WORKING PAPER

2-06

An Evaluation of the Risks Surrounding the 2006-2012 NIME Economic Outlook

Illustrative Stochastic Simulations

E. Meyermans
P. Van Brusselen

April 2006

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Federal Planning Bureau

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Abstract: *In this Working Paper, we apply stochastic simulation to the latest* NIME *Economic Outlook for the world economy. We present confidence intervals around the baseline projection for the euro area, the United States and Japan; we also show estimates of the probabilities of occurrence of specific events. These events include a decline in* GDP *growth rates in 2006, sustained high growth rates as of 2010 in the euro area, contained inflation over the medium term, and successful fiscal consolidation by 2012. The results in this Working Paper are of an illustrative nature and do not constitute an update of the January 2006* NIME *Economic Outlook.*

Executive Summary

In this Working Paper, we describe how we used stochastic simulation to evaluate the risks surrounding the January 2006 NIME Economic Outlook (NEO) for the world economy. We summarise the main results by showing confidence intervals around the baseline projection as well as probabilities that certain events will occur. *The results presented in this Working Paper are of an illustrative nature and do not constitute an update of the January 2006 NIME Economic Outlook.*

This exercise is motivated by the fact that the public discussion of point projections very often treats these as accurate statements on future effective outcomes, notwithstanding that projections made on the basis of macroeconomic models are exposed to several risks. Indeed, macroeconometric models are no more than the best possible representations of complex interactions in the economy, making their use subject to risks related for instance to the behavioural equations' error terms and to the model's exogenous variables.

The Working Paper is structured as follows. The first chapter gives a brief introduction and summarises the main results. The second chapter describes how the stochastic simulation of the NIME model is implemented. The third chapter discusses the main results. There we present confidence intervals for the major macroeconomic variables of the euro area, the United States and Japan. We also estimate the probabilities of occurrence of specific events.

The stochastic simulation results show for instance that there is a 95 per cent probability that GDP growth in the euro area will come out between 1.5 per cent and 3 per cent in 2006. Similarly, there is a 95 per cent probability that real GDP growth will come out between 0.3 and 2.8 per cent in 2012. For the United States, the 95 per cent confidence interval places real GDP growth between 2.5 and 4.2 per cent in 2006 and between 1.3 and 3.3 per cent in 2012. For Japan, there is a 95 per cent probability that real GDP growth will come out between 0.8 and 2.8 per cent in 2006 and between 0.1 and 2.4 per cent in 2012.

Stochastic simulation also allows us to estimate the probability of the occurrence of a specific event. For instance, the simulation results indicate that there is a limited 1 per cent probability, that under current policies, GDP growth in the euro area will be smaller in 2006 than in 2005. Furthermore, the probability that GDP growth in the euro area will come out above 3 per cent over the entire 2010-2012 period, as targeted under the Lisbon Agenda, is also negligible. There is only a 13.3 per cent probability that euro area inflation will effectively stay below the ECB's 2 per cent upper limit over the entire 2006-2012 period. The probability that the euro area's nominal short-term interest rate will come out 25 basis points higher in 2006 than in 2005, when it averaged 2.2 per cent, is estimated at 23.7 per cent; the probability that monetary policy will tighten more strongly, raising the short-term interest rate by 50 basis points in 2006, is estimated at only 1.7 per cent. This compares with a 83.8 per cent probability that the US short-term interest rate will come out 50 basis points higher in 2006 than in 2005. Finally, although the latest NEO baseline projection shows that the rise in Japan's deflator of private consumption should come out at 0.3 per cent in 2006, Table 2 shows there is still a 31.7 per cent probability of deflation in 2006. However, the probability of deflation occurring consecutively in 2006 and in 2007 is just 4.9 per cent.

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I Introduction and Summary

A. Introduction

In recent years economists at the Belgian Federal Planning Bureau (FPB) developed the macroeconometric world model NIME. This model was built in recognition of the very open nature of the Belgian economy and the desire to put the constant monitoring and analysis of developments in the world economy at the heart of the Bureau's concerns. NIME is now used regularly to carry out both policy-oriented economic analyses and medium-term projections for the world economy[1].

Building on the expertise acquired during the development of the NIME model, the FPB has commenced the publication of "The NIME Economic Outlook for the World Economy" (NEO) as of August 2005. To date, two NEOs have been published, with the latest January 2006 issue providing an economic outlook for the 2006-2012 period[2], to which we will henceforth refer to as the "baseline projection".

The baseline projection is the outcome of a deterministic simulation with the NIME model, whereby the values of the error terms of the model's behavioural equations are set to zero and the values of the exogenous variables are set to predetermined levels[3]. As this baseline results from a specific set of assumptions, it constitutes one of many possible scenarios, linked to the model user's own subjective evaluation of outcome probabilities[4]. However, the evaluation of probabilities associated with a model's outcomes can also be addressed, more rigorously, through the stochastic simulation of the model. Indeed, repeated random drawings for the values of equations' error terms and for exogenous variables of the model, followed by simulation, yield what are commonly referred to as stochastic outcomes. These stochastic outcomes then allow for the computation of confidence intervals around the baseline, as well as for the computation of the probabilities of occurrence of specific events.

This Working Paper describes how stochastic simulation is implemented in the context of the NIME model's medium-term economic projections for the world

1. See Appendix A for further details regarding the NIME model.
2. See Meyermans and Van Brusselen (2006).
3. These exogenous variables include trend productivity, secular inflation, the equilibrium real interest rate, population growth and demographic composition, as well as the price of oil.
4. See for example Meyermans and Van Brusselen (2003) who examined the impact on the Belgian international environment of a temporary worldwide autonomous drop in private consumption, a further monetary easing by the European Central Bank, a fiscal consolidation in the euro area and of a prolonged worldwide fall in stock markets. See also Meyermans and Van Brusselen (2005.b), who assess the impact of an oil price shock on the world economy.

economy. The methodology used for this exercise builds on what has been developed elsewhere in the literature, including Fair (1993.a and 1993.b). The Working Paper is structured as follows.

In Chapter Two, we briefly discuss the types of risks associated with the preparation of the NIME Economic Outlook. These risks relate to the error terms of the model's behavioural equations and to the model's exogenous variables. There, we also discuss why risks associated with regime changes are not evaluated in this Working Paper. This implies for instance that monetary authorities are assumed to continue to follow their usual policy rule when setting short-term interest rates, and that the predetermined tax rates are not subject to changes. In Chapter Two, we also discuss how we derive confidence intervals and how we compute probabilities for specific outcomes. Confidence intervals provide an indication of the likelihood that an economic variable's actual outcome will deviate from its sample mean. The computation of specific event probabilities informs us about the likelihood of the occurrence of an event, such as the euro area attaining the EU Lisbon Agenda's growth objectives by 2010.

In Chapter Three, we present stochastic simulation results for the 2006-2012 period. *It should be noted that the simulation results presented in this Working Paper are of an illustrative nature and do not constitute an update of the January 2006 NIME Economic Outlook;* the data on which the simulations are based have as cut-off date early December 2005. The results of Chapter Three are summarised in tables 1 and 2.

The Working Paper ends with two appendices. Appendix A presents the main features of the NIME model. Appendix B outlines how the NIME model is used to produce a projection; Appendix B also specifies the equations for the oil price and population and summarises the results of the January 2006 NEO.

B. Summary of the main results

Table 1 provides 95 per cent confidence intervals for GDP growth and inflation in the euro area, the United States and Japan. The confidence intervals indicate for instance that there is a 95 per cent probability that euro area GDP growth will come out between 1.5 per cent and 3 per cent in 2006, while the confidence intervals indicate that there is a 95 per cent probability that euro area GDP growth will come out between 0.3 and 2.8 per cent in 2012. For the United States, the 95 per cent confidence interval places real GDP growth between 2.5 and 4.2 per cent in 2006 and between 1.3 and 3.3 per cent in 2012. For Japan, there is a 95 per cent probability that real GDP growth will come out between 0.8 and 2.8 per cent in 2006 and between 0.1 and 2.4 per cent in 2012.

Stochastic simulation also allows for the estimation of specific event probabilities. For the euro area, we present probability estimates for a number of specific outcomes that relate to either the main macroeconomic outcomes of 2006 in comparison with 2005, or to the main macroeconomic objectives laid out in the EU's Lisbon Agenda and the Stability and Growth Pact. For the United States and Japan, these event probabilities refer primarily to events regarding output, prices and interest rates. Table 2 summarises some of the probabilities for the events discussed in Chapter 3.

Table 2 shows for instance that there is only a 1 per cent probability that GDP growth in the euro area will be lower in 2006 than in 2005. The probability that GDP growth in the euro area will come out above 3 per cent during each year of the 2010-2012 period, as targeted under the Lisbon Agenda, is also negligible. Moreover, the results also indicate that there is only a 13.3 per cent probability that euro area inflation, as measured by the change in the deflator of private consumption, will effectively remain below 2 per cent during the entire 2006-2012 period.

TABLE 1 - **95% confidence intervals for selected variables of the NIME Economic Outlook**
(variables given in growth rates)

		2006	2007	2008	2009	2010	2011	2012
The euro area								
	Upper bound	3.0	3.2	3.3	3.1	2.9	2.9	2.8
Gross domestic product	*Sample mean*	2.2	2.3	2.4	2.0	1.8	1.6	1.6
	Lower bound	1.5	1.5	1.5	1.0	0.7	0.5	0.3
	Upper bound	1.9	2.0	2.3	2.5	2.6	2.7	2.8
Deflator of private consumption	*Sample mean*	1.4	1.5	1.7	1.8	1.9	2.0	2.0
	Lower bound	0.9	0.9	1.1	1.2	1.3	1.3	1.3
The United States								
	Upper bound	4.2	3.4	4.0	3.8	3.6	2.8	3.3
Gross domestic product	*Sample mean*	3.4	2.5	3.1	2.8	2.6	1.8	2.2
	Lower bound	2.5	1.7	2.1	1.9	1.6	0.9	1.3
	Upper bound	2.5	2.4	2.5	2.5	2.5	2.4	2.4
Deflator of private consumption	*Sample mean*	2.2	2.1	2.1	2.1	2.0	2.0	2.0
	Lower bound	1.9	1.7	1.6	1.6	1.6	1.5	1.5
Japan								
	Upper bound	2.8	2.7	3.4	3.0	2.7	2.5	2.4
Gross domestic product	*Sample mean*	1.8	1.8	2.3	1.9	1.5	1.3	1.2
	Lower bound	0.8	0.7	1.3	0.9	0.5	0.1	0.1
	Upper bound	1.0	1.4	1.8	2.2	2.8	3.2	3.2
Deflator of private consumption	*Sample mean*	0.3	0.6	0.9	1.3	1.7	2.1	2.2
	Lower bound	-0.5	-0.2	0.0	0.2	0.8	1.0	1.2

TABLE 2 - **Selected event probabilities in the NIME Economic Outlook**

	Probability score *(in %)*
Euro area	
GDP growth lower in 2006 than in 2005	1.0
Inflation above 2% in 2006	0.9
Short-term interest rate 25 basis points higher in 2006 than in 2005	23.7
Fiscal deficit-to-GDP ratio above 3% in 2006	0.4
GDP growth higher than 3% over the 2010-2012 period	0.1
Employment rate at least 70% over the 2010-2012 period	11.9
Inflation below 2% over the 2006-2012 period	13.3
Fiscal position (in % of GDP) in balance or surplus in 2012	1.8
United States	
GDP growth lower in 2006 than in 2005	61.2
Short-term interest rate 50 basis points higher in 2006 than in 2005	83.8
Japan	
Deflation in 2006	31.7
Deflation in 2006 and 2007	4.9

The probability that the short-term interest rate of the euro area will lie 25 basis points higher in 2006 than its 2.2 per cent average in 2005 is estimated at 23.7 per cent; however, the probability that the area's short-term interest rate will lie at least 50 basis points higher in 2006 than in 2005 is only 1.7 per cent. This compares with a 83.8 per cent probability that the US short-term interest rate will come out 50 basis points higher in 2006 than in 2005.

Table 2 also shows that, assuming unchanged policies, there is only a 0.4 per cent probability that the euro area's total fiscal deficit will be greater than 3 per cent of GDP in 2006; similarly, the probability that the area's fiscal deficit will come out in balance or in surplus in the medium term is only 1.8 per cent, while the probability that the fiscal deficit will breach the 3 per cent of GDP ceiling in 2012 is estimated at 3.4 per cent.

Finally, although the latest NEO baseline projection shows that the rise in Japan's deflator of private consumption should come out at 0.3 per cent in 2006, Table 2 shows there is still a 31.7 per cent probability of deflation in 2006. However, the probability of deflation occurring consecutively in 2006 and in 2007 is just 4.9 per cent.

II   The stochastic simulation of the NIME model

A. The risk structure of the NIME model

Following the significant advances in the power of computers since the early 1990s, the stochastic simulation of macroeconometric models is increasingly used to gauge the probabilities of the occurrence of specific outcomes, to calculate confidence intervals for model projections, or to analyse the effectiveness of policy rules in a stochastic environment[1]. Indeed, although the presentation of a point projection of macroeconometric models may be useful, it should not be ignored that such projections are surrounded by a number of risks. Such risks relate, amongst others, to the misspecification of the model's behavioural equations, to the values of the behavioural equations' error terms, to parameter values and to the model's exogenous variables[2]. Furthermore, risks also stem from the fact that, due to lags in data availability and measurement errors, the economy's current real-time situation is known only imprecisely.

In this Working Paper, we analyse the risks that relate to the error terms of the behavioural equations and to the model's exogenous variables. Indeed, though there may also exist risks around a model's estimated coefficients, the basic assumption under which the model is estimated is that these coefficients are fixed, implying that the computation of confidence intervals around a model's projections and the computation of specific event probabilities should only be carried out with random draws for error terms and exogenous variables[3].

a. The error terms of the behavioural equations

In the current version of the NIME model, the world is divided into six blocs: the euro area, the bloc consisting of the Western EU Member States that do not belong to the euro area, the Eastern non-euro EU Member States, the United States, Japan and a bloc representing the rest of the world. In all of these blocs but two, i.e. the Eastern non-euro EU Member States and the rest of the world, we distinguish a household sector, an enterprise sector, a government sector and a monetary sector. A similar set of behavioural equations and accounting identities is specified for each sector across blocs, while the parameter values of the equations are ob-

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1. See for instance Barrel and Pina (2004), Bryant et al. (1993), Drew and Hunt (1998), Fair (1993.a) or Wallis (2000).
2. See for instance Fair (1993.a).
3. Stochastic simulations with random drawings for all three sources of risk (error terms, coefficients and exogenous variables) should be run only for the purpose of analysing a model's dynamic properties. For a more detailed discussion, see for instance Fair (1993.a). Risks relating to the possible misspecification of the model are limited by taking into consideration a number of diagnostic statistics during estimation.

tained using standard econometric techniques applied to the different blocs' aggregated annual data, which range from 1970 until 2004.

In this Working Paper, the error terms of the behavioural equations are assumed to follow a first order autoregressive process. Furthermore, the corresponding variance-covariance matrix of the error terms is estimated on the basis of historical data, but assuming that the matrix is diagonal[1].

b. The exogenous variables

The NEO baseline projection was simulated on the basis of a specific set of assumptions regarding the model's exogenous variables. Indeed, trend productivity growth (i.e. growth in private sector gross output per worker), the equilibrium real interest rate (i.e. the long-term nominal interest rate deflated by the consumer price index) and secular inflation (with the exception of secular inflation in Japan, the path of which is assumed to rise gradually as of 2006), were all set to their latest available estimates and kept constant over the projection period. In the case of the demographic variables, trend values were based on the latest official data from national sources and from the 2004 revision of the United Nations' "World Population Prospects". The oil price projections were based on oil futures data, as quoted in commodity markets in December 2005[2].

In the NIME model, trend values for productivity and secular inflation are estimated assuming a second-order random walk; accordingly, the variances of their error terms are estimated on the basis of historical error terms. The oil price equation and the total population equation - for which the NEO values are set to predetermined values - are estimated as simple autoregressive equations for the period ranging from 1970 to 2004. The equations for children, active-age population and older-aged people are obtained by sharing out the total population over the various age groups[3].

c. Policies and risk premia

In the NEO baseline projection, a standard constant policy assumption was used with respect to the conduct of fiscal policy. However, whenever possible, the anticipated effects of existing legislation were taken into account[4]. With respect to monetary policy, we assumed that short-term interest rates follow a Taylor rule, embedded in a partial adjustment scheme. In addition, we also assumed that the risk premia in the financial markets were held constant, implying for instance that changes in an area's nominal effective exchange rate are determined solely by changes in the interest rate differential and the (expected) inflation differential.

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1. Future versions of the model will relax this assumption.
2. For more details, see the appendix on the underlying assumptions in Meyermans and Van Brusselen (2006).
3. For more details, see appendix B of the Working Paper.
4. This is of particular relevance for the United States where, under current laws and policies, certain important tax cut provisions are assumed to sunset over the projection's horizon. For more details, see Meyermans and Van Brusselen (2006).

In this Working Paper we do not consider risks associated with regime changes. This implies for instance that monetary authorities are assumed to continue to follow a Taylor rule when they set the nominal short-term interest rate[1], and that the predetermined tax rates or the risk premia are not subject to random shocks. The latter means for instance that the current risk assessment of the exchange rate does not deal with the possibility of a sudden reversal in market sentiment in the foreign exchange market, nor with a possible sudden retrenchment by Asian central banks which have been major buyers of US Treasury securities in recent years.

Finally, risks associated with imperfect knowledge of the economy's real-time situation are also not considered in this Working Paper.

B. The computation of event probabilities and confidence intervals

In the exercise presented here, the calculations of confidence intervals and event probabilities are carried out using one thousand random draws for both the error terms and the model's exogenous variables.

a. Event probabilities

An "event" refers to the occurrence of a particular outcome for one or more variables of the model. Events may be defined over one year, such as the occurrence of deflation in Japan in 2006; but they may also be defined over several consecutive years, such as the occurrence of below-2-per-cent inflation in the euro area over the entire 2006-2012 period. The probability of occurrence of a specific event is then defined as the number of occurrences of an event over the one thousand random draws divided by one thousand.

b. Confidence intervals

The simulation results can also be used to compute confidence intervals. Indeed, after the model is simulated stochastically one thousand times, the resulting outcomes for a variable in a specific period are ranked according to their magnitude. The $(\lambda/2)10$ highest and lowest outcomes are then eliminated and the remaining outcomes constitute the λ per cent confidence interval around the baseline point projection in a specific period.

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1. However, it should be noted that the error term of this policy rule may be subject to randomness.

III Confidence intervals and event probabilities for the 2006-2012 NIME Economic Outlook

This chapter presents the results of stochastic simulation applied to the NIME Economic Outlook of January 2006. It should be noted that the simulation results presented in this Working Paper are of an illustrative nature and do not constitute an update of the January 2006 NEO; the data on which the simulations are based have as cut-off date early December 2005. The discussion focuses mainly on the probabilistic aspects of the latest NEO; readers who wish to learn more about the NEO baseline projection are referred to Meyermans and Van Brusselen (2006).

Results for the euro area, the United States and Japan are presented in the form of confidence intervals and specific event probabilities. The graphs and tables showing confidence intervals paint a broad picture as to how the actual outcome may deviate from the model's deterministic baseline projection. The event probabilities refer to the probability that outcomes of particular relevance may occur. For the euro area, events relate to either the outcomes of 2006 in comparison with 2005, or to the main macroeconomic objectives laid out in the EU's Lisbon Agenda and Stability and Growth Pact. For the United States and Japan, events refer primarily to developments in output, prices and interest rates.

A. Stochastic simulation results for the euro area

The results of the stochastic simulation for the euro area are shown in Tables 3 to 5 and in Figures 1 to 6. They can be summarised as follows.

i. Real GDP growth

The NEO baseline projection indicates that GDP growth in 2006 will come out at 2.2 per cent[1], almost a full percentage-point higher than in 2005. However, stochastic simulation reveals that there is some uncertainty regarding this point forecast, as the estimated 95 per cent confidence interval indicates that growth will lie between 1.5 and 3 per cent in 2006. However, the probability is high that growth will pick up in 2006, as further inspection of the stochastic simulation results show that there is only a 1 per cent probability that euro area growth will come out lower in 2006 than in 2005. Moreover, the stochastic simulation results also show that there is a 96.4 per cent probability that effective GDP growth will be stronger than potential GDP growth, which is estimated at 1.4 per cent for 2006.

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1. The baseline projection results are only approximately equivalent to the sample mean of the stochastic simulation. The discrepancy stems from the fact that stochastic simulation exercise is based on the Commission's AMECO data, uncorrected for changes in financial variables over the November-December 2005 period.

After 2006, the baseline projection shows GDP growth reaching 2.4 per cent in 2008, followed by a gradual decline to 1.6 per cent by 2012. This deceleration in growth reflects a slowdown in employment growth, due to a rapidly ageing population and a rise in unit labour costs, as well as stalling productivity growth.

Table 4 shows the coefficients of variation, which are defined as a variable's standard deviation divided by its mean over each time period. These coefficients show that the model's point projections for GDP growth, as well as the other variables of interest, become less precise over the projection's horizon. The results also indicate that employment growth is subjet to greater volatility than GDP growth. This reflects less precise estimation results for the labour demand equation than for the equations for the various components of aggregate demand; it also reflects the fact that the NIME model's interest rate rule aims to minimise the deviation of output from its trend.

TABLE 3 -   **Euro area: 95% confidence intervals around the NEO baseline projection results**

		2006	2007	2008	2009	2010	2011	2012
	Upper bound	3.0	3.2	3.3	3.1	2.9	2.9	2.8
Gross domestic product	*Sample mean*	2.2	2.3	2.4	2.0	1.8	1.6	1.6
	Lower bound	1.5	1.5	1.5	1.0	0.7	0.5	0.3
	Upper bound	1.9	2.1	2.1	1.9	1.9	2.1	2.2
Private sector employment	*Sample mean*	1.5	1.4	1.2	1.0	0.8	0.7	0.7
	Lower bound	1.0	0.8	0.4	0.0	-0.4	-0.8	-1.0
	Upper bound	1.9	2.0	2.3	2.5	2.6	2.7	2.8
Deflator of private consumption	*Sample mean*	1.4	1.5	1.7	1.8	1.9	2.0	2.0
	Lower bound	0.9	0.9	1.1	1.2	1.3	1.3	1.3
	Upper bound	2.6	3.1	3.7	4.3	4.9	5.5	6.2
Nominal short-term interest rate (level)	*Sample mean*	2.3	2.5	2.9	3.3	3.7	4.1	4.4
	Lower bound	2.0	2.0	2.2	2.4	2.6	2.6	2.7
	Upper bound	0.8	0.7	0.8	0.8	0.5	0.5	0.5
Nominal effective exchange rate (+: depreciation)	*Sample mean*	-3.1	-3.2	-3.1	-3.3	-3.8	-3.7	-3.7
	Lower bound	-6.9	-6.9	-7.0	-7.3	-7.7	-8.0	-8.0
	Upper bound	-2.3	-1.9	-1.4	-1.1	-0.8	-0.6	-0.4
Net lending (+) or borrowing (-) of government (level, % of GDP)	*Sample mean*	-2.6	-2.3	-2.0	-1.8	-1.7	-1.6	-1.6
	Lower bound	-2.9	-2.7	-2.5	-2.5	-2.5	-2.6	-2.8
	Upper bound	0.8	1.3	1.8	2.0	2.1	2.1	2.1
Current account (level, % of GDP)	*Sample mean*	0.3	0.5	0.8	0.8	0.8	0.7	0.6
	Lower bound	-0.3	-0.3	-0.2	-0.3	-0.5	-0.7	-1.0

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

Table 3 shows that the 95 per cent confidence interval for GDP growth is expected to lie between 0.7 and 2.9 per cent in 2010, between 0.5 and 2.9 per cent in 2011, and between 0.3 and 2.8 per cent in 2012. In this light, the area's growth prospects appear to be modest. Indeed, Table 5 indicates that under current policies, the probability of the euro area effectively achieving the Lisbon Agenda's GDP growth target of 3 per cent over the entire 2010-2012 period is estimated to be no greater than 0.1 per cent[1].

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1. Recall that at the Lisbon Spring European Council in March 2000 and at subsequent European Councils, European leaders developed a comprehensive strategy to make the European Union "the most dynamic and competitive knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment" by 2010. The Lisbon Agenda's objective in terms of economic growth is for the EU to reach an average GDP growth rate of 3 per cent. The Kok report of November 2004 rephrases this strategic goal, aiming to make the EU economy a "single, competitive, dynamic knowledge-based economy that is among the best in the world".

ii. Employment

As explained in Meyermans and Van Brusselen (2006), the projected baseline pick-up in GDP growth in 2006 stems mainly from a pick-up in domestic demand, accompanied by a rebound in net exports. The former is, to a large extent, caused by further strong increases in employment[1]. This result naturally raises the question of how robust the expected strengthening in employment growth will be. Table 3 indicates that the 95 per cent confidence interval around employment growth lies between 1 and 1.9 per cent growth in 2006. Furthermore, Table 5 shows that employment growth has only a 7.5 per cent probability of falling below 1 per cent in 2006.

TABLE 4 - Euro area: Coefficients of variation

	2006	2007	2008	2009	2010	2011	2012
Gross domestic product (growth rates)	0.2	0.2	0.2	0.3	0.4	0.4	0.5
Private sector employment (growth rates)	0.2	0.3	0.4	0.6	0.9	1.3	1.5
Deflator of private consumption (growth rates)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nominal short term interest rate (levels)	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Nominal effective exchange rate (growth rates, +: depreciation)	-0.8	-0.8	-0.8	-0.8	-0.7	-0.7	-0.7
Net lending (+) or borrowing (-) by government (levels, % of GDP)	-0.1	-0.1	-0.2	-0.2	-0.3	-0.4	-0.5
Current account (levels, % of GDP)	1.2	0.9	0.8	0.8	1.0	1.2	1.6

The coefficient of variation is computed as the standard deviation divided by the variable's mean over each time period.

As the evolution of employment in 2006 is, to a large extent, underpinned by a fall in real unit labour costs, it may also be of some interest to gauge the model's baseline projection for labour productivity and real wage growth. Labour productivity growth - measured in terms of real GDP per worker - is expected to come out at 0.9 per cent in 2006, up from 0.2 per cent in 2005. Thanks to the strong pick-up in productivity growth, there is only a 4.2 per cent probability that productivity growth will turn out lower in 2006 than in 2005. The average real private sector wage cost is estimated to have fallen by 0.4 per cent in 2005, but is expected to increase by 0.8 percent in 2006. There is only a 4.4 per cent probability that the real wage cost will fall again in 2006.

The probability of the euro area as a whole achieving the Lisbon Agenda objectives regarding employment and productivity growth appears to be rather low. Indeed, in 2005 the area's employment rate stood at 65.7 per cent of the total working-age population; the baseline projection indicates that this level will rise to 68.8 per cent in 2010, and to 69.8 per cent in 2012. This would clearly constitute an under-performance with respect to the Lisbon objective of a 70 per cent minimum employment rate by 2010. What's more, this expected under-performance appears to be relatively robust, as the probability of the area's employment rate coming out at or above 70 percent of the euro area's working-age population as of 2010 is only 11.9 per cent. Finally, stochastic simulation reveals that under current policies, the probability of the euro area effectively achieving a productivity growth of at least 2 per cent in 2012 is no higher than 3.4 per cent.

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1. In 2006, employment is expected to react to the area's improving output growth, the favourable evolution of real unit labour costs since 2004, and the relatively meagre employment growth in 2003 and 2004.

iii. Consumer price inflation

After having remained stuck around the 2 per cent mark over the previous years, euro area inflation[1] is projected to decelerate to just 1.4 per cent in 2006. This decline reflects several consecutive years of sustained reductions in real unit labour costs and widening output gaps. As the expected reduction in inflationary pressures in 2006 is relatively large, the probability of consumer price inflation coming out above the European Central Bank's 2 per cent ceiling in 2006 is estimated at only 0.9 per cent.

TABLE 5 - Euro area: Computation of selected event probabilities

	Probability score *(in %)*
GDP growth lower in 2006 than in 2005	1.0
Real take-home wage rate growth no more than 0% in 2006	4.4
Labour productivity growth lower in 2006 than in 2005	4.2
Labour productivity growth higher than growth in real wage costs in 2006 (overall economy)	63.6
Effective GDP growth higher than potential GDP growth in 2006 (1.4%)	96.4
Employment growth below 1% in 2006	7.5
Inflation above 2% in 2006	0.9
Short-term interest rate 25 basis points higher in 2006 than in 2005	23.7
Short-term interest rate 50 basis points higher in 2006 than in 2005	1.7
Fiscal deficit-to-GDP ratio above 3% in 2006	0.4
GDP growth higher than 3% over the 2010-2012 period	0.1
Employment rate at least 70% over the 2010-2012 period	11.9
Productivity growth higher than 2% in 2012	3.4
Short-term interest rate 1% higher in 2012 than in 2005	86.6
Nominal effective exchange rate appreciated by more than 20% in 2012 w.r.t. 2005	63.1
Inflation below 2% over the 2006-2012 period	13.3
Fiscal position (in % of GDP) in balance or surplus in 2012	1.8
Fiscal position (in % of GDP) larger than 3% in 2012	3.4
Public debt-to-GDP no more than 60% in 2012	0.4

The baseline projection indicates that in the medium term, inflationary pressures are expected to heighten as potential private sector output growth trails behind growth in effective demand, so pushing consumer price inflation from 1.5 per cent in 2007 to about 2 per cent in 2012. Nevertheless, against this expected increase in inflation, stochastic simulation indicates that the probability of inflation coming out consistently below the 2 per cent mark over the entire 2006-2012 period is just 13.3 per cent.

iv. Nominal short-term interest rates

As inflationary pressures remain subdued, the euro area's nominal short-term interest rate is expected to edge only slightly upwards from an annual average 2.2 per cent in 2005 to 2.3 per cent in 2006. Against this background, the probability that the area's nominal short-term interest rate will come out 25 basis points higher in 2006 than its 2.2 per cent average of 2005, is estimated at no more than 23.7 per cent; the probability that the area's short-term rate will come out 50 basis points higher in 2006 than in 2005 is no greater than 1.7 per cent. In comparison, there is a 83.8 per cent probability that the US nominal short-term interest rate will come out 50 basis points higher in 2006 than in 2005.

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1. Inflation is defined as the per cent change in the deflator of private consumption.

v. Nominal exchange rates

The area's nominal effective exchange rate is projected to appreciate on average by 3.4 per cent per year over the 2006-2012 period. This rise in the external value of the euro is primarily linked to the higher inflation in the rest of the world than within the euro area. Barring any major currency realignments prompted by a sudden reversal of sentiment in foreign exchange markets, the probability of the area's nominal effective exchange rate appreciating by at least 20 per cent in 2012 with respect to its 2005 level is estimated to be 63.1 per cent.

vi. Public finances

In 2006, the public sector net borrowing requirement for the euro area is expected to edge slightly downwards from 2.7 per cent of the area's GDP in 2005 to 2.6 per cent of GDP in 2006. Nevertheless, under current policies, there is still a small 0.4 per cent probability that the deficit-to-GDP ratio will come out above the 3 per cent ceiling in the euro area in 2006.

Over the 2007-2012 period, the euro area's average fiscal deficit is expected to fall from 2.3 per cent of GDP in 2007 to 1.6 per cent of GDP in 2012, as rising employment and firm output growth allow government revenue to rise more rapidly than public expenditure. Though fiscal consolidation does appear to be set in motion, it will most likely be insufficient to ensure fiscal balance by the end of the projection period. Indeed, the probability that the euro area as a whole will reach fiscal balance by 2012 is no higher than 1.8 per cent. Finally, the probability that the euro area's debt-to-GDP ratio - which stood at 71.1 per cent in 2005 - will fall below 60 per cent in 2012 is just 0.4 per cent.

FIGURE 1 -   Euro area: Confidence intervals for real GDP growth

FIGURE 2 -   Euro area: Confidence intervals for private sector employment growth

FIGURE 3 -   Euro area: Confidence intervals for growth in the private consumption deflator
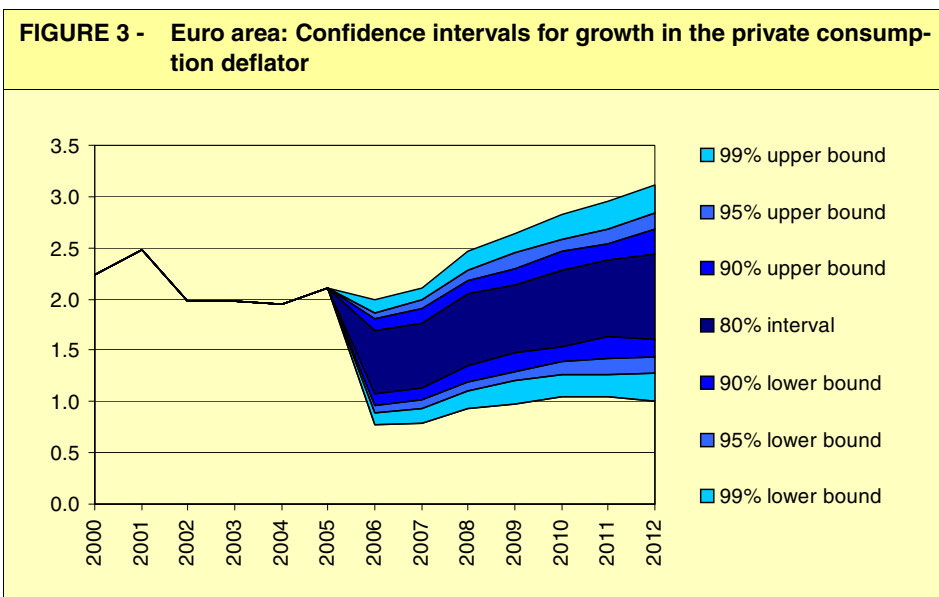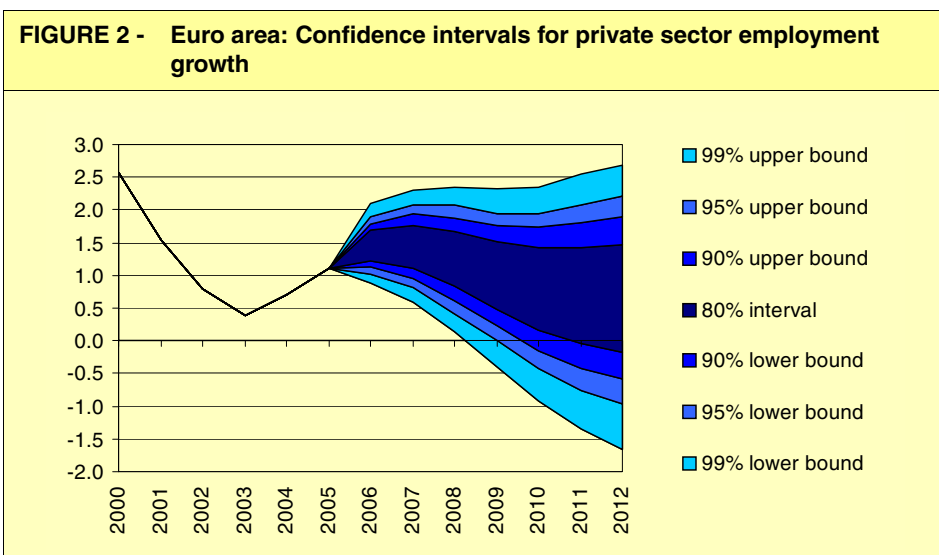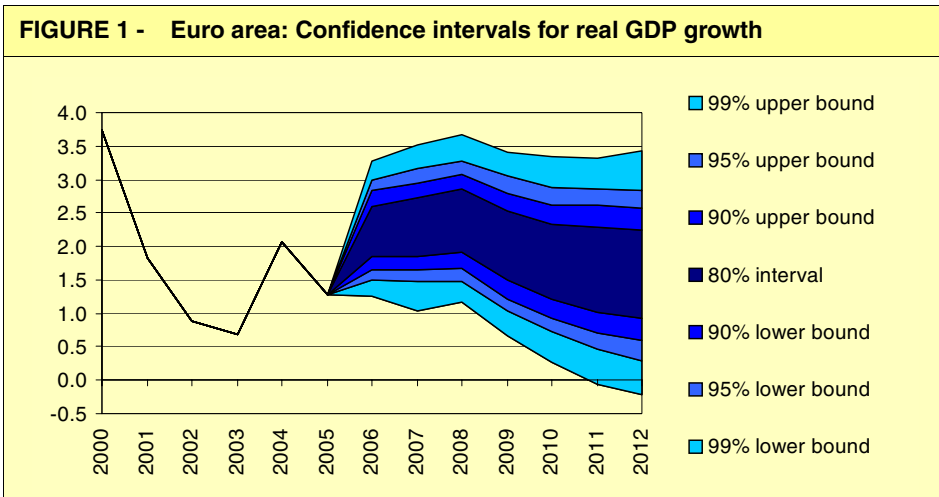
FIGURE 4 -   Euro area: Confidence intervals for the short-term interest rate

Legend:
- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
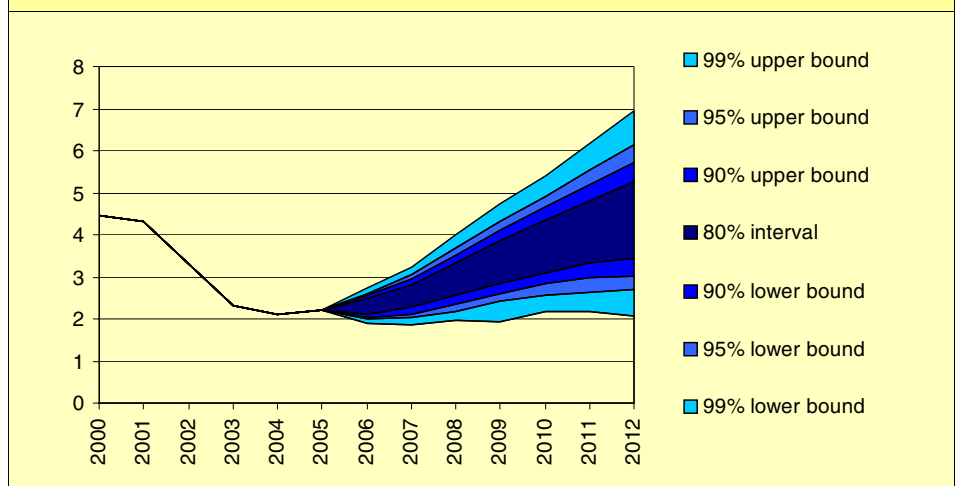
FIGURE 5 -   Euro area: Confidence intervals for the fiscal deficit-to-GDP ratio

Legend:
- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
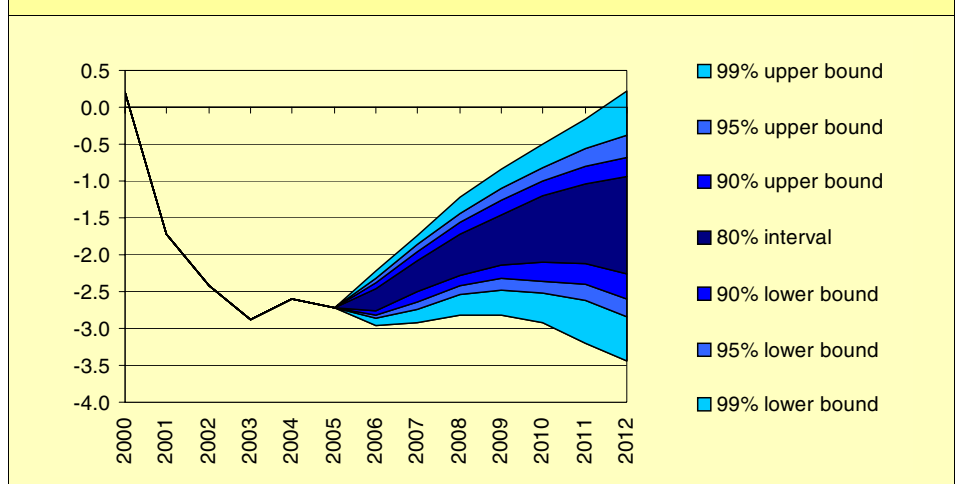
FIGURE 6 -   Euro area: Confidence intervals for the current account-to-GDP ratio

Legend:
- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
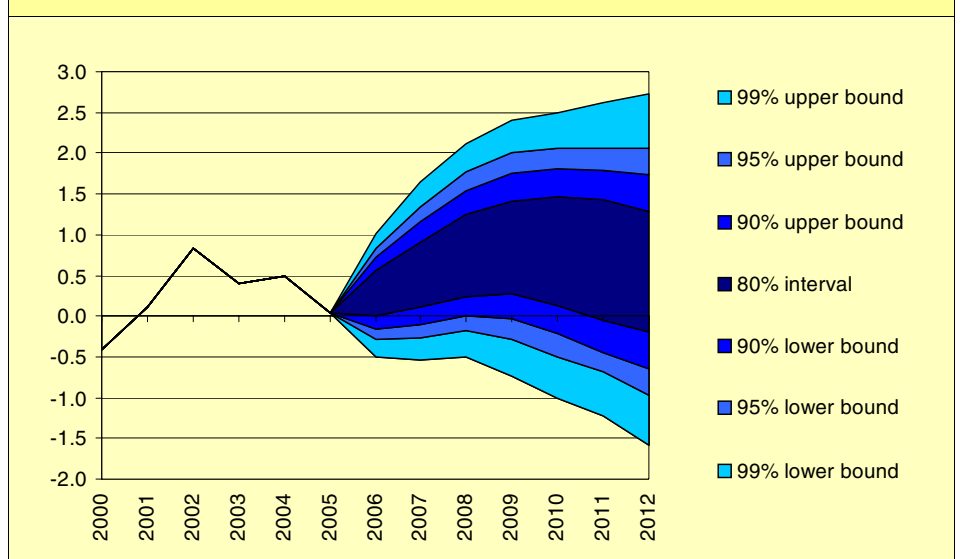
B. Stochastic simulation results for the United States

The results of the stochastic simulation for the United States are given in tables 6 to 8 and figures 7 to 12.

i. GDP growth

In the NEO baseline projection, US GDP is expected to increase by 3.4 per cent in 2006; this is down slightly from the 3.6 per cent growth registered for 2005. Table 6 indicates that the 95 per cent confidence interval around GDP growth in 2006 lies between 2.5 and 4.2 per cent, while Table 8 shows that the probability that US GDP growth will be lower in 2006 than in 2005 is 61.2 per cent.

TABLE 6 -   United States: 95% confidence intervals for the NEO baseline projection results

		2006	2007	2008	2009	2010	2011	2012
	Upper bound	4.2	3.4	4.0	3.8	3.6	2.8	3.3
Gross domestic product	*Sample mean*	3.4	2.5	3.1	2.8	2.6	1.8	2.2
	Lower bound	2.5	1.7	2.1	1.9	1.6	0.9	1.3
	Upper bound	1.6	1.5	1.7	1.5	1.5	0.4	0.9
Private sector employment	*Sample mean*	1.0	0.8	0.9	0.8	0.8	-0.4	0.2
	Lower bound	0.3	0.1	0.2	0.1	0.0	-1.2	-0.5
	Upper bound	2.5	2.4	2.5	2.5	2.5	2.4	2.4
Deflator of private consumption	*Sample mean*	2.2	2.1	2.1	2.1	2.0	2.0	2.0
	Lower bound	1.9	1.7	1.6	1.6	1.6	1.5	1.5
	Upper bound	4.5	4.9	5.1	5.3	5.3	5.2	5.3
Nominal short-term interest rate (level)	*Sample mean*	4.3	4.4	4.5	4.5	4.4	4.3	4.2
	Lower bound	4.0	4.0	3.9	3.8	3.7	3.5	3.3
	Upper bound	-1.1	-1.1	-0.9	-0.7	-0.3	-0.2	0.1
Nominal effective exchange rate (+: depreciation)	*Sample mean*	-3.3	-3.4	-3.3	-3.0	-2.7	-2.6	-2.5
	Lower bound	-5.4	-5.7	-5.6	-5.4	-5.1	-5.1	-4.8
	Upper bound	-3.6	-3.2	-2.9	-2.7	-2.5	-1.9	-1.8
Net lending (+) or borrowing (-) of government (level, % of GDP)	*Sample mean*	-3.9	-3.6	-3.5	-3.4	-3.3	-2.8	-2.7
	Lower bound	-4.2	-4.0	-4.1	-4.1	-4.1	-3.6	-3.7
	Upper bound	-5.6	-5.5	-5.6	-5.6	-5.7	-5.8	-6.0
Current account (level, % of GDP)	*Sample mean*	-6.0	-6.0	-6.2	-6.4	-6.6	-6.7	-7.0
	Lower bound	-6.3	-6.5	-6.8	-7.0	-7.4	-7.7	-8.0

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

US GDP growth is expected to dip to 2.5 per cent in 2007, as domestic demand is adversely affected by high interest rates and rising tax rates[1] and as net exports deteriorate in the wake of a further nominal effective appreciation of the dollar. Although real GDP growth rebounds to 3.1 per cent in 2008, the US economy fails to maintain its growth momentum and real GDP falls to just 2.6 per cent in 2010. Tax rates rise yet again in 2011 and 2012, leaving US real GDP growth at just 1.8 per cent and 2.2 per cent, respectively. Nevertheless, growth is expected to pick up in 2012, and stochastic simulation indicates that the probability of US GDP growth in 2012 falling below that of 2011 is only 29.5 per cent.

---

1. As explained in Chapter 2, the current stochastic simulation does not consider tax policy - and particularly changes in tax rates - to be a random event to which we must attribute a probability distribution. Hence, all probabilities discussed in this section are conditional on the exogenous fiscal framework specified in the appendix on the underlying technical assumptions in Meyermans and Van Brusselen (2006).

ii. Employment

Although private sector employment growth averages 0.8 per cent over the 2007-2010 period, employment growth is projected to falter towards the end of the period as demographic pressures increase and, more importantly, as significant tax cut provisions expire. The tax increases peak in 2011, leading to a 0.4 percent fall in total employment in 2011; employment then rebounds by 0.2 per cent in 2012. Overall, the probability of employment growth coming out negative in 2011 and 2012 is estimated at 70.4 per cent and 22.9 per cent, respectively.

TABLE 7 -   United States: Coefficients of variation

	2006	2007	2008	2009	2010	2011	2012
Gross domestic product (growth rates)	0.1	0.2	0.2	0.2	0.2	0.3	0.3
Private sector employment (growth rates)	0.4	0.5	0.5	0.5	0.6	-1.1	2.3
Deflator of private consumption (growth rates)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Nominal short term interest rate (levels)	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Nominal effective exchange rate (growth rates, +: depreciation)	-0.4	-0.4	-0.5	-0.5	-0.6	-0.6	-0.6
Net lending (+) or borrowing (-) by government (levels, % of GDP)	-0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2
Current account (levels, % of GDP)	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1

The coefficient of variation is computed as the standard deviation divided by the variable's mean over each time period.

iii. Consumer price inflation

Consumer price inflation is expected to remain relatively subdued over the entire projection period. Indeed, the 95 per cent confidence interval around the rate of inflation lies between 1.9 and 2.5 per cent in 2006 and between 1.5 and 2.4 per cent in 2012, indicating that monetary and fiscal policies should succeed in gradually bringing aggregate demand growth into line with the evolution of potential output growth.

iv. Nominal short-term interest rates

The US nominal short-term interest rate came out at an annual average rate of 3.6 per cent in 2005. The NEO baseline projects an annual average rate of 4.3 per cent in 2006, as the US monetary authorities continue raising interest rates to a more neutral level. The probability of the nominal short-term interest rate increasing in 2006 by at least 50 basis points relative to the average yearly rate of 2005 is a high 83.8 per cent. However, the probability of a full 100 basis points average rate hike in 2006 is quite small, coming out no higher than 1.3 per cent. For 2012, the 95 per cent confidence interval for the nominal short-term interest rate lies between 3.3 and 5.3 per cent.

v. Nominal exchange rates

Assuming no sudden reversal in market sentiment or retrenchment by Asian central banks, which have been major buyers of US Treasury securities in recent years, the dollar's nominal effective exchange rate is projected to appreciate at an average annual rate of 2.9 per cent over 2006-2012, primarily due to the higher inflation in the rest of the world. The probability of the dollar's nominal effective exchange rate appreciating by at least 20 per cent between 2005 and 2012 is estimated at 42 per cent, while the probability of the dollar exchange rate against the

euro depreciating by at least 20 per cent between 2005 and 2012 is estimated at only 3.3 per cent.

vi. Public finances

Notwithstanding a rise in fiscal revenue linked to the expiration of significant tax cut provisions over the projection period, the US fiscal deficit-to-GDP ratio is projected to improve only very slowly. The net public borrowing requirement is expected to fall from 3.9 per cent of GDP in 2006 to 3.3 per cent of GDP in 2010. However, as tax rates increase significantly in 2011 and 2012, government revenue is projected to surge, while the deficit-to-GDP ratio falls to 2.8 per cent in 2011 and to 2.7 per cent in 2012. Nevertheless, stochastic simulation indicates that under current laws and policies, the probability that the US fiscal position will return to balance by 2012 is negligible.

TABLE 8 - **United States: Computation of selected event probabilities**

	Probability score *(in %)*
GDP growth lower in 2006 than in 2005	61.2
Short-term interest rate 50 basis points higher in 2006 than in 2005	83.8
Short-term interest rate 100 basis points higher in 2006 than in 2005	1.3
GDP growth lower in 2012 than in 2011	29.5
Employment growth negative in 2011	70.4
Employment growth negative in 2012	22.9
Short-term interest rate 1% higher in 2012 than in 2005	26.5
Nominal effective exchange rate appreciating by more than 20% in 2012 (against 2005)	42.0
Dollar exchange rate against euro depreciating by more than 20% in 2012 (against 2005)	3.3
Current account deficit smaller in 2012 than in 2005	9.5

vii. The current account balance

The US current account deficit is estimated at 6.2 per cent of GDP for 2005 and, assuming no major depreciation of the US dollar, the deficit is projected to continue to expand throughout the projection period. The 95 per cent confidence interval for the current account deficit-to-GDP ratio lies between 6 and 8 per cent in 2012. Moreover, Table 8 indicates that the probability of the US current account deficit-to-GDP ratio coming out lower in 2012 than in 2005 is no higher than 9.5 per cent.

FIGURE 7 -   United States: Confidence intervals for real GDP growth
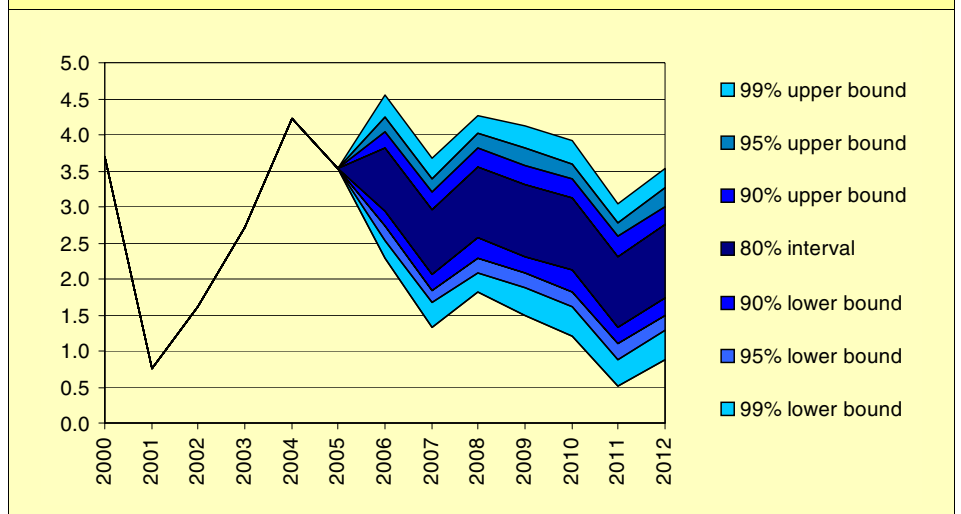
FIGURE 8 -   United States: Confidence intervals for private sector employment growth

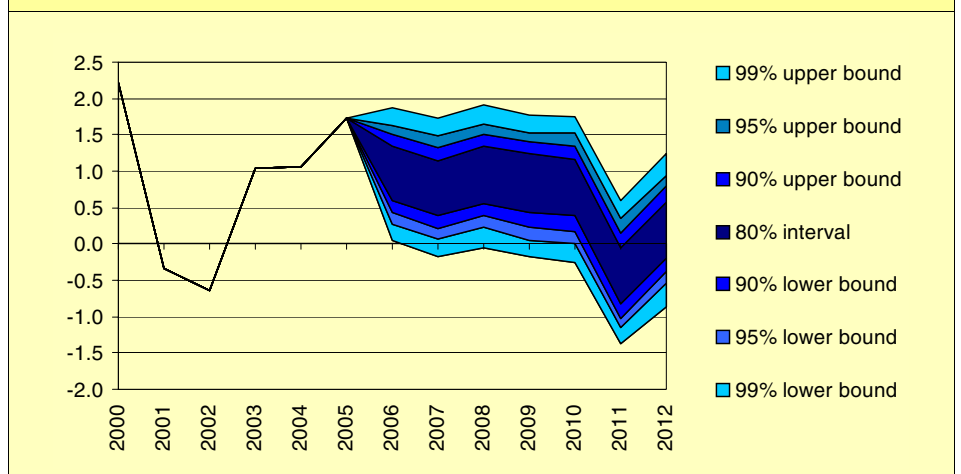**FIGURE 9 -   United States: Confidence intervals for growth in the private con-sumption deflator**
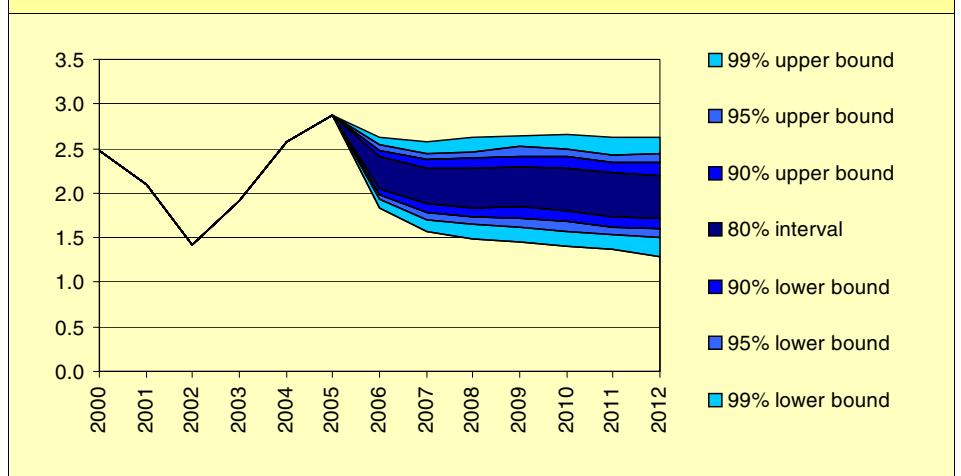
FIGURE 10 - United States: Confidence intervals for the short-term interest rate
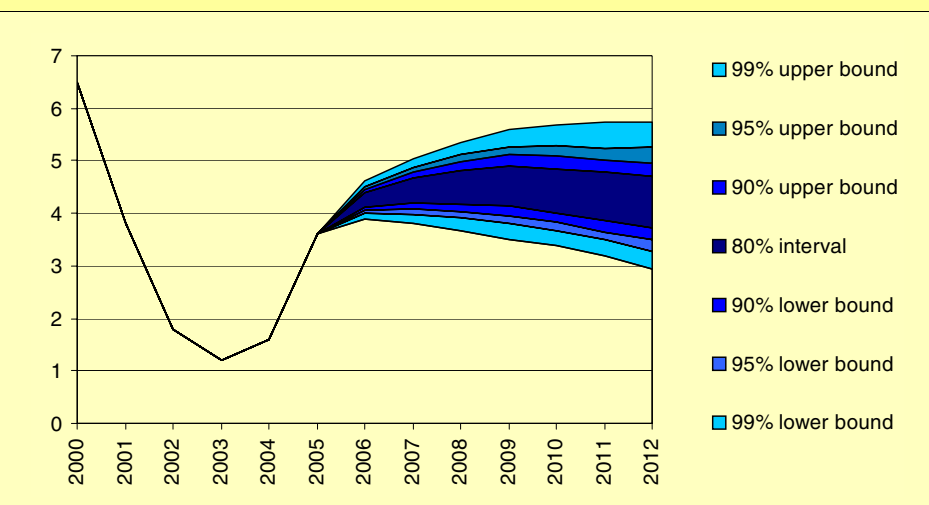

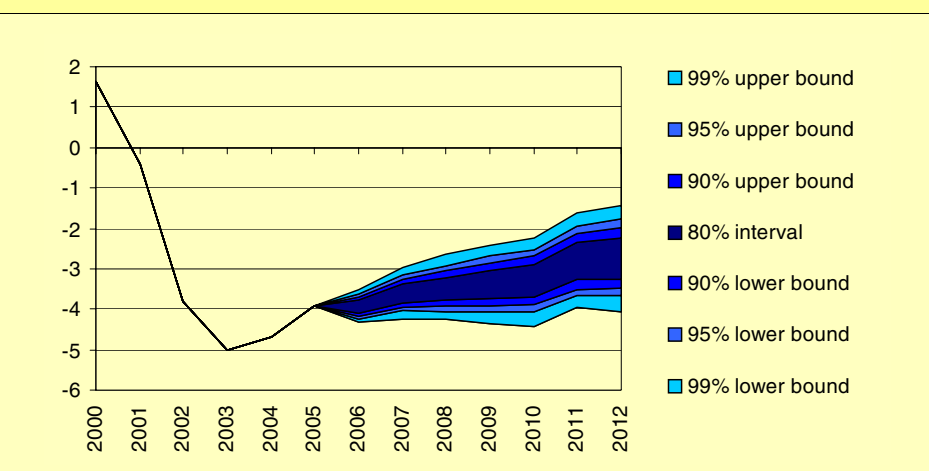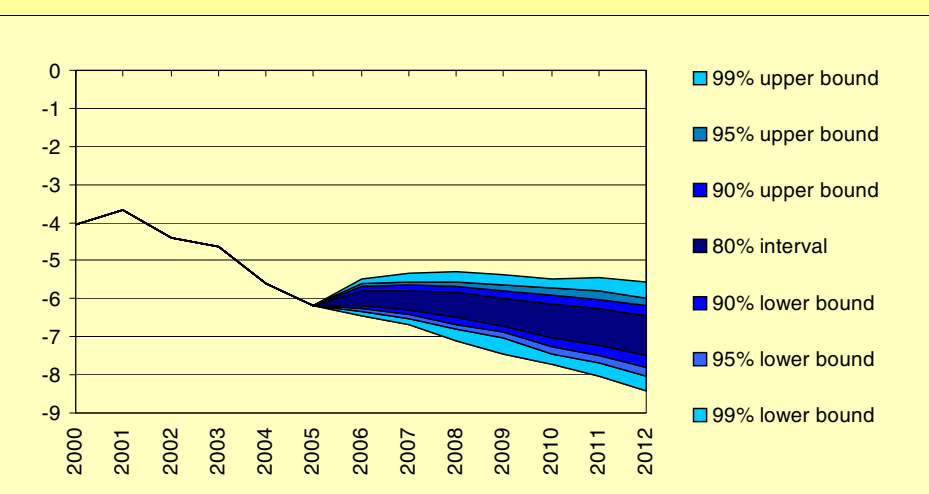**FIGURE 11 - United States: Confidence intervals for the fiscal deficit-to-GDP ratio**

FIGURE 12 - United States: Confidence intervals for the current account-to-GDP ratio

C. Stochastic simulation results for Japan

The results of the stochastic simulation for Japan are shown in tables 9 to 11 and in figures 13 to 18.

i. GDP growth

Japanese real GDP growth is expected to weaken considerably by the end of the projection period, mainly due to negative employment growth. GDP growth is expected to fall from 2.3 per cent in 2008 to 1.2 per cent in 2012, but tables 9 and 10 show also that the precision of the projection for GDP growth declines in time; indeed, the 95 per cent confidence interval for GDP growth in 2012 is estimated to lie between 0.1 and 2.4 per cent. Nevertheless, the probability that GDP growth will be negative in both 2011 and 2012 is only 0.5 per cent.

TABLE 9 -   Japan: 95% confidence intervals for the NEO baseline projection results

		2006	2007	2008	2009	2010	2011	2012
	Upper bound	2.8	2.7	3.4	3.0	2.7	2.5	2.4
Gross domestic product	*Sample mean*	1.8	1.8	2.3	1.9	1.5	1.3	1.2
	Lower bound	0.8	0.7	1.3	0.9	0.5	0.1	0.1
	Upper bound	0.5	0.3	-0.0	-0.3	-0.3	-0.2	-0.5
Private sector employment	*Sample mean*	0.2	-0.0	-0.4	-0.6	-0.6	-0.5	-0.8
	Lower bound	-0.0	-0.3	-0.7	-1.0	-1.0	-0.9	-1.2
	Upper bound	1.0	1.4	1.8	2.2	2.8	3.2	3.2
Deflator of private consumption	*Sample mean*	0.3	0.6	0.9	1.3	1.7	2.1	2.2
	Lower bound	-0.5	-0.2	0.0	0.2	0.8	1.0	1.2
	Upper bound	0.6	1.0	1.5	2.1	2.6	3.1	3.5
Nominal short-term interest rate (level)	*Sample mean*	0.4	0.8	1.2	1.6	2.0	2.4	2.6
	Lower bound	0.3	0.6	0.9	1.2	1.5	1.8	2.0
	Upper bound	6.2	5.5	4.1	2.4	1.5	0.5	-0.4
Nominal effective exchange rate (+: depreciation)	*Sample mean*	2.0	1.1	-0.5	-2.1	-3.2	-4.1	-4.8
	Lower bound	-2.1	-3.2	-4.7	-6.4	-7.9	-8.5	-9.3
	Upper bound	-5.9	-5.5	-5.4	-5.4	-5.5	-5.7	-6.2
Net lending (+) or borrowing (-) of government (level, % of GDP)	*Sample mean*	-6.2	-5.9	-6.0	-6.1	-6.3	-6.5	-7.1
	Lower bound	-6.5	-6.4	-6.6	-6.8	-7.0	-7.4	-8.0
	Upper bound	4.3	4.8	5.3	5.7	5.9	5.9	5.8
Current account (level, % of GDP)	*Sample mean*	3.7	3.9	4.3	4.5	4.6	4.5	4.4
	Lower bound	3.1	3.1	3.2	3.3	3.3	3.1	2.9

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

ii. Employment

In Japan, the decline in the labour force is to a large extent determined by demographic developments. In 2006, total employment is expected to grow by 0.2 per cent, but there is a 12.8 per cent probability that growth will come out negative. Moreover, the probability that employment growth could fall below zero throughout the 2007-2012 period is estimated at 53 per cent.

iii. Consumer price inflation

In 2006, the deflator of private consumption is expected to increase by 0.3 per cent. However, the probability of a decline in consumer prices in 2006 is still estimated at 31.7 per cent, while the probability of deflation in 2006 as well as 2007 is only 4.9 per cent.

iv. Nominal short-term Interest rates

In 2006, the nominal short-term interest rate is expected to rise above its lower bound for the first time since 2001, reaching an average rate of 0.5 per cent on the year. The probability that the interest rates will remain at their lower bound in 2006 is negligible.

TABLE 10 -   Japan: Coefficients of variation

	2006	2007	2008	2009	2010	2011	2012
Gross domestic product (growth rates)	0.3	0.3	0.3	0.3	0.4	0.5	0.6
Private sector employment (growth rates)	0.7	-18.3	-0.6	-0.3	-0.3	-0.4	-0.3
Deflator of private consumption (growth rates)	1.6	0.9	0.6	0.5	0.4	0.3	0.3
Nominal short term interest rate (levels)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nominal effective exchange rate (growth rates, +: depreciation)	1.3	2.6	-5.6	-1.3	-0.9	-0.7	-0.6
Net lending (+) or borrowing (-) by government (levels, % of GDP)	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1
Current account (levels, % of GDP)	0.1	0.1	0.1	0.2	0.2	0.2	0.2

The coefficient of variation is computed as the standard deviation divided by the variable's mean over each time period.

TABLE 11 -   Japan: Computation of selected event probabilities

	Probability score *(in %)*
GDP growth lower in 2006 than in 2005	88.8
Deflation in 2006	31.7
Deflation in 2006 and 2007	4.9
Employment growth below 0% in 2006	12.8
GDP growth below 0% in 2011-2012	0.5x
Employment growth below 0% in 2007-2012	53.0
Nominal effective exchange rate appreciates by more than 20% in 2012 (against 2005)	4.8
Nominal exchange rate against euro depreciates by more than 20% in 2012 (against 2005)	10.4

v. Nominal exchange rates

In 2006 and 2007, Japan's nominal effective exchange rate is expected to depreciate by 2 per cent and 1 per cent, respectively. The nominal effective exchange rate should then embark on a steady appreciation, as measured positive inflation is accompanied by rising real interest rates (deflated by the private sector output price index). The nominal effective exchange rate is projected to appreciate at an annual average rate of 1.9 per cent. Nevertheless, stochastic simulation indicates that the probability of the nominal effective exchange rate appreciating by more than 20 per cent between 2005 and 2012 is just 4.8 per cent.

The yen's exchange rate against the euro is projected to depreciate over the 2005-2012 period, mainly due to the real interest rate differential remaining favourable

to the euro. This depreciation should also remain limited however, as stochastic simulation indicates that the probability of the yen depreciating by more than 20 per cent against the euro between 2005 and 2012 is just 10.4 per cent.

vi. Public finances

After falling in 2007, the Japanese fiscal deficit is projected to widen again as of 2009. The deficit should finally come out at 7.1 per cent in 2012, with the 95 per cent probability interval lying between 6.2 and 8 per cent. This deterioration of Japan's fiscal position is largely due to the effects of the underlying demographic developments, which tend to reduce the tax base and increase public transfers to households.

FIGURE 13 - Japan: Confidence intervals for real GDP growth

FIGURE 14 - Japan: Confidence intervals for private sector employment growth

FIGURE 15 - Japan: Confidence intervals for growth in the private consumption deflator
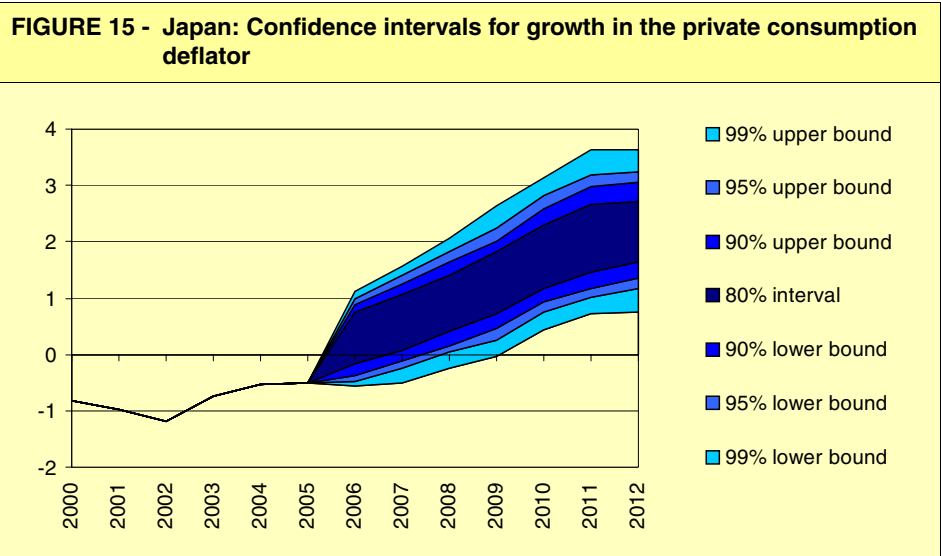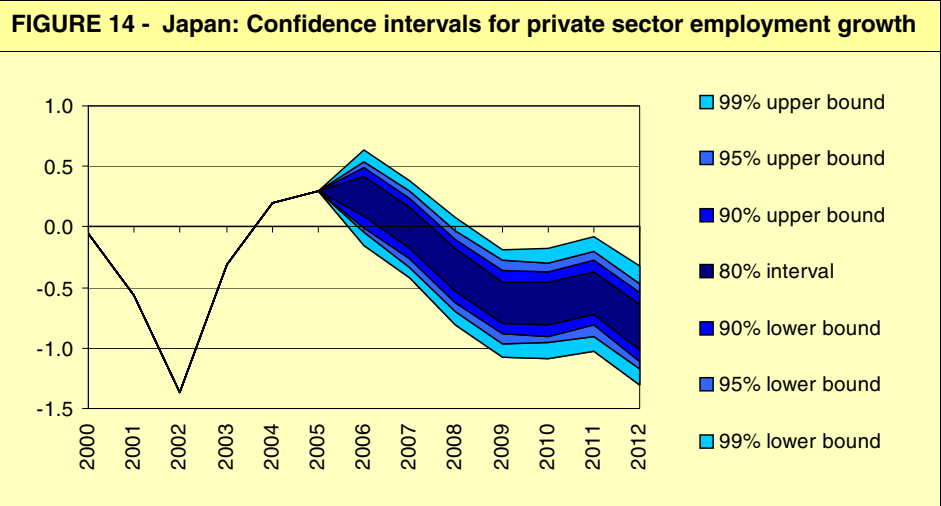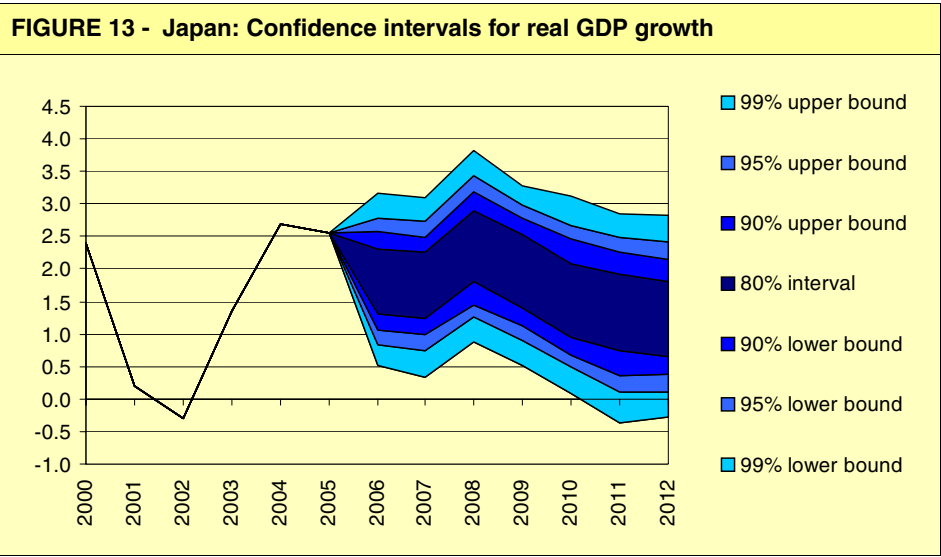
FIGURE 16 - Japan: Confidence intervals for the short-term interest rate

- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
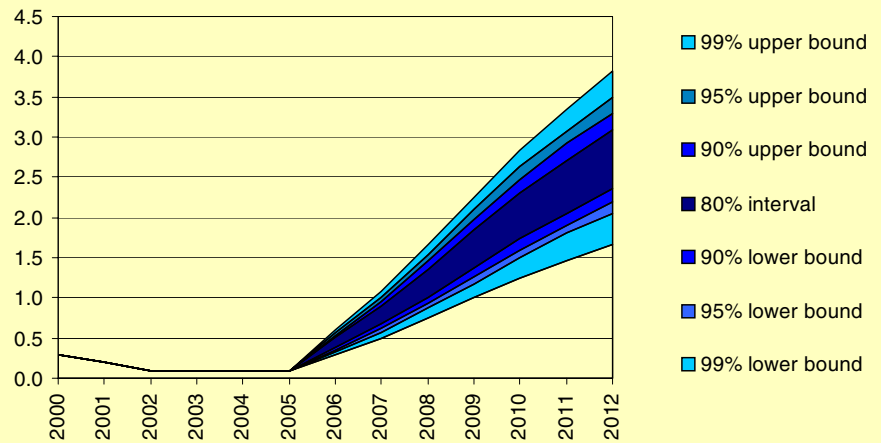
FIGURE 17 - Japan: Confidence intervals for the fiscal deficit-to-GDP ratio

- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
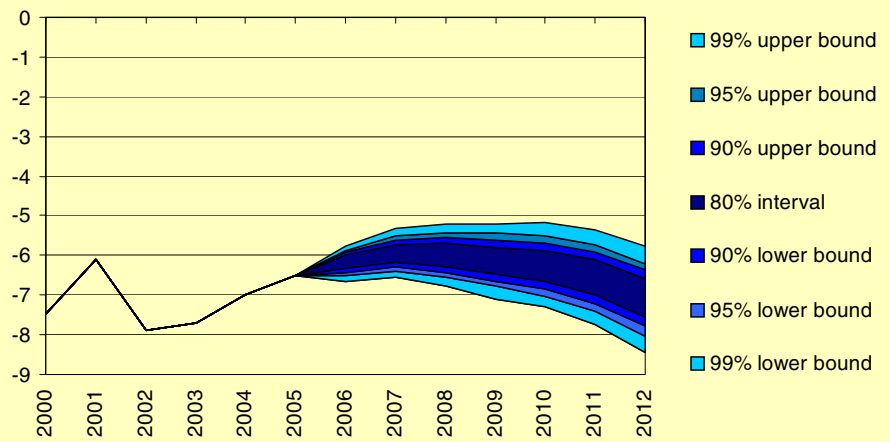
FIGURE 18 - Japan: Confidence intervals for the current account-to-GDP ratio

- 99% upper bound
- 95% upper bound
- 90% upper bound
- 80% interval
- 90% lower bound
- 95% lower bound
- 99% lower bound
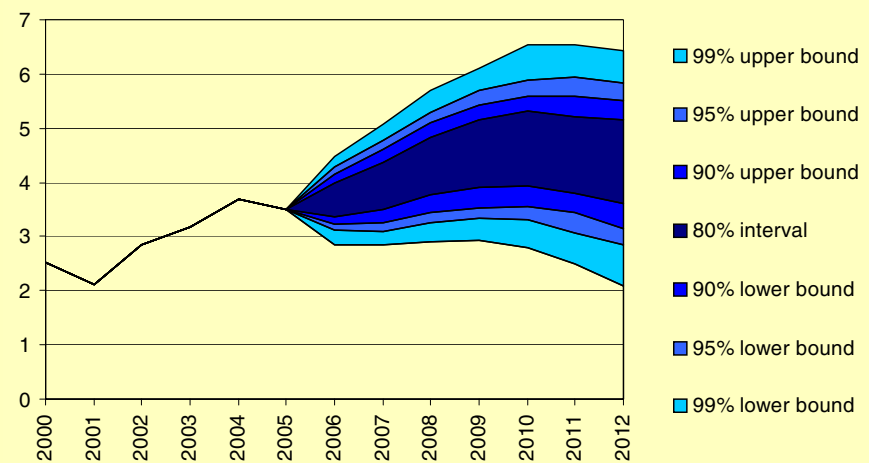
IV   Appendix A: The NIME model

A. The NIME macroeconometric world model

In the current version of the NIME model, the world is divided into six blocs: the euro area, the bloc consisting of the Western non-euro EU Member States[1], the bloc consisting of the Eastern non-euro EU Member States[2], the United States, Japan and a bloc representing the rest of the world. All of these country blocs are linked together by trade and financial flows. Data for the euro area is aggregated using ECU/euro exchange rates. Data for the Western non-euro EU Member States and the Eastern non-euro EU Member States are each aggregated in an own common synthetic currency unit.

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

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

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

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1. This bloc comprises Denmark, Sweden and the United Kingdom.
2. This bloc comprises Cyprus, the Czech republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia plus Bulgaria and Romania.

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

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

In the default version of the model, the short-term interest rates are set according to the Taylor principle. This implies that the monetary authorities increase (decrease) the short-term nominal interest rate more than proportionally to increases (decreases) in inflation, thus increasing (decreasing) real interest rates when inflationary pressures arise (subside). It also implies that the monetary authorities keep the short-term interest rate below (above) the equilibrium interest rate if demand is below (above) potential output. Long-term interest rates are determined by the term structure theory of interest rates. Changes in an area's nominal effective exchange rate are determined by changes in the interest rate differential and the (expected) inflation differential. The risk premia in the financial markets are kept constant.

B. Case studies and technical variants

Several studies have been carried out with the NIME model[1]. Meyermans (2002.a and 2002.b) used the NIME model to investigate to what extent the working of the automatic fiscal stabilisers and monetary policy can contribute to the full realisation of potential output and price stability. Meyermans (2003) used the NIME model to assess the transmission of shocks from the United States to the euro area under alternative exchange rate policies. Meyermans (2004) studied how a cut in the social security contribution rate and an increase in the labour participation rate affect economic activity in the euro area in the medium term. Meyermans and Van Brusselen (2003) examined the impact on the Belgian international environment of a temporary worldwide autonomous drop in private consumption, a further monetary easing by the European Central Bank, a fiscal consolidation in the euro area and of a prolonged worldwide fall in stock markets. Meyermans and Van Brusselen (2005.b) assessed the impact of an oil price shock on the world economy, while Meyermans and Van Brusselen (2005.d) studied the interactions between monetary policy, asset prices and economic growth in the world economy over the 1995-2004 period. Finally, Meyermans and Van Brusselen (2004, 2005.a and 2005.c) used the NIME model to prepare economic outlooks for the world economy for the periods 2004-2010 and 2005-2011.

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1. The technical details concerning the NIME model are primarily discussed in Meyermans and Van Brusselen (2000.a, 2000.b, and 2001).

V Appendix B: The 2006-2012 NIME Economic Outlook for the World Economy

A. The January 2006 issue of the NEO

The January 2006 issue of the NEO was produced with a version of the NIME model which is based on data from the November 2005 AMECO database of the European Commission (EC), data from the Direction of Trade Statistics and the International Financial Statistics of the International Monetary Fund, and the World Population Prospects of the United Nations as well as demographic projections from various national institutions.

The NEO baseline projection was simulated on the basis of a specific set of assumptions regarding the model's exogenous variables. Indeed, trend productivity growth (i.e. growth in private sector gross output per worker), the equilibrium real interest rate (i.e. the long-term nominal interest rate deflated by the consumer price index) and secular inflation (with the exception of secular inflation in Japan, the path of which is assumed to rise gradually as of 2006), were all set to their latest available estimates and kept constant over the projection period. In the case of the demographic variables, trend values were based on the latest official data from national sources and from the 2004 revision of the United Nations' "World Population Prospects". The oil price projections were based on oil futures data, as quoted in commodity markets in December 2005.

As the NIME model is basically medium-term oriented, it was calibrated to replicate the Commission's business cycle estimates for 2005. In December 2005, we updated the NIME model's financial variables such as interest and exchange rates on the basis of both the latest available historical data and financial futures data. A first-run computation was made of the impact of all these changes on the overall macro-economic conditions for 2005. Once these revised initial conditions for 2005 had been determined, the model was run to generate a deterministic projection over the 2006-2012 period.

The NEO baseline projection is discussed more fully in Meyermans and Van Brusselen (2006). For ease of reference, we reproduce below tables containing the baseline projection results published in the January 2006 issue of the NEO.

B. Oil prices and population in the NEO

Future oil prices and future demographic developments are predetermined in the January 2006 NEO. In order to be able to shock these exogenous variables during the stochastic simulation runs, they needed to be endogenised.

1. Oil prices

For the price of oil denominated in US dollars, POILUSD, we specified and estimated the following equation:

(1) $\ln(\text{POILUSD}) = \ln(\text{WORLD\_PASP}) + \text{poil\_s0}$
$+ \text{poil\_s1} \ln(\text{POILUSD}/\text{WORLD\_PASP})[-1] + \text{POILUSD\_V},$

with WOLRLD_PASP the world price level and POILUSD_V the error term of the equation. poil_s0 and poil_s1 are parameters. In the deterministic simulation the value of POILUSD_V is equal to zero, while in the stochastic simulation its value is randomly drawn.

When we simulate the NIME model augmented with equation (1), we add to the right-hand side of equation (1) the variable POILUSD_ADJ. In the deterministic baseline projection, this variable measures the difference between the simulated value of POILUSD and its predetermined value. In the stochastic simulation, the baseline values for POILUSD_ADJ are retained so that, in the absence of any change in POILUSD_V, the deterministic baseline projection is replicated.

2. Population

For total population of a particular country bloc, we specified and estimated:

(2) $\ln(\text{NPO}) = \text{npo\_s0} + \text{npo\_s1} \ln(\text{NPO})[-1] + \text{npo\_s2} \ln(\text{NPO})[-2]$
$+ \text{npo\_s3} \text{ DU7090} + \text{NPO\_V},$

with NPO total population, DU7090 a dummy equal to one from 1970 to 1990 and zero elsewhere, and where NPO_V is a error term. The parameters npo_s0, npo_s1, npo_s2 and npo_s3 are estimated; however, parameter npo_s3 is fixed at zero, except for the euro area. When we simulate the model augmented with equation (2), we add to the right-hand side equation (2) the variable NPO_ADJ. In the deterministic baseline projection, this variable measures the difference between the simulated value of NPO and the predetermined value. In the stochastic simulation, the baseline values for NPO_ADJ are retained.

The shares of children (NPOC), active-age population (NPOA) and old people (NPOO) are estimated as:

(3) $\text{NPOX}/\text{NPO} = \text{npox\_s0} + \text{npox\_s1} \text{ NPO} + \text{npox\_s2} \text{ TIME} + \text{NPOX\_V},$

with X = C, A or O. When we simulate the model, we also add the term NPOX_ADJ.

C. Summary tables with the results of the January 2006 NEO

TABLE 12 -   Detailed Projection results for the Euro Area

	2004	2005	2006	2007	2008	2009	2010	2011	2012
I. Aggregate demand and supply									
1. Private consumption	1.5	1.3	1.8	2.3	2.3	2.1	1.9	1.7	1.6
2. Government consumption	1.0	1.2	2.0	1.8	1.9	1.7	1.6	1.6	1.6
3. Gross fixed capital formation	2.1	1.3	2.5	2.2	2.1	1.9	1.8	1.8	1.8
. of which business sector	2.7	2.1	3.4	2.7	2.5	2.3	2.2	2.2	2.2
4. Exports	6.5	3.2	5.7	4.7	4.8	4.7	4.5	4.2	4.1
5. Imports	6.7	4.0	4.9	4.5	4.1	5.0	4.8	4.7	4.6
6. Gross domestic product	2.1	1.3	2.3	2.3	2.4	2.0	1.8	1.7	1.6
7. Private sector value added	2.2	1.3	2.5	2.4	2.5	2.1	1.9	1.7	1.6
8. Gross private sector output	3.0	1.8	3.0	2.8	2.8	2.6	2.5	2.3	2.2
9. Output gap (deviation of GDP from trend GDP, in %)	-1.6	-2.1	-1.3	-0.8	-0.3	-0.1	0.0	-0.1	-0.1
10. Contributions to real GDP growth									
a. Total domestic expenditure	1.9	1.3	1.9	2.1	2.1	1.9	1.8	1.6	1.6
b. Net exports	0.1	-0.1	0.3	0.2	0.3	0.1	0.1	0.0	0.0
II. Deflators									
1. Private consumption	1.9	2.1	1.4	1.5	1.7	1.8	1.9	2.0	2.1
2. Gross fixed capital formation	2.6	2.7	2.1	1.6	1.2	1.0	0.8	0.7	0.6
. of which business sector	1.6	1.8	1.6	1.4	1.2	1.0	0.8	0.7	0.6
3. Exports	0.7	0.6	0.5	0.5	0.4	0.4	0.3	0.2	0.2
4. Imports	1.3	3.3	1.0	0.7	0.6	0.7	0.8	0.9	1.0
5. Gross domestic product	1.9	1.8	1.4	1.3	1.4	1.4	1.4	1.5	1.5
6. Private sector value added	1.8	1.8	1.2	1.3	1.5	1.4	1.4	1.4	1.4
7. Gross private sector output	1.7	2.0	1.2	1.2	1.3	1.3	1.3	1.3	1.3
III. Financial Markets									
1. Short-term interest rate (level)	2.1	2.2	2.3	2.5	2.9	3.3	3.7	4.1	4.4
2. Long-term interest rate (level)	4.1	3.4	3.4	3.6	3.8	4.0	4.2	4.4	4.5
3. Nominal effective exchange rate (+ depreciation)	-5.2	1.9	-3.0	-3.1	-3.2	-3.5	-3.6	-3.8	-3.8
4. Real effective exchange rate (+ : depreciation)	-2.4	5.4	0.2	0.0	0.0	-0.2	-0.3	-0.3	-0.3
IV. Labour Market									
1. Labour supply	0.8	0.8	0.7	0.9	0.9	0.9	0.8	0.8	0.7
2. Employment	0.6	1.0	1.3	1.3	1.1	0.9	0.7	0.7	0.6
. of which private sector	0.7	1.1	1.5	1.4	1.2	1.0	0.8	0.7	0.7
3. Unemployment rate (level, % of civilian labour force)	8.9	8.6	8.0	7.6	7.4	7.4	7.4	7.5	7.6
4. Nominal wage rate, private sector	2.2	1.6	1.9	2.5	3.1	3.3	3.3	3.3	3.3
5. Real take-home wage rate, private sector	0.3	-0.5	0.4	1.0	1.4	1.4	1.4	1.3	1.2
6. Real producer wage rate, private sector	0.6	-0.4	0.8	1.4	1.7	2.0	2.0	2.0	2.0
7. Labour productivity (GDP per worker)	1.4	0.2	0.9	1.0	1.2	1.1	1.1	1.0	1.0
V. Household sector									
1. Total real means	3.1	2.8	2.3	2.1	1.8	1.4	1.1	0.8	0.7
. of which real disposable income	1.3	1.1	1.6	1.7	1.8	1.8	1.7	1.5	1.5
2. Net saving by households (level, % of disposable income)	9.4	9.1	8.9	8.4	8.0	7.8	7.8	7.8	7.9
VI. Fiscal sector									
1. Net lending (+) or borrowing (-) (% of GDP)	-2.6	-2.7	-2.6	-2.3	-2.0	-1.8	-1.7	-1.6	-1.6
2. Government gross debt (% of GDP)	70.2	71.1	71.2	71.0	70.5	69.9	69.4	68.9	68.5
VII. International environment									
1. Foreign effective output	5.7	4.8	4.3	4.1	4.3	4.3	4.1	3.9	3.8
2. Foreign effective output price	3.7	4.0	3.9	3.7	3.7	3.7	3.8	3.8	3.8
3. Foreign effective short-term interest rate (level)	2.0	3.4	4.0	4.2	4.3	4.3	4.3	4.3	4.3
4. Current account (level, % of GDP)	0.5	0.1	0.4	0.6	0.8	0.9	0.9	0.8	0.6
VIII. Memo items									
1. Total population	0.6	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2
2. Working-age population (% of total population)	66.9	66.9	66.8	66.8	66.7	66.6	66.5	66.4	66.2

All figures are year-on-year average growth rates, unless specified otherwise.

The euro area includes Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain.

Exports and imports: consolidated trade flows.

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

TABLE 13 -   Detailed Projection results for the United States

	2004	2005	2006	2007	2008	2009	2010	2011	2012
I. Aggregate demand and supply									
1. Private consumption	3.9	3.5	2.8	2.3	2.9	2.7	2.5	1.6	2.2
2. Government consumption	2.5	1.9	4.2	3.2	3.1	3.1	2.9	2.7	2.5
3. Gross fixed capital formation	8.3	7.1	4.3	3.2	4.0	3.8	3.4	2.3	2.7
. of which business sector	9.6	7.9	4.8	3.9	4.1	3.9	3.5	3.0	2.8
4. Exports	8.4	7.1	6.5	5.3	5.9	6.1	6.0	5.8	5.6
5. Imports	10.7	6.0	4.4	4.9	5.2	5.6	5.5	4.7	5.2
6. Gross domestic product	4.2	3.6	3.4	2.5	3.1	2.8	2.6	1.8	2.2
7. Private sector value added	4.6	3.8	3.6	2.4	3.0	2.7	2.5	1.7	2.2
8. Gross private sector output	5.6	4.2	3.7	2.9	3.4	3.2	3.1	2.2	2.7
9. Output gap (deviation of GDP from trend GDP, in %)	0.1	0.2	1.0	0.6	0.8	0.8	0.6	0.4	0.4
10. Contributions to real GDP growth									
a. Total domestic expenditure	5.1	3.8	3.5	2.8	3.3	3.1	2.9	2.0	2.5
b. Net exports	-0.9	-0.3	-0.0	-0.3	-0.3	-0.3	-0.3	-0.2	-0.3
II. Deflators									
1. Private consumption	2.6	2.9	2.2	2.1	2.1	2.1	2.0	2.0	2.0
2. Gross fixed capital formation	3.1	2.9	2.8	2.3	2.4	2.4	2.5	2.4	2.8
. of which business sector	1.1	1.2	1.4	1.2	1.5	2.0	2.6	3.1	3.6
3. Exports	3.6	3.7	1.9	0.9	0.5	0.5	0.7	0.9	1.0
4. Imports	5.0	5.7	1.9	1.6	1.5	1.6	1.7	1.7	1.8
5. Gross domestic product	2.6	2.8	2.4	2.0	1.9	1.9	2.0	2.0	2.1
6. Private sector value added	2.5	2.7	2.4	2.1	2.0	2.0	2.0	2.0	2.1
7. Gross private sector output	2.7	3.1	2.3	1.9	1.9	1.9	1.9	1.9	2.0
III. Financial Markets									
1. Short-term interest rate (level)	1.6	3.6	4.2	4.4	4.5	4.5	4.5	4.4	4.3
2. Long-term interest rate (level)	4.3	4.3	4.5	4.6	4.6	4.6	4.6	4.5	4.5
3. Spot exchange rate, local/euro (level x 100)	124.4	125.0	125.6	126.0	126.3	127.1	128.4	129.9	131.8
4. Spot exchange rate, local/euro (+ : depreciation)	10.0	0.5	0.5	0.3	0.3	0.6	1.0	1.2	1.5
5. Nominal effective exchange rate (+ : depreciation)	4.4	2.4	-3.2	-3.4	-3.2	-3.0	-2.7	-2.6	-2.4
6. Real effective exchange rate (+ : depreciation)	4.5	2.8	-1.4	-0.5	0.1	0.4	0.4	0.5	0.6
IV. Labour Market									
1. Labour supply	0.6	1.3	0.8	1.0	1.1	1.0	1.0	1.0	0.7
2. Employment	1.1	1.7	1.0	0.8	1.0	0.8	0.8	-0.2	0.3
. of which private sector	1.1	1.7	1.0	0.8	0.9	0.8	0.8	-0.4	0.2
3. Unemployment rate (level, % of civilian labour force)	5.5	5.1	5.0	5.2	5.3	5.5	5.7	6.8	7.2
4. Nominal wage rate, private sector	4.9	5.3	4.6	4.0	4.1	4.1	4.1	4.7	4.3
5. Real take-home wage rate, private sector	2.1	0.9	2.0	1.5	1.6	1.6	1.6	0.9	1.4
6. Real producer wage rate, private sector	2.0	2.0	2.3	2.0	2.2	2.2	2.2	2.8	2.3
7. Labour productivity (GDP per worker)	3.1	1.8	2.4	1.7	2.1	1.9	1.8	2.0	1.9
V. Household sector									
1. Total real means	4.2	4.4	2.3	2.4	2.4	2.3	2.3	1.6	2.0
. of which real disposable income	4.1	2.8	3.2	2.5	3.3	3.2	3.1	2.1	2.8
2. Net saving by households (level, % of disposable income)	3.3	2.5	3.1	3.3	3.8	4.3	4.9	5.3	5.9
VI. Fiscal sector									
Net lending (+) or borrowing (-) (% of GDP)	-4.7	-3.9	-3.9	-3.6	-3.5	-3.4	-3.3	-2.8	-2.7
VII. International environment									
1. Foreign effective output	5.4	4.6	4.2	4.2	4.3	4.3	4.1	3.9	3.8
2. Foreign effective output price	3.7	4.0	3.9	3.9	4.0	4.0	4.0	4.1	4.1
3. Foreign effective short-term interest rate (level)	1.4	2.4	3.0	3.4	3.6	3.8	4.0	4.0	4.1
4. Current account (level, % of GDP)	-5.6	-6.2	-5.9	-6.0	-6.1	-6.3	-6.5	-6.7	-6.9
VIII. Memo items									
1. Total population	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
2. Working-age population (% of total population)	66.7	66.7	66.7	66.7	66.7	66.6	66.5	66.3	66.0

All figures are year-on-year average growth rates, unless specified otherwise.

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

TABLE 14 -   Detailed Projection results for Japan

	2004	2005	2006	2007	2008	2009	2010	2011	2012
I. Aggregate demand and supply									
1. Private consumption	1.5	1.9	1.5	1.6	2.0	1.7	1.3	1.2	1.0
2. Government consumption	2.7	1.8	1.0	1.1	1.3	1.0	1.1	1.7	1.8
3. Gross fixed capital formation	1.6	4.2	2.2	1.3	2.3	2.0	1.6	1.4	1.3
. of which business sector	5.6	9.3	3.0	1.9	1.9	1.9	1.7	1.6	1.6
4. Exports	14.4	5.8	4.9	4.3	4.5	4.2	3.5	2.6	2.1
5. Imports	8.9	6.4	1.8	2.2	1.8	2.7	2.8	3.0	2.8
6. Gross domestic product	2.7	2.6	1.9	1.8	2.3	1.9	1.6	1.3	1.2
7. Private sector value added	2.9	2.7	2.2	1.9	2.5	2.0	1.6	1.3	1.2
8. Gross private sector output	3.4	3.1	2.2	1.9	2.4	2.1	1.7	1.5	1.3
9. Output gap (deviation of GDP from trend GDP, in %)	0.0	0.7	0.6	0.5	1.1	1.4	1.3	1.0	1.0
10. Contributions to real GDP growth									
a. Total domestic expenditure	1.9	2.4	1.4	1.4	1.8	1.6	1.3	1.2	1.1
b. Net exports	1.0	0.2	0.5	0.4	0.5	0.4	0.3	0.1	0.1
II. Deflators									
1. Private consumption	-0.5	-0.5	0.3	0.6	0.9	1.3	1.8	2.1	2.3
2. Gross fixed capital formation	-0.7	-0.8	-0.0	0.2	0.5	0.7	0.8	0.9	1.0
. of which business sector	-0.9	-0.8	-0.0	0.4	0.6	0.7	0.8	0.9	1.0
3. Exports	-1.6	3.4	1.0	1.1	1.3	1.3	1.2	1.0	0.8
4. Imports	2.2	5.8	1.1	0.6	0.5	0.5	0.6	0.7	0.8
5. Gross domestic product	-1.2	-1.0	0.2	0.5	0.9	1.2	1.4	1.6	1.7
6. Private sector value added	-1.2	-1.0	0.0	0.6	1.1	1.2	1.5	1.7	1.8
7. Gross private sector output	-0.8	-0.2	0.1	0.6	1.0	1.1	1.4	1.6	1.7
III. Financial Markets									
1. Short-term interest rate (level)	0.1	0.1	0.5	0.8	1.2	1.6	2.0	2.4	2.8
2. Long-term interest rate (level)	1.5	1.4	1.6	2.0	2.3	2.5	2.8	3.0	3.3
3. Spot exchange rate, local/euro (level)	134.4	137.3	143.7	148.9	152.3	153.7	153.5	152.0	149.6
4. Spot exchange rate, local/euro (+ : depreciation)	2.6	2.1	4.7	3.6	2.3	0.9	-0.1	-0.9	-1.6
5. Nominal effective exchange rate (+ : depreciation)	-4.0	3.5	2.0	1.0	-0.3	-1.9	-3.2	-4.1	-4.9
6. Real effective exchange rate (+ : depreciation)	1.1	4.2	4.6	3.4	1.9	0.1	-1.0	-1.8	-2.4
IV. Labour Market									
1. Labour supply	-0.3	0.1	0.1	-0.1	-0.3	-0.5	-0.4	-0.3	-0.7
2. Employment	0.2	0.3	0.2	-0.0	-0.4	-0.6	-0.6	-0.5	-0.8
. of which private sector	0.2	0.3	0.2	-0.0	-0.4	-0.6	-0.6	-0.6	-0.8
3. Unemployment rate (level, % of civilian labour force)	4.7	4.5	4.4	4.3	4.4	4.5	4.8	5.0	5.1
4. Nominal wage rate, private sector	-1.1	-0.2	1.8	2.3	3.1	3.4	3.4	3.3	3.4
5. Real take-home wage rate, private sector	-1.2	-0.1	1.6	1.7	2.2	2.0	1.6	1.2	1.1
6. Real producer wage rate, private sector	-0.3	-0.2	1.7	1.7	2.1	2.2	2.0	1.7	1.7
7. Labour productivity (GDP per worker)	2.5	2.3	1.7	1.8	2.7	2.6	2.2	1.9	2.0
V. Household sector									
1. Total real means	0.6	1.0	1.6	1.6	1.5	1.1	0.9	0.8	0.4
. of which real disposable income	1.7	1.7	1.4	1.4	2.1	1.9	1.5	1.4	1.3
2. Net saving by households (level, % of disposable income)	7.6	7.9	7.9	7.8	8.0	8.3	8.5	8.8	9.1
VI. Fiscal sector									
Net lending (+) or borrowing (-) (% of GDP)	-7.0	-6.5	-6.1	-5.9	-6.0	-6.1	-6.2	-6.5	-7.0
VII. International environment									
1. Foreign effective output	5.6	4.6	4.2	3.9	4.1	4.1	3.9	3.5	3.6
2. Foreign effective output price	3.7	4.0	3.6	3.5	3.5	3.5	3.5	3.5	3.5
3. Foreign effective short-term interest rate (level)	1.8	3.4	3.9	4.1	4.2	4.3	4.3	4.3	4.3
4. Current account (level, % of GDP)	3.7	3.5	3.8	4.0	4.4	4.6	4.7	4.7	4.5
VIII. Memo items									
1. Total population	0.1	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.2
2. Working-age population (% of total population)	66.6	66.4	66.1	65.9	65.4	65.0	64.8	64.7	64.0

All figures are year-on-year average growth rates, unless specified otherwise.

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

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