)													
1. Trade balance, in % of GDP	1.2	0.6	-0.2	-1.3	-2.3	-3.3	-4.0	-4.5	-4.8	-5.1	-5.5	-6.0	-6.4
2. Terms of trade	2.4	-0.8	-1.7	-1.7	-2.3	-3.9	-4.7	-4.4	-2.6	-1.3	-0.8	-1.7	-2.6
3. Gross Domestic Product, per capita	3.4	2.9	1.7	4.3	5.4	5.6	4.9	4.1	2.5	1.7	1.9	3.0	3.5
4. Population	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
a. Aged 0 to 14	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2
b. Aged 15 to 64	1.5	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9
c. Aged 65 and over	3.2	3.3	3.5	3.4	3.7	3.8	3.9	3.8	3.7	3.7	3.7	3.6	3.6

Table 19 Rest of the World: Structural variables underlying the projection
(growth rates, unless noted otherwise)

	Average 1997-2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1. Population	1.4	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
2. Working-age population	1.8	1.7	1.6	1.6	1.6	1.6	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9
3. Trend labour supply	1.8	1.7	1.6	1.6	1.6	1.6	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9
4. Equilibrium labour demand (persons/year)	1.8	1.7	1.6	1.6	1.6	1.6	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9
5. Trend labour productivity, private business sector	3.4	3.6	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
6. Trend labour productivity, total economy	3.1	3.5	3.4	3.4	3.4	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
7. Equilibrium output, private business sector	5.3	5.3	5.2	5.2	5.2	5.2	4.9	4.9	4.8	4.7	4.7	4.6	4.6	4.6	4.5	4.5	4.5	4.5
8. Equilibrium output, total economy	5.0	5.2	5.1	5.1	5.1	5.1	4.8	4.8	4.7	4.6	4.6	4.5	4.5	4.5	4.5	4.4	4.4	4.4
9. Trend inflation	8.1	4.0	4.1	4.1	4.2	4.2	4.2	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3

Table 20 Detailed point projection results for the world economy
(growth rates, unless noted otherwise)

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
I. World nominal GDP (at market exchange rates)													
1. level, in trillions of EUR	55.5	55.6	60.6	65.6	69.9	73.1	75.1	75.6	76.5	77.9	79.9	82.4	85.9
.% change	10.5	0.1	9.0	8.2	6.6	4.6	2.7	0.7	1.1	1.9	2.6	3.1	4.3
2. level, in trillions of USD	71.7	72.5	78.5	84.9	90.8	97.1	104.8	113.9	124.5	136.5	149.6	164.2	179.7
.% change	2.0	1.2	8.2	8.1	7.0	7.0	7.9	8.7	9.4	9.6	9.6	9.8	9.5
II. Real GDP growth rates (at market exchange rates)													
1. World	2.6	2.6	2.6	4.1	4.2	3.9	3.2	2.7	2.0	1.7	2.0	2.6	2.9
2. Euro-12 Area	-0.6	-0.5	1.7	3.1	2.3	1.6	1.0	0.1	0.1	0.1	0.1	0.5	1.1
3. United States of America	2.2	1.9	3.1	2.7	1.6	0.8	0.6	0.9	1.2	1.6	1.8	1.8	1.7
4. Japan	2.0	1.7	2.4	1.2	0.7	0.5	0.3	0.5	0.2	0.1	0.0	0.1	0.1
5. Rest of the World	4.7	4.2	2.9	5.5	6.6	6.8	6.0	5.2	3.6	2.7	2.9	4.0	4.5
III. Real per capita GDP growth rates (at market exchange rates)													
1. World	1.5	1.5	1.5	3.0	3.1	2.8	2.2	1.7	1.0	0.7	1.0	1.7	2.0
2. Euro-12 Area	-0.9	-0.8	1.4	2.8	2.0	1.4	0.7	-0.1	-0.1	-0.2	-0.1	0.3	1.0
3. United States of America	1.6	1.1	2.3	1.8	0.6	-0.2	-0.3	-0.1	0.3	0.6	0.9	0.9	0.8
4. Japan	2.2	1.9	2.6	0.9	0.9	0.7	0.5	0.7	0.5	0.4	0.4	0.4	0.5
5. Rest of the World	3.4	2.9	1.7	4.3	5.4	5.6	4.9	4.1	2.5	1.7	1.9	3.0	3.5
IV. Shares in world GDP, in % (at market exchange rates)													
1. Euro-12 Area	16.8	16.9	15.9	15.4	15.0	14.8	14.8	15.0	15.1	15.1	15.0	14.9	14.7
2. United States of America	21.7	22.6	21.8	21.2	20.6	19.9	18.9	18.0	17.0	16.1	15.4	14.7	14.1
3. Japan	8.3	6.9	7.6	8.3	8.9	9.6	10.3	11.0	11.8	12.8	13.8	14.8	15.9
4. Rest of the World	46.7	46.9	48.3	49.2	49.8	49.9	49.7	49.3	49.1	49.2	49.4	49.5	49.4
V. Contributions to World real GDP growth, in pp (at market exchange rates)													
1. Euro-12 Area	-0.1	-0.1	0.3	0.5	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.2
2. United States of America	0.5	0.4	0.7	0.6	0.3	0.2	0.1	0.2	0.2	0.3	0.3	0.3	0.3
3. Japan	0.2	0.1	0.2	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
4. Rest of the World	2.1	1.9	1.4	2.6	3.2	3.4	3.0	2.6	1.8	1.3	1.4	2.0	2.2

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
VI. World exports and trade (at market exchange rates)													
1. World exports, in volume	3.2	2.0	3.6	4.6	5.4	5.4	5.0	4.4	3.7	3.2	3.4	4.0	4.4
.in % of World GDP (nominal)	18.8	18.7	18.8	18.8	18.9	19.1	19.4	19.8	20.1	20.3	20.4	20.4	20.5
2. World trade, in volume	3.2	2.0	3.6	4.6	5.4	5.4	5.0	4.4	3.7	3.2	3.4	4.0	4.4
.in % of World GDP (nominal)	37.7	37.4	37.6	37.5	37.8	38.2	38.8	39.5	40.2	40.6	40.7	40.8	40.9
3. Shares in world trade, in % (nominal)													
.Euro-12 Area	21.6	21.6	20.8	20.3	19.9	19.7	19.7	19.8	19.8	19.8	19.7	19.7	19.7
.United States of America	18.5	19.0	18.9	19.1	19.2	19.0	18.6	18.2	17.8	17.5	17.4	17.4	17.3
.Japan	7.2	5.9	6.5	6.9	7.3	7.5	7.8	8.0	8.2	8.5	8.9	9.2	9.6
.Rest of the World	38.6	38.6	39.2	39.1	38.8	38.4	37.9	37.6	37.7	38.0	38.4	38.5	38.4
VII. Price of oil (bbl, Brent crude)													
1. level, in USD	112.0	105.0	114.0	119.1	121.1	121.7	123.4	126.6	133.0	142.1	151.9	160.6	168.0
.% change	0.9	-6.2	8.6	4.5	1.7	0.5	1.4	2.6	5.1	6.8	6.9	5.7	4.6
2. level, in EUR	86.8	80.5	88.1	92.0	93.3	91.6	88.4	84.0	81.7	81.1	81.2	80.6	80.3
.% change	9.3	-7.2	9.4	4.5	1.4	-1.8	-3.5	-5.0	-2.8	-0.7	0.1	-0.7	-0.4
VIII. World population													
1. In billions	7.0	7.1	7.2	7.3	7.3	7.4	7.5	7.6	7.6	7.7	7.8	7.8	7.9
.% change, Total	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9
.% change, 0-14	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2
.% change, 15-64	1.2	1.2	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8
.% change, 66+	2.8	2.9	3.0	3.2	3.3	3.4	3.4	3.4	3.3	3.3	3.2	3.2	3.1

13. Appendices

Appendix 1: Definition of the steady-state variables of the NIME model

Appendix 2: Presentation of steady-state variables by economic area

- The euro area
- The United States of America
- Japan
- The Rest of the World

13.1. Appendix 1: Definition of the steady state variables of the NIME model

Historical data used for generating past values of the long-run trends are taken from the EU Commission's AMECO database. The extension of the data for total population and working-age population out to the projection horizon is based on available official population projections. We use the Eurostat Europop demographic projections for the euro area. For the United States and Japan, we use the demographic projections provided by official national sources. As for the population data for the Rest of the World, they are based on projections of the United Nations Population Division. Trend data series, representing the long-term evolutions, are generated by applying a Hodrick-Prescott filter to the available data.

a. Total population

The total population data that is used in the NIME model corresponds to the domestic concept of total population. For the euro area, the United States and Japan, the historical data series are taken from the EU Commission's AMECO database, which provides historical data as well as forecasts up to two years ahead of the current year. Historical demographic data for the countries that compose the Rest of the World area come from various national sources and the International Monetary Fund (IMF).

b. Working-age population

Working-age population data for the euro area, the United States and Japan are, once again, taken from the EU Commission's AMECO database, which provides historical data as well as forecasts up to two years ahead of the current year for working-age population, currently defined as residents aged 15 to 64. Historical demographic data for the countries that compose the Rest of the World area come from various national sources and the IMF.

c. Labour force participation rate

The trend labour force participation rate is defined as the share of working-age population that is effectively in the labour market, i.e., either in employment or unemployed but available and searching for employment.

d. Hours worked

The trend of working time (or hours worked) represents the number of hours of labour per year that is provided by the average worker to his employer. The available historical data is projected over the projection horizon by assuming that the growth rate of trend hours worked gradually falls to nil, leading to a stabilisation in the level of hours worked.

e. Labour supply

The trend labour supply (or labour force) is comprised of persons aged between 15 and 64 who are either employed or temporarily unemployed due to search costs and skills mismatches. In this sense, there is no involuntary unemployment in the equilibrium labour supply, as the state of equilibrium

implies that supply equals demand in all markets. The labour supply is the product of the trend level of working-age population and the trend labour force participation rate.

f. The natural rate of unemployment

Once the trend labour supply has been generated, one must decompose this labour supply into a part representing persons in employment and another part representing persons who are "structurally" unemployed. The level of unemployment is computed as the product of the labour supply and the equilibrium or "natural" rate of unemployment, often referred to as the NAIRU. The NAIRU is the Non-Accelerating Inflation Rate of Unemployment, i.e., the rate of unemployment that is compatible with a rate of inflation that is both stable and corresponding to the Central Bank's target rate of inflation. In the NIME model, the NAIRU is not, strictly speaking, an underlying exogenous variable or core assumption. Rather, it is endogenous and modelled explicitly as a time-varying variable reacting to structural determinants and hysteresis. However, as it depends on structural variables and is crucial to the computation of equilibrium or "potential" output, it is provided along with the other, effectively exogenous, long-run variables.

g. Public sector labour input

Trend public sector labour input represents the volume of labour services that is used by the public sector. Regarding the projection period, it is assumed that growth in the trend public sector labour input remains nil over the projection horizon of 2013-2024. This reflects the expected prolonged fiscal consolidation implemented by euro area governments with a view to complying with the new budgetary criteria laid out in the fiscal compact and revised Stability Pact. Note that the public sector labour input is expressed here not in terms of persons per year but in terms of hours of work provided each year to the public sector employer.

h. Private sector labour input

The equilibrium private sector labour input that is provided here is defined in terms of hours of labour services that are provided annually to the private sector. The trend ("equilibrium") private sector labour input follows directly from the assumptions made regarding the trend labour supply, the value of the natural rate of unemployment (the "NAIRU"), the trend public sector labour input and the trend working time in the private sector. Indeed, in the long-run equilibrium, the trend private sector labour input can simply be computed as the product of, on the one hand, the trend labour supply minus the trend public sector labour input minus the equilibrium level of unemployment, and, on the other hand, the trend working time in the private sector. The equilibrium level of unemployment is computed as the product of the labour supply and the natural rate of unemployment.

i. Hourly labour productivity growth

The core or "steady state" NIME model rests on a traditional Cobb-Douglas production function. This function represents the technology that is used to produce goods and services using factors of production in a competitive market equilibrium setting. Clearly, such a setting should not cover the activities of the government sector in an economy. Hence, in NIME, the production function is

representative only of the private business sector. This implies that the labour productivity that is used in this setting must be the (average) labour productivity of the sole private business sector. This is computed as the ratio of trend real private sector output over the trend of private sector labour input. This provides a measure of labour productivity that is expressed in terms of units of real output per hour of labour services used as inputs in the business sector.

j. Equilibrium real private sector output

Equilibrium real private sector output, usually referred to as "potential output", is computed as the product of trend hourly labour productivity in the private business sector and the equilibrium labour input in the business sector. It represents the volume of production that the private sector will be able to produce in equilibrium, i.e., in a situation where prices balance supply and demand at a level such that there is no cyclical unemployment, such that the rate of inflation is stabilised at the target rate of inflation set by the monetary authorities (the central banks), and such that expected economic outcomes correspond to effective outcomes. It is also a situation where, by definition, the business sector's output gap is nil. The computation of potential output relies on both trend labour productivity and equilibrium labour inputs. However, labour inputs depend on the level of equilibrium unemployment, which is a function of the NAIRU. Hence, potential output is not, strictly speaking, an exogenous core determinant of the model. However, it can still be seen as a structural determinant, in that the NAIRU is modelled as being fully determined in the long run by exogenous structural variables.

Note that the business sector's production function is modelled on the basis of three factors of production: hours of labour services, the business sector real capital stock and real intermediary inputs. Furthermore, as the production function aggregates the entire private business sector of the economy, real intermediary inputs are identical to real imports. Hence, the production function generates an output that must not be interpreted in terms of value-added. Indeed, the output of such a three-factor production function can only be interpreted in terms of real production delivered to real final demand. Hence, the economy's real GDP is then defined as the difference between real final demand and real imports, reflecting the usual expenditure approach to calculating GDP.

k. Trend inflation

Trend inflation or the target rate of inflation is the annual percentage change in the deflator of private consumption expenditure that is targeted by an economy's monetary authorities (central bank). This target is usually chosen to be 2% per year.

13.2. Appendix 2: Description of the steady-state variables by economic area

We present here the main equilibrium paths for the four main economic areas of the model, which are the euro area, the United States, Japan and the Rest of the World.

13.2.1. The euro area

a. Total population

Euro area trend population growth over the period 1960-2007 reached about 0.6% per year. However, the growth rate of total population tended to decline, from a rate of about 0.9% in the early 1960s to no more than about 0.3% in 2012. Total population was pushed up sharply in 1991, rising by a little more than 6% year on year (yoy) after German re-unification, which produces a structural break in euro area population. Re-unification also provided a small and temporary boost to population growth, which had been falling steadily over the previous 30 years. However, total population growth then reverted to its historical decline, which went on uninterrupted to 2012. In the projection, total population growth for the period 2015-2024 is based on growth rates from the latest demographic projections of Eurostat. In the Eurostat projection, total population growth is projected to fall from about 0.3% in 2015 to 0.2% by 2024. Over the period 2013-2014, the growth rate of total population in the euro area is based on assumptions from the EU Commission's AMECO database of Spring 2013.

b. Working-age population

The trend rate of growth for working-age population in the euro area fell from about 0.6% in the early 1960s to no more than 0.1% in 2012. Going forward, and based on Eurostat demographic projections, working-age population is projected to decline as of 2013. The annual average rate of decline should be of about 0.1% per year over the period 2013-2024. Over the period 2013-2014, the evolution of working-age population in the euro area is based on assumptions from the EU Commission's AMECO database of Spring 2013.

c. Labour force participation rate

Over the period 1960-2013, the average labour force participation rate in the euro area was of about 67.9%. The labour force participation rate first declined from about 68.7% in the early 1960s to a low of 65.6% in 1983. The participation rate then began to rise steadily, reaching about 74% in 2008. Thereafter, due to the impact of the financial and economic crises, what was a steady rise in the participation rate began to weaken significantly. In 2012, the rate is thought to have reached 75%. For the post-2012 period, however, the decline in the trend growth rate is assumed to continue, until growth in the trend labour force participation rate eventually falls to nil as of 2017.

d. Working time

In the euro area, trend hours worked declined significantly between the early 1960s and 2013. Indeed, in 1960 the average worker in the euro area worked approximately 2240 hours per year. This is thought to have fallen to about 1570 hours per year in 2013. Going forward, the decline in hours worked is

assumed to continue but at a decreasing pace. The rate of decline is assumed to fall to nil around 2016, stabilising the level of hours worked thereafter.

e. Labour supply

Growth in the euro area's equilibrium labour supply rose from about 0.2% yoy in the early 1960s to a high of about 1.6% yoy in the early 1990s. It then began to decline steadily and is expected to reach no more than 0.1% in 2013. The labour supply is projected to begin to fall by 2017, with the rate of decline reaching -0.2% in 2024.

f. The natural rate of unemployment

The natural rate of unemployment is used to determine the equilibrium level of unemployment, predicated upon a given equilibrium supply of labour. In the euro area, the estimated NAIRU rose from about 2.5% of the (equilibrium) labour force in the early 1960s to a local maximum of about 9.5% in 1995. The NAIRU then declined over the next ten years thanks to euro area structural reforms accompanied by a relatively robust period of economic growth. However, the recession of the early 2000s and the outbreak of the financial crisis in 2008 drove the NAIRU up once again as of the middle of the 2000s. The rise in the NAIRU is projected to be interrupted in 2013 as the euro area economy recovers from these crises, but the NAIRU should still embark on a gradual upward movement as fiscal consolidation leads to rising overall tax burdens and as economic growth remains subdued over the medium term. Hence, the NAIRU is projected to reach 10.7% of the labour force in 2024.

g. Public sector labour input

Equilibrium public sector labour input has been growing at an annual average rate of about 1.4% over the period 1960-2007. Since the beginning of the financial and economic crisis however, trend growth in public labour supply has been significantly curtailed, falling to nil in 2012. It is assumed that, in projection, growth in the trend public sector labour input remains nil over the projection horizon of 2013-2024. This reflects the expected prolonged fiscal consolidation implemented by euro area governments with a view to complying with the new budgetary criteria laid out in the fiscal compact and revised Stability Pact. Note that the public sector labour input is expressed here not in terms of persons per year but in terms of hours of work provided each year to the public sector employer.

h. Private sector labour input

The equilibrium private sector labour input that is provided here is not expressed in terms of the number of persons employed in the private sector, but is defined in terms of hours of labour services that are provided annually to the private sector. In the euro area, private sector labour input declined regularly from 1960 to 1986, and then began to rise again until the beginning of the financial crisis in 2008. Over the projection horizon, the equilibrium input of labour services is projected to decline at an annual average rate of about 0.3%.

i. Hourly labour productivity growth

Trend private business sector (average) labour productivity growth in the euro area progressed in the 1960s, rising at an annual average rate of about 5.2%. Then, as the stagflation of the 1970s hit, labour productivity growth dropped to about 3.1% in 1985. Growth then picked up once again, reaching a new high of about 4.2% in 1991. Since then, trend labour productivity growth has been declining regularly, coming out at no more than 1.3% in 2007, and falling to about 1.1% in 2012. The projection assumes that this decline in productivity growth will then come to a halt, stabilising productivity growth at an annual rate of 1.1% over the period 2013-2024.

j. Equilibrium real private sector output

Equilibrium real private sector output, usually referred to as “potential output”, is computed as the product of trend hourly labour productivity in the private business sector and the equilibrium labour input in the business sector. It represents the volume of production that the private sector will be able to produce in equilibrium, i.e., when prices balance supply and demand at a level such that there is no cyclical unemployment, such that the rate of inflation is stabilised at the target rate of inflation set by the monetary authorities (the central banks), and such that expected economic outcomes correspond to effective outcomes.

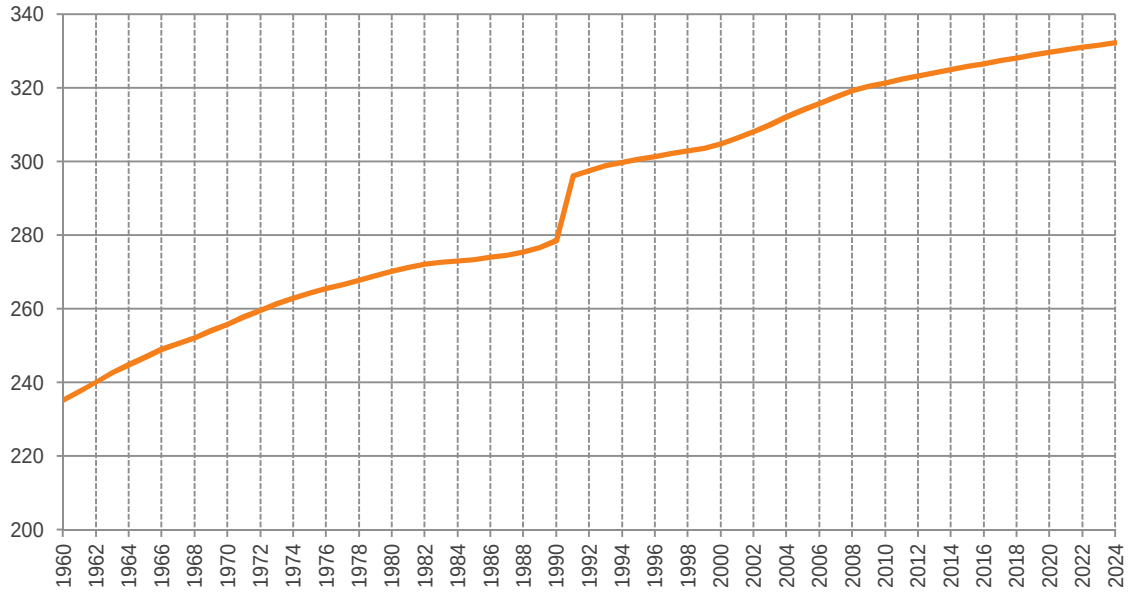
In the euro area, potential output growth rose from about 3% yoy in the early 1960s to a first local maximum of about 5% in 1970. Potential output growth then gradually declined to a local minimum of 2.3% in 1982. Then, the growth rate began to rise once again, reaching a second local maximum of about 5% in 1991. Ever since then, euro area potential output growth has been in steady decline, falling to 1.4% in 2008 as the financial and economic crises hit. These two crises reduced potential output growth, notably by raising the natural rate of unemployment in the euro area. Though the natural rate of unemployment is projected to recede as the euro area economy recovers from these shocks, potential output growth is projected to continue to decline, falling to just 0.8% in 2024.

k. Trend inflation

In the euro area, the trend rate of inflation averaged about 1.8% per year from the early 2000s. This is about in line with the European Central Bank’s stated medium-term inflation objective of close to, but below, 2%. Over the projection horizon, it is assumed that the inflation target will settle at an annual rate of 2%.

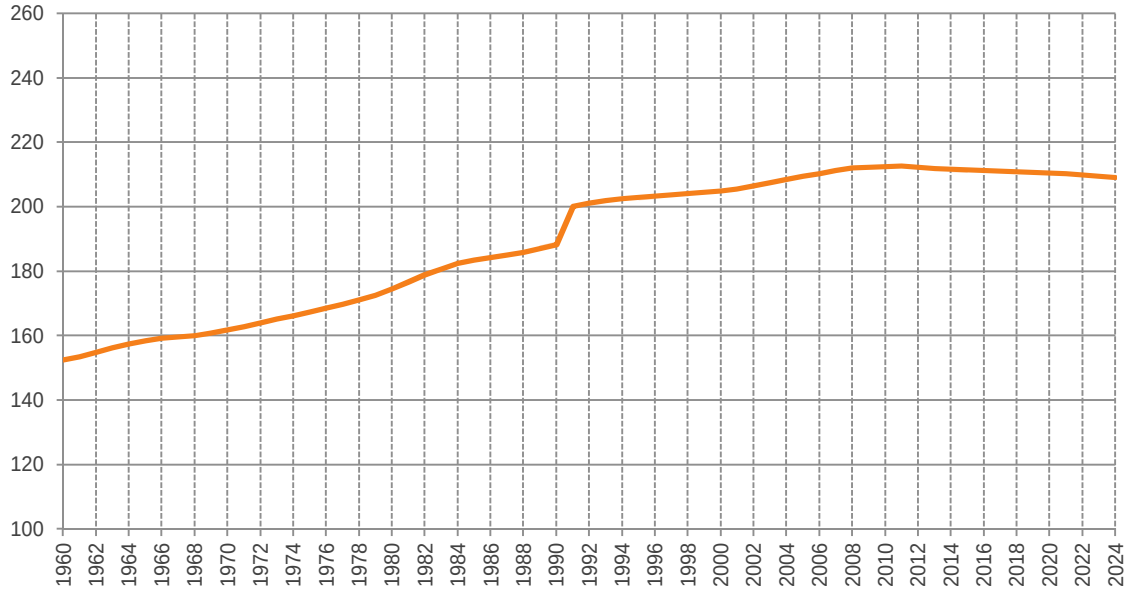
I. Graphs for euro area trend data

Graph 43 Total population
(Millions of persons; historical data for 1960-2012)

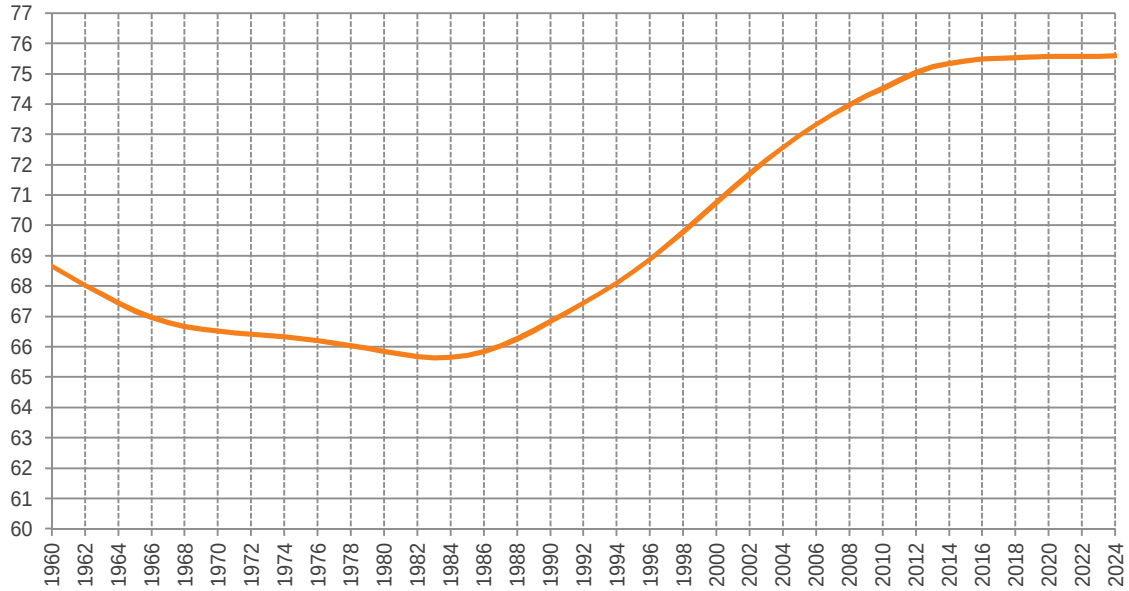


Source: Eurostat; NIME

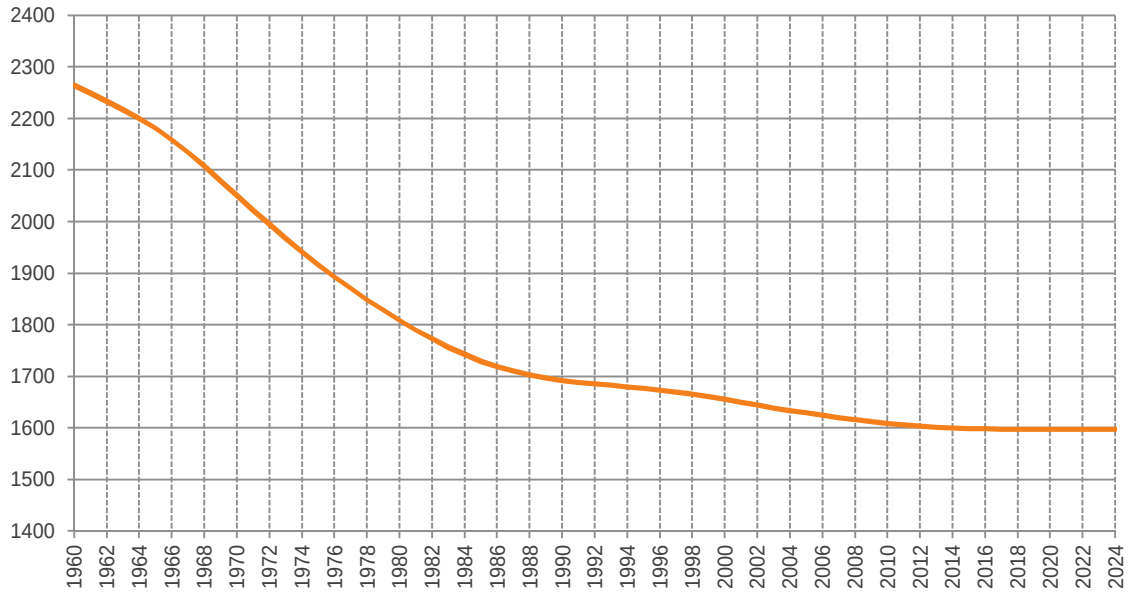
Graph 44 Working-age population (aged 15 to 64)
(Millions of persons; historical data for 1960-2012)



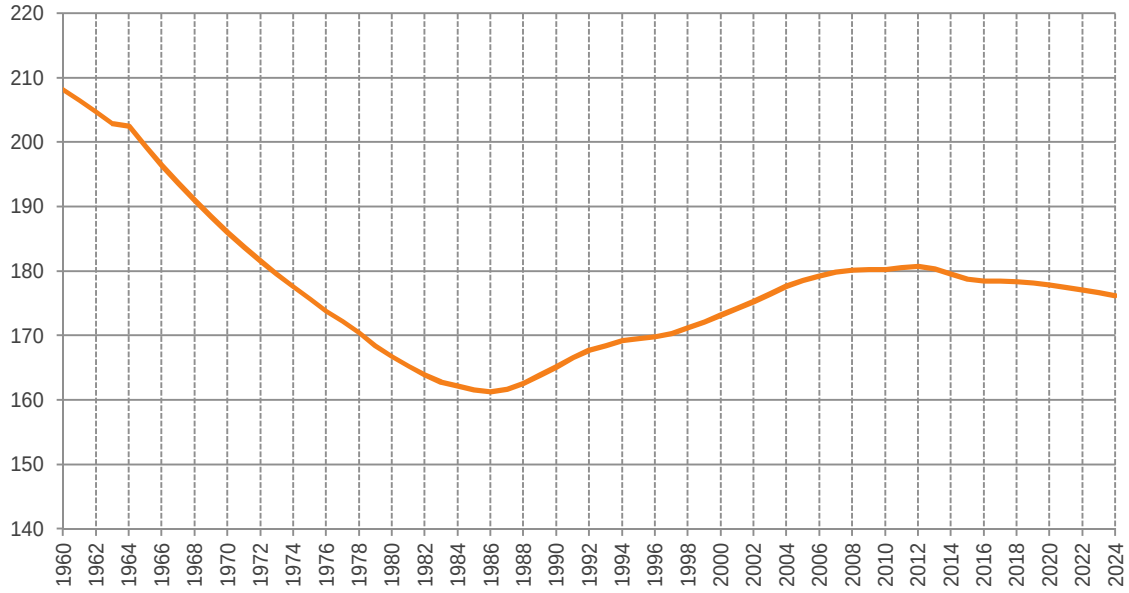
Graph 45 Trend labour force participation rate
(% of working-age population; historical data for 1960-2012)



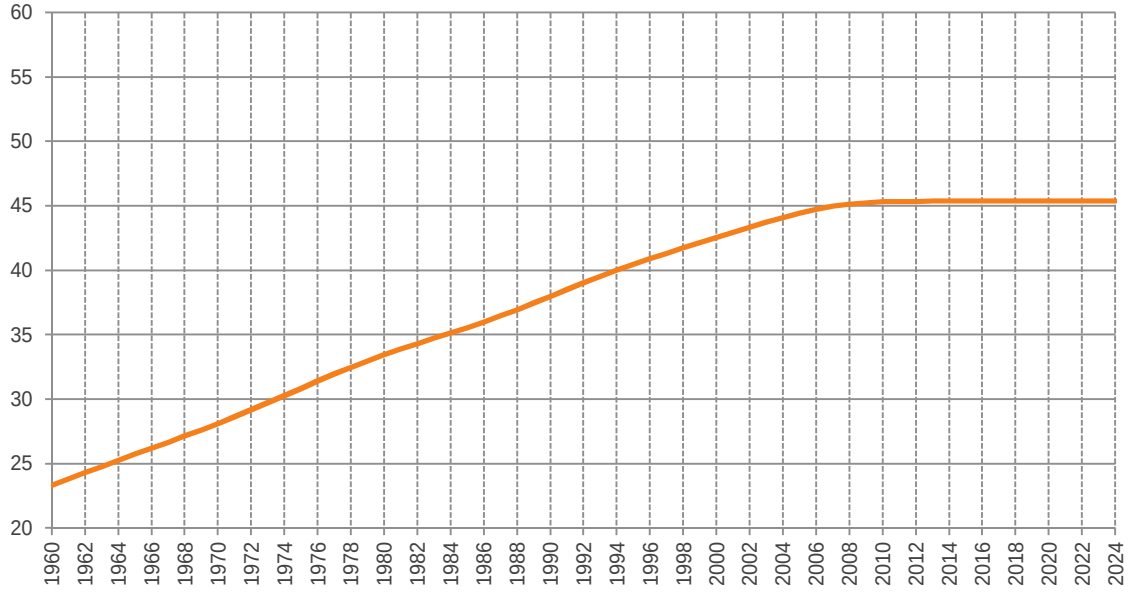
Graph 46 Trend working time, private business sector
(Hours per person, per year; historical data for 1960-2012)



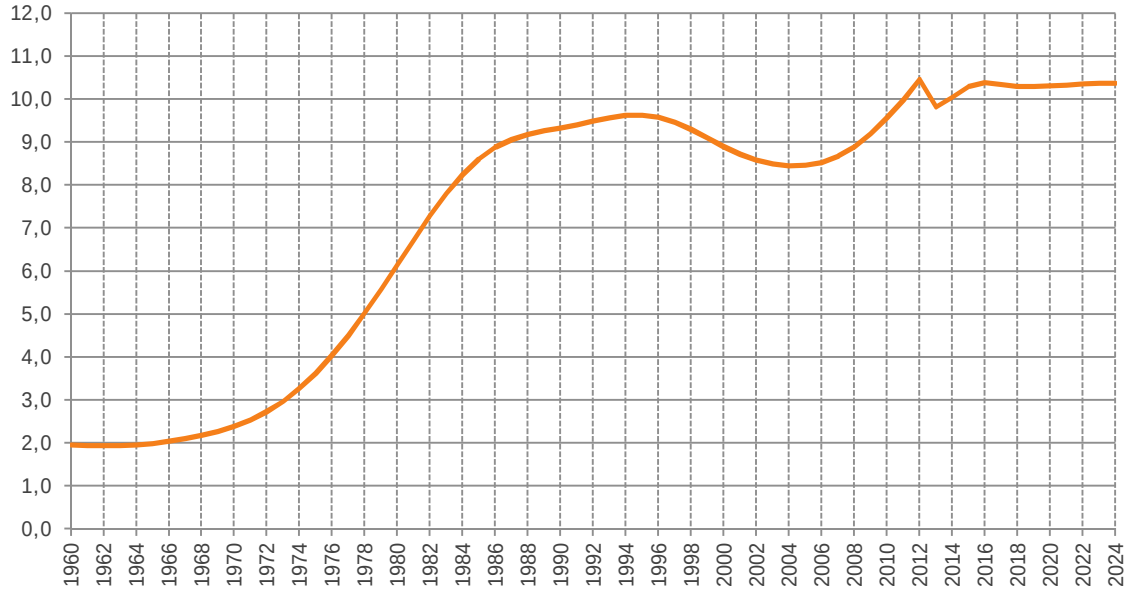
Graph 47 Equilibrium labour supply, private business sector
(Millions of hours per year; historical data for 1960-2012)



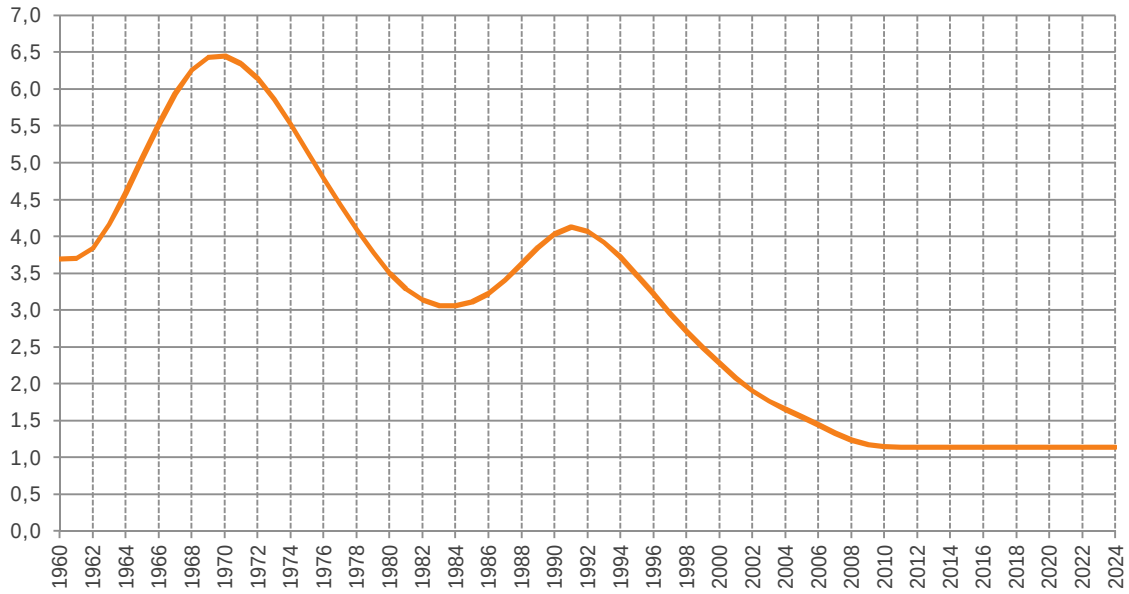
Graph 48 Equilibrium labour supply, public sector
(Millions of hours per year; historical data for 1960-2012)



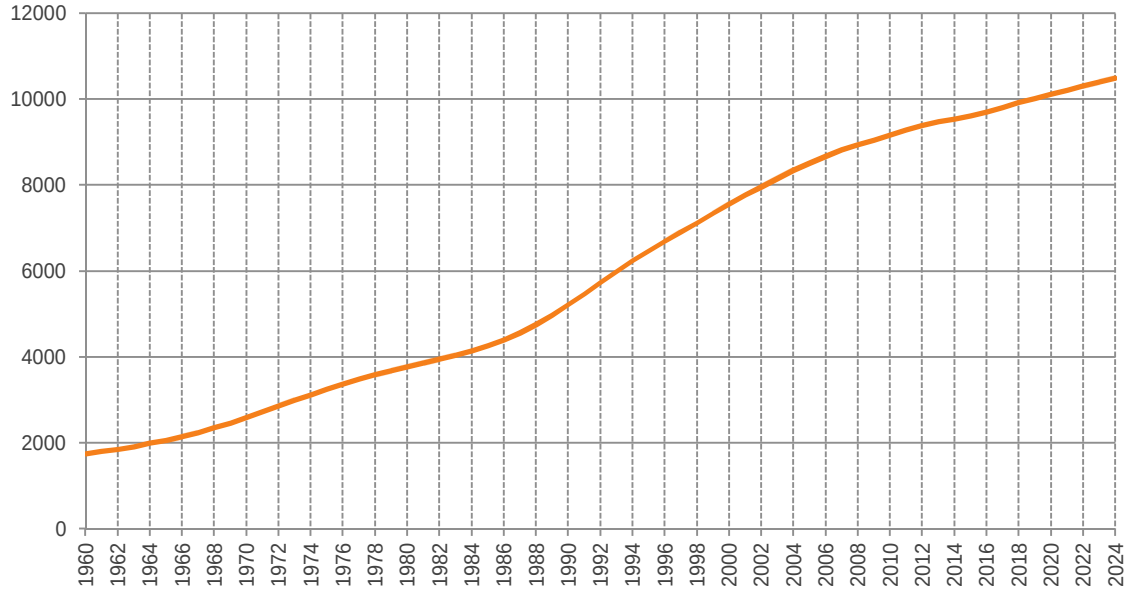
Graph 49 Natural rate of unemployment
(In % of the equilibrium labour supply)



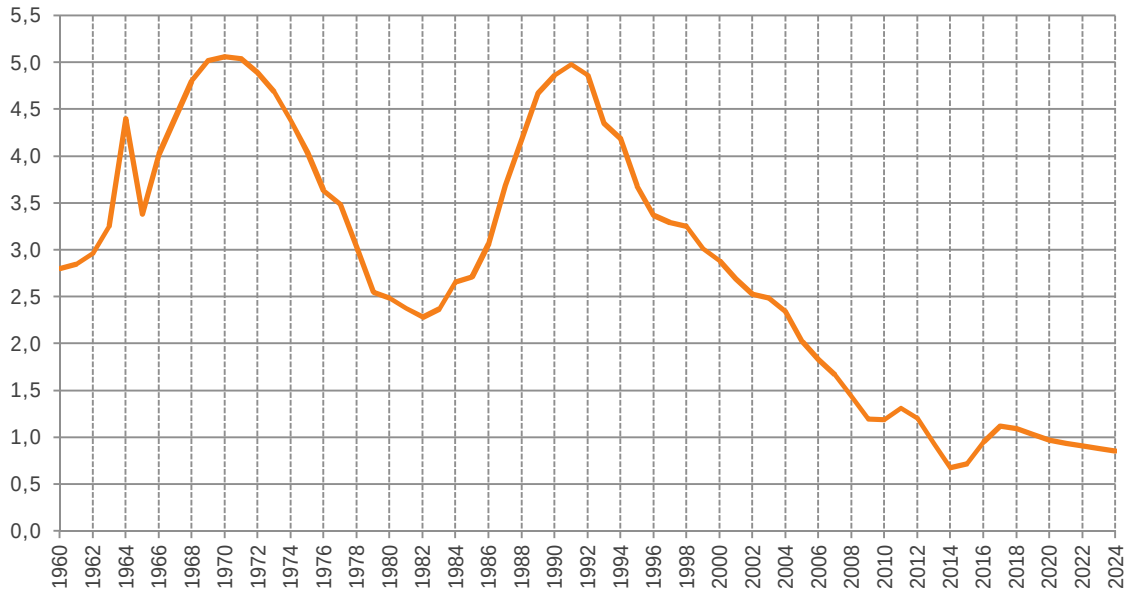
Graph 50 Trend hourly average labour productivity growth, private business sector
(Annual % change; historical data for 1960-2012)



Graph 51 **Potential output level, private business sector**
(Chained volumes, in billions of euros of 2005; historical data for 1960-2012)

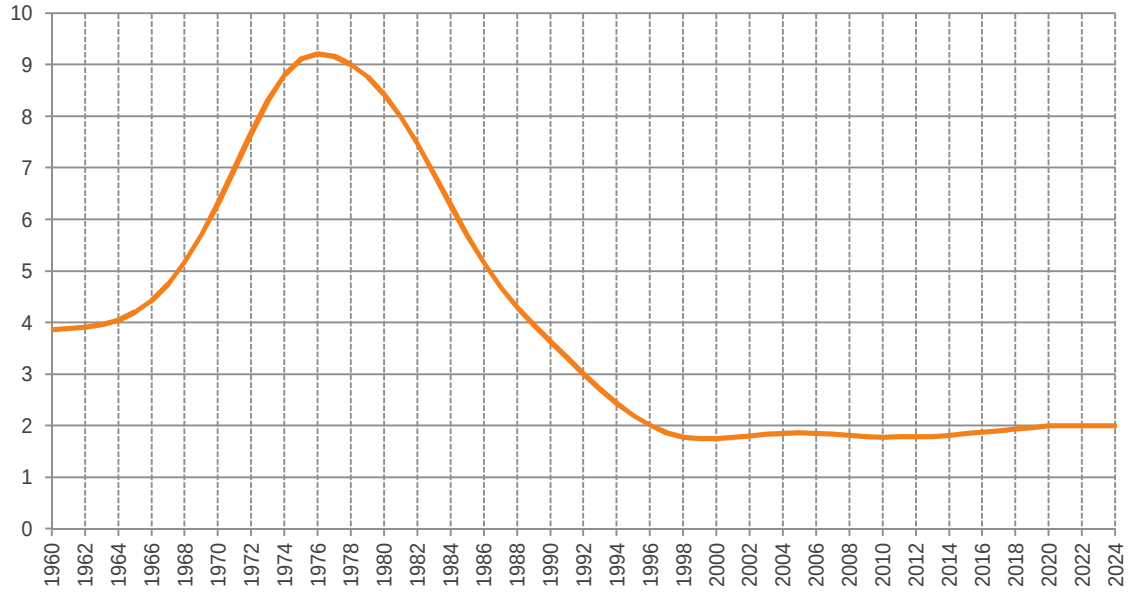


Graph 52 **Potential output growth, private business sector**
(Annual % change; historical data for 1960-2012)



Graph 53 Trend/target rate of inflation

(Annual % change in the deflator of private consumption; historical data for 1960-2012)



13.2.2. The United States of America

a. Total population

US trend population growth over the period 1960-2012 reached about 1.1% per year. This growth rate remained steady all through this historical period. In the projection, total population growth for 2015-2024 is based on growth rates from the latest demographic projections of the Census Bureau of the US Department of Commerce. In the Census Bureau's projection, total population is projected to increase at an annual average rate of about 0.9% between 2013 and 2024, although the growth rate should weaken somewhat over this period.

b. Working-age population

In the US, working-age population rose at an annual average rate of about 1.3% from the early 1960s to 2012. Though working-age population increased steadily over this period, the rate of growth followed a clear declining trend. Going forward, and based on the Census Bureau's demographic projections, working-age population should continue to rise over the period 2013-2024. However, the growth rate is expected to continue to decline after 2015. The annual average growth rate over 2013-2024 is expected to come out at about 0.5%.

c. Labour force participation rate

Over the period 1960-2013, the average labour force participation rate in the US was of about 73.2%. The trend labour force participation rate rose from about 67% in the early 1960s to a maximum of 77.7% in 1995. Since then, the trend participation rate has been falling regularly, reaching about 75.6% in 2012. For the post-2012 period, it is assumed that the rate of decline will abate, leading to a stabilisation of the trend participation rate around 2015. Between 2015 and 2024, the trend participation rate should thus remain steady around 75.3%.

d. Working time

In the US, trend hours worked in the private business sector declined significantly between the early 1960s and 2013. Indeed, in 1960 the average worker in the US put in about 2150 hours per year. Trend working time then dropped to about 1800 hours by 1990. There followed a small rebound in trend hours worked between 1995 and 1998, but working time then resumed its previous decline, falling to about 1745 hours per person per year in 2012. Going forward, the rate of decline in trend hours worked is assumed to fall to nil, leading to a stabilisation in hours worked in the private sector by 2015.

e. Labour supply

Between 1960 and 2012, the US's equilibrium labour supply increased at an annual average rate of about 1.5%. The rate of growth in the labour supply rose from about 1.7% in the early 1960s to a maximum of about 2.3% in the mid-1970s. Growth in the US's equilibrium labour supply has been falling ever since, reaching about 0.5% yoy in 2012. Growth in the trend labour supply is expected to be particularly weak in 2013 and 2014, rebounding in 2015 and 2016. However, growth in trend labour

supply is then projected to continue to weaken, coming out at just 0.4% in 2024. All in all, over the period 2013-2024, the US's equilibrium labour supply is projected to increase at an annual average rate of 0.4%.

f. The natural rate of unemployment

In the US, the NAIRU is estimated to have been on a declining path through most of the 1960s. Indeed, the NAIRU fell from about 5.5% of the (equilibrium) labour force in 1960 to a first local minimum of about 4.3% in 1968. Towards the end of the 1960s, the NAIRU began rising and this lasted until a local maximum of 7.4% was reached in 1982. As of 1983, the NAIRU embarked on a steady fall, which brought it back by the year 2001 to a rate of 4.9%, a rate which had last been obtained between 1971 and 1972. As of 2001, the NAIRU began rising again and, after the recession of 2001 and the post 2007 economic and financial crises, the NAIRU is estimated to have reached a new maximum of about 7.9% in 2012. The NAIRU is then expected to fall swiftly as the economy picks up speed, coming out at 6.9% in 2013. Between 2013 and 2024, the NAIRU is projected to fluctuate between 6.7% and 7%, depending on the phase of the US economy's business cycle and on the government's fiscal stance.

g. Public sector labour input

US trend labour services provided to general government expanded at an annual rate of about 1.7% between 1960 and 2007. However, the growth rate of public sector labour input declined regularly over the entire period 1965-2010. Indeed, in 1965, the growth rate stood at about 3.6% yoy, but this fell to just 0.3% in 2007. The growth rate has continued to decline since then and is assumed to fall to nil by 2015, reflecting the fiscal consolidation assumption that is retained throughout the projection period.

h. Private sector labour input

In the US, private sector equilibrium labour input rose at an annual average rate of about 1.2% between 1960 and 2007. After progressing rapidly between 1965 and 1980, the growth rate of trend private sector labour input declined between 1980 and 2012, with a particularly pronounced fall occurring between 1996 and 2002. In 2013, private sector labour input is expected to rise by no more than 0.1%, but labour input growth is then projected to pick up somewhat over the period 2014-2024.

i. Hourly labour productivity growth

Trend private business sector labour productivity growth in the US rose at an annual average rate of about 2.4% between 1960 and 2012. The growth rate began by falling from about 4.3% in 1960 to a historical low of about 1.4% in 1981. Trend productivity growth then picked up and reached a local maximum of about 3% in 2000. Since then, however, productivity growth has once again embarked on a significant decline, and the growth rate came out at just 1.6% in 2012. The projection assumes that this decline in productivity growth will come to a halt, stabilising productivity growth at an annual rate of 1.6% over the period 2013-2024.

j. Equilibrium real private sector output

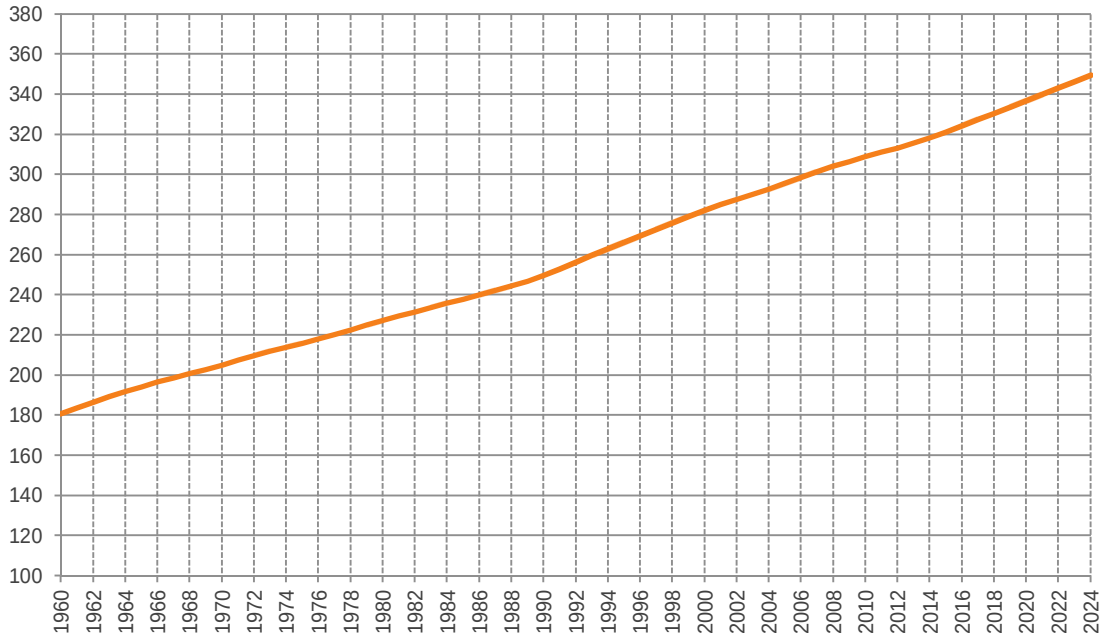
In the US, potential output growth rose at an annual average rate of about 3.5% over the period 1960-2012. Potential output growth in the business sector declined from about 4.9% in 1960 to 3.2% in 1982, but then rose to 4.2% by 1997. Since then, potential output growth has once again been on a steady decline, with growth reaching just 1.9% in 2012. Potential output growth is projected to pick up slightly over the period 2013-2024, as the US economy recovers from the recent crisis. However, notwithstanding the projected decline in the natural rate of unemployment that should come about as the US economy recovers from the recent economic crises, private sector potential output growth is projected to remain relatively weak going forward, averaging just 2.1% per year over 2013-2024.

k. Trend inflation

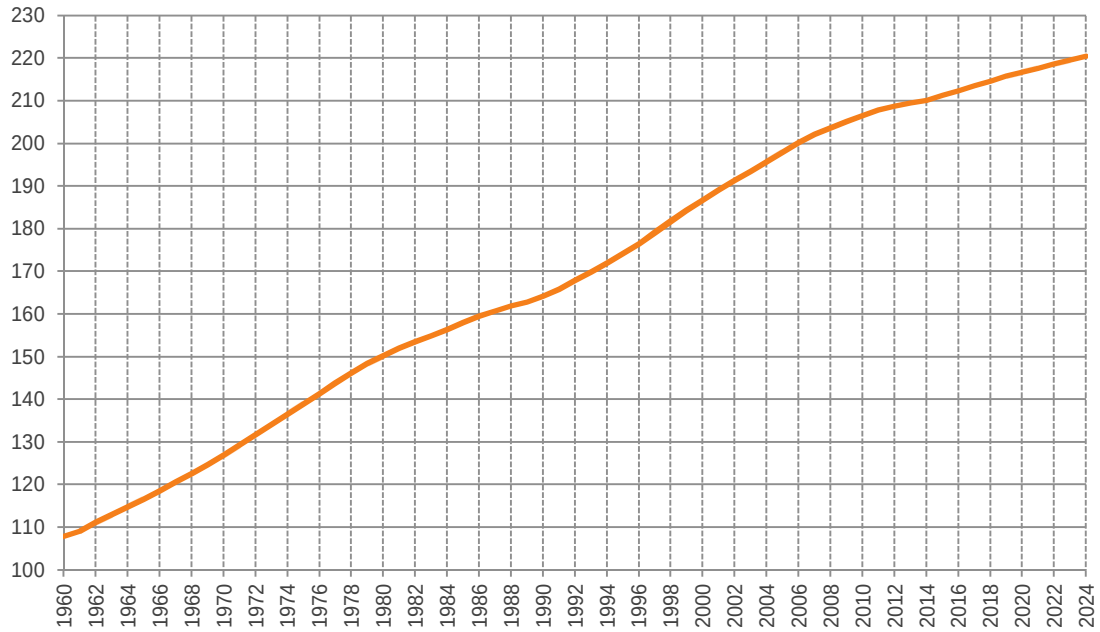
In the US, the trend rate of inflation averaged about 2.1% per year over the period 2000-2012. This is in line with the Federal Reserve's new medium-term inflation objective of 2%. Over the projection horizon, it is assumed that the inflation target settles at an annual rate of 2%.

l. Graphs for US trend data

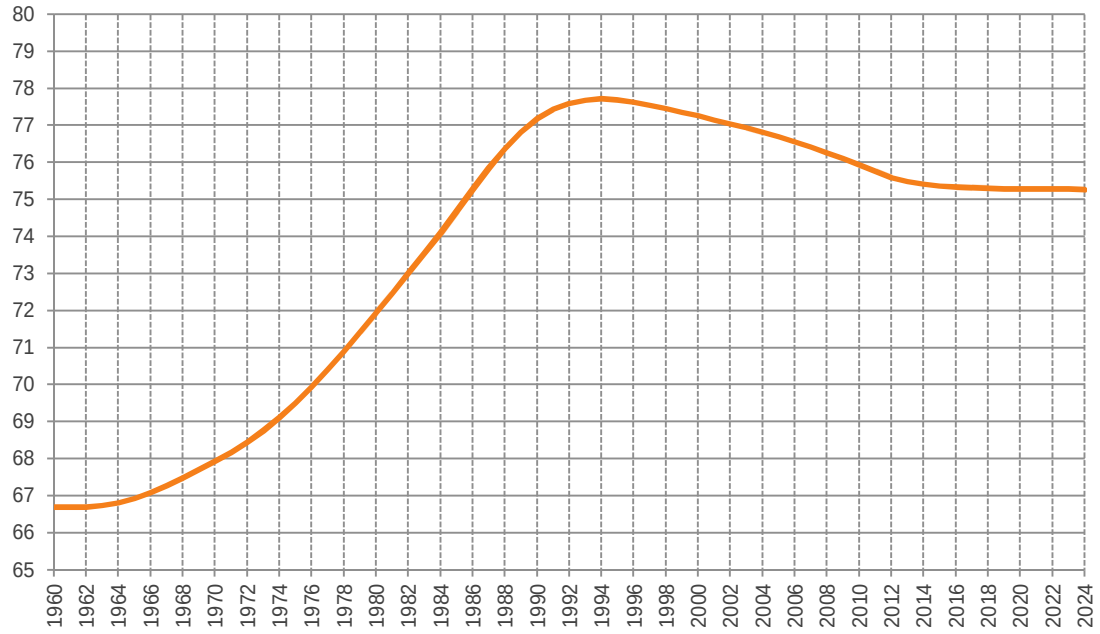
Graph 54 **Total population**
(Millions of persons; historical data for 1960-2012)



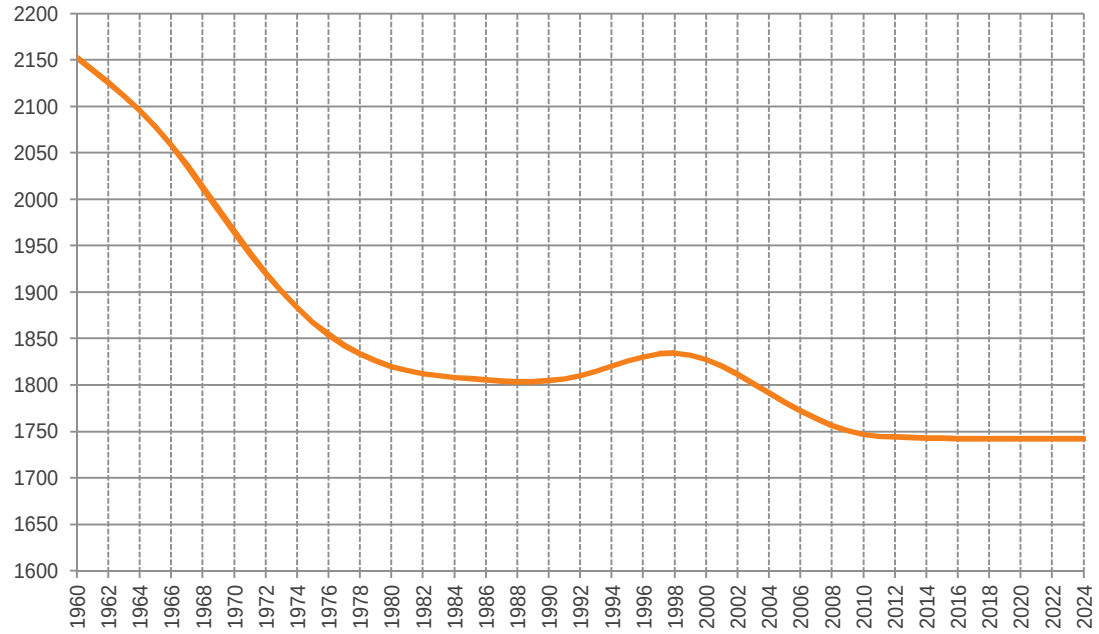
Graph 55 Working-age population
(Millions of persons; historical data for 1960-2012)



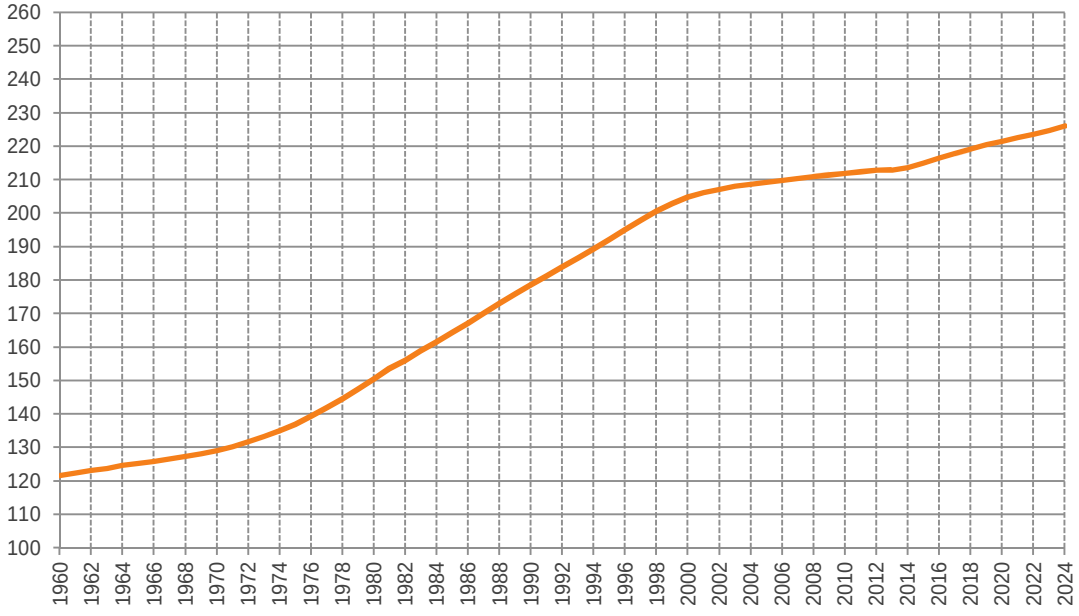
Graph 56 Trend labour force participation rate
(In %; historical data for 1960-2012)



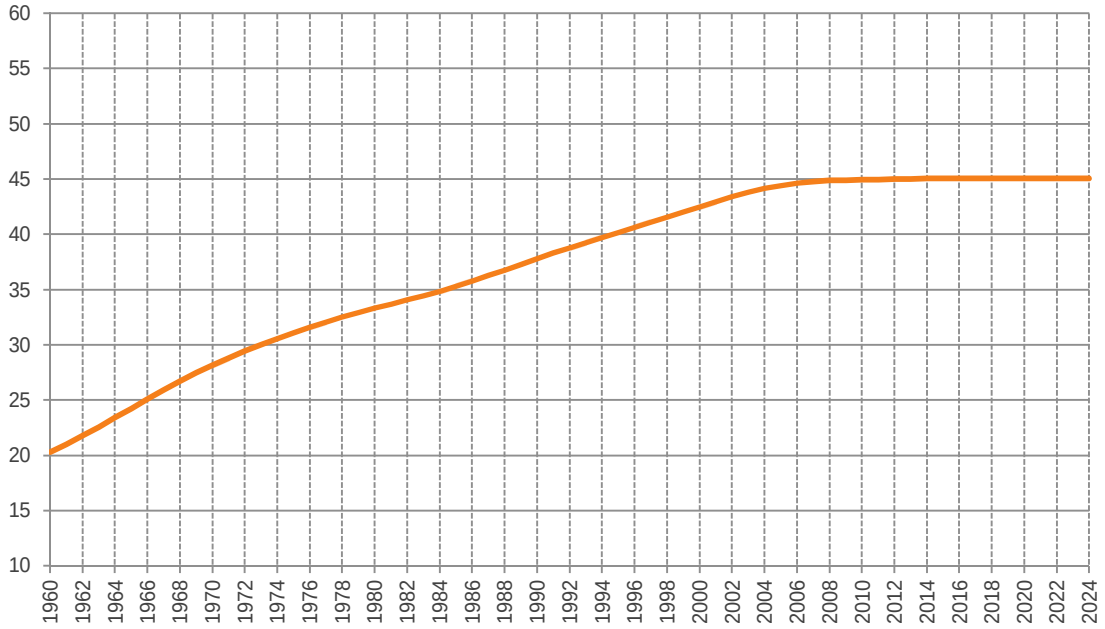
Graph 57 **Trend working time, private sector**
(Hours per person, per year; historical data for 1960-2012)



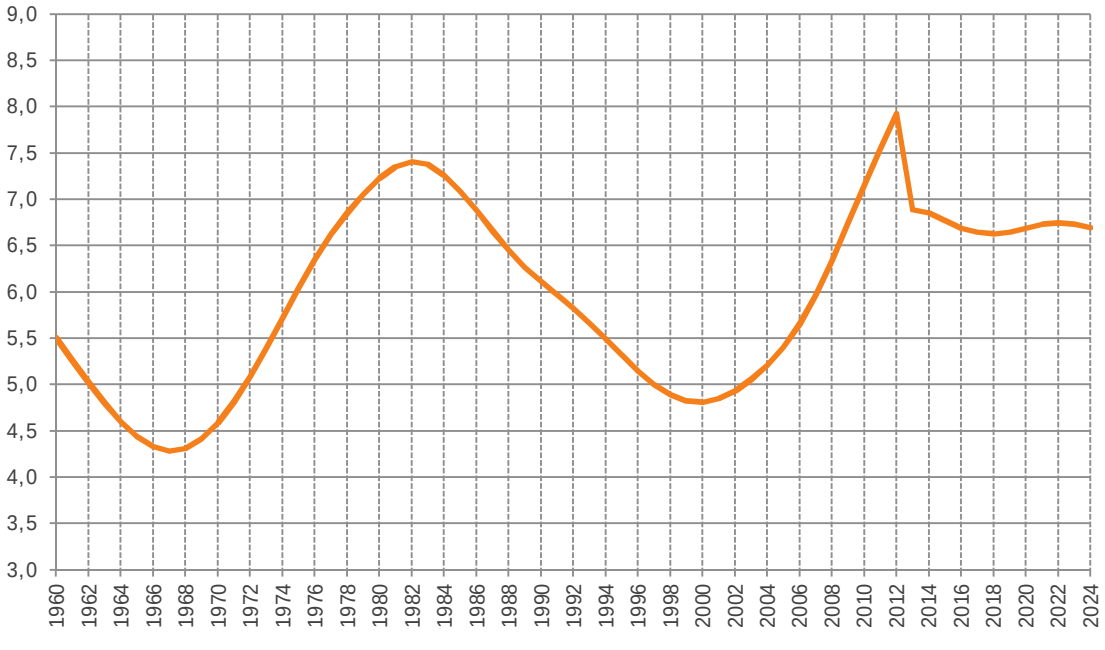
Graph 58 **Trend labour supply, private sector**
(Millions of hours of labour services; historical data for 1960-2012)



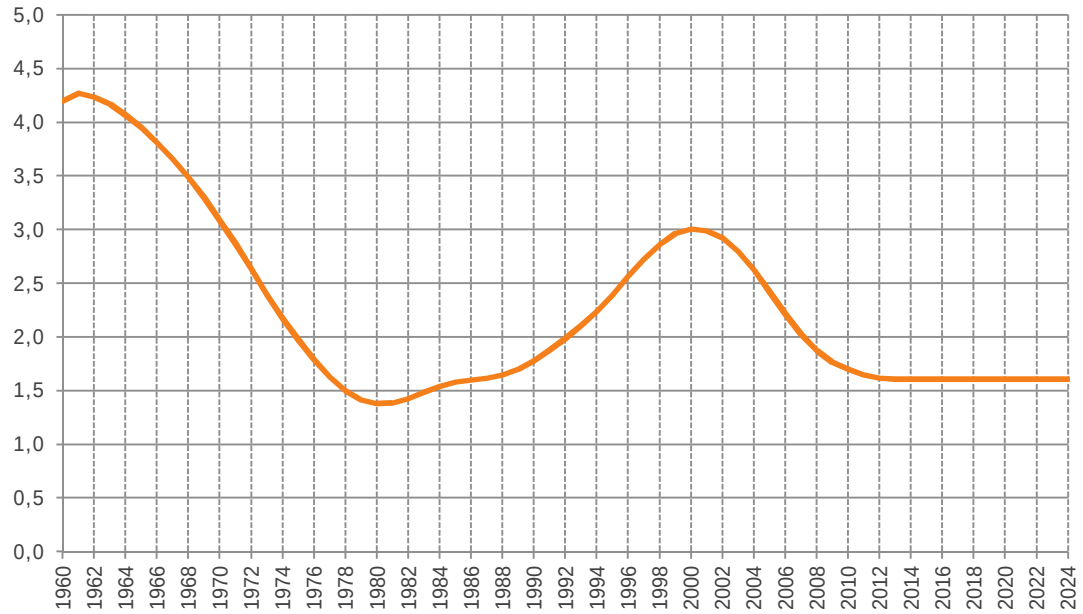
Graph 59 Trend labour supply, public sector
(Millions of hours; historical data for 1960-2012)



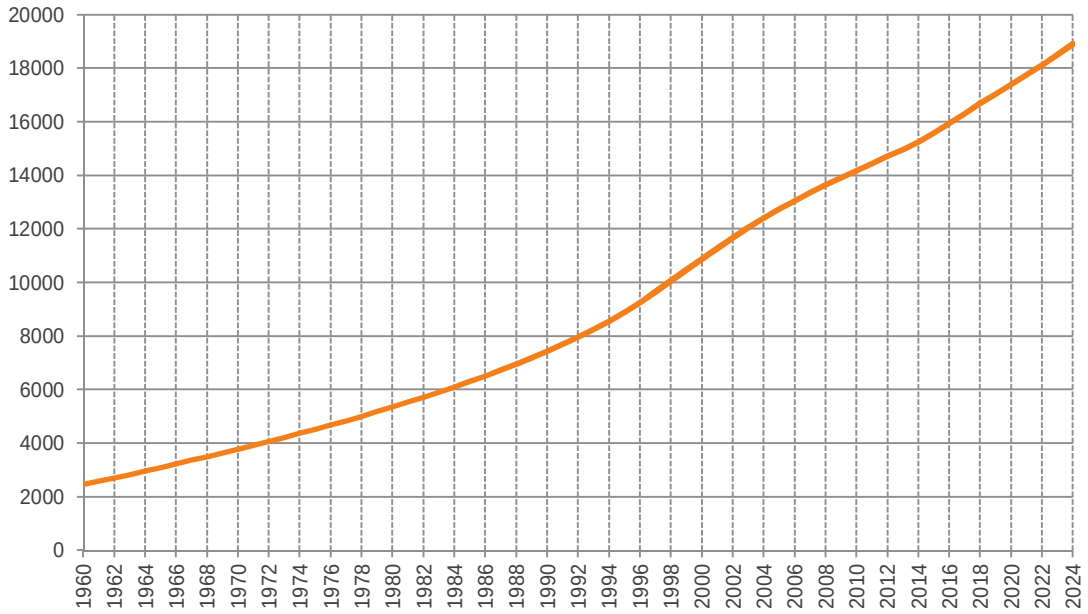
Graph 60 Natural rate of unemployment
(In % of the equilibrium labour supply)



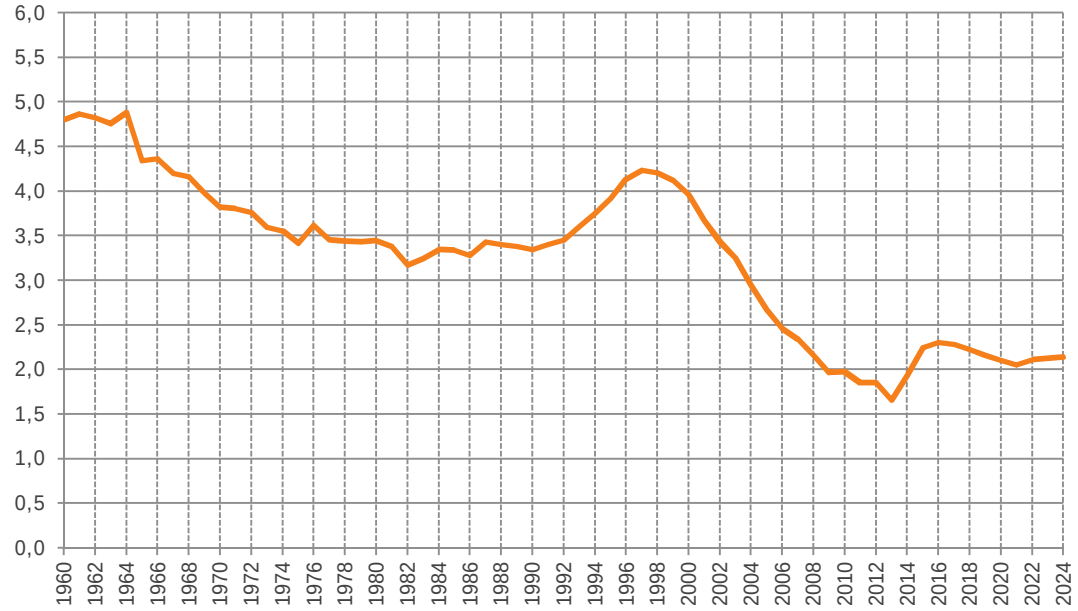
Graph 61 Trend hourly labour productivity growth, private sector
(In %; historical data for 1960-2012)



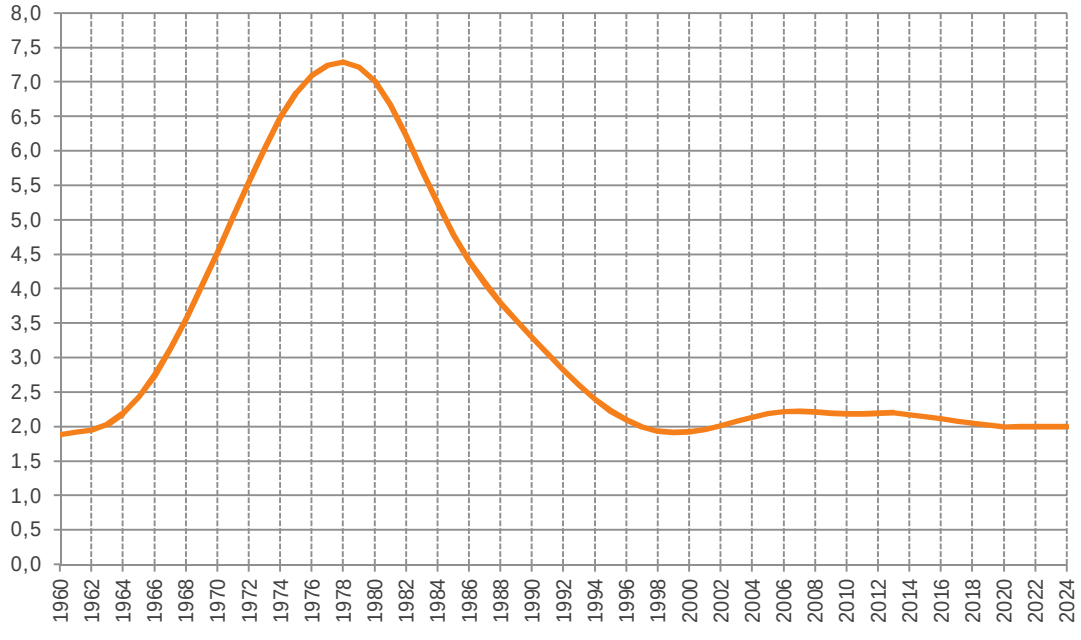
Graph 62 Potential output level, private sector
(Chained volumes, in billions of dollars of 2005; historical data for 1960-2012)



Graph 63 Potential output growth, private sector
(Annual % change; historical data for 1960-2012)



Graph 64 Trend/target rate of inflation
(Annual % change in the deflator of private consumption; historical data for 1960-2012)



13.2.3. Japan

a. Total population

Japanese trend population growth over the period 1960-2012 reached about 0.6% per year. However, the growth rate of total population tended to decline, from a maximum of 1.3% in 1972 to about nil in 2005. As of 2006, total population has been in decline, and the rate of contraction has been increasing. Japanese demographic projections for the period 2015-2024 are taken from Japan's National Institute of Population and Social Security Research (NIPSSR). The institute's latest projections indicate that total population should continue to decline, falling at an annual average rate of about 0.2% over the projection horizon.

b. Working-age population

Though the trend rate of growth of working-age population in Japan was positive between 1960 and 1996, working-age population has been falling ever since 1997. Furthermore, the rate of decline has been increasing, from 0.7% in 1997 to an estimated 1% in 2012. Based on the latest demographic projection of the NIPSSR, working-age population should continue to decline over the period 2015-2024 at an annual average rate of about 0.8%.

c. Labour force participation rate

In the early 1960s, Japan's trend labour force participation rate is estimated to have been just a little below 80%. The participation rate then followed a gradual decline, bottoming out at a low of about 76% in 1979. The participation rate then embarked on a sharp rise, hitting a high of about 85% by 2012. Going forward, we assume that the rise in the participation rate will now begin to decline, falling to approximately nil over the second half of the projection period.

d. Hours worked

In Japan, trend hours worked in the private business sector declined from about 2500 hours per person per year to an average of about 1690 hours per worker in 2012. Going forward, the decline in hours worked is assumed to continue but at a decreasing pace. The rate of decline is assumed to fall to nil around 2019, with the level of hours worked thereafter stabilising.

e. Labour supply

Growth in Japan's equilibrium labour supply rose until the mid-1990, at an annual average rate of about 1%. Growth remained robust at a rate around 1% per year, until about 1990. The growth rate then began to fall rapidly, leading to a decline in the labour supply as of 1996. Between 1996 and 2012, the equilibrium labour supply fell at an annual average rate of about 0.1%. The trend labour supply is projected to continue to fall over the projection period, with the rate of decline accelerating as of 2013 to about 0.7% per annum over the period 2013-2024.

f. The natural rate of unemployment

In Japan, the NAIRU rose from an estimated 1.4% of the (equilibrium) labour force in the early 1960s to a first local maximum of about 4.6% in 2004. The NAIRU is then estimated to have fallen somewhat, reaching about 4.3% in 2012. The decline in the NAIRU is projected to come to a halt as of 2013 as the Japanese economy is adversely affected by aftershocks of the global financial and economic crises, and we assume that the Japanese government will implement gradual fiscal consolidation through tax increases, which should push the NAIRU steadily higher over the period 2013-2024. The NAIRU is thus projected to reach a historical high of 5.6% of the labour force in 2024.

g. Public sector labour input

Equilibrium public sector labour input has been growing at an annual average rate of about 1.4% over the period 1960-2012. The growth rate of public sector labour input has, however, been declining sharply since the early 2000s, coming out at just 0.2% in 2012. It is assumed that, in projection, growth in the trend public sector labour input will fall to nil by 2016, stabilising the level of labour inputs over the period 2015-2024.

h. Private sector labour input

In Japan, private sector equilibrium labour input increased from 1960 to about 1989, and then began to fall at an annual average rate of about 1% between 1990 and 2012. This declining trend is projected to extend over the entire projection horizon, due mainly to the assumption of a trend decline in the equilibrium labour supply over this period.

i. Hourly labour productivity growth

Though trend labour productivity has been rising since the early 1960s, the growth rate of trend labour productivity is has been in sharp decline since the late 1960s. There was a temporary reprieve in the rate decline in the 1980s, but the decline was pursued as of the early 1990s and has been ongoing ever since. Indeed, in 1966, trend labour productivity growth in Japan reached a high of about 10.3%. This rate had fallen to no more than 3.5% by 1982, but then rose gradually to 4.1% in 1988. Trend private business sector labour productivity growth in Japan then resumed its declining trend at the end of the 1980s, and labour productivity growth is estimated to have dropped to no more than 1.6% in 2012. The projection assumes that this decline in productivity growth will stop and that productivity growth will continue at an annual average rate of 1.6% over the period 2013-2024.

j. Equilibrium real private sector output

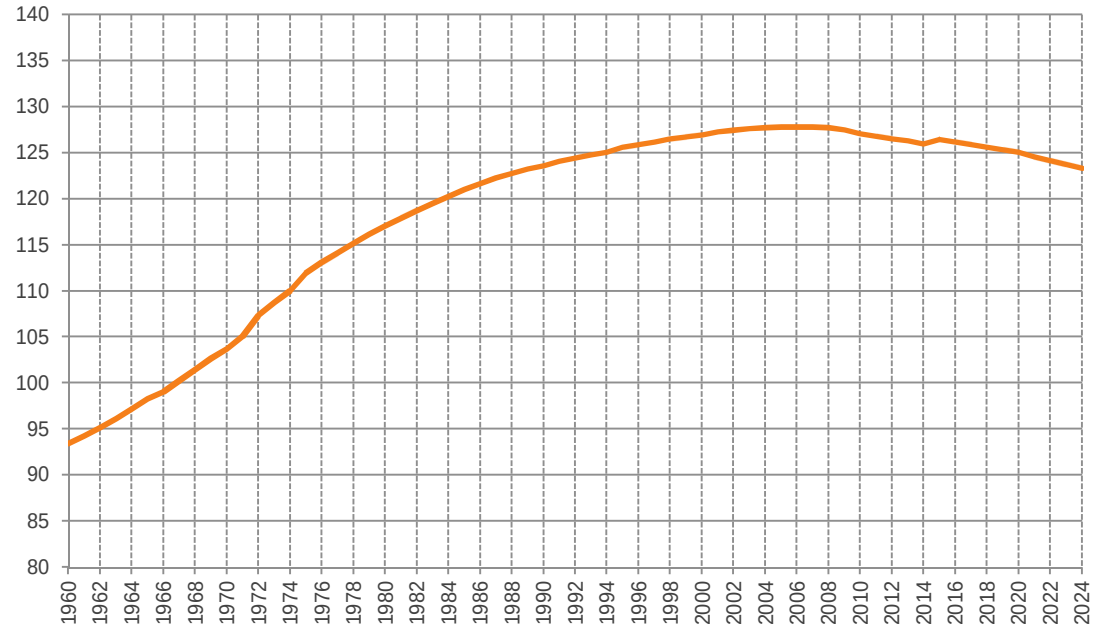
In Japan, potential output growth fell from about 11% yoy in the early 1960s to a low of about 0.7% in 2012. Potential output growth is projected to rise at an annual average rate of no more than 0.5% over the projection period 2013-2024.

k. Trend inflation

In Japan, the trend rate for inflation in the early 1960s was about 5.7%, and this then increased to a maximum of 9% in 1974. Trend inflation then declined until the general price level began to fall, embarking in 1998 on an outright deflationary course that has persisted since that date. In 2013, the government of Prime Minister Shinzo Abe as well as central bank governor Kuroda declared their intention of putting Japan back onto a path of positive inflation and announced a new explicit medium-term inflation target of 2%. In the current projection, it is assumed that the Japanese authorities' commitment to this target is maintained. This leads to a projection where the target (trend) rate of inflation shifts from a 1.1% decline in 2012 to a steady and effective 2% annual increase as of 2020.

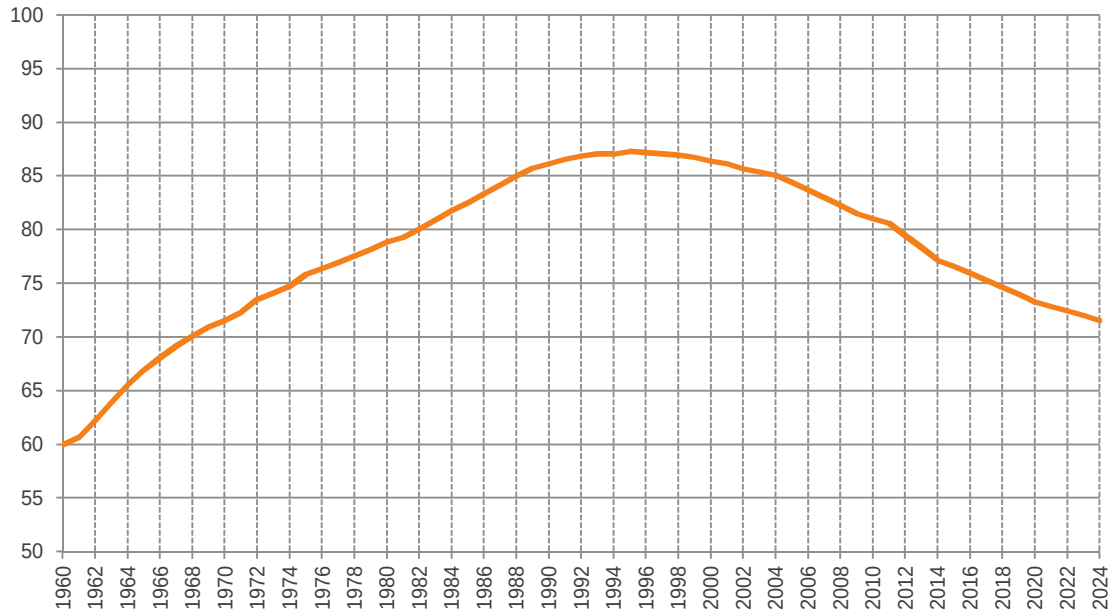
l. Graphs for Japanese trend data

Graph 65 Total population
(Millions of persons; historical data for 1960-2012)



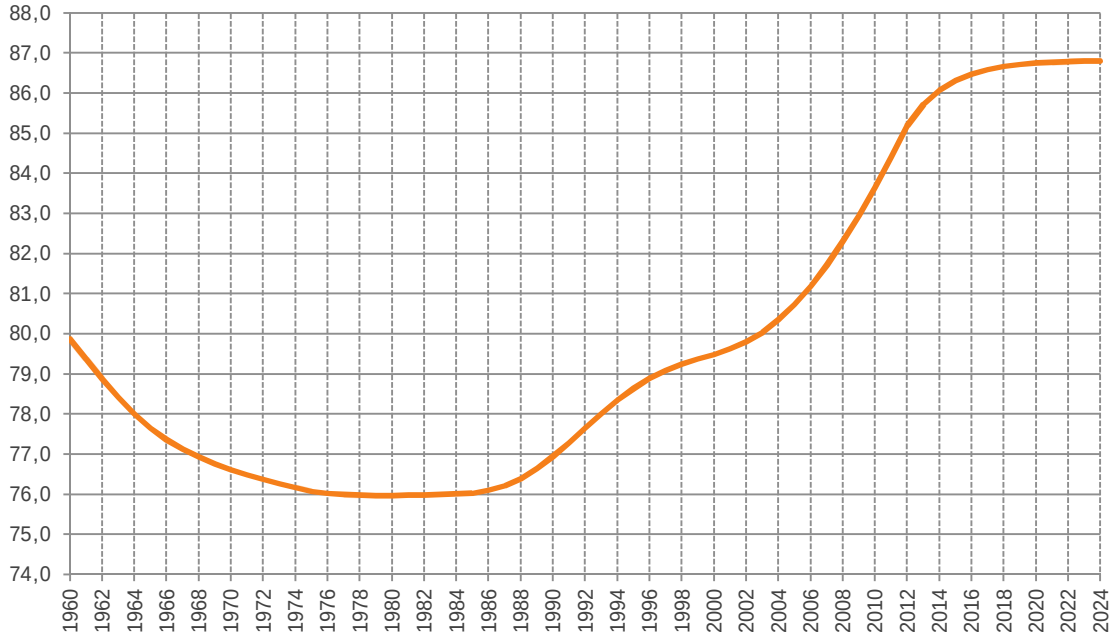
Graph 66 Working-age population

(Millions of persons; historical data for 1960-2012)

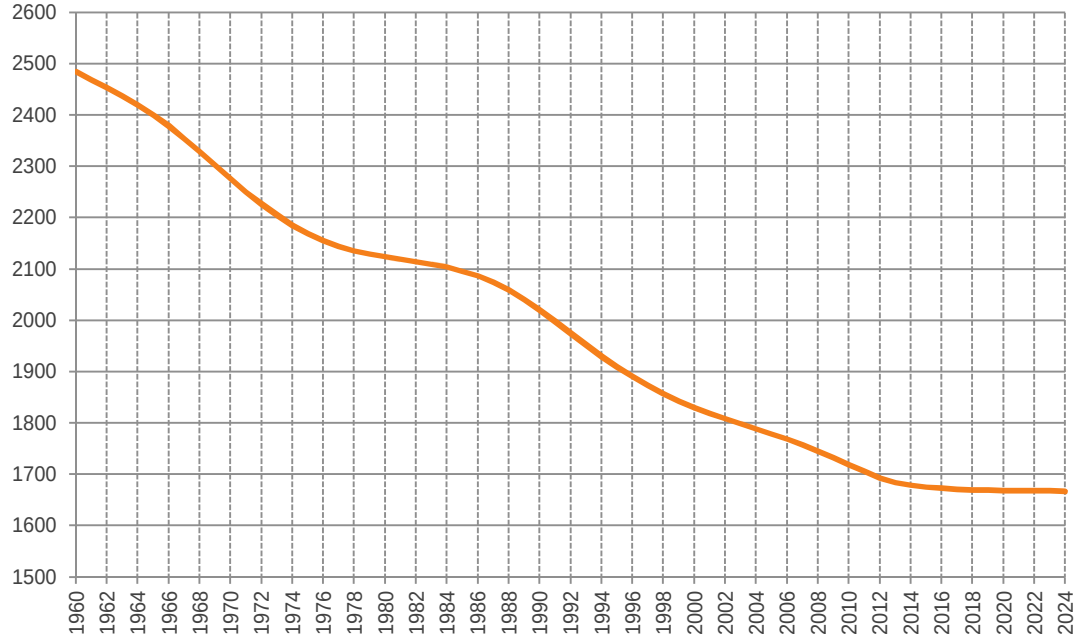


Graph 67 Trend labour force participation rate

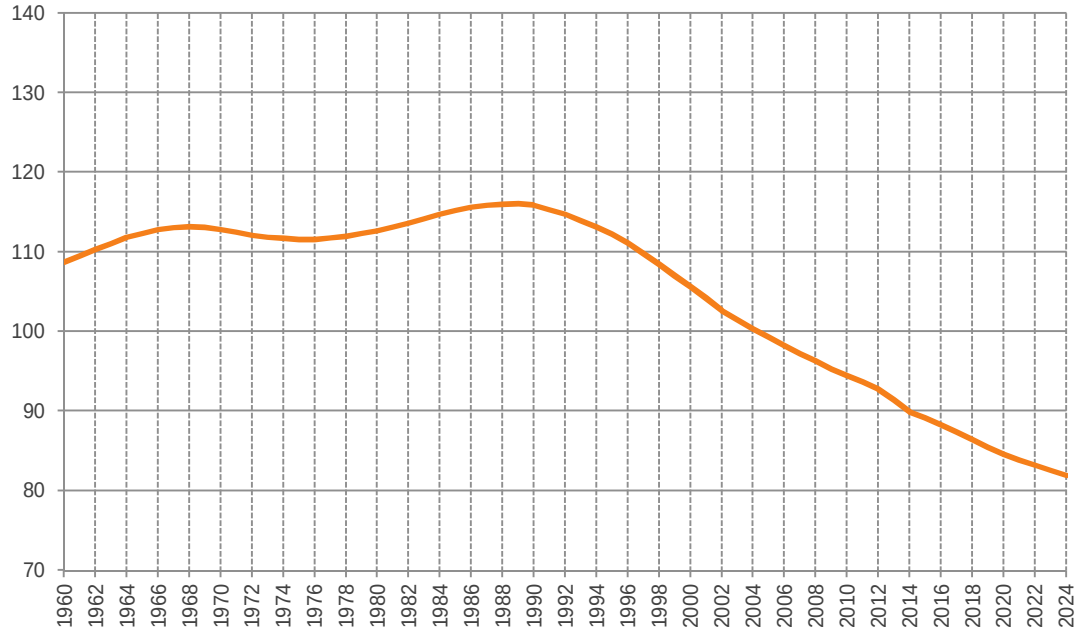
(% of working-age population; historical data for 1960-2012)



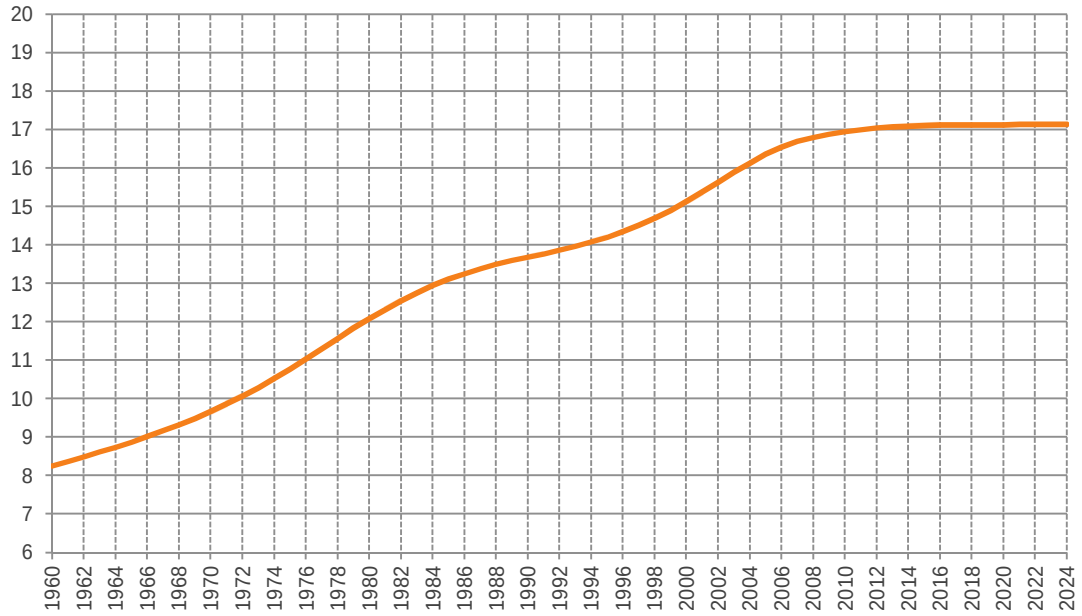
Graph 68 **Trend working time, private sector**
(Hours per person, per year; historical data for 1960-2012)



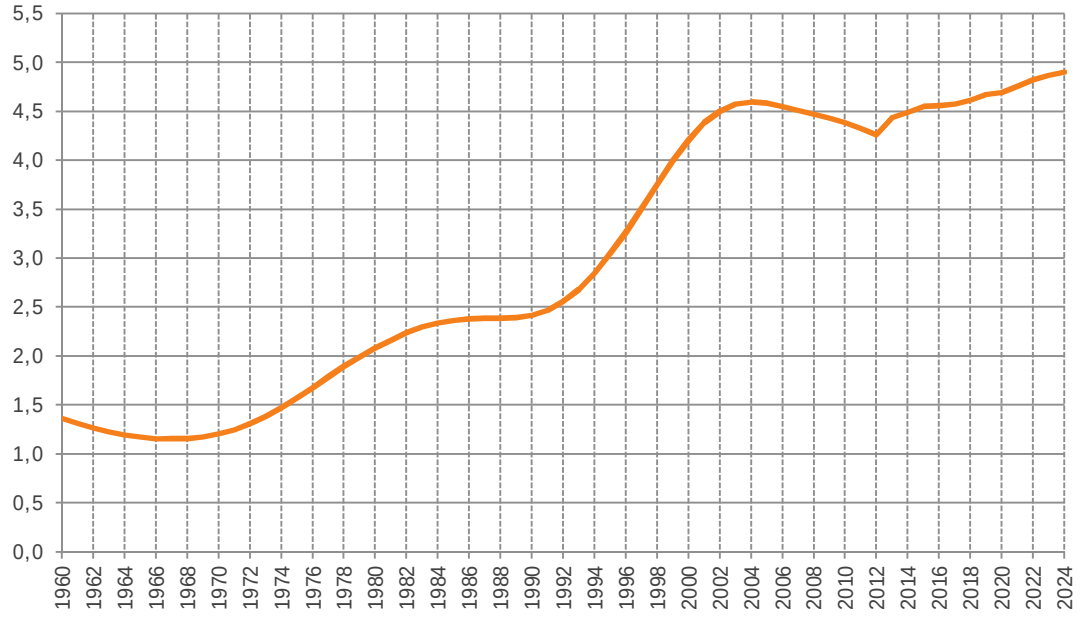
Graph 69 **Equilibrium labour supply, private sector**
(Millions of hours; historical data for 1960-2012)



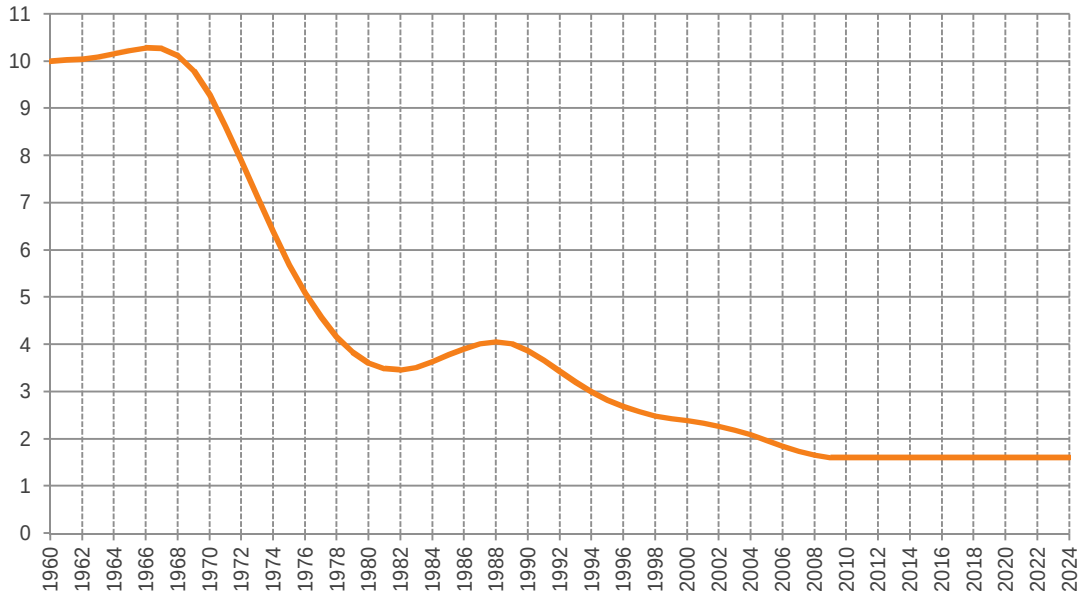
Graph 70 **Equilibrium labour supply, public sector**
(Millions of hours; historical data for 1960-2012)



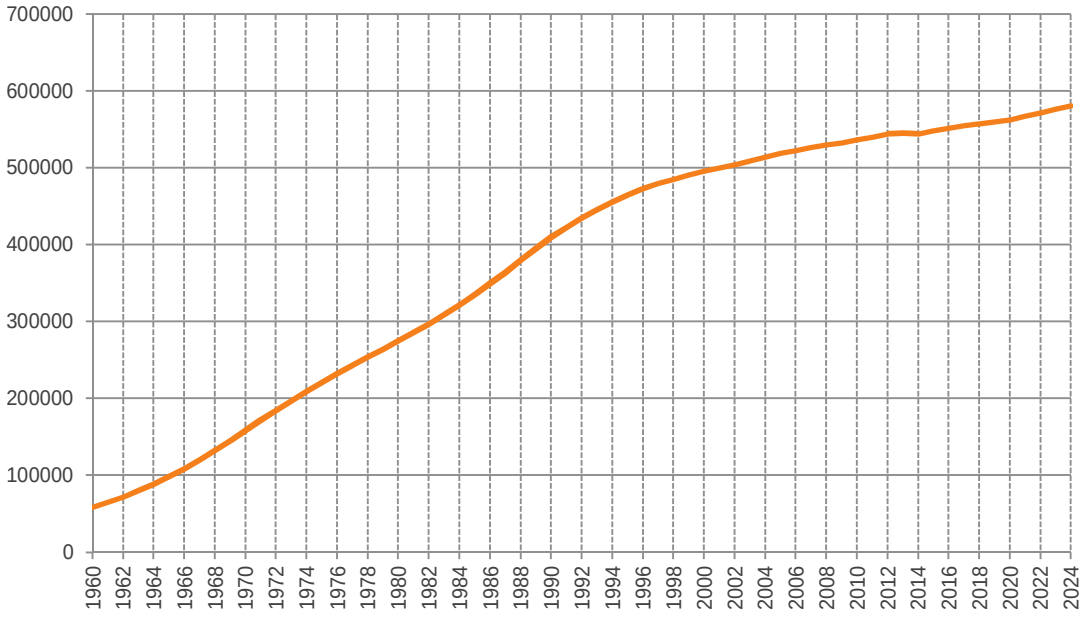
Graph 71 **Natural rate of unemployment**
(In % of the equilibrium labour supply)



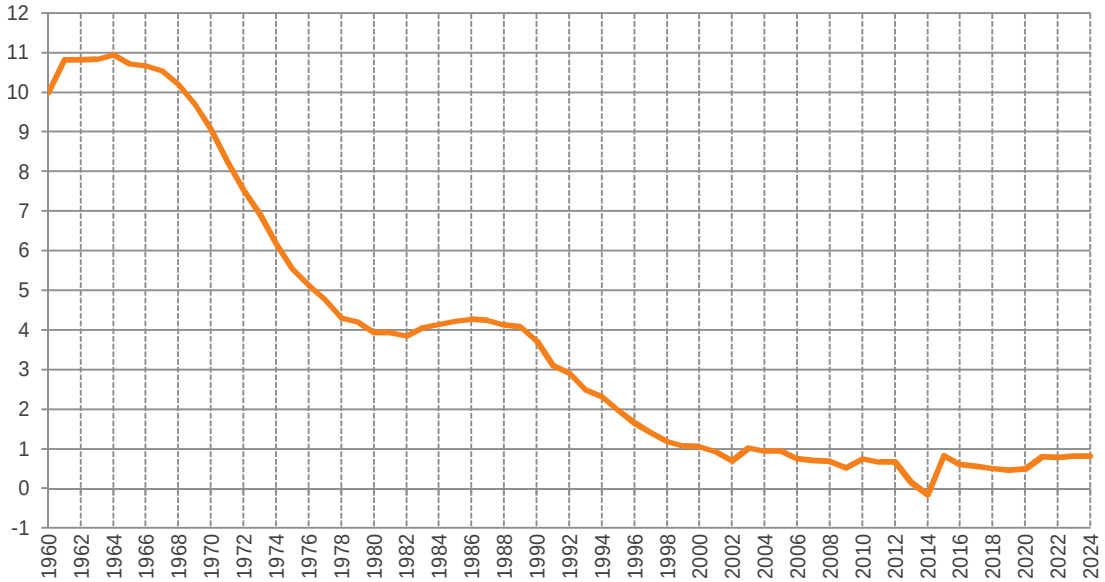
Graph 72 **Trend hourly labour productivity growth, private sector**
(In %; historical data for 1960-2012)



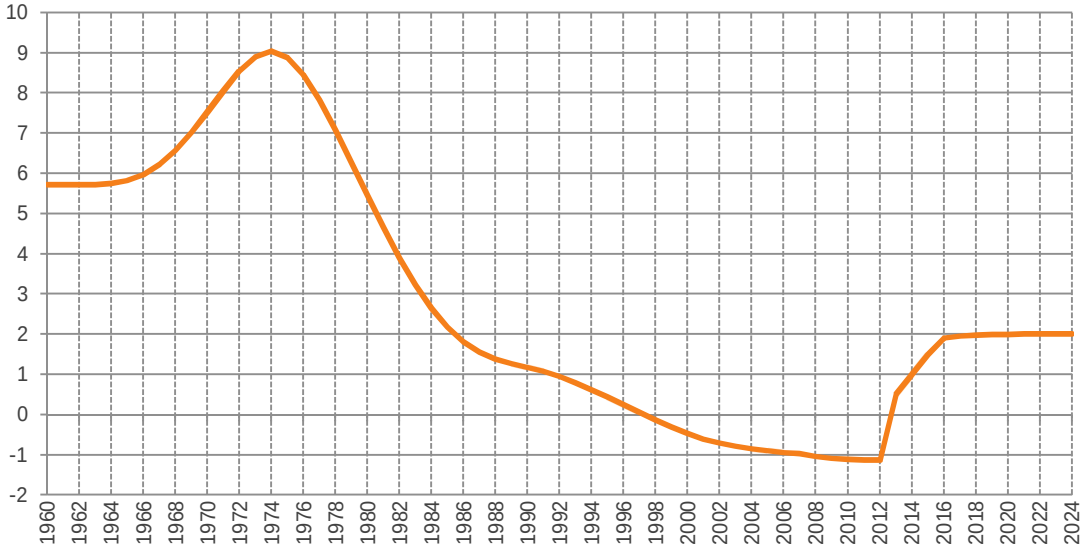
Graph 73 **Potential output level, private sector**
(Chained volumes, in billions of yen of 2005; historical data for 1960-2012)



Graph 74 Potential output growth
(Annual % change; historical data for 1960-2012)



Graph 75 Trend/target rate of inflation
(In %; historical data for 1960-2012)



13.2.4. The Rest of the World

a. Total population

The Rest of the World area consists to a large extent of a wide variety of such countries as China, India, Brazil, Russia, Indonesia, Mexico, South Africa, Switzerland, Canada, Australia and Saudi Arabia. On the aggregate, the trend population growth of this area reached about 1.8% per year over the period 1960-2012. However, the growth rate of total population tended to decline, from a maximum of about 2.6% in the mid-1960s to about 1.2% in 2012. Demographic projections for this area extend this decline, leading to a trend growth rate of total population which reaches just 1% in 2024.

b. Working-age population

The trend rate of growth of working-age population in the Rest of the World was 2.1% between 1960 and 2012. Working-age population increased rapidly between 1978 and 1988, with an annual average growth rate of 2.8% but then fell back sharply to 1.8% in 1997. Since then, the rate of growth has continued to decline albeit much more gradually, with the growth rate reaching 1.5% in 2012. Based on the latest demographic projections, working-age population growth should continue to fall over the projection horizon, reaching 0.9% in 2024.

c. Labour supply

In the absence of any explicit data or assumptions regarding the labour force participation rate for the Rest of the World area, it is assumed that the evolution of the labour supply in the Rest of the World tracks that of the area's working age population.

d. Private sector labour input

In the absence of any explicit data or assumptions regarding the natural rate of unemployment for the Rest of the World area, it is assumed that the evolution of the private sector's equilibrium labour input in the Rest of the World tracks that of the area's labour supply.

e. Labour productivity growth

The private business sector's trend labour productivity has been rising since the early 1960s at an annual average rate of about 6.6%. Productivity growth accelerated in the mid-1960s, rising from 7.5% in 1964 to 12.7% in 1975. However, trend labour productivity growth then plummeted, reaching just 2.7% in 1998. Since then, the area's productivity growth has picked up a little, but has only averaged 3.6% between 1999 and 2012. Going forward, the projection assumes that the area's labour productivity will increase at 3.4% per year over the period 2013-2024.

f. Equilibrium real private sector output

The Rest of the World's real private sector output expanded rapidly between 1960 and 1975, with output growth rates rising from about 10% in the mid-1960s to 14.7% in 1975. The area's output has been in steady decline ever since, averaging 7.5% over the period 1976-2013 but reaching just 5.2% in

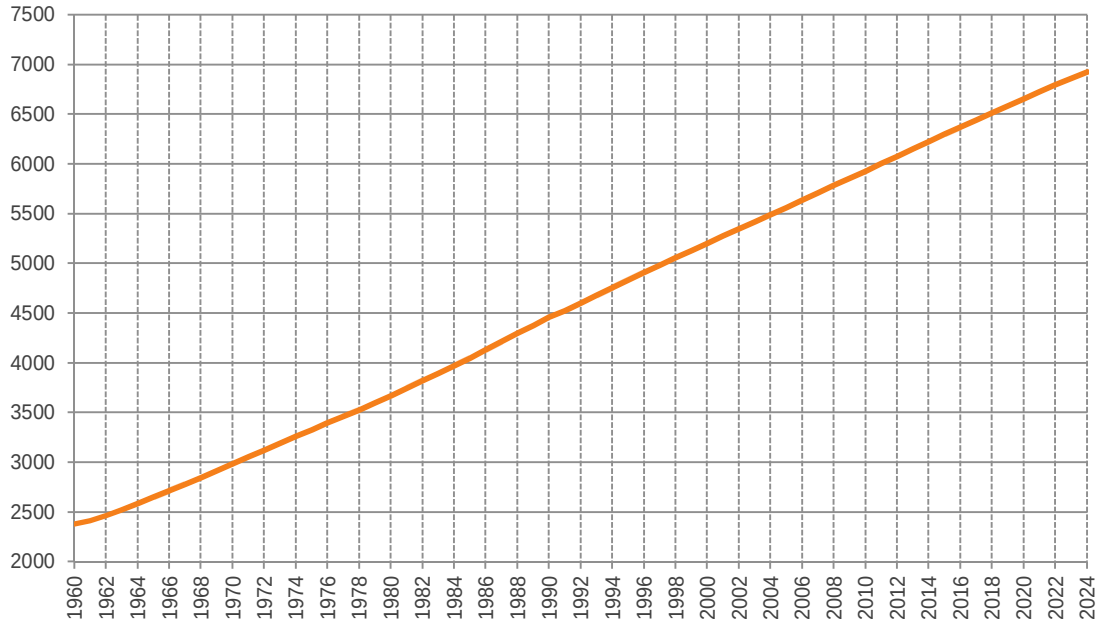
2012. Given the assumptions that are retained for the labour supply and productivity growth over the projection period, potential output continues to decline, coming out at 4.5% in 2024.

g. Trend inflation

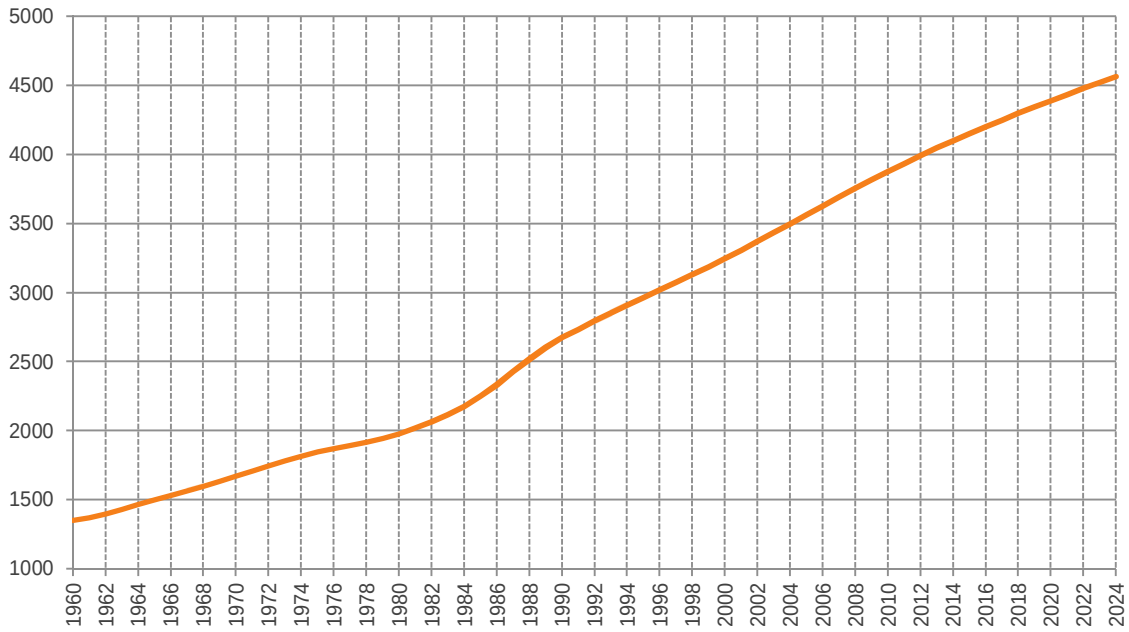
The Rest of the World's trend rate of inflation sky-rocketed in the early 1970s, rising from less than 10% per year in the 1960s to about 60% in the late 1980s. Trend inflation then came down about as quickly as it rose, falling back below the 10% level in the early 2000s. Since 2000, the area's annual rate of inflation has stabilised at about 4.5%. Over the period 2013-2024, trend inflation is assumed to be 4.3%.

h. Graphs for Rest of the World trend data

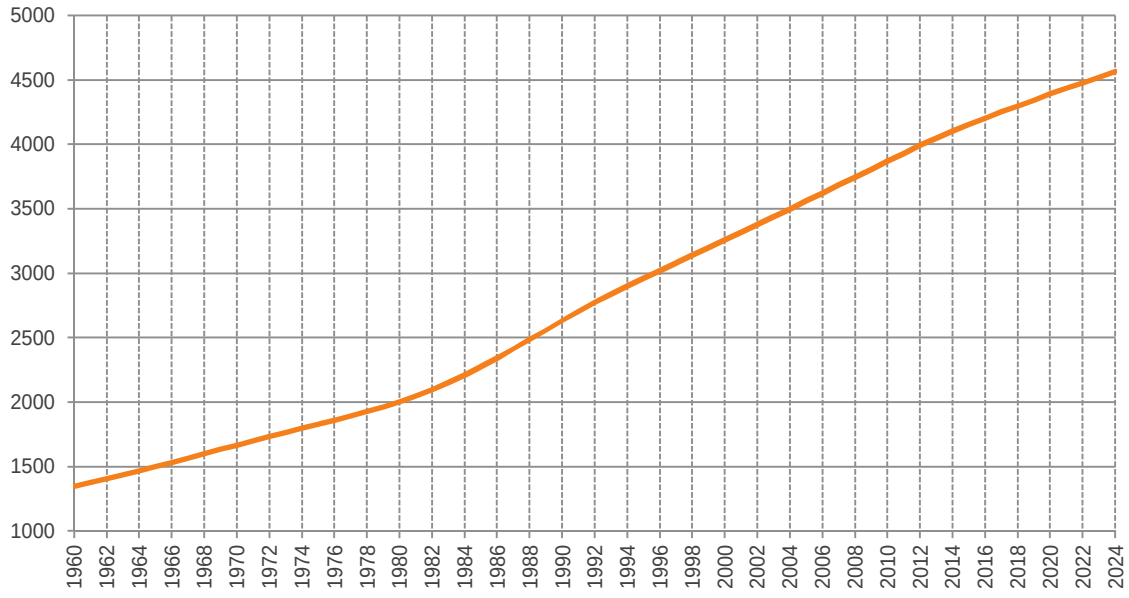
Graph 76 **Total population**
(Millions of persons; historical data for 1960-2012)



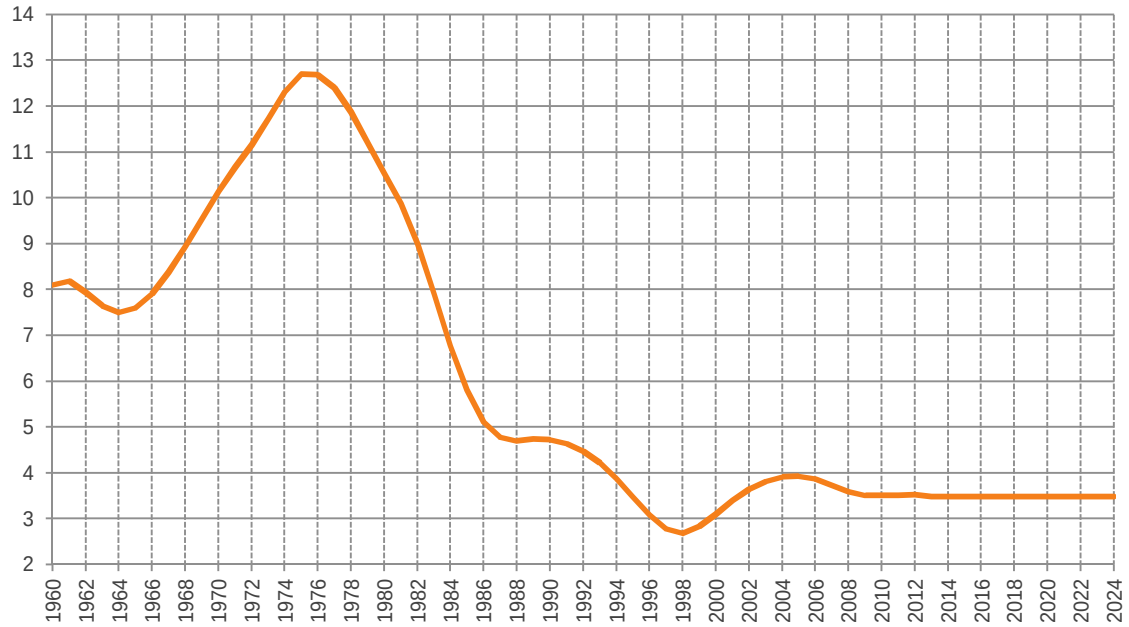
Graph 77 Working-age population
(Millions of persons; historical data for 1960-2012)



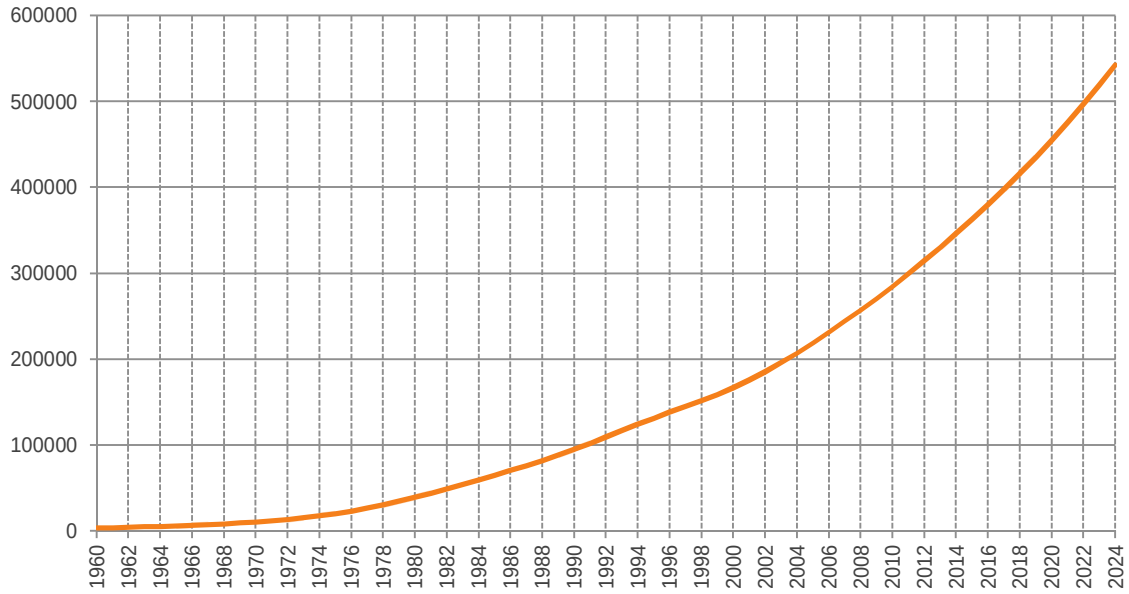
Graph 78 Trend labour supply
(Millions of persons)



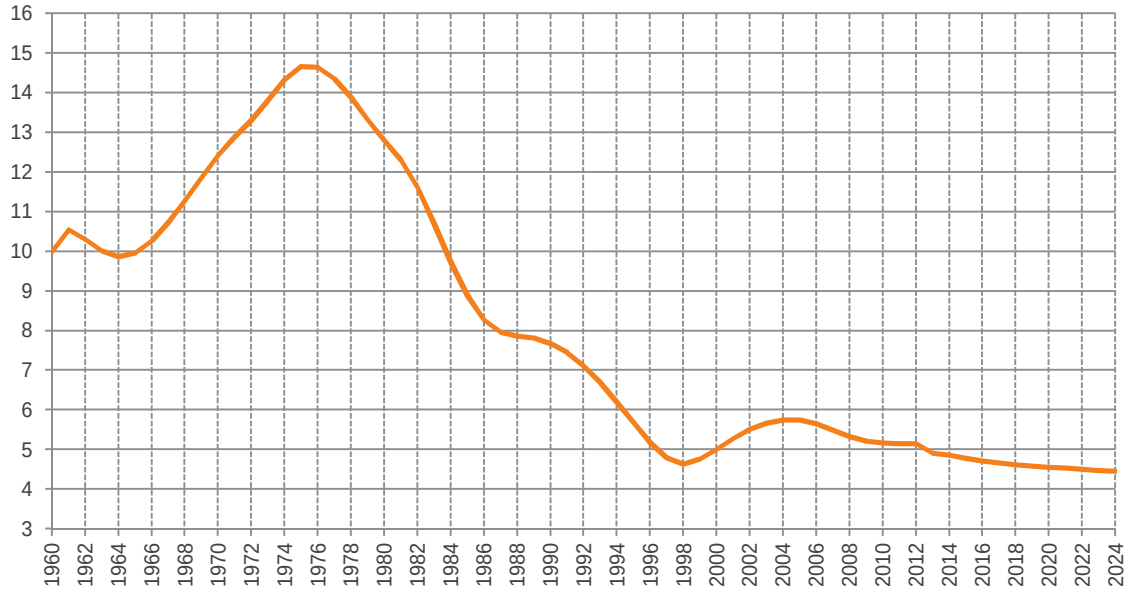
Graph 79 Trend average labour productivity growth, total economy
(Output per worker, yearly % change; historical data for 1960-2012)



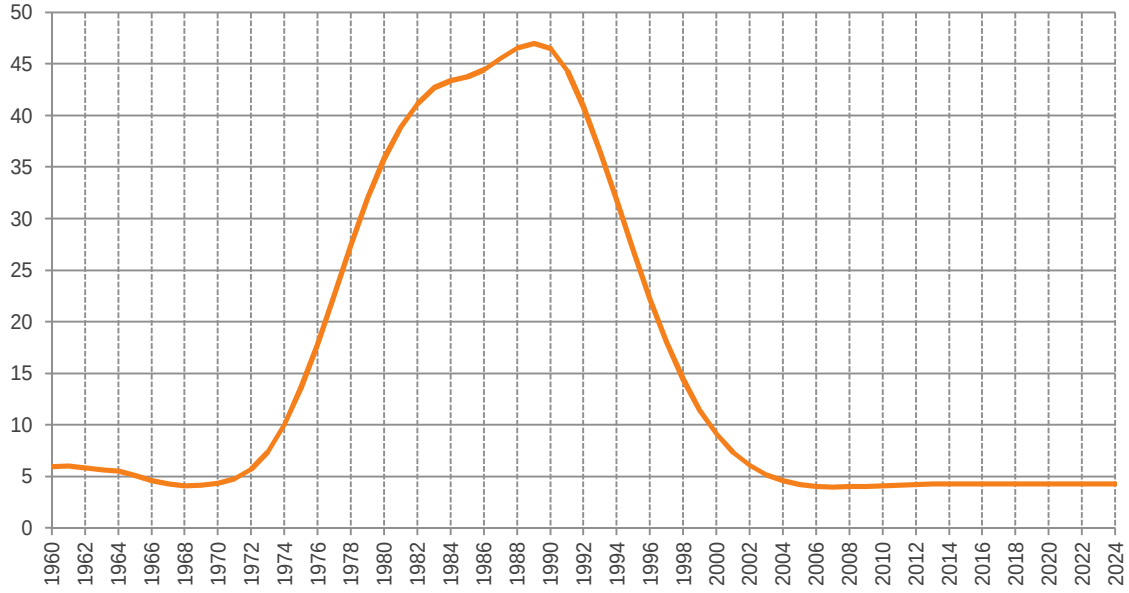
Graph 80 Potential output level, total economy
(Currency units of 2005, chained volumes)



Graph 81 Potential output growth, total economy
(Annual % change; historical data for 1960-2012)



Graph 82 Trend rate of inflation
(Annual % change in the deflator of total economy output; historical data for 1960-2012)



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