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OUTLOOK FOR THE PORTUGUESE ECONOMY: 2011-2012

OUTLOOK FOR THE PORTUGUESE ECONOMY: 2011-2012[1]

1. Introduction

In the 2011-2012 period the Portuguese economy will be characterised by a recessive environment, in the context of a process of correction of macroeconomic imbalances which cannot be postponed. This process takes place within the framework of the economic and financial adjustment programme associated with the request of financial assistance by the Portuguese economy signed with the European Union, the euro area member countries and the International Monetary Fund. This programme envisages structural reforms that promote economic growth and competitiveness, while maintaining the stability of the financial system.[2]

The need to strengthen fiscal consolidation, as well as gradually deleveraging the private sector, including the financial system, is essential to ensure balanced and sustained development in the long run. The adjustment of macroeconomic imbalances will however imply a significant contraction of domestic demand over the projection horizon, impacting on economic activity and employment.

Hence, these projections point to a contraction in Gross Domestic Product (GDP) of 2.0 per cent in 2011 and 1.8 per cent in 2012 (Table 1.1). These developments reflect a sharp and broadly based decline in public and private domestic demand, including consumption and investment. Exports are projected to be the only component of demand contributing positively to growth of the economy over the projection horizon, benefiting from the consolidation of global economic growth.

Table 1.1

PROJECTIONS OF BANCO DE PORTUGAL: 2011-2012 | ANNUAL RATE OF CHANGE, PER CENT

	Weights 2010	EB Summer 2011			EB Spring 2011		
		2010	2011(p)	2012(p)	2010	2011(p)	2012(p)
Gross Domestic Product	100.0	1.3	-2.0	-1.8	1.4	-1.4	0.3
Private Consumption	66.8	2.3	-3.8	-2.9	2.0	-1.9	-1.0
Public Consumption	21.4	1.2	-6.3	-4.4	3.2	-6.6	-1.0
Gross Fixed Capital Formation	19.0	-4.9	-10.8	-10.0	-4.8	-5.6	-1.3
Domestic Demand	107.2	0.6	-5.6	-4.4	0.8	-3.6	-1.0
Exports	31.0	8.8	7.7	6.6	8.7	6.0	6.5
Imports	38.1	5.1	-4.0	-1.2	5.3	-1.6	2.0
Contribution to GDP growth (in p.p.)							
Net Exports		0.6	4.0	2.8	0.5	2.5	1.4
Domestic Demand		0.7	-6.0	-4.6	0.9	-3.9	-1.1
of which: Change in Inventories		-0.1	0.0	0.0	-0.2	-0.1	0.0
Current plus Capital Account (% of GDP)		-8.8	-6.4	-4.4	-8.7	-8.9	-8.3
Trade Balance (% of GDP)		-6.5	-3.8	-0.7	-6.5	-5.5	-3.7
Harmonised Index of Consumer Prices		1.4	3.4	2.2	1.4	3.6	2.0

Source: Banco de Portugal.

Notes: (p) projected. For each aggregate, this table shows the projection corresponding to the most likely value, conditional on the set of assumptions considered.

1 This section is based on data available up to the end of June 2011.

2 For further information on the economic and financial adjustment programme see "Box *The economic and financial adjustment programme under the request for financial assistance to the European Union, the member countries of the euro area and the International Monetary Fund*", Banco de Portugal, *Annual Report* 2010, and Banco de Portugal's website on this issue, at http://www.bportugal.pt/en-US/OBancoeoEurosistema/ProgramaApoioEconomicoFinanceiro/Paginas/default.aspx.

The current projections include a gradual and orderly deleveraging process in the banking sector, given that it is essential that Portuguese banks gradually converge towards a more stable financing structure, characterised by less sensitivity to changes in risk perception by international wholesale debt markets. This process is likely to constrain to some extent access by economic agents to new credit. This constitutes an additional factor limiting expenditure, in particular consumption of durable goods and private investment, notwithstanding the anticipated decline in demand for credit.

As regards inflation, its profile in the course of 2011-2012 is particularly marked by measures associated with the fiscal consolidation process. The Harmonised Index of Consumer Prices (HICP) is projected to grow by 3.4 per cent in 2011 (1.4 per cent in 2010), chiefly reflecting the impact of the increases in the Value Added Tax (VAT) recorded in mid-2010 and early 2011, as well as the significant upsurge in prices of some goods and services subject to regulation. Moreover, the oil price increase will also contribute to such growth in consumer prices. The rise in inflation in 2011 is expected to be largely temporary, as a decline to 2.2 per cent is projected for 2012, reflecting an evolution more in line with developments in the usual inflation macroeconomic determinants, against the background of a virtual stabilisation of oil prices and moderate growth of imported non-energy goods prices and of wage costs.

Current projections are characterised by particularly high uncertainty. This is influenced by some external factors, namely by possible adverse economic and financial developments at the international level, and a renewal of sovereign debt concerns at the European level. Moreover, it is difficult to ascertain, at the current juncture, the impact on domestic demand of the measures associated with the adjustment programme, due to the significant and comprehensive changes it may imply for the functioning of the economy. In turn, the impact of this programme on the agents' expectations in also highly uncertain. In this context of increased uncertainty, current projections comprise essentially balanced risks for economic growth in 2011 and 2012.

When compared with the spring 2011 issue of the Economic Bulletin, GDP growth was revised downwards in 2011 and particularly in 2012, chiefly reflecting the impact on domestic demand of the fiscal consolidation measures of the adjustment programme. In turn, exports were revised upwards, reflecting the update of external demand for Portuguese goods and services assumptions, as well as the impact of the most recent information, which was more favourable than expected. As regards inflation, projections for 2011 are revised slightly downwards, largely reflecting the impact of the recent slower-than-anticipated inflation developments, and a downward revision of the energy component of inflation, in line with more favourable assumptions for oil prices in euro. For 2012, inflation projections point to a slight upward revision, which chiefly reflects the assumption of a VAT increase in some goods, in the context of the adjustment programme.

2. Conjunctural data and assumptions

The current projections are based on a broad set of information, in particular on recent developments in the Portuguese economy, and on a set of assumptions with regard to the external framework and public finances.

The most recent information includes data compiled in the Quarterly National Accounts by *Instituto Nacional de Estatística – INE* (Statistics Portugal) for the first quarter of 2011, as well as conjunctural economic indicators. The external framework of the Portuguese economy is expected to be characterised by continued sustained recovery of the world economy, a relative stabilisation of oil prices, and a moderate rise in money market interest rates. Turning to the domestic framework, current projections consider the measures included in the economic and financial adjustment programme. The financing conditions of the economy have been affected by the sovereign debt crisis in the euro area, which has narrowed access to international wholesale debt markets by the national banking system. In this context, current projections reflect the start of a gradual and orderly deleveraging process of the banking sector, which will likely translate into tighter credit supply conditions, as already observed in recent months.

Decline in economic activity in the first half of 2011, reflecting a reduction in domestic demand, partially compensated by export growth

According to the Quarterly National Accounts published by Statistics Portugal, GDP declined by 0.6 per cent in the first quarter of 2011, both in year-on-year and in quarter-on-quarter terms. These developments reflected a broadly based fall in domestic demand, while exports maintained significant growth in year-on-year terms. Developments in private consumption were conditioned by anticipated purchases of durable goods at the end of 2010, in particular cars, in view of the tax changes introduced in early 2011. Consumption expenditure in non-durable goods declined more sharply than in early 2009. Gross Fixed Capital Formation (GFCF) also contracted year-on-year in the first quarter of 2011, across all institutional sectors. Imports of goods and services also recorded a negative change in the first quarter of 2011, by -0.8 per cent year-on-year, reflecting the high short-term elasticity of this component, when compared with import content-weighted overall demand.

According to the information available for the second quarter of 2011, GDP and the main components of domestic demand are envisaged to intensify their pace of contraction in year-on-year terms. In particular, private consumption of durable goods and residential investment are projected to decline rather significantly, in a context where consumer confidence is at a level close to its historical trough and where a further deterioration of labour market conditions is envisaged. However, exports are projected to maintain a dynamic growth, despite slowing down in year-on-year terms.

Continued robust growth of external demand over the projection horizon

Current projections are based on a set of assumptions on future developments regarding the external environment of the Portuguese economy. In the case of external environment variables whose assumptions are based on information available in financial markets, specifically relating to the short-term interest rate, the oil prices and the exchange rate, the cut-off date of the information is the end of June (Table 2.1).

In a context of consolidating recovery of the global economy, external demand growth for Portuguese goods and services will likely remain robust in the 2011-2012 period, notwithstanding some deceleration from 2010, according to information underlying the projections for the euro area in the June issue of the Monthly Bulletin of the European Central Bank (ECB). Compared with the spring issue of the Economic Bulletin, these assumptions translate into a slight upward revision of external demand.

Assumptions for the exchange rates consider that these will remain unchanged over the projection horizon at the average levels observed in the two weeks prior to the cut-off date of the information, and entail a slight appreciation of the euro, both in effective nominal terms and *vis-à-vis* the US dollar in 2011 and 2012, after the depreciation recorded in 2010. These developments imply a more significant appreciation of the euro over the projection horizon than in the previous Economic Bulletin.

The oil prices, according to assumptions implied by futures markets, will likely remain relatively stable in annual average terms at levels close to USD 110 (EUR 77) per barrel over the projection horizon. This, however, represents a very significant acceleration (29 per cent in euro) from the 2010 levels. Compared with the previous Economic Bulletin, these assumptions imply a marginal downward revision of the oil prices in euro.

Financing conditions of the economy are expected to tighten over the projection horizon

Turning to the financing conditions of the economy, the assumptions for the short-term interest rate are based on expectations regarding developments in the three-month EURIBOR implied in futures contracts, which point to moderate increasing trend. These assumptions have remained virtually unchanged from the spring issue of the Economic Bulletin. In turn, recourse by the national banking system to Eurosystem

Table 2.1

PROJECTION ASSUMPTIONS

		EB Summer 2011			EB Spring 2011		
		2010	2011	2012	2010	2011	2012
External demand	yoy	8.9	6.3	6.6	9.3	5.6	6.2
Interest rate							
Short-term (3-month EURIBOR)	%	0.8	1.5	2.1	0.8	1.5	2.3
Long-term [(a)]	%	5.4	5.6	5.6	5.4	7.6	7.9
EUR exchange rate							
EUR effective exchange rate	yoy	-6.3	0.9	0.4	-6.3	-0.1	0.3
EUR-USD	aav	1.33	1.42	1.43	1.33	1.38	1.39
Oil price							
in USD	aav	79.6	110.7	109.5	79.6	111.1	110.3
in EUR	aav	60.1	78.1	76.5	60.1	80.2	79.3

Sources: Bloomberg, ECB, Thomson Reuters and Banco de Portugal calculations.

Notes: yoy - year-on-year rate of change, % - per cent, aav - annual average value. An increase in the exchange rate accounts for an appreciation. **(a)** In 2010 and the first quarter of 2011, the assumption for the long-term interest rate corresponds to market interest rates. Over the projection horizon, these assumptions are an estimate of the sovereign debt interest rate implied by the adjustment programme.

financing is assumed to decline gradually over the projection horizon. Within the framework of the deleveraging process of the national banking sector, credit supply conditions are expected to tighten, in line with developments in recent months. However, the actual impact of this process on financing conditions depends on the strategies followed by the banking sector. These should privilege the sale of non-strategic assets and the reinforcing of more stable funding sources, such as customer deposits, in order not to jeopardise the financing of the economy. In this context, the spreads between loan interest rates and market benchmark rates are expected to widen over the projection horizon, remaining above the levels observed before the financial crisis.

Assumptions for long-term interest rates after the second quarter of 2011 consider an estimate of the average cost rate of external financing by the European Union, euro area countries and the International Monetary Fund in the context of the current financial assistance programme. It corresponds to the relevant interest rate for Portuguese long-term sovereign debt.[3] In this context, these assumptions cannot be directly compared with those underlying the previous Economic Bulletin.

The inevitable fiscal consolidation in 2011 and in coming years will negatively affect growth of the Portuguese economy in the short term, but will be the basis for sustainable growth in the long run

The outlook for public finances follows the general rule used in Eurosystem's projection exercises, considering the policy measures already adopted or those with a high probability of approval, and specified with sufficient detail. Therefore, in the absence of detailed information on the expenditure items that are essentially determined by discretionary decisions, but not necessarily defined in legislation, Eurosystem projection exercises consist of an analysis that seeks to identify the most likely scenario. This exercise took into account the measures included in the adjustment programme. As a result of some of the main measures on the expenditure side, public consumption and investment are projected to decline very significantly, in real terms, in both 2011 and 2012.

3 For a more detailed description of the sources and financing costs associated with the adjustment programme, see http://www.bportugal.pt/en-US/OBancoeoEurosistema/ProgramaApoioEconomicoFinanceiro/Pages/default.aspx.

On the revenue side, and as regards indirect taxation, all VAT rates were raised by 1 percentage point (p.p.) in mid-2010 and the VAT standard rate by 2 p.p. in early 2011. Over the projection horizon, a number of goods and services subject to reduced and intermediate rates are expected to have their rates raised as well. Also worthy of mention are the increases in other taxes, such as the Tax on Motor Vehicles and the Tax on Tobacco, the creation of a special tax on electricity, and the indexing of special excise taxes to underlying inflation. As regards the Municipal Tax on Real Property, temporary exemptions are to be eliminated and the taxable value of the properties updated. In terms of direct taxation, the Personal Income Tax underwent a broadly based increase in rates applicable to the different income tax brackets and final withholding tax rate, which entered into force in 2010. Over the projection horizon, the conversion of the taxation on pension income to the regime applicable to employee's income is to be concluded, and some tax rebates are to be reduced or eliminated. Measures taken with respect to the Corporate Income Tax include introducing a surcharge of 2.5 p.p. on taxable profit in excess of EUR 2 million, with effect in 2011, as well as eliminating special systems and limiting the use of tax allowances and benefits in subsequent years. In this projection exercise, the extraordinary tax recently announced in the context of the Government's programme and discussed in Parliament was already considered.

On the expenditure side, it is worth mentioning the 5 per cent average cut in wages of public sector employees in 2011 and the respective freeze in subsequent years. The number of public sector employees will also be reduced over the whole projection horizon. In terms of social expenditure, in addition to a freeze in pensions updating rules, there will be a cut in non-contributory benefits and payments in kind, chiefly in the health sector. Finally, transfers to local and regional governments will be lowered and the investment plans of public corporations (either or not included in the state corporate sector in national accounts) revised.

3. Supply, demand and external accounts

Reduction in economic activity in 2011 and 2012

Current projections point to a contraction in GDP of 2.0 per cent in 2011 and 1.8 per cent in 2012, characterised by a significant fall in public and private domestic demand. These developments will likely translate into a deterioration of the accumulated growth differential between the Portuguese and euro area economies (Chart 3.1). However, it will also be characterised by a shift in expenditure composition, consisting namely in the reduction of the weight of domestic demand in GDP and the increase in the corresponding weight of exports, since this component is projected to maintain relatively robust growth (Chart 3.2). It is therefore worth stressing that the Portuguese economy has been characterised by a relatively small weight of exports in GDP, when compared with other small euro area economies (Chart 3.3).

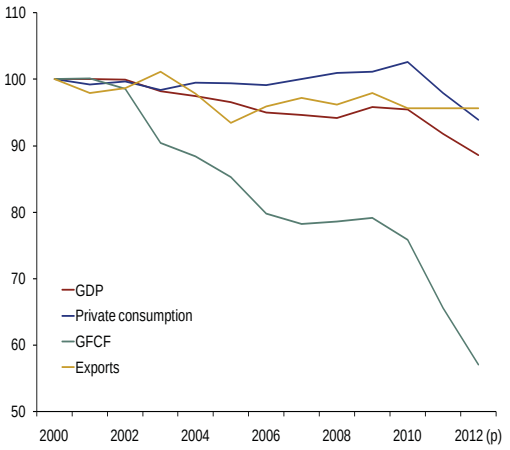
Negative growth extending to most activity sectors, in spite of some buoyancy in export-oriented sectors

The contraction of economic activity projected for the whole economy is projected to be broadly based across the public and private sectors. In particular, activity in the public sector is projected to be constrained by the fiscal consolidation process. In turn, activity in the private sector, in particular in the industrial and services sectors, should be conditioned by the significant decline in domestic demand. The tradable goods sector is projected to benefit from continued robust growth of external demand. Activity in the construction sector is envisaged to maintain the downward trend observed in recent years, in line in particular with developments projected for public and residencial investment.

As regards the composition of economic growth over the projection horizon, the contribution of the labour factor and total factor productivity to the decline in GDP is projected to be very similar in 2011 and 2012,

Chart 3.1

DIFFERENTIAL *VIS-À-VIS* THE EURO AREA | INDEX 2000=100

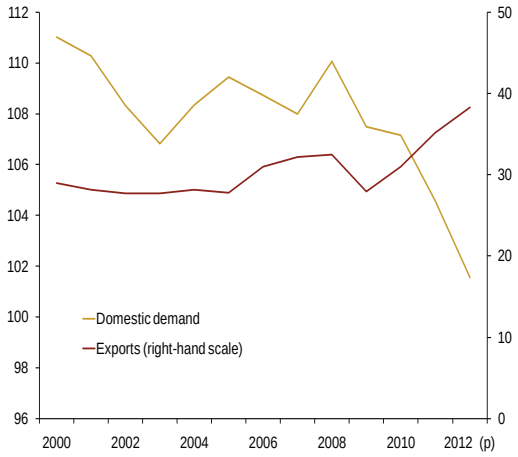


Sources: ECB, Eurostat and Banco de Portugal.

Note: For 2011 and 2012, the midpoints of projection ranges published in the June 2011 issue of the ECB Monthly Bulletin are taken into account for the euro area.

Chart 3.2

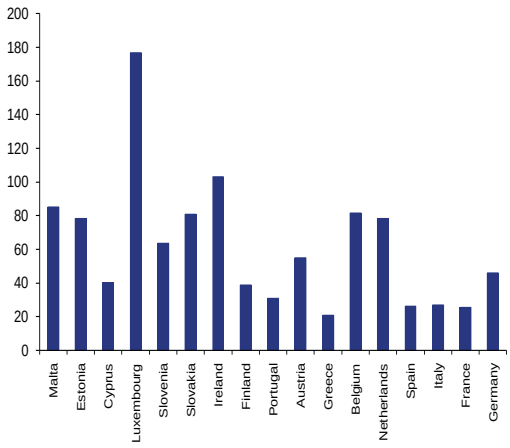
WEIGHT OF DOMESTIC DEMAND AND EXPORTS IN GDP | AS A PERCENTAGE OF NOMINAL GDP



Souces: *INE* and Banco de Portugal.

Chart 3.3

WEIGHT OF EXPORTS IN GDP | AS A PERCENTAGE OF NOMINAL GDP IN 2010



Sources: ECB, Eurostat and Banco de Portugal.

Note: Countries are listed in increasing order of their weight in euro area GDP.

whereas the contribution from the capital stock should be around zero, in a context of continued decline in GFCF (Chart 3.4).[4] Labour will have a contribution to activity growth of -0.6 p.p. on average over the projection horizon, slightly above the one recorded in 2010, as a result of the projected annual rates of change in employment of -1.1 and -0.9 per cent in 2011 and 2012 respectively (-1.5 per cent in 2010).

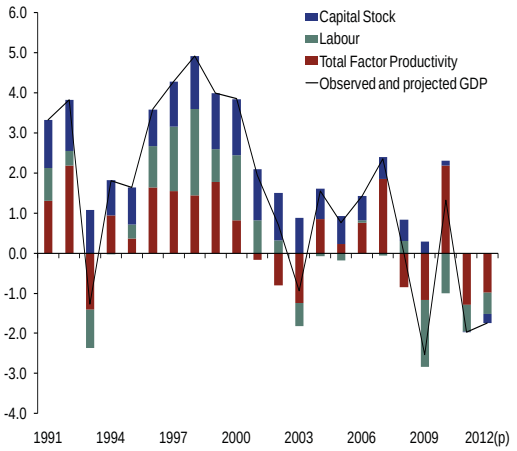
In the context of structural measures included in the economic and financial adjustment programme, which may lead to a change in the long-run equilibrium of the economy, the analysis of potential output

4 This accounting exercise of contributions to growth is carried out on the basis of a Cobb-Douglas production function. For a more detailed discussion of this methodology, see Almeida, V. and R. Félix (2006), "Computing potential output and the output gap for the Portuguese economy", Banco de Portugal, Economic Bulletin – autumn.

reveals to be particularly difficult. In addition, the degree of persistence of the impact of the international financial crisis on the potential output level is still difficult to assess, since the adjustment process of the economy after this shock is still under way. Notwithstanding the sensitivity of the results to the different calculation methodologies, most methods considered point to marginally positive growth of potential output in 2012, after a stagnation in 2011 (Chart 3.5).[5]

Chart 3.4

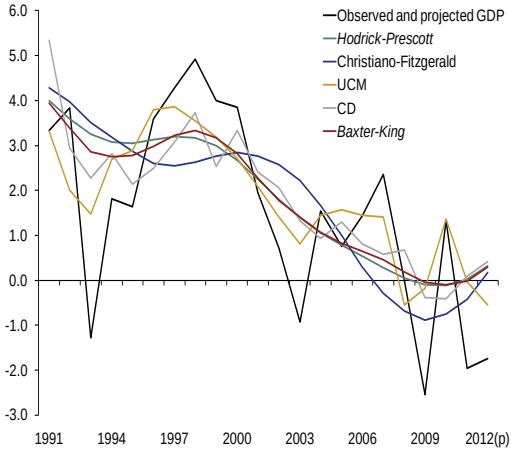
CONTRIBUTIONS TO GDP GROWTH | IN PERCENTAGE POINTS



Sources: *INE* e Banco de Portugal.

Chart 3.5

POTENTIAL GDP GROWTH | PER CENT



Sources: *INE* and Banco de Portugal.

Note: UCM stands for unobserved component methodology. CD stands for the methodology based on a Cobb-Douglas production function.

Sharp reduction in domestic demand over the projection horizon, in parallel with continued buoyant growth of exports

The reduction in GDP projected for the 2011-2012 period reflects a decline in domestic demand, with a contribution to GDP growth of -6.0 and -4.6 percentage points in 2011 and 2012 respectively, whereas net exports maintain a positive contribution to economic activity (Chart 3.2). The fall in domestic demand extends to all its components, with very large decreases in 2011 and gradually more moderate in the course of 2012.

Projections point to a decline in private consumption of 3.8 per cent in 2011 and 2.9 per cent in 2012. Although very sharp, the fall projected for private consumption is broadly in line with developments in real disposable income, consistent with expectations of a permanent decline in income over the projection horizon. This will very significantly affect households' intertemporal budget constraints. The very marked developments of disposable income reflect, to a large extent, the impact of fiscal consolidation measures, inter alia at the level of public sector wages, as well as very moderate growth of private sector wages, in a context of rising unemployment. The labour market situation may also constrain developments in private consumption by interacting with the deterioration of expectations among economic agents regarding developments in future income and wealth.

5 The unobserved component methodology (UCM) is presented in Centeno, Novo and J. Maria (2009), "Unemployment: A supply, demand and institutions approach", in *The Portuguese economy in the context of Economic, Financial and Monetary Integration*, Economics and Research Department, Banco de Portugal.

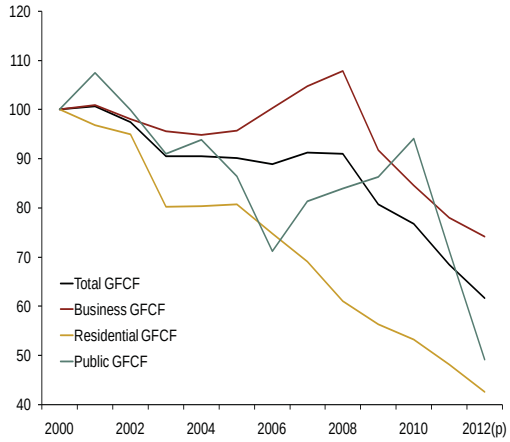
Projected developments are expected to translate into the start of the restructuring process of households' balances, in a context of deteriorating financing conditions. It should be noted that, notwithstanding the persistence of a negative differential of GDP growth *vis-à-vis* the euro area, in the case of private consumption this differential has been positive in recent years, although it is projected to be reversed in the 2011-2012 period (Chart 3.1).

In terms of the composition of private consumption, current projections point to a very sharp fall in the durable goods component, which will possibly be constrained by limitations in access to credit, as a result of the deleveraging process of the banking sector. In addition, expenditure decisions in durable goods reflect most significantly the changes in consumer expectations, contributing to the traditionally more volatile behaviour of this variable. Hence, this consumption component may more strongly reflect the impact of the adjustment programme measures, interacting with a deterioration of economic agents' expectations. In 2011, these developments will also be negatively affected by the anticipation in purchases of some durable goods to the end of 2010, in particular cars (Section 2). The reductions projected for the non-durable goods component, albeit more moderate, will also be significant in view of the historical developments of this variable, implying a profile consistent with a longer adjustment period of real disposable income. Therefore, projections for the consumption of non-durable goods are characterised by a lower smoothing level than usually observed in this component.

Expectations of a strong contraction in domestic demand, as well as tightening financing conditions, particularly associated with the deleveraging process of the banking sector, in a context where the indebtedness level of Portuguese corporations is among the highest in the euro area, are projected to determine a very significant decline in private GFCF over the projection horizon. Moreover, the fiscal consolidation process is envisaged to translate into a cut in public investment (Chart 3.6). Therefore, after a reduction of about 5 per cent in 2010, projections point to a fall in total GFCF by around 11 per cent in 2011 and 10 per cent in 2012, implying that this continues to be the most relevant component of overall demand behind the accumulated growth differential of the Portuguese economy *vis-à-vis* the euro area (Chart 3.1). Although the GFCF decline is broadly based across all institutional sectors, business GFCF is projected to start to recover around mid 2012, against the background of some continued buoyancy in the tradable goods sector, given that the deleveraging process of the banking system should not raise financing limitations on the most productive sectors (Chart 3.6). Hence, current projections point to gradually moderating falls in business GFCF over the projection horizon (4.9 per cent in 2012, compared to 7.7 per cent in 2011 and 7.8 per cent in 2010). According to current projections, residential GFCF

Chart 3.6

BREAKDOWN OF GFCF BY INSTITUTIONAL SECTOR | INDEX 2000=100



Sources: *INE* and Banco de Portugal.

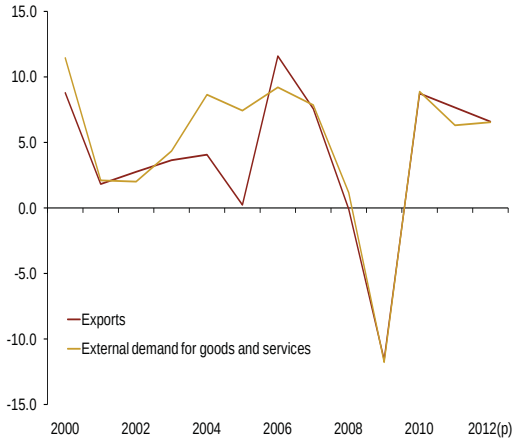
will follow the downward trend observed over the last decade, as a result of the adjustment process of this component, after the fast expansion seen in the second half of 1990s. This trend is projected to be strengthened over the projection horizon by possibly tighter credit conditions.

According to current projections, exports, albeit decelerating, should continue to be the most dynamic component of overall demand, growing by approximately 7 per cent in the 2011-2012 period. These developments correspond, however, to a deceleration from growth in 2010 (8.8 per cent), in line with assumptions with regard to external demand for Portuguese goods and services (Chart 3.7). The robust growth projected for exports extends to both goods and services.

Projections for imports imply falls in real terms of 4.0 and 1.2 per cent in 2011 and 2012 respectively. This profile corresponds to a trend broadly in line with import-weighted overall demand, against which imports usually show high elasticity in the short term. Moreover, this component will be constrained by a base effect resulting from the acquisition of military equipment in 2010, with an estimated impact of around -1.5 p.p. in 2011. These dynamics are projected to translate into a decline in import penetration in 2011 and a marginal increase in 2012.

Chart 3.7

EXPORTS AND EXTERNAL DEMAND | ANNUAL RATE OF CHANGE, PER CENT



Sources: ECB, *INE* and Banco de Portugal.

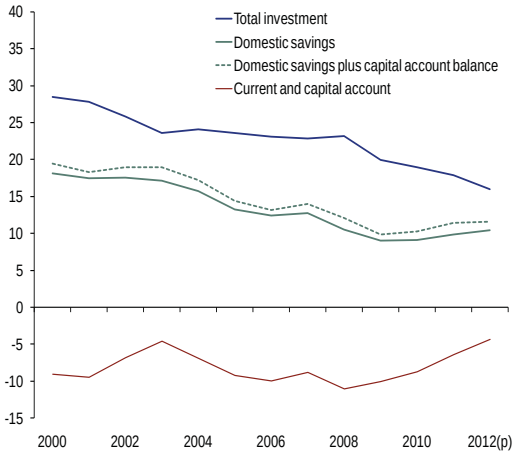
Gradual reduction in the financing requirements of the economy

Current projections include a reduction in the financing requirements of the economy, as measured by the combined current and capital account balance, from 8.8 per cent of GDP in 2010, to 6.4 and 4.4 per cent of GDP in 2011 and 2012 respectively (Chart 3.8). This downward trend of the external imbalance of the Portuguese economy is the result of a gradual reduction in the public sector deficit, as well as a gradual deleveraging of the private sector.

The lower financing requirements of the economy reflect a significant narrowing of the trade balance deficit from 6.5 per cent of GDP in 2010 to 3.8 per cent of GDP in 2011 and 0.7 of GDP in 2012 (Chart 3.9). The improvement in the trade balance is due, in particular, to a very favourable volume effect, as a result of the continued buoyancy of exports, together with a fall in imports (Section 3), notwithstanding a persistent unfavourable terms-of-trade effect in 2011, largely reflecting developments in oil prices. In turn, the income account deficit is projected to increase over the projection horizon from 4.6 per cent of GDP in 2010 to 5.6 and 6.3 per cent of GDP in 2011 and 2012 respectively. This deterioration reflects, in the case of the private sector, an increase in financing costs over the projection horizon, whereas in the public sector the income account will likely be constrained by the financing costs borne by the Portuguese

Chart 3.8

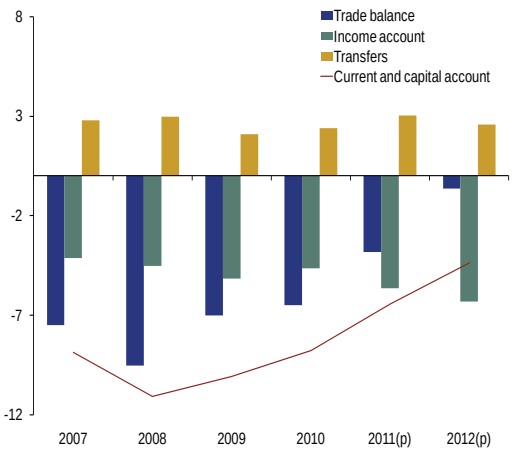
DEVELOPMENTS IN FINANCING REQUIREMENTS | AS A PERCENTAGE OF GDP



Sources: *INE* and Banco de Portugal.

Chart 3.9

CURRENT AND CAPITAL ACCOUNT | AS A PERCENTAGE OF GDP



Sources: *INE* and Banco de Portugal.

State, particularly high in early 2011, and the increase in public debt. The combined current and capital account balance as a percentage of GDP is projected to temporarily improve in 2011, resuming in the following year a level close to the one observed in 2010, in line with the assumptions for the profile of European Union transfers.

4. Prices and wages

The HICP is projected to accelerate in 2011, largely reflecting the impact of changes in indirect taxation and administered prices. Projections for 2012 point to consumer price growth more in line with the respective macroeconomic determinants. Wages are projected to undergo very moderate developments over the projection horizon.

Significant temporary increase in inflation in 2011, constrained by fiscal consolidation measures

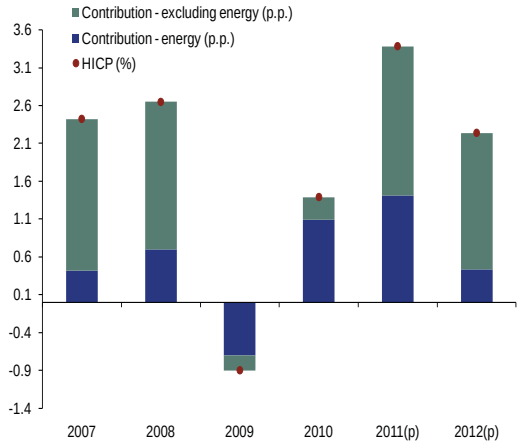
Current projections point to an increase in inflation, measured by the HICP, from 1.4 per cent in 2010 to 3.4 per cent in 2011, followed by a slowdown in 2012 to 2.2 per cent. The projected profile is common to the energy and non-energy components of the HICP. The latter contributes more significantly to the increase in inflation in 2011 (Chart 4.1), as a result of an acceleration in the HICP excluding energy from 0.3 per cent in 2010 to 2.3 and 2.1 per cent in 2011 and 2012 respectively.

The increase in inflation in 2011 is largely conditional on the impact of the VAT rise in January 2011, and on the significant growth of some administered prices early this year (for instance pharmaceutical products, mainly due to a reduction in co-payments, and transport services). For 2012, VAT is assumed to increase in some goods, according to the measures included in the adjustment programme, with an estimated impact on inflation of 0.3 p.p. Nonetheless, the contribution of indirect taxation measures to inflation in 2012 is projected to be close to that observed in 2010.

The acceleration of prices in 2011 also reflects the behaviour of its main macroeconomic determinants. In particular, unit labour costs in the private sector are projected to grow by about 2.5 per cent in 2011 and 2012, after declining in 2010. These developments reflect a fall in productivity over projection horizon

Chart 4.1

INFLATION | CONTRIBUTION TO THE ANNUAL RATE OF CHANGE OF THE HICP IN PERCENTAGE POINTS



Sources: Eurostat and Banco de Portugal.

and very moderate developments in wages, in the context of a deterioration of the situation in the labour market and the adoption of some of the measures included in the adjustment programme. These are intended to promote wage growth in line with the specific situation of the corporations. As regards the import deflator excluding energy, projections also point to an acceleration of these prices in 2011, followed by more moderate growth in 2012. However, according to current projections, developments in the determinants of inflation will be largely offset by profit margins compression, given the context of significant contraction of domestic demand.

Turning to the energy component of the HICP, current projections point to a high annual average rate of change in 2011 (11.3 per cent, compared to 9.5 per cent in 2010), largely reflecting the assumption of continued significant growth of oil prices in euro terms. In 2012 energy goods prices are projected to decelerate to 3.3 per cent, in spite of a reduction in oil prices, reflecting the impact of the increase in the taxation on electricity and gas.

5. Uncertainty and risks

Current projections correspond to the most probable scenario, in a context determined by the assumptions defined in section 2. The non-materialisation of these assumptions or the occurrence of factors that, due to their idiosyncratic nature, are not considered in the projections, may lead to a number of risks, amid some uncertainty. Their assessment is presented in this section[6].

High degree of uncertainty in the context of the economic and financial adjustment programme

These projections are characterised by a particularly high degree of uncertainty, partly reflecting some external factors, specifically possible adverse economic and financial developments at the international level, mainly associated with the sovereign debt crisis in the euro area. Moreover, the consequences of the economic conditionality measures underlying the adjustment programme presently under way, in

6 The methodology used in this section is based on the article published in Pinheiro, M. and P. Esteves (2010), "On the uncertainty and risks of macroeconomic forecasts: Combining judgements with sample and model information", *Empirical Economics*, pp. 1-27.

particular of structural measures, are difficult to establish, as regards either their temporal dynamics or the magnitude of their impact. These measures may imply substantial changes in the operation of some sectors of the economy and are significantly dependent on the respective implementation conditions. In addition, the impact of measures associated with this programme on the expectations of the economic agents, as well as the corresponding implications for their demand decisions, are difficult to assess, given the unprecedented nature of the adjustment process under way.

Risks over the projection horizon: broadly balanced on activity and moderately rising on inflation

In this context of heightened uncertainty, the quantification of risks determines an evaluation of broadly balanced risks for economic activity, as a result of offsetting risk factors arising from the external framework of the Portuguese economy as well as domestic risk factors. In particular, account was taken of a moderate upward risk factor for oil prices, emerging from additional pressures on the supply side, as a result of persisting geopolitical tensions in some oil-producing countries. The possibility that the very buoyant pace of economic growth shown by some emerging economies may lead to an abrupt correction of accumulated macroeconomic imbalances, and the resulting weakening of global economic growth and trade flows gives rise to a downward risk on external demand for Portuguese goods and services (Table 5.1). Finally, the possibility of increased concerns of investors about developments in the sovereign debt crisis in the euro area may lead to a depreciation of the exchange rate.

Turning to domestic risk factors constraining the current projections, a the decline in households' consumption expenditure in 2011 less significant than that envisaged in the current projections was considered, against a background of a possible less marked deterioration of consumers' expectations, and taking into account the usually smooth cyclical evolution of this expenditure component. In addition, account was also taken of an upward risk on consumer prices in 2012, as a result of the implementation of the fiscal devaluation included in the adjustment programme, which points to a cut in the employers' social security contributions, offset by measures ensuring its neutrality is fiscal terms.[7] However, the pass through of these fiscal measures to consumer prices may translate into an upward net impact on prices. Moreover, this measure may lead to an increase in the competitiveness of national production, implying a rise in exports and a decline in import content. Hence, a moderately ascending risk on exports and descending on imports were considered.

The quantification of these factors points to essentially balanced risks for GDP growth in 2011 and 2012 (Table 5.2). In 2011, this evaluation stems from the fact that the impact of the risk factor for private consumption virtually offsets the possibility of a less favourable evolution of exports, mainly resulting from the risk factor associated with external demand. For 2012, all domestic demand components, and, to a lesser extent, exports, contribute to this scenario of descending risks for activity. However, this effect is compensated by a stronger descending risk on import growth, resulting on a broadly neutral impact on GDP. As a result of this analysis, the probability of a positive change in GDP arising from this quantification stands below 10 per cent in 2011 and 20 per cent in 2012.

As regards consumer prices, this risk quantification indicates the existence of upward risks, particularly in 2012, resulting from the risk factor related to possible changes in indirect taxation, and, to a lesser extent, from the risk factor associated with the euro depreciation.

7 These measures may include a change in VAT structure and rates, permanent additional cuts in expenditure, and a rise in other taxes with no effect on competitiveness.

Table 5.1

RISK FACTOR PROBABILITIES | PER CENT

	2011	2012
Conditioning variables		
Exchange rate	60	60
External demand	55	55
Oil prices	45	45
Endogenous variables		
Private Consumption	40	50
Exports	50	45
Imports	50	55
HICP	50	45

Source: Banco de Portugal.

Table 5.2

PROBABILITY OF AN OUTTURN BELOW THE PROJECTIONS | PER CENT

	Weights in 2010 (%)	2011	2012
Gross Domestic Product	100	49	51
Private Consumption	67	41	54
GFCF	19	48	53
Exports	31	52	52
Imports	38	48	56
HICP		42	38

Source: Banco de Portugal.

Chart 5.1

GROSS DOMESTIC PRODUCT | RATE OF CHANGE, PER CENT

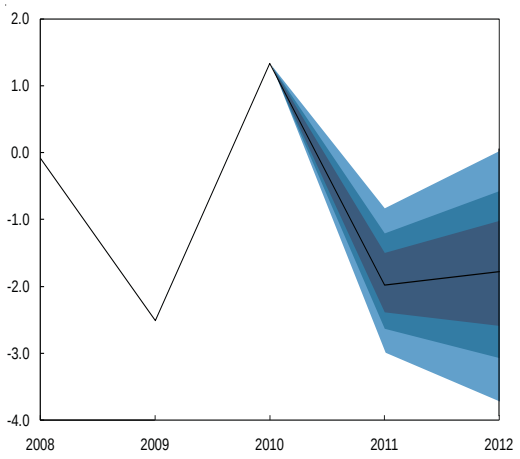
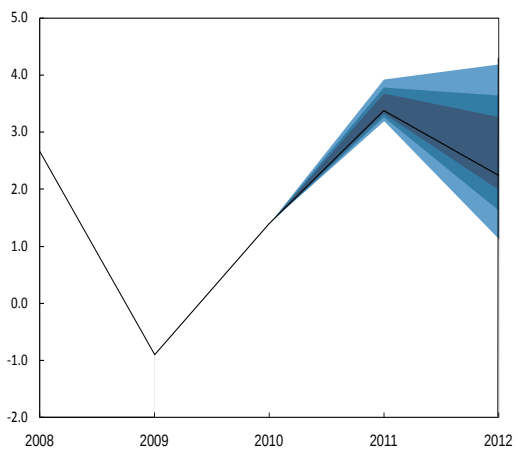


Chart 5.2

HARMONISED INDEX OF CONSUMER PRICES | RATE OF CHANGE, PER CENT



Current projection | 40% confidence interval | 60% confidence interval | 80% confidence interval

Sources: *INE* and Banco de Portugal.

6. Conclusions

In coming years, the Portuguese economy will be faced with a period of ambitious and comprehensive reforms, in the context of the economic and financial adjustment programme agreed with the European Union, euro area countries and the International Monetary Fund. The measures envisage the necessary correction of structural macroeconomic imbalances which have worsened in the wake of the international financial crisis and the sovereign debt crisis. In particular, the persistent imbalances between demand and supply in the economy have translated into an ongoing situation of external deficit, with the ensuing deterioration of the international investment position. The correction of this situation cannot but imply in the short run a significant contraction of domestic demand, as reflected in the projections of this Economic Bulletin. On the one hand, the unsustainable situation of public finance requires a continued demanding and credible fiscal consolidation strategy, in line with the commitments assumed in the adjustment programme. On the other hand, the deleveraging process of the private sector is expected to interact with a gradual and orderly deleveraging of the banking sector, allowing for a more stable financing structure of the latter, less dependent on international wholesale debt markets and Eurosystem financing.

The measures to be adopted also envisage, on the supply side, the implementation of structural reforms promoting the potential growth of the economy. Reduced growth in the last decade translated into an interruption of the real convergence process with the euro area. In terms of the composition of expenditure, such fragilities have translated into a fall in investment and a relatively low weight of exports, when compared with other small economies in the euro area. This structure will tend to change over the projection horizon, as a result of measures intended to raise external competitiveness and strengthen competition in the non-tradable goods sector, and to promote a more favourable framework for economic activity, particularly at the level of the labour market and the judicial sector. Moreover, it will be important not to compromise other development factors of the economy, especially investment in sectors of increased innovation and growth potential, and the effective qualification of human resources.

Against this background, and notwithstanding the high degree of uncertainty and increased risks in the context of the sovereign debt crisis in the euro area, the strict pursue of the economic and financial adjustment programme is an essential condition to ensure the return to an environment that promotes confidence and sustained economic growth.

This text was based on data available up to the end of June 2011.

ARTICLES

II

INTERNATIONAL ORGANISATIONS' *VS.* PRIVATE ANALYSTS' GROWTH FORECASTS: AN EVALUATION*

*Ildeberta Abreu***

ABSTRACT

This article evaluates the performance of economic growth forecasts disclosed by three international organisations – the IMF, the European Commission and the OECD – and compares it with that of the mean forecasts of two surveys of private analysts – the Consensus Economics and The Economist. The aim is to help forecast users in answering the question of how much (little) confidence they should place in the alternative forecasts that are available at each moment. The evaluation covers projections for nine advanced economies over the period 1991-2009. Several evaluation criteria are used: the quantitative and the directional accuracy of forecasts and, also, the ability to predict economic recessions. The results suggest that the forecasting performance of the international organisations is broadly similar to that of the surveys of private analysts. By and large, current-year forecasts present desirable features and clearly outperform year-ahead forecasts for which evidence is more mixed.

1. Introduction

Considerable effort and resources are devoted to forecasting major economic variables and the publication of forecasts usually attracts great interest of economists, policymakers and the general public. Although some of the disappointment that arises from time to time with macroeconomic forecasting might be justified, part of it reflects a failure to inform forecast users of how much (little) confidence to place in forecasts. An empirical evaluation of the past accuracy of the various forecasters and of their relative performance might help the user to make an informed use of the many different predictions available.

This article will evaluate the forecasting record of three leading international organisations – the International Monetary Fund (IMF), the European Commission (EC) and the Organisation for Economic Co-operation and Development (OECD) – and compare it with that of two surveys of private analysts – the Consensus Economics and The Economist. The forecasts published twice a year by the three international organisations receive a great deal of media attention and are usually perceived to benefit from the large amount of intellectual/physical resources devoted to their production. However, many private sector analysts (including banks, corporations, consultants, etc.) also produce forecasts making use of their knowledge about the countries where they are based. These private analysts' forecasts are published on a monthly basis and have been gaining increased visibility. In this analysis, and unlike most

* The author gratefully acknowledges Carlos R. Marques for the many valuable discussions and suggestions. The author also thanks Rita Duarte and João Sousa for their useful comments. The opinions expressed in the article are those of the author and do not necessarily coincide with those of the Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the author.

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previous work on forecast evaluation, we want to place ourselves in the position of a forecast user that needs to know how much confidence to place on each of these various forecasts that are available at a specific point in time. Besides following a slightly different empirical approach for choosing the timing of comparison of the various forecasts, this analysis aims to contribute to the existing literature by assessing a less known survey of private forecasters (The Economist) and by extending the assessment to the most recent vintages of projections up to the latest recession.

The evaluation covers real Gross Domestic Product (GDP) growth forecasts, for the period 1991-2009, for nine main advanced economies.[1] Several evaluation criteria will be used. We will assess the accuracy of forecasts in terms of magnitude (quantitative accuracy) and test their unbiasedness and efficiency. We will also examine accuracy in terms of direction of change (directional accuracy) and briefly assess the ability of forecasters to predict economic recessions. The performance of forecasters will be judged against different benchmarks: firstly, against a "naive" benchmark which establishes a minimum level of accuracy that a forecast should have and, secondly, the accuracy of international organisations' forecasts will be compared to that of the alternative private analysts' forecasts. As much as possible, the statistical significance of these differences in accuracy will be tested.

The article is structured as follows. Section 2 describes in detail the data set and conventions used. Section 3 evaluates the quantitative accuracy of forecasts. The weak form efficiency of forecasts is studied in the following section. Section 5 examines two additional dimensions of accuracy: the directional accuracy and the ability to predict economic recessions. The last section summarises the results and briefly compares them with the findings of previous in-house evaluations of international organisations' forecasts.

2. Data set used

The study examines two groups of forecasts: the ones published by the IMF, the EC and the OECD and the mean forecasts of the panels of private analysts surveyed by the Consensus Economics and The Economist.[2] We make use of the fact that international organisations publish projections two times per year (generally, in Spring and in Autumn) for both the current-year and the year-ahead.[3] This means that we use four sets of forecasts which correspond to four different forecasting horizons. For a target year t, we will be looking at the Spring and Autumn next-year forecasts (reported in year $t-1$) and the Spring and Autumn current-year forecasts (reported in year t). For example, the IMF reported four forecasts for the 2000 German GDP growth: the Spring and Autumn 1999 next-year forecasts and the Spring and Autumn 2000 current-year forecasts. These forecasting horizons can be thought of as corresponding roughly to seven, five, three and one quarter-ahead, respectively.

To investigate the relative performance of international organisations and private analysts it is necessary to decide on the timing of the comparison given that the surveys of private analysts are available on a monthly basis. A valid argument would be to choose a reference month for which the information set underlying the private analysts' forecasts is similar to the one underlying each international organisa-

1 This article draws heavily on the work carried out in Abreu (2011), which also covers the performance of inflation forecasts. For additional details see *Working Paper* 20.

2 IMF, "World Economic Outlook"; EC, "European Economic Forecast"; OECD, "OECD Economic Outlook"; Consensus Economics, "Consensus Forecasts" and The Economist, "The Economist pool of forecasters".

3 We will not consider any interim assessments published by these organisations and neither the two-year-ahead forecasts that are published in Autumn by the EC and the OECD. For an evaluation of OECD's two-year-ahead growth forecasts see Vuchelen and Gutierrez (2005).

tion's forecasts. Most previous work on forecast evaluation tries to follow this approach but typically end-up using rough approximations. Moreover, according to tentative evidence on the sensitivity of the relative performance of international organisations and private forecasters to changes in the dating, such as the one presented in Timmermann (2007) and Lenain (2001), the timing of the comparison presumably matters.

We decided to follow a slightly different empirical strategy in this work. The idea is to place ourselves in the position of a user that has a new forecast just released by an international organisation and also the more recent forecasts released by private institutions and needs to have an informed judgement about their relative reliability. To do this, we first collected for each international organisation the public disclosure date of every forecasting exercise. Then, we selected for each private institution the forecast disclosed to the public at a closer date (before or no more than a couple of days after that of the international organisation). This means that the reference months used for the Consensus and for The Economist vary according to which international organisation they are being compared to and also differ somewhat over the sample period.[4]

The study focus on real GDP annual growth forecasts for nine advanced economies: the six major euro area countries (Germany, France, Italy, Spain, Netherlands and Belgium),[5] the United Kingdom, the United States and Japan. The set of countries was chosen both on account of their importance in the world economy and of data availability across the institutions and the period under analysis.[6] Note that the definitions of the data collected can differ across institutions and over time (*e.g.* the working-day adjustment of GDP data and the German reunification). As much as possible, given data availability, these differences are properly taken into account so that they do not affect the size of the forecast error. The observation period covers around two decades, from 1991 to 2009.[7] However, it is important to be aware that the relatively small sample size (19 observations at most for each forecasting horizon) may limit the robustness of the inference that can be made and the number of cyclical fluctuations to be studied.

Given that GDP data are subject to revisions, a choice has to be made concerning the outcome data to be used in the forecast evaluation. Though no single choice is optimal, we decided to take the conventional view that forecasters should be judged by their ability to predict the early releases of data rather than the later revisions, which often incorporate methodological changes and information that was not available to them at the time of forecasting.[8] Hence, for each institution we use as outcome value for year t the first-available data reported in their Spring forecast exercise of the following year $(t+1)$.[9] This choice has the additional advantage of allowing us to take into account the differences in definitions among institutions.

4 Roughly speaking, the reference months used were mostly April and September for comparison with the IMF, April/May and October/November for comparison with the EC and May/June and November/December for comparison with the OECD.

5 Which represent over 85 per cent of euro area GDP.

6 In particular, The Economist's survey does not provide forecasts for smaller euro area countries, including Portugal.

7 The forecast exercises analysed go from Autumn 1991 till Autumn 2009. In the case of the IMF's forecasts for Spain, Netherlands and Belgium the sample is slightly smaller given the lack of a couple of observations at the beginning of the period.

8 See McNees (1992) and Zarnowitz and Braun (1993) for a discussion on this issue.

9 In the case of private analysts, which no longer report year t data in their first forecast exercise of the following year, the outcome of one of the international organisations is used.

In this study, the forecast error (e) is defined as the difference between the outcome/actual value (y) and the forecasted value $(\hat{y})$. For each target year t, we analyse four different forecast errors corresponding to four different forecasting horizons (h). According to this notation, the forecast error can be generally written as:

$$e_{t,h} = y_t - \hat{y}_{t,h} \tag{1}$$

and the following designation will be used for the four different forecast errors:

$$e_{t,Spring_{t-1}} = y_t - \hat{y}_{t,Spring_{t-1}} \quad \text{Spring next-year forecast error}$$
$$e_{t,Autumn_{t-1}} = y_t - \hat{y}_{t,Autumn_{t-1}} \quad \text{Autumn next-year forecast error}$$
$$e_{t,Spring_t} = y_t - \hat{y}_{t,Spring_t} \quad \text{Spring current-year forecast error}$$
$$e_{t,Autumn_t} = y_t - \hat{y}_{t,Autumn_t} \quad \text{Autumn current-year forecast error}$$

3. Quantitative accuracy of forecasts

To evaluate the quantitative accuracy of forecasts we examine the forecast errors and compute a set of conventional summary measures. The aim is to characterize in a simple way the distribution of errors. The first measure is the mean error (ME), *i.e.* the arithmetic average of forecast errors over the available observations (n), for each horizon (h). Even though positive and negative errors might offset each other, the ME gives an indication of a possible bias in the forecasts, with a negative sign indicating an over-prediction on average of the actual value.

$$ME_h = \frac{1}{n}\sum_{t=1}^{n} e_{t,h} \tag{2}$$

The second is the standard deviation of errors (SD), which can give an indication about the uncertainty at each forecasting horizon.

$$SD_h = \sqrt{\frac{1}{n-1}\sum_{t=1}^{n}\left(e_{t,h} - ME_h\right)^2} \tag{3}$$

The third one is the root mean squared error $(RMSE)$, which is the square root of the sample average of squared forecast errors (*i.e.* the square root of the mean squared error (MSE)). The $RMSE$ disregards the sign of errors (puts equal weight on over- and under-predictions) and implicitly assumes that the seriousness of any error increases sharply with square the size of the error. Therefore, it penalises forecasters who make large errors.[10]

10 The $RMSE$ is consistent with a symmetric quadratic loss function of forecasters. This assumption will be discussed in Section 4.

$$RMSE_h = \sqrt{\frac{1}{n}\sum_{t=1}^{n} e_{t,h}^2} \quad (4)$$

These measures have been subject to some criticisms (see, for example, Fildes and Stekler (2002)). The $RMSE$ can be particularly affected by outliers which are common in economic data sets. Also, neither the ME nor the $RMSE$ are scale independent. As done in Koutsogeorgopoulou (2000), we will adjust the $RMSE$ by the standard deviation of outcomes to compare performance across countries, in order to take into account the variability of the series being forecasted.

In addition, to evaluate the performance of a forecaster, these descriptive statistics are compared to similar statistics obtained from alternative forecasts available to the user. The first alternative is a "naive" benchmark that serves to establish a minimum level of accuracy that a forecast should have. A frequent procedure is to use a no-change naive model. In this work we use instead a same-change naive model, which extrapolates a GDP growth rate similar to the one observed in the last period. As argued by McNees (1992), this is a more stringent and sensible basis of comparison for variables that tend to grow over time. To be fair to forecasters, we use for each forecasting horizon the last rate of change known at the time of forecasting. This is similar to assume that the variable to be forecasted follows a random walk.[11] To formalise the comparison, we compute a version of Theil's inequality coefficient (U), defined as the ratio of the MSE of the forecaster being evaluated to the MSE of the naive forecast $\left(\hat{y}_{t,h}^{N}\right)$.[12] If the Theil's U is less than one the forecaster being evaluated beats the naive model. This measure, unlike others, is not affected by the units of measurement of data.

$$U_h = \frac{\frac{1}{n}\sum_{t=1}^{n}\left(y_t - \hat{y}_{t,h}\right)^2}{\frac{1}{n}\sum_{t=1}^{n}\left(y_t - \hat{y}_{t,h}^{N}\right)^2} \quad (5)$$

The second alternative is the benchmarking of other experts' forecasts. In this study, the focus is on the comparison of the performance of each international organisation with that of the two private institutions. The comparison is based on the ratio of their respective $RMSE$.[13] A ratio higher than one indicates a lower accuracy of the international organisation relative to the private institution.

Irrespectively of the benchmark used to evaluate the performance of a forecaster, it is necessary to test whether a forecaster's errors are significantly different from those of the benchmark, *i.e.* the difference should be tested for statistical significance. For this purpose, we run the test for equal forecast accuracy proposed by Diebold and Mariano (1995). To implement the test we estimate the following equation:[14]

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11 In practice this means that: in Spring and Autumn $t-1$, the naive forecast for growth in year t corresponds to the actual growth rate in year $t-2$; in Spring and Autumn t, the naive forecast corresponds to the actual growth rate in year $t-1$.

12 In the case of a no-change naive model, the Theil's U corresponds to the ratio of the MSE of the forecaster to the mean of squared outcomes, as originally proposed by Theil (1971).

13 Note that this ratio is equivalent to the square root of a corresponding Theil's U coefficient.

14 By ordinary least squares, using the Newey-West covariance estimator that is consistent in the presence of both heteroskedasticity and autocorrelation.

$$d_{t,h} = \alpha + \varepsilon_{t,h} \quad \text{where} \quad d_{t,h} = e_{t,h}^2 - e_{t,h}^{*\,2} \tag{6}$$

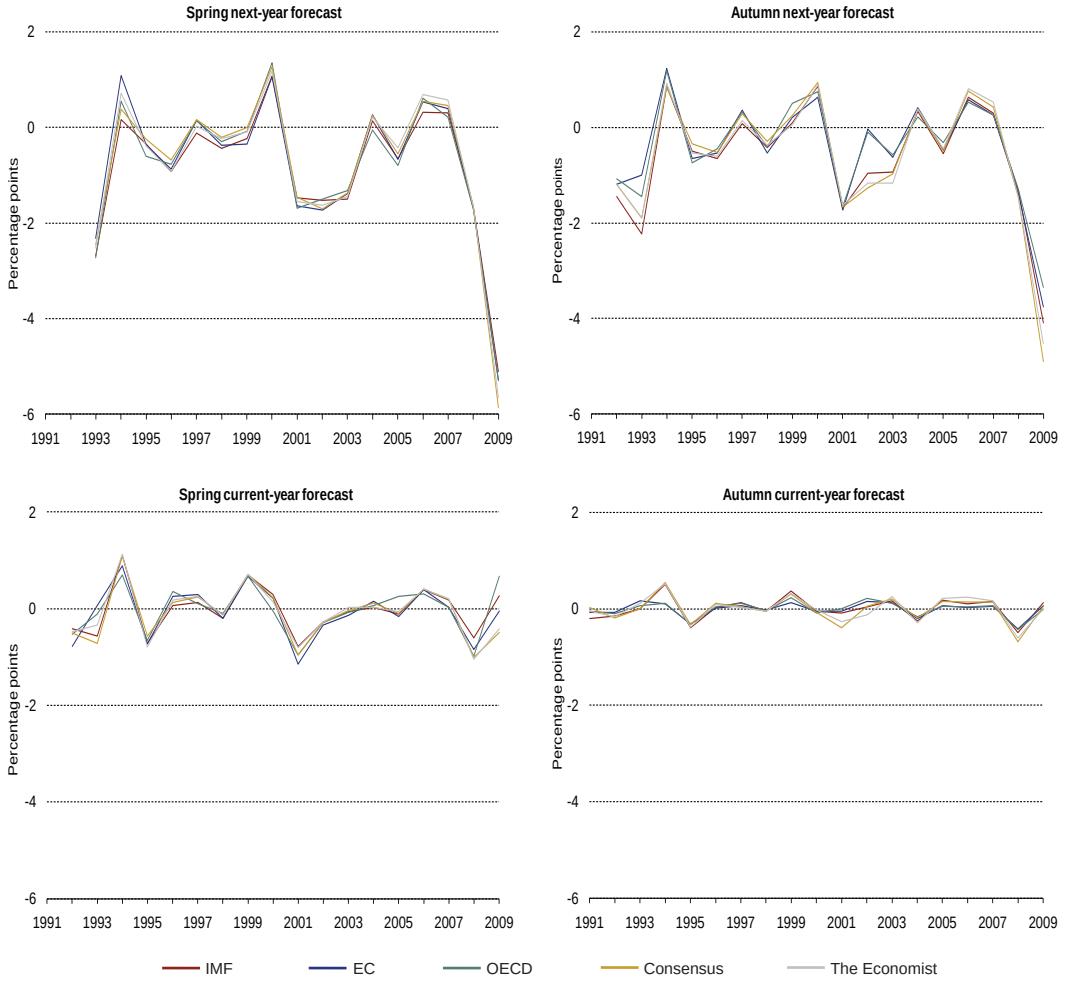
being $e_{t,h}$ the forecast errors of the forecaster being evaluated and $e_{t,h}^{*}$ the forecast errors of the benchmark (either the naive forecast or another forecaster). The null hypothesis of equal forecast accuracy $\left(H_0 : \alpha = 0\right)$ is tested using the small sample modifications proposed by Harvey *et al.* (1997).

3.1. A general look at forecast errors

Chart 1 provides a general picture of GDP growth forecast errors over time for each projection horizon.[15] For the sake of simplicity, data refer to the average of the nine countries under analysis but similar assertions hold at the individual country level.[16] It is clear that, for all institutions, errors are more significant for next-year forecasts and much closer to zero for current-year forecasts, especially

Chart 1

GDP GROWTH - FORECAST ERRORS FOR THE AVERAGE OF 9 COUNTRIES



Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

15 When presenting isolated data for the Consensus and The Economist they always correspond to the data set specifically used for comparison with the IMF's forecasts. Nothing in substance would change if the data sets used for comparison with the EC or the OECD were chosen instead.

16 See Abreu (2011) for information at the country level.

for the shorter projection horizon (Autumn current-year). Indeed, the profiles of next-year forecasts are generally flatter than the outcome while current-year forecasts tend to follow more closely the volatility of GDP growth. Forecast errors are quite similar across institutions as their forecasts tend to move closely together, particularly for current-year horizons.[17] The correlation coefficient of the various institutions' current-year forecasts for GDP growth is close to one.

Year-ahead forecast errors are predominantly below zero (overestimation) for most countries and are especially pronounced at the beginning and end of the sample period, when most countries were experiencing economic recessions. There is a tendency of the various forecasters to overestimate growth when activity is slowing down and, for most countries, this was stronger than the underestimation during upswings of economic activity.[18] Regarding current-year forecast errors, as mentioned before, they fluctuate around zero and do not seem to present a clear bias over the sample period.

Table 1 reports some summary statistics of projection errors. For the various countries and institutions, it is clear that accuracy improves as more relevant information becomes available to the forecaster. Both the ME and the $RMSE$ tend to be smaller as the horizon shortens. This is also true for the standard deviation of forecast errors and the reduction in uncertainty seems to be especially large as we move from next-year to current-year horizons. Regarding year-ahead horizons, the ME for the group of nine countries analysed is negative for all institutions. In fact, GDP growth was overestimated more than 50 per cent of the time by all forecasters. The mean error stands at around -0.8 p.p. of GDP growth for forecasts made in Spring $t-1$ and around -0.5 p.p. for forecasts made in Autumn $t-1$.[19] Given that actual GDP growth averaged 1.6 per cent a year over this period, the accuracy of year-ahead forecasts is not particularly impressive. The countries with larger mean errors are the three major euro area countries and Japan.[20] Let's just mention that the large negative mean error in the case of Japan is associated with a high standard deviation. Regarding current-year horizons, forecasts seem to be generally unbiased. For the group of countries studied, the mean forecast error is very small and in the case of Autumn current-year forecasts is basically zero.

Looking at the $RMSE$ adjusted by the standard deviation of GDP growth outcomes, to take into account the fact that countries with higher GDP volatility might be harder to predict, the forecasting performance becomes somewhat more similar across the various countries.

Finally, it should be mentioned that the correlation of projection errors across countries is higher for year-ahead horizons but especially among euro area countries and, though less so, among these and the United Kingdom. The United States' and Japan's forecast errors are weakly correlated with each other and with those of other countries. Therefore, it can be said that error correlation appears to be substantial only for longer horizons and for economies with more synchronised business cycles, such as the euro area countries.

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17 As mentioned before, we decided to use for each institution its own outcome value (as reported in its Spring forecast exercise of the following year) but the outcomes for each country turn out to be quite similar across institutions.

18 This looks consistent with existing evidence of a considerable sluggishness in revisions of growth forecasts, as documented for example in Loungani *et al.* (2011).

19 If we exclude the 2009 recession, the mean error would still be negative but slightly less: around -0.5 p.p. for forecasts made in Spring $t-1$ and around -0.3 p.p. for forecasts made in Autumn $t-1$.

20 The statistical significance of the mean errors will be tested in Section 4.

Table 1 (to be continued)

DESCRIPTIVE STATISTICS OF GDP GROWTH FORECAST ERRORS (1991-2009)

	Memo:	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	Actual GDP growth	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
ME																					
Germany	*1.3*	-1.2	-1.0	-1.1	-1.0	-1.1	-0.9	-0.6	-0.6	-0.8	-0.9	0.1	0.0	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0
France	*1.5*	-1.0	-0.9	-0.9	-0.9	-0.9	-0.7	-0.5	-0.5	-0.7	-0.7	-0.1	-0.1	-0.1	-0.2	-0.1	-0.1	0.0	0.0	-0.1	-0.1
Italy	*0.8*	-1.4	-1.4	-1.3	-1.3	-1.3	-1.1	-1.0	-0.8	-1.1	-1.1	-0.4	-0.5	-0.3	-0.5	-0.4	-0.1	-0.1	-0.1	-0.2	-0.1
Spain	*2.3*	-0.6	-0.6	-0.6	-0.4	-0.3	-0.2	-0.4	-0.3	-0.2	-0.2	0.1	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1
Netherlands	*1.7*	-0.7	-0.7	-0.8	-0.7	-0.6	-0.5	-0.3	-0.3	-0.5	-0.4	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.2	0.2
Belgium	*1.6*	-0.6	-0.8	-0.8	-0.6	-0.5	-0.3	-0.5	-0.5	-0.4	-0.4	0.1	-0.1	0.0	-0.1	0.0	0.1	0.0	0.1	0.1	0.1
United Kingdom	*1.6*	-0.6	-0.6	-0.6	-0.5	-0.6	-0.5	-0.4	-0.3	-0.5	-0.5	-0.1	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
United States	*2.6*	0.0	0.2	0.0	-0.1	0.0	0.2	0.4	0.3	0.0	0.1	0.3	0.3	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
Japan	*0.9*	-1.4	-1.2	-1.3	-1.1	-1.3	-1.2	-0.9	-0.7	-0.9	-1.1	-0.1	-0.3	-0.2	0.0	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2
Average of 9 countries	*1.6*	-0.8	-0.8	-0.8	-0.7	-0.7	-0.6	-0.5	-0.4	-0.6	-0.6	0.0	-0.1	0.0	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0
SD																					
Average of 9 countries	*1.9*	1.8	1.8	1.8	1.9	1.9	1.5	1.4	1.4	1.6	1.6	0.8	0.8	0.8	0.8	0.8	0.4	0.3	0.3	0.5	0.5
Percentage of negative errors																					
Average of 9 countries		63.3	58.8	60.8	57.8	57.1	57.1	54.3	54.3	55.1	57.1	47.2	47.5	46.3	54.7	51.6	38.8	40.9	38.0	46.7	43.0
RMSE																					
Germany		2.3	2.3	2.2	2.3	2.3	1.9	1.6	1.5	2.0	2.0	0.8	0.8	0.8	0.7	0.8	0.3	0.2	0.2	0.3	0.4
France		1.5	1.6	1.7	1.7	1.7	1.3	1.1	1.1	1.5	1.4	0.6	0.6	0.6	0.7	0.7	0.3	0.3	0.3	0.4	0.4
Italy		2.1	2.1	2.1	2.2	2.2	1.8	1.7	1.4	1.9	1.9	0.9	0.8	0.7	0.9	0.8	0.5	0.3	0.3	0.5	0.4
Spain		1.6	1.8	1.7	1.7	1.7	1.1	1.2	1.1	1.3	1.2	0.5	0.6	0.5	0.6	0.6	0.3	0.1	0.2	0.2	0.3
Netherlands		2.0	2.0	2.0	2.1	2.1	1.7	1.5	1.4	1.8	1.8	0.9	0.9	0.9	0.9	0.9	0.5	0.4	0.3	0.5	0.6
Belgium		1.6	1.8	1.8	1.7	1.7	1.3	1.3	1.3	1.6	1.5	0.8	0.7	0.7	0.9	0.8	0.4	0.3	0.3	0.6	0.5
United Kingdom		1.8	1.8	1.7	1.8	1.8	1.5	1.3	1.3	1.6	1.5	0.7	0.7	0.6	0.8	0.8	0.3	0.2	0.3	0.3	0.3
United States		1.5	1.5	1.6	1.7	1.6	1.3	1.3	1.3	1.5	1.3	0.6	0.7	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4
Japan		2.8	2.5	2.7	2.7	2.7	2.3	2.1	2.1	2.3	2.4	1.4	1.4	1.3	1.3	1.3	0.7	0.6	0.6	0.8	0.8
Average of 9 countries		1.9	2.0	2.0	2.0	2.0	1.6	1.5	1.4	1.7	1.7	0.8	0.8	0.8	0.8	0.8	0.4	0.3	0.3	0.5	0.5

Table 1 (continued)

DESCRIPTIVE STATISTICS OF GDP GROWTH FORECAST ERRORS (1991-2009)

	Memo:	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	Actual GDP growth	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
$RMSE$ / SD **of actual GDP growth**																					
Germany	1.1	1.2	1.1	1.2	1.2	1.2	1.0	0.8	0.8	1.0	1.0	0.4	0.4	0.4	0.4	0.4	0.2	0.1	0.1	0.2	0.2
France	1.1	1.1	1.1	1.1	1.1	1.1	1.0	0.8	0.7	1.0	1.0	0.4	0.5	0.4	0.5	0.5	0.2	0.2	0.2	0.3	0.3
Italy	1.1	1.2	1.1	1.2	1.2	1.2	1.0	0.9	0.8	1.0	1.0	0.5	0.4	0.4	0.5	0.5	0.3	0.2	0.2	0.3	0.2
Spain	0.8	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.7	0.7	0.3	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Netherlands	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.7	0.9	0.9	0.4	0.5	0.5	0.4	0.5	0.2	0.2	0.2	0.2	0.3
Belgium	1.0	1.1	1.1	1.1	1.0	0.8	0.8	0.8	1.0	0.9	0.5	0.4	0.4	0.5	0.5	0.3	0.2	0.2	0.3	0.3	
United Kingdom	0.9	0.9	0.9	1.0	0.9	0.8	0.7	0.7	0.8	0.8	0.4	0.4	0.3	0.4	0.4	0.2	0.1	0.1	0.2	0.2	
United States	0.8	0.9	0.9	1.0	0.9	0.8	0.8	0.8	0.9	0.8	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	
Japan	1.3	1.1	1.3	1.2	1.2	1.1	1.0	1.0	1.1	1.1	0.6	0.6	0.6	0.6	0.6	0.3	0.3	0.3	0.4	0.4	
Average of 9 countries	1.0	1.0	1.0	1.0	1.0	0.9	0.8	0.7	0.9	0.9	0.4	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.2	0.2	

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

3.2. Assessing relative accuracy

Table 2 reports Theil's U coefficient for the comparison of the various institutions' GDP growth forecasts with a same-change naive benchmark. All forecasters have U coefficients lower than one, meaning that they all have a lower MSE than the naive forecast.[21] However, according to the results of the test proposed by Diebold and Mariano (1995), the five forecasters are significantly better than the naive benchmark for current-year but not for next-year horizons. The negative estimates for the parameter α are the equivalent to the result of U coefficients lower than one. For current-year horizons, we are able to reject the null hypothesis of equal forecast accuracy for most countries, at a 10 per cent significance level. For next-year horizons, it is not possible to conclude that the forecasters were significantly better than the naive for the majority of countries (with a clear exception for Japan).

The comparison of the forecast accuracy of the three international organisations with that of the two private institutions is reported in table 3.[22] In general, the $RMSE$ of international organisations' forecasts does not differ much from that of private analysts, for the various countries and horizons. The ratio of $RMSE$ is in most cases close to one. The test of statistical significance of the difference between the two sets of forecasts confirms that, in general, we cannot reject the hypothesis that international organisations and private analysts have similar forecast accuracy. There are just a few cases for the shorter forecasting horizon (Autumn current-year) where this hypothesis is rejected. In most of these cases one of the international organisations, though not always the same, proved to be more accurate than the Consensus or The Economist (ratio of $RMSE$ lower than one $\Leftrightarrow$ negative estimate for α). The evidence is somewhat more consistent for France and Belgium but even for these countries it seems far-fetched to conclude that international organisations perform consistently better in the shorter horizon.[23]

4. Efficiency of forecasts

The evaluation of forecasts provided in the previous section does not assess their quality in the sense of being optimal with regard to a particular information set. To assess this we need to establish testable properties that an optimal forecast should have and, for that, we will assume that the objective function of forecasters is of the mean squared error type, *i.e.* forecasts minimize a symmetric quadratic loss function. As discussed in Timmermann (2007), this implies, under broad conditions, that the optimal forecast is unbiased and there is absence of serial correlation in the forecast errors. The existence of serially correlated errors means that it would be possible to improve the forecast using the information on known past errors. These requirements are usually referred to in the literature as weak efficiency requirements and are empirically tested for our data set.

The test for the weak efficiency requirements is performed directly on the properties of the forecasting errors (unbiasedness and absence of serial correlation). Indeed, for a h-period-ahead forecast to be

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21 This same-change naive benchmark proved to be more demanding than a no-change benchmark as we expected: Theil's U coefficients are generally higher. There are a few exceptions for year-ahead forecasts for Germany, Italy and Japan, which experienced around zero GDP growth rates during some years of the sample.

22 Recall that, as explained in Section 2, each international organisation is compared with its specific data set for the Consensus and for The Economist.

23 We also run a Diebold and Mariano (1995) test for differences in accuracy among the international organisations and among the two private analysts and, again, it was not possible to reject equal forecast accuracy for the vast majority of cases.

Table 2

GDP GROWTH - COMPARISON OF THE FORECAST ACCURACY OF EACH INSTITUTION WITH THAT OF A SAME-CHANGE NAIVE FORECAST

	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
Theil's U																				
Germany	0.9	0.8	0.7	0.8	0.8	0.6	0.4	0.3	0.6	0.5	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
France	0.9	0.9	0.9	0.9	0.8	0.6	0.4	0.4	0.7	0.6	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.1
Italy	0.8	0.9	0.9	0.9	0.9	0.6	0.5	0.4	0.7	0.7	0.2	0.2	0.2	0.3	0.2	0.1	0.0	0.0	0.1	0.1
Spain	0.5	0.6	0.5	0.6	0.6	0.2	0.3	0.2	0.3	0.3	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Netherlands	0.6	0.7	0.7	0.7	0.7	0.5	0.4	0.4	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.1
Belgium	0.6	0.7	0.7	0.7	0.7	0.3	0.3	0.3	0.5	0.5	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.1	0.1
United Kingdom	0.5	0.5	0.4	0.5	0.5	0.3	0.3	0.3	0.4	0.3	0.1	0.2	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.0
United States	0.4	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.5	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Japan	0.8	0.6	0.8	0.7	0.7	0.5	0.4	0.4	0.5	0.6	0.4	0.4	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Diebold and Mariano test: estimate for α																				
Germany	-0.5	-1.5	-2.1	-1.4	-1.6	-2.1	-4.6	-5.1	-3.0	-3.4	-4.3	-4.5	-4.2	-4.6	-4.2	-4.4	-4.8	-4.6	-4.7	-4.5
France	-0.4	-0.3	-0.4	-0.5	-0.5	-1.2	-1.8	-2.1	-1.1	-1.2	-1.8	-1.7	-1.8	-1.7	-1.7	-2.0	-2.1	-2.2	-2.1	-2.1
Italy	-1.1	-0.7	-0.7	-0.5	-0.5	-2.1	-2.3	-3.0	-1.5	-1.5	-2.2	-2.3	-2.3	-2.0	-2.1	-2.6	-2.6	-2.6	-2.5	-2.5
Spain	-2.4	-2.7	-3.1	-2.0	-2.0	-4.3	-4.5	-4.8	-4.0	-4.0	-2.6	-2.5	-2.6	-2.5	-2.6	-2.6	-2.5	-2.5	-2.6	-2.5
Netherlands	-2.3	-2.0	-1.9	-1.7	-1.8	-2.9	-3.7	-3.8	-2.8	-2.7	-2.9	-2.7	-2.8	-3.0	-2.9	-3.3	-3.2	-3.2	-3.3	-3.2
Belgium	-1.6	-1.5	-1.5	-1.3	-1.4	-3.0	-3.6	-3.5	-2.2	-2.5	-2.7	-2.8	-2.7	-2.5	-2.7	-3.1	-3.4	-3.1	-2.9	-3.0
United Kingdom	-3.7	-3.7	-3.7	-3.4	-3.4	-4.2	-4.8	-4.8	-4.0	-4.2	-2.8	-2.8	-2.9	-2.7	-2.7	-3.4	-3.4	-3.4	-3.4	-3.4
United States	-2.6	-2.4	-2.3	-1.8	-2.3	-2.7	-2.8	-2.7	-2.2	-2.6	-2.5	-2.3	-2.6	-2.5	-2.5	-2.3	-2.3	-2.3	-2.3	-2.3
Japan	-2.4	-3.8	-2.5	-2.8	-2.8	-4.9	-6.1	-6.1	-5.0	-4.6	-3.2	-3.3	-3.4	-3.4	-3.3	-4.3	-4.5	-4.3	-4.1	-4.1
p-value of the t-statistic for $\alpha=0$[(a)]																				
Germany	0.76	0.31	0.24	0.25	0.24	0.33	0.09	0.08	0.10	0.11	0.07	0.07	0.06	0.06	0.06	0.05	0.04	0.04	0.04	0.04
France	0.56	0.63	0.56	0.49	0.48	0.25	0.06	0.07	0.19	0.16	0.02	0.02	0.04	0.03	0.03	0.01	0.01	0.02	0.02	0.02
Italy	0.42	0.53	0.50	0.56	0.58	0.17	0.09	0.10	0.18	0.18	0.04	0.04	0.04	0.04	0.03	0.02	0.02	0.02	0.03	0.02
Spain	0.24	0.15	0.19	0.26	0.29	0.17	0.10	0.11	0.16	0.17	0.12	0.12	0.11	0.12	0.13	0.10	0.07	0.07	0.10	0.11
Netherlands	0.27	0.25	0.26	0.35	0.32	0.20	0.11	0.15	0.18	0.22	0.20	0.21	0.20	0.19	0.19	0.14	0.11	0.10	0.14	0.15
Belgium	0.23	0.19	0.15	0.10	0.16	0.10	0.04	0.03	0.05	0.08	0.02	0.02	0.01	0.02	0.02	0.01	0.00	0.01	0.02	0.02
United Kingdom	0.11	0.12	0.12	0.12	0.12	0.13	0.14	0.14	0.11	0.13	0.14	0.13	0.14	0.15	0.15	0.08	0.07	0.07	0.07	0.07
United States	0.09	0.11	0.13	0.18	0.09	0.07	0.07	0.11	0.10	0.07	0.02	0.03	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.01
Japan	0.06	0.01	0.04	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02	0.03	0.03	0.01	0.01	0.01	0.01	0.01

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.
Note: (a) p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of equal forecast accuracy, at a significance level of 5 (10) per cent.

Table 3

GDP GROWTH – COMPARISON OF THE FORECAST ACCURACY OF INTERNATIONAL ORGANISATIONS WITH THAT OF PRIVATE ANALYSTS

	Compared to the Consensus												Compared to The Economist											
	Spring next-year forecast			Autumn next-year forecast			Spring current-year forecast			Autumn current-year forecast			Spring next-year forecast			Autumn next-year forecast			Spring current-year forecast			Autumn current-year forecast		
	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD	IMF	EC	OECD
Ratio of $RMSE$[a]																								
Germany	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.1	0.9	1.1	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.1	0.8	0.7	0.9
France	0.9	1.0	1.0	0.9	0.9	0.9	0.9	1.1	1.0	0.6	0.7	1.1	0.9	1.0	1.0	0.9	1.0	0.9	0.9	1.0	1.0	0.6	0.8	1.0
Italy	1.0	1.0	1.0	0.9	1.0	0.9	1.0	0.9	1.0	1.1	1.0	1.0	0.9	1.0	1.0	0.9	1.1	0.9	1.0	0.9	1.0	1.2	1.1	1.0
Spain	0.9	1.0	0.9	0.9	1.0	0.9	0.8	0.9	0.9	1.2	0.6	0.9	0.9	1.0	0.9	0.9	1.1	0.9	0.9	0.9	0.9	0.9	0.6	0.8
Netherlands	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.1	1.1	1.0	1.1	1.0	0.9	1.0	1.0	1.0	1.0	0.9	0.9	1.1	1.1	0.8	1.1	1.0
Belgium	0.9	1.0	1.0	0.8	0.8	0.9	0.9	0.9	0.9	0.7	0.6	0.7	0.9	1.0	1.0	0.9	1.0	0.9	1.0	1.0	0.9	0.9	0.7	0.8
United Kingdom	1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.9	0.9	1.0	0.8	1.1	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.0	0.8	1.2
United States	0.8	0.9	1.0	0.9	1.0	1.0	1.0	1.4	1.0	0.9	1.0	1.1	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.3	1.0	0.9	1.0	1.1
Japan	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.9	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8	0.9	1.0
Diebold and Mariano test: estimate for α																								
Germany	-0.2	0.2	-0.2	-0.2	-0.1	-0.1	0.1	0.1	0.2	0.0	-0.0	0.0	-0.3	0.1	-0.2	-0.3	0.1	-0.4	0.1	0.1	0.1	-0.0	-0.1	-0.0
France	-0.4	-0.1	0.0	-0.4	-0.4	-0.2	-0.1	0.0	-0.0	-0.1	-0.1	0.0	-0.3	-0.2	0.1	-0.2	-0.0	-0.2	-0.1	-0.0	-0.0	-0.1	-0.1	-0.0
Italy	-0.4	0.1	0.1	-0.5	0.0	-0.3	-0.0	-0.1	-0.0	0.0	-0.0	-0.0	-0.5	-0.1	-0.1	-0.4	0.4	-0.3	0.0	-0.1	-0.0	0.1	0.0	0.0
Spain	-0.4	-0.1	-0.4	-0.4	-0.1	-0.2	-0.1	-0.1	-0.1	0.0	-0.0	-0.0	-0.4	-0.2	-0.4	-0.4	0.2	-0.2	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0
Netherlands	-0.5	-0.2	-0.1	-0.3	-0.3	-0.0	-0.0	0.1	0.1	-0.0	0.0	0.0	-0.5	-0.2	-0.1	-0.3	-0.0	-0.3	-0.1	0.1	0.1	-0.1	0.0	0.0
Belgium	-0.5	-0.2	-0.1	-0.8	-0.7	-0.5	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.4	-0.1	0.1	-0.6	-0.0	-0.3	-0.1	-0.0	-0.1	-0.0	-0.1	-0.1
United Kingdom	-0.2	-0.0	-0.0	-0.2	-0.4	-0.0	-0.1	-0.1	-0.0	0.0	-0.0	0.0	-0.1	-0.2	-0.0	-0.0	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.0	0.0
United States	-0.8	-0.5	-0.3	-0.5	-0.1	0.1	0.0	0.2	0.0	-0.0	0.0	0.0	-0.3	-0.2	0.0	-0.1	-0.0	-0.0	0.1	0.2	0.0	-0.0	-0.0	0.0
Japan	0.4	-1.0	0.4	0.1	-0.3	0.3	0.2	0.1	-0.1	-0.2	-0.1	-0.0	0.3	-0.9	0.4	-0.3	-0.1	-0.0	0.1	0.1	-0.1	-0.2	-0.1	0.0
p-value of the t-statistic for $\alpha=0$[b]																								
Germany	0.75	0.34	0.63	0.72	0.85	0.72	0.34	0.19	0.09	0.53	0.34	0.14	0.57	0.62	0.67	0.43	0.50	0.34	0.51	0.47	0.09	0.23	0.05	0.41
France	0.49	0.76	0.84	0.37	0.29	0.08	0.25	0.47	0.92	0.02	0.01	0.34	0.42	0.62	0.33	0.46	0.82	0.34	0.18	0.92	0.51	0.04	0.05	0.82
Italy	0.60	0.84	0.59	0.40	0.96	0.30	0.84	0.26	0.64	0.74	0.75	0.97	0.49	0.81	0.58	0.32	0.05	0.32	0.91	0.55	0.62	0.53	0.35	0.90
Spain	0.22	0.60	0.43	0.28	0.27	0.22	0.18	0.21	0.12	0.04	0.20	0.63	0.09	0.37	0.53	0.18	0.29	0.31	0.36	0.15	0.09	0.38	0.04	0.31
Netherlands	0.07	0.35	0.72	0.17	0.30	0.97	0.71	0.35	0.11	0.89	0.07	0.90	0.09	0.41	0.79	0.16	0.88	0.55	0.32	0.54	0.15	0.10	0.48	0.97
Belgium	0.49	0.69	0.77	0.25	0.22	0.13	0.07	0.38	0.21	0.02	0.00	0.00	0.38	0.81	0.42	0.12	0.89	0.13	0.38	0.76	0.58	0.21	0.01	0.09
United Kingdom	0.47	0.83	0.81	0.65	0.40	0.86	0.27	0.32	0.56	0.75	0.17	0.23	0.38	0.35	0.84	0.96	0.15	0.04	0.28	0.41	0.32	0.93	0.11	0.18
United States	0.35	0.52	0.62	0.38	0.79	0.60	0.26	0.13	0.69	0.07	0.90	0.05	0.50	0.65	0.97	0.75	0.90	0.96	0.09	0.22	0.80	0.16	1.00	0.49
Japan	0.59	0.25	0.47	0.86	0.63	0.43	0.38	0.72	0.56	0.02	0.32	0.86	0.48	0.17	0.33	0.59	0.69	0.95	0.45	0.77	0.63	0.05	0.31	0.95

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

Notes: (a) Ratio of the $RMSE$ of each international organisation to the $RMSE$ of the Consensus or The Economist. **(b)** p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of equal forecast accuracy, at a significance level of 5 (10) per cent.

efficient, forecast errors can follow a moving average process of order not higher than $h-1$.[24] To implement the test we estimate the regression:

$$e_{t,h} = \gamma + \beta e_{t-1,h} + \varepsilon_{t,h} \qquad (7)$$

and perform the three following tests: a t-test for $\gamma = 0$ (unbiasedness), a t-test for $\beta = 0$ (no serial correlation) and an F-test for the joint hypothesis $\gamma = 0$ and $\beta = 0$ (weak efficiency). If β is significantly different from zero it would indicate that there is a systematic error with autocorrelation of a higher than appropriate order. For these econometric tests to be valid it must be the case that there is no serial correlation in the residual terms $\varepsilon_{t,h}$. The Breusch-Godfrey test is carried out to test for the presence of serial correlation in the residuals.[25]

The evidence regarding unbiasedness of GDP growth forecasts, presented in table 4, shows that for the majority of countries we are not able to reject that the mean error of year-ahead forecasts is statistically equal to zero. However, as hinted from the analysis in Section 3, forecasters present a tendency to significantly overestimate GDP growth for the major euro area countries in year-ahead horizons.[26] Current-year forecasts have no significant bias for the vast majority of countries and institutions (with a few exceptions for Italy and Spain).[27]

When testing jointly for unbiasedness and no serial correlation of forecast errors, it is not possible in most cases to reject that forecasts are efficient for current-year horizons. For year-ahead horizons, the evidence points to inefficiency of the various institutions' forecasts for some euro area countries. This means that projections could have been improved if either the average bias or the information contained in past errors were properly taken into account.

5. Additional dimensions of forecast accuracy

5.1. Assessing directional accuracy

The traditional quantitative evaluation of macroeconomic forecasts tends to overlook the fact that, even if forecast errors are substantial, forecasts may provide useful information about the qualitative status of an economy, such as the acceleration/deceleration of economic activity. Useful forecasts should go in the right direction. This section investigates the directional accuracy of forecasts, *i.e.* the correctness of the projected direction of change of GDP growth.

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24 Given that we are working with annual data, we assumed that h could be either equal to 1 (for current-year forecasts) or 2 (for year-ahead forecasts). For $h = 1$, the errors must be serially uncorrelated.

25 In cases deemed necessary, the test for weak efficiency is performed by running an alternative regression: $e_{t,h} = \gamma + \beta_1 e_{t-1,h} + \beta_2 e_{t-2,h} + \varepsilon_{t,h}$ and testing for $\beta_1 = \beta_2 = 0$ (no serial correlation) and for $\gamma = \beta_1 = \beta_2 = 0$ (weak efficiency). Results presented in table 4 for Germany, France, Italy and Spain refer to this equation, given that the Breusch-Godfrey test applied to equation (7) indicated possible serial correlation in the residuals in various cases.

26 The evidence of a significant bias for major euro area countries in year-ahead horizons still holds if we exclude 2009 from the sample.

27 As suggested by Holden and Peel (1990), we also perform a direct test for the statistical significance of the bias by running the regression $e_{t,h} = \gamma + \varepsilon_{t,h}$ and making a simple Student's t-test for $\gamma = 0$. This test confirms in general the results presented in table 4 but there is additional evidence of a significant bias in year-ahead forecasts for Japan, at a 10 per cent significance level. This difference in results is probably related to the above mentioned high standard deviation of forecast errors for Japan.

Table 4

GDP GROWTH – TEST FOR WEAK EFFICIENCY OF FORECASTS

	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
Test for unbiasedness ($\gamma=0$)[a]																				
Germany	0.05	0.08	0.08	0.11	0.08	0.10	0.17	0.12	0.16	0.12	0.67	0.95	0.83	0.94	0.74	0.63	0.70	1.00	0.87	0.87
France	0.06	0.05	0.10	0.13	0.10	0.03	0.07	0.10	0.11	0.07	0.33	0.37	0.38	0.26	0.44	0.44	0.49	0.41	0.74	0.76
Italy	0.01	0.01	0.03	0.02	0.02	0.01	0.03	0.03	0.03	0.02	0.02	0.00	0.12	0.02	0.05	0.18	0.14	0.29	0.04	0.13
Spain	0.13	0.20	0.25	0.30	0.25	0.51	0.54	0.74	0.54	0.70	0.56	0.16	0.01	0.58	0.28	0.04	0.28	0.03	0.00	0.01
Netherlands	0.29	0.35	0.32	0.32	0.37	0.25	0.36	0.40	0.28	0.32	0.84	0.82	0.69	0.92	0.93	0.25	0.10	0.51	0.29	0.43
Belgium	0.24	0.12	0.14	0.34	0.34	0.20	0.15	0.17	0.26	0.27	0.30	0.92	0.69	0.93	0.68	0.13	0.57	0.48	0.23	0.25
United Kingdom	0.40	0.37	0.37	0.37	0.37	0.40	0.47	0.55	0.43	0.34	0.69	0.82	0.91	0.85	0.76	0.67	0.73	0.99	0.88	0.96
United States	0.90	0.95	0.85	0.61	0.70	0.68	0.21	0.44	0.85	0.95	0.20	0.21	0.63	0.51	0.43	0.31	0.64	0.96	0.54	0.60
Japan	0.27	0.24	0.24	0.33	0.26	0.19	0.23	0.25	0.27	0.20	0.74	0.41	0.54	0.97	0.80	0.28	0.29	0.38	0.11	0.16
Test for no serial correlation ($\beta=0$)[b]																				
Germany	0.41	0.49	0.59	0.36	0.26	0.72	0.59	0.65	0.77	0.73	0.79	0.94	0.77	0.50	0.88	0.60	0.64	0.75	0.68	0.64
France	0.59	0.72	0.44	0.29	0.34	0.45	0.43	0.52	0.73	0.69	0.12	0.50	0.41	0.15	0.22	0.49	0.10	0.50	0.23	0.39
Italy	0.08	0.10	0.13	0.08	0.08	0.16	0.37	0.30	0.18	0.18	0.09	0.10	0.34	0.36	0.50	0.29	0.55	0.34	0.18	0.29
Spain	0.00	0.05	0.13	0.01	0.01	0.04	0.18	0.24	0.09	0.03	0.52	0.21	0.10	0.44	0.39	0.46	0.17	0.23	0.04	0.09
Netherlands	0.24	0.27	0.37	0.25	0.22	0.36	0.78	0.84	0.31	0.28	0.75	0.26	0.36	0.35	0.34	0.16	0.23	0.40	0.67	0.23
Belgium	0.94	0.71	0.76	0.64	0.55	0.97	0.37	0.55	0.58	0.72	0.05	0.34	0.66	0.17	0.23	0.40	0.73	0.97	0.45	0.52
United Kingdom	0.16	0.15	0.16	0.18	0.19	0.39	0.54	0.68	0.49	0.62	0.72	0.92	0.96	0.80	0.72	0.31	0.26	0.38	0.72	0.91
United States	0.10	0.19	0.11	0.07	0.09	0.34	0.93	0.78	0.23	0.22	0.65	0.19	0.64	0.68	0.71	0.52	0.98	0.79	0.91	0.82
Japan	0.15	0.22	0.31	0.18	0.23	0.24	0.38	0.63	0.25	0.33	0.46	0.38	0.35	0.46	0.34	0.11	0.32	0.41	0.29	0.32
Test for weak efficiency ($\gamma=0$ and $\beta=0$)[c]																				
Germany	0.10	0.18	0.14	0.20	0.11	0.39	0.49	0.46	0.51	0.42	0.87	0.99	0.91	0.70	0.95	0.77	0.76	0.89	0.85	0.82
France	0.04	0.09	0.06	0.08	0.07	0.13	0.28	0.36	0.41	0.29	0.20	0.62	0.54	0.24	0.36	0.65	0.17	0.62	0.38	0.57
Italy	0.00	0.01	0.01	0.01	0.01	0.02	0.07	0.07	0.04	0.03	0.07	0.02	0.32	0.10	0.18	0.37	0.18	0.22	0.13	0.28
Spain	0.00	0.07	0.16	0.02	0.01	0.06	0.28	0.38	0.12	0.04	0.61	0.21	0.04	0.61	0.50	0.15	0.16	0.10	0.03	0.05
Netherlands	0.19	0.27	0.29	0.24	0.25	0.29	0.61	0.66	0.29	0.31	0.93	0.51	0.58	0.63	0.62	0.26	0.19	0.58	0.39	0.20
Belgium	0.43	0.28	0.31	0.47	0.42	0.43	0.31	0.37	0.40	0.47	0.10	0.63	0.83	0.38	0.45	0.27	0.82	0.77	0.42	0.47
United Kingdom	0.17	0.14	0.17	0.23	0.21	0.38	0.57	0.73	0.50	0.46	0.88	0.97	0.99	0.95	0.90	0.56	0.50	0.67	0.92	0.99
United States	0.25	0.36	0.27	0.17	0.22	0.49	0.38	0.64	0.48	0.44	0.26	0.07	0.78	0.70	0.61	0.52	0.89	0.96	0.82	0.85
Japan	0.06	0.10	0.15	0.14	0.11	0.08	0.19	0.36	0.17	0.14	0.74	0.56	0.59	0.75	0.62	0.20	0.43	0.54	0.23	0.30

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

Notes: (a) p-value of the t-statistic for $\gamma=0$. p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of unbiasedness, at a significance level of 5 (10) per cent. **(b)** p-value of the t-statistic for $\beta=0$. In the cases of Germany, France, Italy and Spain, p-value of the F-statistic for $\beta_1=\beta_2=0$. p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of no serial correlation, at a significance level of 5 (10) per cent. **(c)** p-value of the F-statistic for $\gamma=\beta=0$. In the cases of Germany, France, Italy and Spain, p-value of the F-statistic for $\gamma=\beta_1=\beta_2=0$. p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of weak efficiency, at a significance level of 5 (10) per cent.

Being y_t the actual growth rate in year t, let $\Delta y_t = y_t - y_{t-1}$ be the actual acceleration $\left(\Delta y_t > 0\right)$ or deceleration $\left(\Delta y_t < 0\right)$ in year t. Most previous studies compute the predicted acceleration/deceleration by comparing the forecasted growth rate with the actual growth rate of the previous period $\left(\Delta \hat{y}_{t,h} = \hat{y}_{t,h} - y_{t-1}\right)$. However, for longer forecasting horizons this would imply using information not yet known to forecasters at the time of forecasting. To be consistent with the approach followed in Section 3 – use only information available to forecasters at each point in time – and following the methodology of Ashiya (2003), we decided to compute the predicted direction of change as the acceleration/deceleration implicit in the forecast at each forecasting exercise $\left(\hat{\Delta y}_{t,h} = \hat{y}_{t,h} - \hat{y}_{t-1,h}\right)$. To evaluate the directional accuracy of forecasts the sign of $\hat{\Delta y}_{t,h}$ is compared to the sign of Δy_t.

The directional data for each country can be arranged in a 2x2 contingency table, in which the two rows represent positive and negative/null changes in the outcome and the two columns represent positive and negative/null changes in the forecast. If the number of cases in the diagonal ($n_{11} + n_{22} =$ cases where Δy_t and $\hat{\Delta y}_{t,h}$ are both > 0 or both ≤ 0) is "sufficiently" large compared to the total number of observations $\left(n\right)$, the forecasts are considered to be directionally accurate. More formally, we run a chi-squared independence test as described in Carnot *et al.* (2005):[28]

$$\sum_{i=1}^{2}\sum_{j=1}^{2}\frac{\left(n_{ij} - n_{i.}n_{.j}/n\right)^2}{n_{i.}n_{.j}/n} \sim \chi^2(1) \qquad (8)$$

The null hypothesis is that the sign of Δy_t and the sign of $\hat{\Delta y}_{t,h}$ are independent. The rejection of the null means that there is a significant association between the actual and the predicted direction of change and, therefore, forecasts can be said to be directionally accurate.

As before, the directional accuracy of the various forecasters is compared to that of a same-sign of change naive benchmark. This naive benchmark extrapolates the same sign of change for GDP growth as was last observed at the time of forecasting. Also, the forecasting ability of the three international organisations in terms of direction of change is compared to that of the two private sector institutions.

Table 5 shows the proportion of times that forecasters correctly predicted that GDP was going to accelerate or decelerate. For the group of nine countries, forecasts of all institutions are accurate more than 60/70 per cent of the time for the year-ahead horizons. For current-year horizons their accuracy is higher, at around 80/90 per cent of the time.[29] The results of the chi-squared independence test for the individual countries confirm that there is a significant association between the sign of change of GDP growth in the forecasts and in the outcomes for basically all countries, with some exceptions for the longest forecasting horizon.

When looking at different benchmarks to evaluate the directional accuracy of forecasts, it is clear that the five forecasters were better at predicting the sign of change of GDP growth than a naive forecast for all

28 See Ash *et al.* (1998) for an application of alternative non-parametric tests on the direction of forecasts.

29 Note that, for this group of countries, the sign of $\hat{\Delta y}_{t,h}$ proved to be a more accurate predictor than the sign of $\Delta \hat{y}_{t,h}$ for year-ahead horizons. This is in line with previous results by Ashiya (2003).

Table 5

GDP GROWTH – DIRECTIONAL ACCURACY OF FORECASTS

	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
Percentage of correct predictions of the direction of change																				
Germany	47	71	65	47	71	67	83	83	72	67	83	83	89	89	83	100	100	94	100	94
France	59	65	59	53	71	72	78	78	67	67	94	89	83	89	89	100	94	94	89	89
Italy	53	53	53	47	59	61	72	72	56	56	78	78	78	72	78	94	94	94	89	89
Spain	87	71	82	80	80	88	78	83	81	81	81	78	89	88	88	94	100	100	100	88
Netherlands	67	65	71	60	60	56	72	67	63	56	63	72	72	65	59	81	83	83	76	71
Belgium	73	71	76	80	80	88	89	78	81	88	88	83	83	82	82	88	89	89	76	76
United Kingdom	82	82	76	82	82	83	89	94	89	89	100	94	94	94	94	94	100	100	100	100
United States	59	65	65	59	59	67	56	67	67	67	78	78	83	78	78	83	83	83	78	72
Japan	53	82	59	53	59	78	83	67	78	72	72	78	72	72	72	72	78	72	78	72
All 9 countries	64	69	67	62	69	73	78	77	72	71	82	81	83	81	81	90	91	90	87	84
Ratio of correct predictions to those of a naive benchmark																				
Germany	0.8	1.2	1.2	0.9	1.5	1.1	1.6	1.8	1.4	1.6	2.1	2.1	2.0	2.0	1.7	2.6	2.3	1.9	2.3	1.7
France	1.0	1.1	1.0	0.9	1.2	1.4	1.5	1.3	1.1	1.1	2.8	2.7	2.1	2.3	2.3	3.6	3.4	2.4	2.3	2.3
Italy	1.1	1.1	1.1	1.0	1.3	1.3	1.5	1.5	1.2	1.2	1.6	1.6	1.6	1.4	1.6	1.9	1.9	1.9	1.8	1.8
Spain	2.0	1.7	2.0	1.9	2.3	2.2	1.9	2.0	2.0	2.3	1.6	1.4	1.6	1.8	1.8	1.9	1.8	1.8	2.0	1.8
Netherlands	1.3	1.0	1.1	0.9	1.1	0.9	1.4	1.3	1.2	1.2	1.7	1.6	1.6	1.7	1.8	1.9	1.5	1.5	1.5	1.6
Belgium	2.6	2.0	2.2	2.8	3.4	2.6	2.5	2.2	2.4	3.0	2.0	1.7	1.7	1.9	1.9	2.0	1.8	1.8	1.7	1.7
United Kingdom	3.5	3.5	3.3	3.5	3.5	3.5	5.0	4.0	3.8	3.8	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.3	2.3	2.3
United States	1.3	1.2	1.2	1.1	1.1	1.4	0.9	1.1	1.1	1.1	1.4	1.6	1.7	1.6	1.6	1.3	1.3	1.3	1.2	1.1
Japan	1.3	2.3	1.4	1.3	1.4	1.9	2.4	1.6	1.9	1.8	1.1	1.3	1.1	1.1	1.1	1.1	1.3	1.1	1.2	1.1
All 9 countries	1.4	1.5	1.5	1.4	1.6	1.6	1.8	1.7	1.6	1.7	1.8	1.7	1.7	1.7	1.7	1.9	1.8	1.7	1.7	1.6
p-value of the χ^2 statistic[(a)]																				
Germany	0.27	0.02	0.06	0.27	0.03	0.03	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
France	0.09	0.05	0.09	0.16	0.02	0.02	0.01	0.01	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Italy	0.16	0.16	0.16	0.27	0.09	0.06	0.02	0.02	0.11	0.11	0.01	0.01	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.00
Spain	0.00	0.08	0.01	0.02	0.02	0.00	0.02	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.19	0.20	0.06	0.45	0.45	0.61	0.06	0.17	0.30	0.61	0.30	0.06	0.06	0.23	0.46	0.01	0.00	0.00	0.02	0.03
Belgium	0.06	0.03	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.03	0.03
United Kingdom	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
United States	0.38	0.13	0.13	0.38	0.38	0.04	0.13	0.04	0.09	0.09	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.02	0.04
Japan	0.60	0.00	0.31	0.60	0.31	0.01	0.00	0.17	0.02	0.06	0.06	0.02	0.06	0.06	0.06	0.07	0.02	0.07	0.02	0.07

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

Note: (a) p-values below or equal to 0.05 (0.1) are shaded in dark yellow (light yellow) and indicate rejection of the null hypothesis of independence, at a significance level of 5 (10) per cent.

horizons, even if less so for the longest one.[30] When we compare the institutions among themselves,[31] the directional accuracy of international organisations' forecasts does not seem in general to differ significantly from that of the Consensus or The Economist, for the various horizons.

5.2. Ability to forecast recessions

An additional informative criterion to evaluate macroeconomic forecasts is the ability to predict turning points, considering both the number of actual turns that are correctly predicted and the number of false turns that are predicted. To analyse the forecasters ability to predict economic recessions, we define recession as any year in which real GDP declined $\left(y_t < 0\right)$.[32]

Over the sample period 1991-2009, a total of twenty-three recession episodes were identified for the group of nine countries under analysis. The properties of forecasts during those recession episodes are summarised in table 6. When we compute the percentage of episodes that forecasters were able to anticipate, we see that in general they are not able to anticipate in the preceding year that a recession is going to occur. This is particularly true as of Spring of the previous year and more evident in the case of private analysts. Forecasters seem to identify recessions just in the year in which they occur, though by Spring of that year around half of the recession episodes are still not acknowledged by most forecasters. By Autumn of the year of the recession, even though the decline in GDP is correctly identified in the vast majority of cases, the magnitude of the fall is still under-predicted for around 50 per cent of the cases.[33]

During the period analysed, forecasters predicted a couple of false recessions. This is however a rare event and in most cases happened in current-year forecasts for years with close to zero GDP growth outcomes.

The evidence on the difficulties that forecasters experience in identifying economic recessions in advance (or even when they are occurring) is notable, both for international organisations and private analysts. Though the reasons for this do not seem to have been yet adequately explored, some authors such as Loungani (2001) have suggested that either forecasters lack the required information (reliable real-time data or models) or lack the incentives to predict recessions. In any case, we should keep in mind that these point forecasts reported by the various institutions may not capture shifts in the probability that they attach to worst case scenarios.

6. General summary and comparison with previous evaluations

In this article, we assessed the accuracy of IMF's, EC's and OECD's forecasts and compared it with that of the Consensus' and The Economist's surveys of private analysts. The focus was on economic growth forecasts for nine advanced economies, over the past two decades. We now provide an overall picture of our findings and briefly compare them with previous results from in-house evaluations of international organisations' forecasts.

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30 When we apply a chi-squared independence test to the naive benchmark it is not possible in general to reject the null hypothesis of no significant association between the actual direction of change of GDP growth and that of the naive forecast.

31 Looking at the ratio of correct predictions of each international organisation to those of its corresponding data set for the Consensus and for The Economist (not provided in table 5).

32 A similar analysis of Consensus' forecasts for a large group of countries can be found in Loungani (2001).

33 As mentioned in Section 3, forecasters show a tendency to overestimate growth when the economy is slowing down and this is particularly severe during economic recessions.

Table 6

GDP GROWTH – FORECAST PERFORMANCE DURING RECESSION EPISODES IN THE GROUP OF 9 COUNTRIES OVER THE PERIOD 1991-2009

	Spring next-year forecast					Autumn next-year forecast					Spring current-year forecast					Autumn current-year forecast				
	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist	IMF	EC	OECD	Consen-sus	The Econo-mist
Percentage of episodes where a recession was forecasted $\left(\hat{y}_{t,h} < 0\right)$	0	0	0	0	0	13	22	39	0	0	43	57	65	48	57	87	87	91	83	87
Percentage of episodes where the forecast was too optimistic $\left(\hat{y}_{t,h} > y_t\right)$	100	100	100	100	100	100	100	100	100	100	70	70	61	87	83	48	48	52	61	57
Number of episodes where a false recession was forecasted $\left(\hat{y}_{t,h} < 0, y_t \geq 0\right)$	0	0	0	0	0	0	1	1	0	0	2	3	4	2	3	3	3	3	3	3

Sources: Consensus Economics, EC, IMF, OECD, The Economist and author's calculations.

We find that the accuracy of GDP growth projections clearly increases as the horizon shortens and more information becomes available to the forecaster. Regarding year-ahead horizons, even though the projections of the various forecasters are unbiased and efficient in most cases, there is evidence of inefficiency for some euro area countries. Year-ahead forecasts show a significant negative bias for major euro area countries. This stems from a tendency of the various forecasters to persistently over-predict growth when the economy is slowing down, most noticeably during periods of economic recession. Current-year GDP growth forecasts are generally unbiased and efficient.

Our analysis suggests that the quantitative accuracy of the GDP growth forecasts published by the IMF, the EC and the OECD is not statistically different from that of the Consensus or The Economist, for the various countries and horizons examined. In the rare exceptions observed for the shorter horizon (Autumn current-year), no institution proved to perform consistently better. All five forecasters beat in general a naive model, which projects a GDP growth rate equal to the last one observed, for current-year but not for year-ahead horizons.[34]

Notwithstanding a few distinctive features of the analysis undertaken, our findings are broadly in line with those of the latest in-house assessments of forecasts published by the IMF, the EC and the OECD.[35] Timmermann (2007) analysis of IMF's forecasts, over the period 1990-2003, found that GDP growth forecasts display a tendency for over-prediction in next-year horizons for various advanced economies. However, there is very little evidence on biases or serial correlation of errors for current-year forecasts. IMF's performance is overall statistically similar to that of Consensus, even if the IMF performs slightly better in a few cases for current-year horizons. According to Melander *et al.* (2007) assessment of the EC's forecasts, for the period 1969-2005, growth forecasts for the European Union generally proved to be unbiased and efficient, though there is evidence of the contrary for some Member States. They also concluded that the track record of the EC's forecasts is broadly comparable with the ones of the Consensus, the IMF and the OECD. The review of OECD's growth projections for the G7 countries over the period 1991-2006, carried out by Vogel (2007), found that year-ahead forecasts are less accurate and have a tendency to overestimate the outcome. Current-year projections are, however, unbiased and efficient. The author argues that OECD's forecasts tend to outperform Consensus for the current-year horizon.

Regarding the directional accuracy of GDP growth forecasts, we find that all forecasters are directionally accurate in the various horizons, with some exceptions for the longest one. As before, the directional accuracy of international organisations' forecasts does not seem to differ much from that of private analysts. The five forecasters are better at forecasting accelerations/decelerations of economic activity than a naive benchmark.

There is a general agreement in the literature about the failure of most forecasters to predict economic recessions in advance and, sometimes, to detect them contemporaneously.[36] Notwithstanding the limited number of observations, our brief evaluation of the recession episodes occurred in the sample

34 Similarly, the assessment of inflation forecasts performed in Abreu (2011) (which only covers the IMF, the Consensus and The Economist) also concludes that the quantitative accuracy of IMF's forecasts is similar to that of the Consensus and The Economist. The accuracy of these three forecasters is not in most cases statistically different from that of a naive random-walk model. Inflation forecasts are generally unbiased and efficient, both for year-ahead and current-year horizons, even though forecasters also display some tendency to over-predict (under-predict) inflation when it is falling (rising). Also, these three forecasters seem to be slightly more accurate at predicting inflation than GDP growth for year-ahead horizons.

35 For earlier assessments see, for example, Artis (1997), Keereman (1999) and Koutsogeorgopoulou (2000).

36 See Fildes and Stekler (2002) for a survey and Loungani (2001) for evidence across a large sample of industrialised and developing countries.

of nine countries during the period 1991-2009 is totally consistent with this finding. As of Spring of the previous year no forecaster is able to predict that GDP is going to fall and by Spring of the recession year around half of the recession episodes is still not acknowledged by most forecasters. Moreover, the forecasts made in Autumn of the recession year still underestimate its magnitude in around 50 per cent of the cases. This underestimation was particularly notorious during the latest economic recession for all five forecasters. Also, forecasters make very few predictions of recessions that do not occur. As pointed out by McNees (1992), this disturbing evidence about the inability to forecast economic recessions advises the forecast user not to ignore the forecasts but rather to think carefully about plausible outcomes far from the central scenarios.

The findings of this study are in line with previous evidence that current-year forecasts for economic growth in advanced economies present in general desirable features but year-ahead forecasts present a more mixed picture in terms of quantitative and qualitative accuracy. This understanding of how large forecast errors are likely to be and how often forecasters are likely to miss the direction where the economy is going is absolutely necessary in order to assess the usefulness of forecasts to its users. Some may consider disappointing the fact that the performance of reputed international organisations is generally similar to that of panels of private analysts. However, we must emphasize that international organisations' forecasts serve a quite different purpose from those of private institutions. They do provide more than just point forecasts. In particular, they provide a detailed and consistent picture for the international outlook and a thorough discussion of the main issues and risks, besides policy recommendations potentially valuable to policymakers. For the forecast user it might however be comforting to learn that he can place as much (little) confidence in the alternative private analysts' forecasts that are available on a monthly basis.

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FISCAL CONSOLIDATION IN A SMALL EURO AREA ECONOMY*

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ABSTRACT

This article focuses on the costs and benefits of a fiscal consolidation in a small euro area economy. The macroeconomic impacts and the welfare analysis are conducted in a New-Keynesian general equilibrium model with non-Ricardian agents. We define a benchmark fiscal consolidation strategy based on a permanent reduction in Government expenditure. We find that, over the long run, fiscal consolidation leads to a considerable increase in the level of output and consumption, and is welfare improving. In addition, the gains are boosted if the fiscal strategy also involves a tax reform that shifts the tax burden away from labour income towards the final goods consumption. However, important short-run costs arise, notably through output, consumption and welfare losses. Finally, we assess the effect of alternative fiscal consolidation paths in terms of its degree of front loading, speed of completion and interaction with the risk premium.

1. Introduction

The Great Recession triggered by the international financial crisis led to the implementation of massive fiscal stimulus plans in many economies. In addition, the injection of public funds in many troubled financial institutions assumed a crucial role in taming systemic risk. In this context, public debt increased substantially across developed economies, including the United States, euro area, the United Kingdom and Japan. These developments raised increasing concerns over public finances sustainability, bringing the discussion on the need of a fiscal consolidation to the center stage of the economic policy debate.

In a context of tense global financing conditions created by increased risk aversion, the uncertainty on public finances sustainability in many economies led to a reappraisal of the sovereign debt risk pricing, which translated into an uneven increase in Government bond yields, in particular across euro area economies. These developments challenged the widely-held belief that the euro was a bulletproof vest against significant risk price discrimination among participant economies, since the common monetary policy coupled with the Stability and Growth Pact rules were taken as almost ensuring perfect risk-sharing.

The international financial and economic crisis put in evidence the heterogeneity of euro area economies and discredited the perfect risk sharing assumption. Euro area economies revealing more fragilities, including larger fiscal imbalances, asset price bubbles and/or increasing difficulties of the banking system in acceding wholesale international financial markets, started to be discriminated in what respects debt pricing. More precisely, higher quality sovereign debt experienced a relative price increase

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* The opinions expressed are those of the authors and not necessarily those of Banco de Portugal or the Eurosystem. Any errors and omissions are the sole responsibility of the authors.

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against lower quality debt. In this context, restoring debt sustainability after the crises, evaluating the benefits of fiscal consolidation in the long-run and creating conditions for a successful consolidation process have become a major focus of the current economic literature (see Rother 2010, Mulas 2010 and Barrios 2010).

This article focuses on the short, medium and long-run impacts on economic activity, demand conditions and welfare of a fiscal consolidation based on specific fiscal policy measures, encompassing a permanent cut in government expenditure and a temporary increase in labour income taxes. Fiscal consolidation is defined herein as a permanent reduction in the public debt ratio. The impact of unbalancing the fiscal instruments towards a stronger increase in consumption taxes in exchange for a smaller increase on taxation on labour income is also analyzed, which in the context of a small-open economy integrated in a monetary union is a possible way of implementing a real exchange rate devaluation, thereby regaining competitiveness and reducing the external imbalance. This might be an important objective in the case where the fiscal deficit and the external deficit (the "twin deficits") are a major concern of domestic authorities. The impact of alternative timings to complete the fiscal consolidation is also addressed. Finally, we consider the case in which the consolidation strategy restores credibility, bringing interest rates to levels below the pre-consolidation period.

The discussion is based on *PESSOA*, a New-Keynesian model for a small euro area economy. The structure of the article is as follows. The model is presented in section 2. Section 3 addresses the impact of alternative fiscal consolidation strategies, with alternative timings, on the main macroeconomic aggregates and on welfare. Section 4 presents a scenario in which the fiscal consolidation is accompanied by a reduction in the domestic risk premium. Section 5 concludes and draws some policy implications.

2. *PESSOA*: a model for a small euro area economy

PESSOA features a small open economy integrated in a fully-fledged monetary union, the euro area.[1] Its structure mainly builds on the IMF's model, Global Integrated Monetary and Fiscal model (GIMF), presented in Kumhof and Laxton (2007). It is assumed from the outset that the rest of the monetary union is not affected by domestic shocks, implying that monetary policy decisions are orthogonal to domestic developments as in Adolfson (2007). In the small open economy setup, the domestic economy is modeled in detail, while the rest of the monetary union modeling is very parsimonious. Contrary to most general equilibrium models in the literature on small open economy, *PESSOA* has intrinsic non-Ricardian features: finitely-lived households in line with the stochastic finite lifetime framework (see Blanchard (1985), Yaari (1965), Buiter (1988) and Weil (1989)); distortionary taxation on households consumption, labour and capital income; and hand-to-mouth households (see Gali *et al.* (2007)). The fiscal block of the model is detailed enough to account for shocks over the several types of distortionary taxation, lump-sum transfers to households, and government expenditure.

Since *PESSOA* is designed for a small open economy integrated in a monetary union, the adjustment mechanism of the economy to domestic shocks is rather different from the standard general equilibrium model setup, in which monetary policy and real interest rate movements are crucial to render the model dynamically stable. In *PESSOA*, monetary policy is trivial in the sense that the domestic interest rate is orthogonal to domestic shocks and can only deviate from the rest of the union rate by a risk premium,

1 See Almeida, V. Castro, G., Félix, R. M. and Maria, J. R. (2011) "Fiscal policy in a small euro area economy", Banco de Portugal, *Economic Bulletin* – Spring 2011.

assumed to be constant. This implies that domestic shocks affecting domestic inflation developments tend to generate powerful effects on the real interest rate, amplifying domestic economy fluctuations. The dynamic stability of the model is ensured instead by an active role of the real exchange rate in the adjustment of international trade in goods and assets. Domestic agents in *PESSOA* are assumed to trade in goods and assets/debt solely with agents in the monetary union. Therefore, real exchange rate fluctuations have sizeable impacts on competitiveness, trade and thus in the net foreign asset/debt position of the economy. Since foreign prices developments are assumed to be independent of domestic shocks, the real exchange rate pins down uniquely the domestic price level.

The model is populated by two types of households: inter-temporal optimizers that can smooth out consumption by trading in domestic and foreign bonds; and hand-to-mouth households that can only perform intra-temporal optimization, since they do not access asset markets. Both types of households derive utility from consumption and leisure, which is modeled by means of a constant relative risk aversion utility function and is subject to external habit formation.

Concerning the production block of the model, two types of firms are featured: manufacturers and distributors. All firms operate in monopolistic competition in their output markets, charging a mark-up over their marginal cost, and in perfect competition in their input markets, rewarding production factors at their marginal productivity. The model features a number of nominal and real rigidities that give rise to realistic short-run impacts and create room for stabilization policy.

The government consumes a particular good and performs transfers across households. To finance its activities, the government levies taxes on labour income, firms' dividends and households' consumption and benefits from non-tax revenues, stemming from EU transfers. Furthermore, the government issues one-period bonds and pays an interest rate on the stock of bonds held from one period to the next, which might differ from the monetary union interest rate due to the risk-premium. To prevent a divergent debt path, a fiscal rule is imposed to ensure that the debt to GDP ratio converges to a pre-specified target value that uniquely pins down the fiscal balance.

3. Macroeconomic effects of a fiscal consolidation

This section assesses the macroeconomic effects of a fiscal consolidation in a small euro area economy. Fiscal consolidation is defined as a permanent reduction in the target public debt ratio and is implemented through a gradual fiscal tightening, followed by stabilization around the new steady-state level. Over time debt falls and so does Government interest outlays, which allows for a larger primary deficit in the new steady-state.

The analysis presented in this section is conducted by implementing a set of fiscal policy simulations using the model described in section 2, to study the costs and benefits of fiscal consolidation. We analyze the effects of two alternative fiscal consolidation scenarios: a pure fiscal consolidation and a fiscal consolidation accompanied by a tax reform. Those scenarios are based on a very specific set of policy measures, which were selected partly on the basis of their macroeconomic impacts. Therefore, before discussing those scenarios, subsection 3.1 presents four simulations in which the impact of each available fiscal policy instrument on the main macroeconomic variables is analyzed in isolation to illustrate the main transmission channels.

Subsection 3.2 studies the transitional dynamic, the steady-state and the welfare impacts of a pure fiscal consolidation program and of a fiscal consolidation program accompanied by a tax reform. The first scenario is focused on the potential benefits and costs of a fiscal consolidation, while in the second

scenario it is examined whether costs can be minimized and benefits can be enhanced by a change in the policy mix.

In subsection 3.3 the pure fiscal consolidation scenario is expanded to implement a sensitivity analysis focused on the duration of the consolidation process. More specifically, we consider two alternative scenarios. The first one evaluates the possibility of a protracted consolidation period (the "slow consolidation scenario"), which is characterized by a less aggressive policy towards reaching the target debt-to-GDP ratio. The second one considers a shorter consolidation period (the "fast consolidation scenario") with a more aggressive policy towards reaching the target debt-to-GDP ratio.

Throughout this section, the fiscal consolidation experiments are all based on a permanent reduction in the public deficit of 1 per cent of the initial steady-state GDP. Given the assumptions of the model for nominal interest rates and nominal GDP growth, around 4.5 and 4 per cent respectively, a permanent reduction in the public deficit of 1 per cent of the initial steady-state GDP corresponds to a decline in the Government debt-to-GDP ratio of around 25 p.p. in the long-run. However, given the extremely long-lived dynamics of fiscal consolidation, changes in flows take literally decades to be fully reflected in the corresponding public debt stock. Thus, in the following subsections impulse response functions are shown by lines for the first 10 years and by points representing outcomes for longer horizons.

3.1. The macroeconomic impact of alternative fiscal instruments

Chart 1 presents the results of 4 alternative fiscal consolidation instruments, with one fiscal instrument being used at a time (transfers to households, Government consumption, tax burden on wage income[2] or consumption tax) to reach a reduction on the fiscal deficit equal to 1 per cent of initial steady-state GDP. In each simulation, the remaining tax rates or spending components are held constant.

Starting with fiscal consolidation based on transfers to households, it affects macroeconomic outcomes mainly through their impact on households' wealth and on the resulting responses of labour supply and private consumption.[3] A reduction in transfers has a significant negative wealth effect, leading to a drop in consumption and leisure and thus to an increase in labour supply.[4] Rule-of-thumb households strongly cut their consumption and simultaneously increase hours worked to compensate foregone income. Consumption of asset holders is less affected, reflecting expected dividend prospects and the possibility of consumption smoothing. Moreover, the shift in labour supply leads to lower real wages and to a decrease in the firm's' marginal costs implying a drop in domestic prices and a real exchange rate depreciation.

A fiscal consolidation based on a decrease in the demand for Government consumption goods, which are labour intensive, implies a reduction in labour demand. As a consequence, real wages decline and so households' wealth and private consumption. In this simulation, unlike what happens in the case of transfers cuts, the impact in labour supply and consumption is similar for both types of households. Moreover, the Government consumption goods employ resources that would otherwise be available

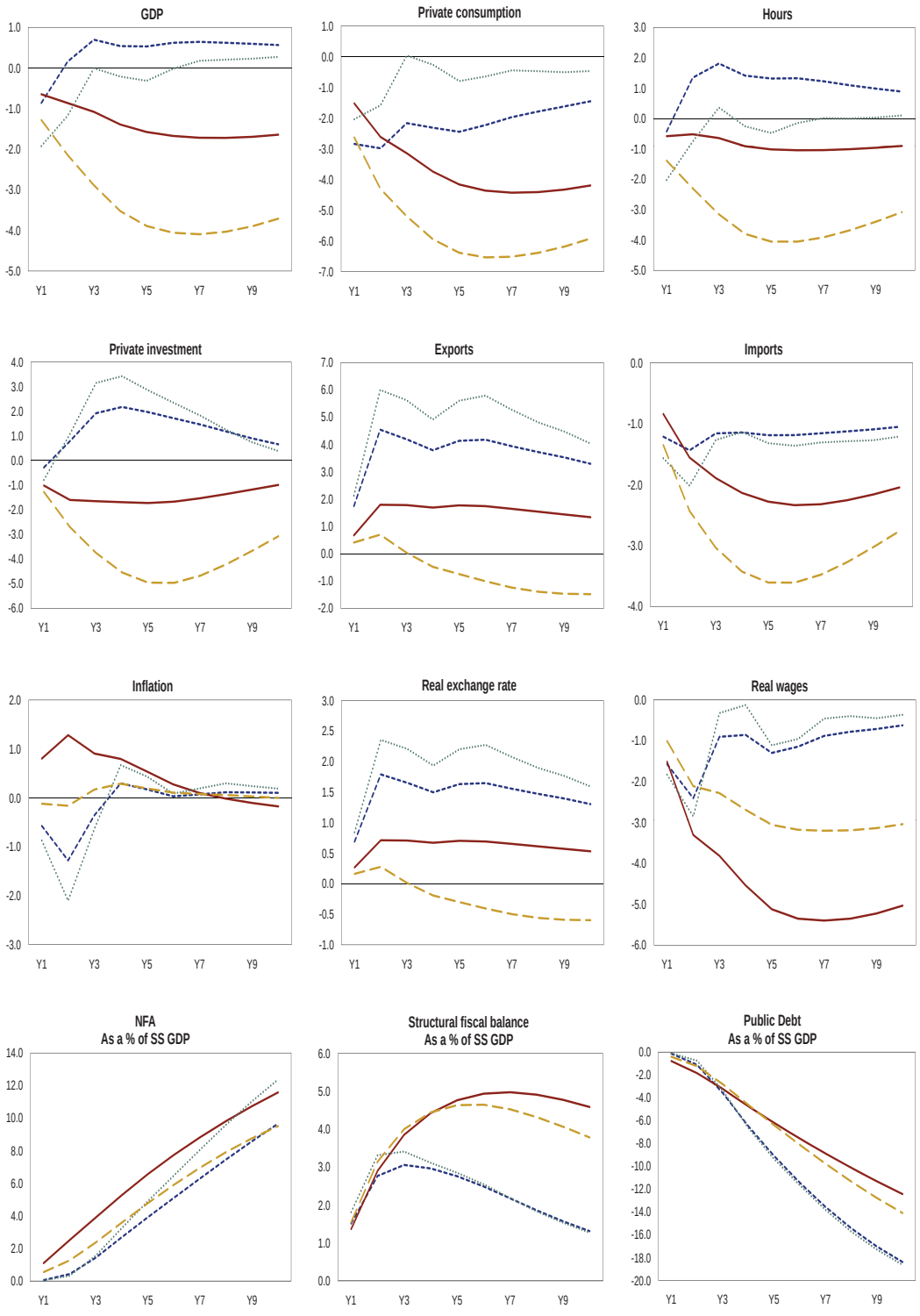
2 "Tax burden on wage income" corresponds to the labour income tax rate paid by employees and employers' social security contributions, which are adjusted in equal magnitudes in terms of percentage point changes in their average tax rates.

3 For a detailed analysis on the impact of alternative fiscal instruments on the main macroeconomic variables and the implied transmission mechanisms see Almeida *et al.* (2010).

4 The underlying assumption behind the effect on labour supply is that all households act as labour suppliers, and therefore a cut in transfers induces a shift in labour supply. In practice, a part of the transfers are received by pensioners, who do not actively supply labour.

Chart 1

THE MACROECONOMIC IMPACT OF ALTERNATIVE FISCAL INSTRUMENTS | DEVIATION FROM INITIAL STEADY-STATE, IN PERCENTAGE



Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

to produce other types of goods and so a cut in Government consumption reduces demand side pressures and contributes to a decrease in domestic prices and thus to international competitiveness gains, through real exchange rate depreciation.

Expenditure-based fiscal consolidation policies reduce demand pressures, promote a real exchange rate depreciation and benefit the international competitiveness of domestic firms. The increase in competitiveness stimulates domestic production and factor demand and improves the external imbalance, partly offsetting the recessionary impacts of fiscal consolidation. On the other hand, the fall in expected inflation raises the real interest rate, exacerbating the decline in aggregate demand and amplifying the short-run recessive effect of fiscal consolidation.[5]

In turn, fiscal consolidation based on tax increases implies a protracted decline in output, private consumption and investment to levels below the steady-state. An increase in the labour income tax affects the economy mainly through its impact on the marginal rate of substitution between consumption and leisure. Hence, a rise in the labour income tax discourages workers, implying a decrease in labour supply. At the same time, an increase in employers' social security contributions leads to an increase in the marginal costs of firms and thus firms substitute labour for capital, reducing labour demand. Therefore, a rise in tax burden on wage income implies a decrease in hours worked and an increase in domestic prices, which implies a real exchange rate appreciation and a loss in competitiveness.

Regarding the consumption tax, it is far less distortionary of the consumption/leisure allocation than the tax burden on wage income. Changes in the consumption tax affect the economy mainly through the price transmission channel, reducing the real value of households' wealth. This induces households to supply more labour in order to cushion the impact of the negative wealth effect on consumption, explaining the smaller decline in hours worked than in the case of the tax burden on wage income.

Accordingly, the tax burden on wage income is likely to be the instrument that involves higher short and medium term losses in terms of GDP, consumption and investment when used to perform fiscal consolidation. Consolidation strategies based on transfers and Government consumption cuts are the less penalizing for real GDP, private consumption and investment. These results suggest that expenditure cuts tends to dominate tax increases in a fiscal consolidation strategy (see Corsetti *et al.* 2009), which could be particularly true in the case of some European economies where taxes are high and where the recent period has been characterized by a huge rise in public expenditures. However, expenditure cuts are also likely to imply some reforms that take time to implement and so, in the short-run, taxes may help to speed up fiscal consolidation.

Therefore, we choose a fiscal consolidation strategy mainly based on expenditure cuts (Government consumption and transfers to households), but where tax burden on wage income adjusts endogenously, increasing slightly in the short-run in order to reach the lower target level for Government deficit more quickly (henceforth the pure consolidation scenario).

3.2. Two fiscal consolidation strategies: macroeconomic impact

This subsection analyses the impact on the main macroeconomic variables of two alternative fiscal consolidation scenarios that are based on specific fiscal instruments. The exercise is conducted assuming perfect foresight and full credibility of the fiscal authority and therefore the risk premium on Govern-

5 In models with endogenous monetary policy, the contractionary short-term impact of fiscal consolidation is partly compensated by a reduction in nominal interest rates, if the zero lower bound is not binding.

ment debt is not affected by the consolidation strategy. However, it should be highlighted that this assumption looks too strong at the current juncture and thus the results should be interpreted with caution. In fact, if an economy is facing high market pressures and a rise in the risk premium, a credible fiscal consolidation may reduce it, implying lower borrowing rates and therefore smaller short-run costs of fiscal consolidation (see section 4).

The first scenario considers a pure fiscal consolidation strategy, which corresponds to a permanent reduction in the public deficit of 1 per cent of initial steady-state GDP. The reduction in the deficit is mainly achieved through spending cuts, which are the least penalizing fiscal instruments for economic activity (see subsection 3.1). More specifically, it is considered a permanent cut in Government consumption and in transfers to households, each one contributing 0.5 per cent of initial steady-state GDP for the tightening. These measures are assumed to be gradually factored in over a period of four years. In the short-run, the adjustment to a lower deficit level implies that the tax burden on wage income increases (Chart 2). However, as Government debt falls, interest payments will decline and the resulting saving may be used to finance either new tax cuts or public spending increases. We assumed that the savings are used to reduce tax burden on wage income over the medium and the long-run, since this instrument is the most distortionary and, therefore, a cut in tax burden on wage income enhances the impact of the fiscal consolidation on economic growth and welfare (this issue will be discussed below).

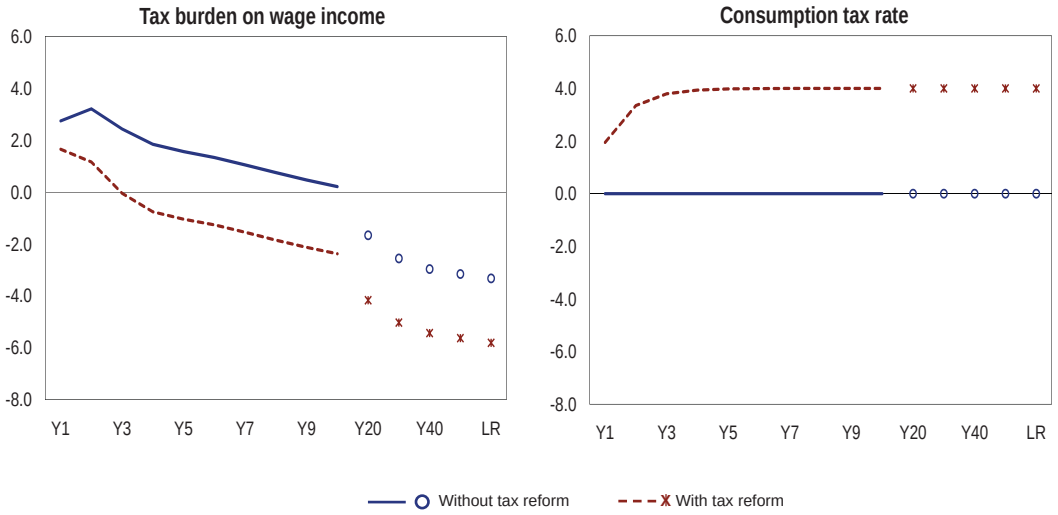
The second scenario considers a fiscal consolidation with a tax reform. Labour taxes or consumption taxes affect differently savings and labour supply decisions. It is often claimed that shifts towards increasing taxes on consumption and decreasing taxes on labour stimulate private saving and competitiveness, enhance economic growth and promote job creation, and improve the current account balance. This way, substituting labour income taxes by consumption taxes (as for e.g. VAT and special consumption taxes), is a competitiveness-enhancing tool and can be used to achieve a real exchange depreciation.

In this context, the scenario of fiscal consolidation with tax reform preserves the fiscal consolidation path, but adds a shift in the tax burden away from wage income towards consumption tax. In this scenario, it is assumed that the average consumption tax rate increases by 4 p.p.. The tax burden on wage income adjusts endogenously as in the previous exercise, but given the additional revenue generated by the consumption tax it increases by less in the short run and falls more substantially in the long run. Hence, in the case of the simulation without tax reform the tax burden on wage income remains above the baseline level during the first 10 years and then starts to decline, whereas in the case with tax reform it only remains above the baseline level during the first 3 years (Chart 2).

Chart 3 shows the short and long term impact on the main macroeconomic variables of the two fiscal consolidation scenarios. Regarding the short-tem, the pure consolidation scenario points to a fall in GDP, which reaches a trough in the second year (around 2.1 per cent below the steady state) and to a gradual recovery thereafter. This scenario leads to a protracted period of below-steady-state real GDP. Private consumption strongly decreases in the first years, due not only to the direct impact of fiscal measures on wealth, but also to its impact on the real interest rate, which increases the return on savings, measured in terms of future consumption, and implies a further disincentive to present consumption. The negative impact on consumption and investment is slightly reduced in the short-run by the anticipation of more favorable future wealth prospects due to expected lower distortionary taxes. On the other hand, the decrease in the price level leads to a gain in international competitiveness, which implies an increase in the exports market share and a decline in the import content of national production. Thus, in the short-run, fiscal consolidation leads to an improvement in the trade balance-to-GDP ratio.

Chart 2

FISCAL CONSOLIDATION SCENARIOS – EVOLUTION OF TAX RATES | DEVIATION FROM INITIAL STEADY-STATE, IN PERCENTAGE POINTS



Sources: Authors' calculations using *PESSOA*.

In the case of a fiscal consolidation accompanied by a tax reform, it is assumed a permanent increase in the consumption tax, allowing a higher reduction of the tax burden on wage income in the new steady-state, which in a rational expectations framework is fully anticipated by households. Hence, the tax reform reduces distortions in the economy, promoting a higher labour utilization and an increase in international competitiveness, and therefore has a positive impact on GDP. Output decline is smaller in the short-run than in the pure fiscal consolidation scenario, reaching a trough in the first year (around 1.6 per cent below the steady state) and starting to recover thereafter. The period of below-steady-state real GDP is substantially shortened, from 10 years in the pure consolidation scenario to 6 years in the scenario with tax reform.

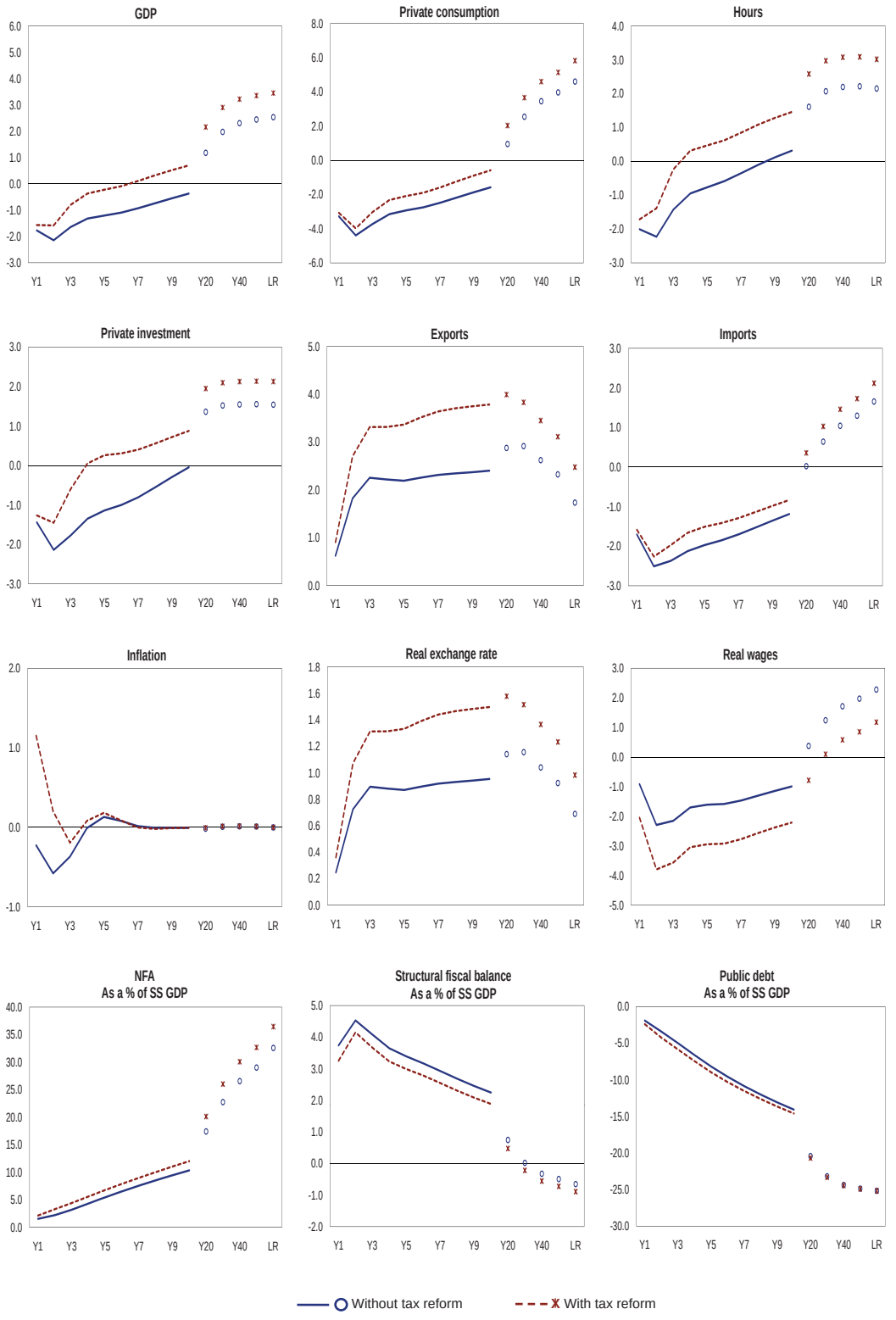
Overall, it can be concluded that a fiscal consolidation has unavoidable contractionary short-run effects on economic activity, in particular on consumption and investment. At the same time, an expansion in net exports usually occurs, partly offsetting the negative impact of domestic demand on GDP. Moreover, it can be concluded that short-run costs can be limited by changing the policy mix towards less distortionary taxation.

Regarding the long-run effects, chart 3 also sheds some light on the following question: Does fiscal consolidation generate long-term benefits?

Lower public debt reduces the burden of Government interest payments over the longer time horizon, which in the simulations illustrated in chart 3 is used to reduce the tax burden on wage income. In the case of a fiscal consolidation without tax reform, the tax burden on wage income declines 3.3 p.p. in the new steady-state. Hence, households' after-tax real wage increases, raising the opportunity cost of leisure and therefore leading to an increase in labour supply. At the same time, labour costs of firms fall and labour demand increases, leading to a rise in the marginal product of capital and fostering capital accumulation. The increase in households' wealth, due to the increase in wage income and capital accumulation, boosts consumption and investment and therefore real GDP. In the long-run, real GDP is 2.5 per cent above the initial steady state.

Chart 3

THE MACROECONOMIC IMPACT OF FISCAL CONSOLIDATION SCENARIOS WITH AND WITHOUT TAX REFORM | DEVIATIONS FROM INITIAL STEADY-STATE, IN PERCENTAGE



Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

In the case of a fiscal consolidation with tax reform the qualitative effects are quite similar, but the magnitudes are amplified. The tax burden on wage income declines 5.8 p.p. in the new steady-state and real GDP is 3.5 per cent above the initial steady-state, which is significantly higher than the impact of a pure fiscal consolidation scenario.

The decrease in public debt implies a decline in the net foreign liabilities-to-GDP ratio of the small-open economy. Hence, the temporary trade balance improvement mentioned in the short-run analysis, mainly due to the real exchange rate depreciation, declines gradually, resulting in a lasting trade deficit financed by a lower burden of interest payments on foreign debt in order to ensure that the net foreign liabilities stabilize at a lower level.

Finally, the effects of a fiscal consolidation can also be assessed by analyzing the impact on households' welfare. We consider a discrete time counterpart of the suggestion of Calvo (1988), which has also been used in Ganelli (2005) and Kumhof *et al.* (2008). Welfare analysis can be seen as a benchmark metric for the impact of a particular policy experiment, as measured through the aggregate lifetime utility, which is a function of the goods valued by households (consumption and leisure in the case at hand).[6] Hence, welfare corresponds to a weighted average of the utility of individuals alive in current and future periods, where a weighting factor reflects the importance of future generations in the welfare from the viewpoint of the policymaker. The welfare impact is synthesized in the standard compensated variation of consumption measure proposed in Lucas (1987), which transforms utility into corresponding units of consumption good in the initial steady-state. Table 1 presents the impact on households' welfare measured by the compensated consumption variation from a fiscal consolidation with and without tax reform, according to four different average planning horizons. As the planning horizon increases the gains from consolidation in terms of households' welfare also increase. In the pure consolidation scenario households' welfare, in aggregate terms, varies from -8.9 per cent, if the planning horizon is very short, to 7.9 per cent, in a long term planning horizon. In scenario with tax reform, the welfare losses are smaller in the short-run and the gains are higher in the long-run.

As mentioned before, we have assumed that the fiscal room created by lower interest rate payments on outstanding Government debt is used to lower the tax burden on wage income. This assumption was selected on the basis of its macroeconomic impact, as illustrated in table 2. This table compares the long run impacts of a pure fiscal consolidation if savings on the burden of interest payments are used to cut consumption tax or to raise one of the spending components (Government consumption or transfers to households) instead of using them to cut the tax burden on wage income.

Table 1

IMPACT ON WELFARE OF FISCAL CONSOLIDATION SCENARIOS | COMPENSATING VARIATION IN CONSUMPTION, IN PERCENTAGE

Discount rate		**2.8%**	**6.3%**	**30%**
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Fiscal consolidation without tax reform	7.9	1.5	-3.4	-8.9
Fiscal consolidation with tax reform	10.4	3.5	-1.9	-8.2

Sources: Authors' calculations using *PESSOA*.

6 In *PESSOA*, it is assumed that public consumption is not valued by households in the utility function. In reality, public consumption expenses are used in the provision of public goods and services, which are valued by households. In this context, the reduction in public consumption considered in this article should always be seen as an increase of government efficiency in broad sense, achieved through both an increase in the efficiency in the provision of goods and services actually valued by households, and an elimination of the spending associated with goods and services who are only negligibly valued by households.

Table 2

THE MACROECONOMIC AND WELFARE IMPACTS FROM THE BUDGETARY CLEARANCE OBTAINED WITH THE LOWER INTEREST RATE BURDEN | IN PERCENTAGE

	Lower interest burden used to:			
	Reduce labour income tax	Reduce consumption tax	Raise government consumption	Raise transfers to households
GDP	2.5	1.4	0.5	-0.4
Private consumption	4.6	3.1	-0.2	0.8
Private investment	1.5	0.7	0.6	-0.3
Exports	1.7	0.7	-0.5	-0.7
Imports	1.7	1.1	0.4	0.2
Hours	2.1	1.0	0.4	-0.6
Real wage rate	2.3	4.1	0.2	0.2
Real exchange rate	0.7	0.3	-0.2	-0.3
Compensating variation in consumption (in SS)	12.1	8.8	-1.6	3.7

Sources: Authors' calculations using *PESSOA*.
Note: All variables are measured as percentage deviations from the initial steady state.

The results points to positive long-run impacts on economic activity from fiscal consolidation, regardless of the strategy chosen, except in the case that the fiscal authority uses the improvement in the fiscal position to raise transfers.[7] The positive effects on output vary from around 0.5 per cent (increase in Government consumption) to 2.5 per cent (cut in tax burden on wage income). When the fiscal authority uses public savings on interest payments to cut the consumption tax, real GDP increases around 1.4 per cent. Thus, stronger positive impacts on GDP and in all private expenditure came from using savings to cut tax burden on wage income, which is in line with the standard view of relative distortionary features of the different fiscal instruments. Reducing this tax burden also seems the preferred option if we consider welfare analysis (see last row of table 2).

It can be concluded that despite the short-run costs of fiscal consolidation, in the long-run a lower Government debt-to-GDP ratio has positive impacts on economic activity, enhancing private consumption and investment and exports, and increasing households' welfare. Moreover, the change in the fiscal structure, in particular reducing the tax burden on wage income and increasing the consumption tax, is beneficial not only to reduce the short-run costs of fiscal consolidation but also to boost the long-run benefits. In short, a reduction of fiscal distortions has a sizeable expansionary effect on the economy and positive effects on aggregate welfare.

Finally, it is worth recalling that the analysis presented in this section does not take into account the probability that reduced Government debt affects the foreign risk premium on euro area interest rates (this possibility is explored in section 4).

3.3. Alternative timings for fiscal consolidation

In this subsection we illustrate the impact of alternative timings to complete the fiscal consolidation. The scenarios differ in the time horizon in which the new target for the debt-to-GDP ratio is reached: the benchmark scenario (which corresponds to the one illustrated in chart 2 without tax reform), the "slow consolidation scenario" and the "fast consolidation scenario". The time by which half of the reduction in the target debt ratio is reached is 8 years, 19 years and 4 years, respectively. It is worth

7 This result is conditioned by the assumption that all households act as labour suppliers and therefore a cut in transfers induces an increase in labour supply.

mentioning that, similar to previous simulations, our analysis is conducted under the assumption of perfect foresight, full credibility of the fiscal authority and unchanged sovereign risk premium. The results are summarized in chart 4.

A front-loading fiscal consolidation – the "fast consolidation scenario" – implies a deep recession, with significant losses in output, consumption, investment and hours worked in the short term. On the other hand, a slow fiscal consolidation, with a longer duration of the consolidation period, implies smaller output, consumption and investment losses and a smaller reduction in hours worked in the short and medium term, but a more protracted period of below steady-state GDP. Moreover, improvements in the competitiveness of domestic firms', which takes place in all scenarios, are more limited in the case of a slow consolidation strategy.

Table 3 presents the welfare costs and benefits for the 3 scenarios. Results show that for short-term horizons the slow consolidation scenario implies lower welfare losses, and therefore current generations may prefer this fiscal policy strategy. As the planning horizon increases, the difference between the alternative fiscal consolidation strategies in terms of costs and benefits narrows and therefore a slow consolidation may no longer be the optimal strategy for future generations.

The above results suggest that in general a credible and slow fiscal adjustment implies in the short-run lower output and welfare costs.[8] However, it should be emphasized that results are conditioned by the assumption of an unchanged risk premium. In the current juncture, characterized by high risk premium on sovereign debt of some euro area economies and a low risk tolerance among investors, this assumption does not seem very realistic. In this context, section 4 offers some evidence regarding the importance of considering the likely impact of risk premium changes.

Table 3

WELFARE ASSESSMENT – COMPENSATING VARIATION IN CONSUMPTION | IN PERCENTAGE

Discount rate		2.8%	6.3%	30%
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Alternative timings for fiscal consolidation				
Slow consolidation scenario	7.2	1.4	-2.1	-3.9
Benchmark scenario	7.9	1.5	-3.4	-8.9
Fast consolidation scenario	7.9	0.7	-5.6	-14.8

Sources: Authors' calculations using *PESSOA*.

4. Fiscal consolidation with a decrease in the risk premium

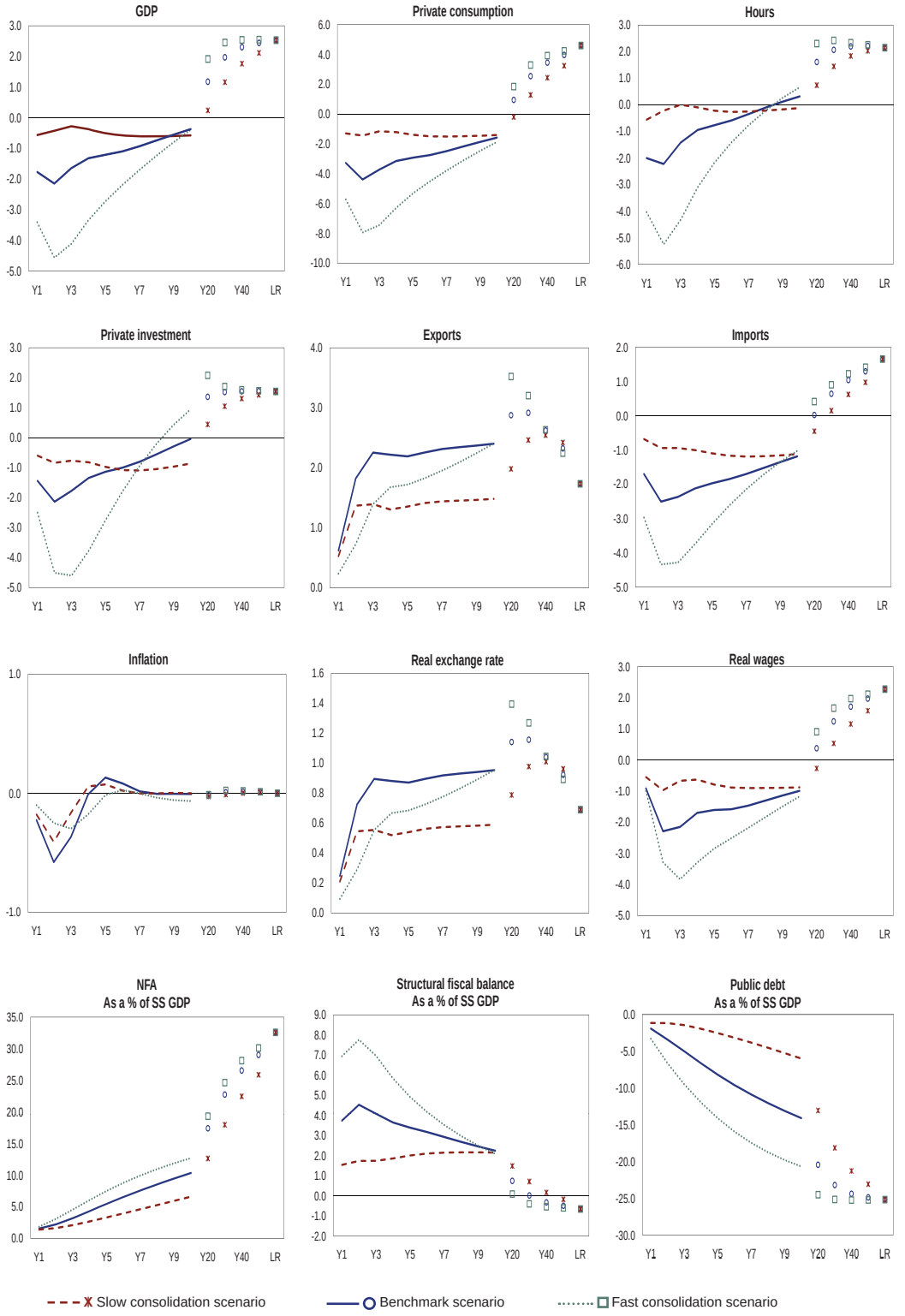
In the scenarios presented in section 3 it is assumed that the risk premium on Government debt is not affected by the level of the debt-to-GDP ratio. However, in the current juncture, characterized by high risk premium on sovereign debt of some euro area economies and a low risk tolerance among investors, the assumption of an unchanged risk premium does not seem very realistic.

This section presents a simple exercise to illustrate the importance of considering the role of the risk premium in the analysis of the costs and benefits of fiscal consolidation. The discussion of the impact of fiscal consolidation in a context of a small open economy that faces a high risk premium is particularly relevant in the current juncture. However, in *PESSOA* the risk premium is orthogonal to macroeconomic

8 For a similar result see Coenen (2008).

Chart 4

THE MACROECONOMIC IMPACT OF FISCAL CONSOLIDATION SCENARIOS WITH ALTERNATIVE TIMINGS |
DEVIATIONS FROM INITIAL STEADY-STATE, IN PERCENTAGE



Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation. The Benchmark scenario corresponds to the one illustrated in chart 3 without tax reform.

developments and does not reflect probabilities of default. In this context, an ad-hoc exercise was implemented to illustrate the impact of a reduction in the risk premium as a credible fiscal consolidation is implemented. The initial steady state of the pure fiscal consolidation scenario was changed in order to include a risk premium of 100 basis points in the small open economy. As the observed debt-to-GDP ratio converges to a lower target level, the risk premium decreases and reaches zero in the final steady-state. The risk premium $\left(\Psi_t\right)$ is modeled as a shock that follows a first-order auto-regressive process:

$$\ln \Psi_t = \left(1-\rho^{\Psi}\right)\ln \Psi + \rho^{\Psi} \ln \Psi_{t-1} + \varepsilon_t^{\Psi}$$

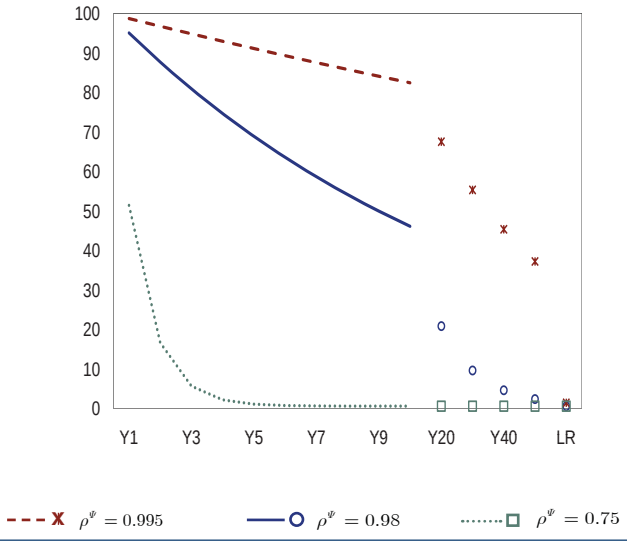
Where ρ^{Ψ} is the persistence parameter, Ψ is the steady-state risk premium and ε_t^{Ψ} stands for time t independent and identically distributed zero mean innovation. chart 5 presents 3 alternative trajectories for the risk premium, which differ on the calibration of parameter ρ^{Ψ}.

Chart 6 shows the results of the pure fiscal consolidation scenario accompanied by a reduction in the risk premium, considering the three above-mentioned trajectories. The results point to a significant impact of a decrease in the risk premium on domestic demand and economic activity. The evolution of the risk premium directly affects households and firms decisions, stimulating both private consumption and private investment. The decrease in the risk premium implies, on the one hand, a lower discount rate on future income, which increases net wealth and has a positive effect on households' consumption. On the other hand, the decrease in the domestic interest rate and the higher demand prospects implies a higher desired capital stock level and thus has a positive impact on private investment. Additionally, the decrease in Government interest outlays implies a lower increase of the tax burden on wage income in the short-run and a more substantial fall in the long run, which leads to positive effects on households' wealth enhancing the impact on economic growth.

The gains of fiscal consolidation in terms of households' welfare are enhanced and the short-term costs are reduced if the consolidation is accompanied by a decrease in the risk premium (see Table 4). In the

Chart 5

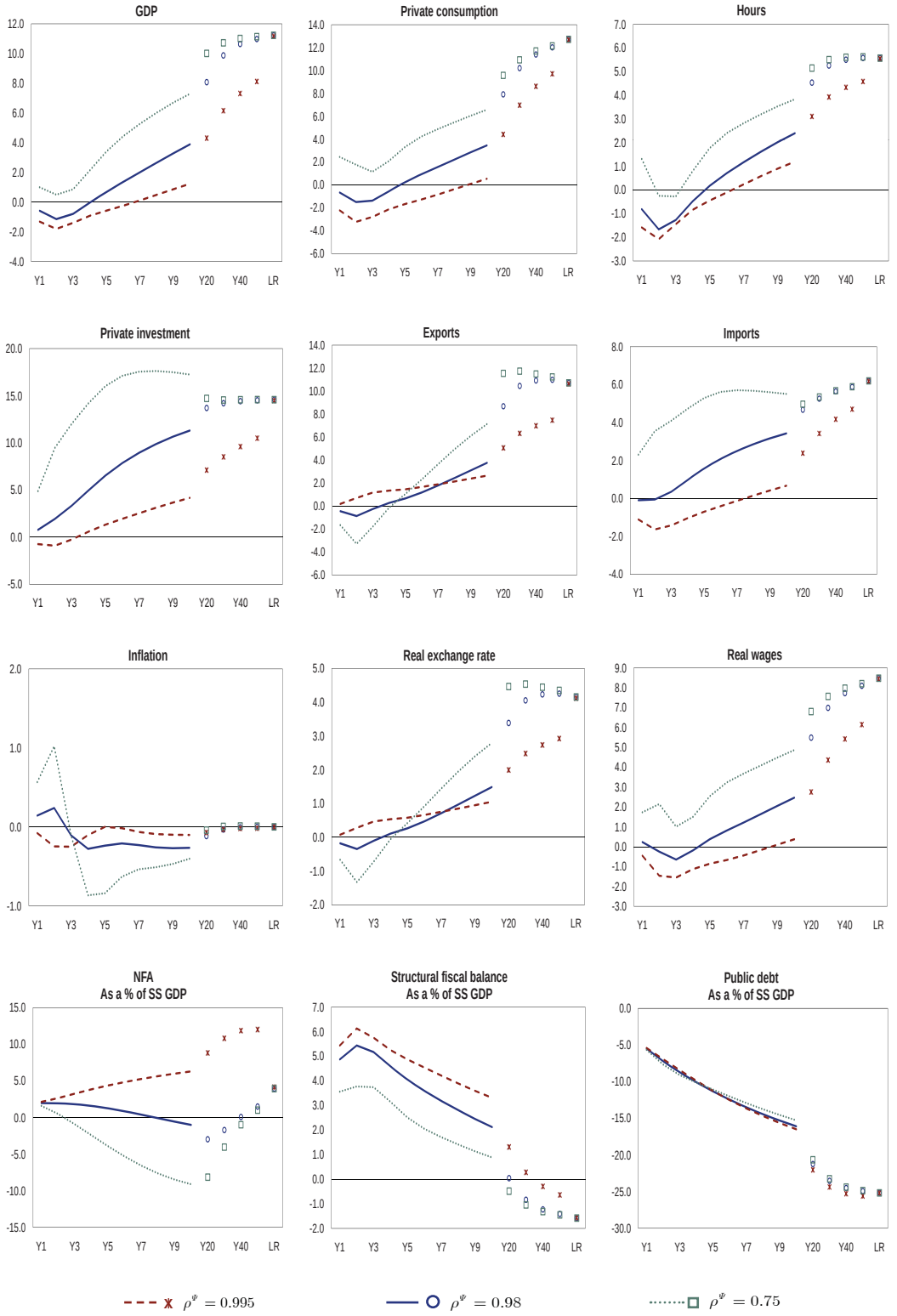
FISCAL CONSOLIDATION SCENARIO – EVOLUTION OF THE RISK PREMIUM | DEVIATIONS FROM THE INITIAL STEADY-STATE, IN PERCENTAGE POINTS



Sources: Authors' calculations using *PESSOA*.
Note: The three considered trajectories differ in the convergence velocity of the risk premium to the final steady state value.

Chart 6

THE MACROECONOMIC IMPACT OF A FISCAL CONSOLIDATION SCENARIO WITH A DECREASE IN THE RISK PREMIUM | DEVIATION FROM THE INITIAL STEADY-STATE, IN PERCENTAGE



Sources: Authors' calculations using *PESSOA*.

Notes: SS: initial steady-state. Inflation, NFA and Public debt deviations are in percentage points. The remaining variables are in percentage. Higher real exchange rate implies depreciation.

Table 4

WELFARE ASSESSMENT – COMPENSATING VARIATION IN CONSUMPTION | IN PERCENTAGE

Discount rate		2.8%	6.3%	30%
Average planing horizon of agents (years)	*Long run*	*36*	*16*	*3*
Fiscal consolidation with decrease in the risk premium				
$\rho^{\Psi} = 0.995$	24.5	11.9	3.4	-5.6
$\rho^{\Psi} = 0.98$	29.8	19.1	10.5	-0.8
$\rho^{\Psi} = 0.75$	31.7	23.9	17.2	6.9

Sources: Authors' calculations using *PESSOA*.

case of a sharp decrease in the risk premium $\left(\rho^{\Psi} = 0.75\right)$, fiscal consolidation leads to gains in current generations' welfare even for very short planning horizons. This is largely explained by the behavior of consumption, which increases relative to the initial steady state, even in the short-run, while hours worked show a decreasing path over the first three years.

Although the reduction in the risk premium is ad-hoc, it clearly shows the importance of taking risk premium effects into account in the discussion of the gains and costs of fiscal consolidation. The results point to lower short-term costs and higher long-term benefits if the reduction in public debt is accompanied by a reduction in the risk premium, implying that short-term costs of fiscal consolidation are smaller in economies that face higher market pressures. Moreover, in a scenario of a sizeable immediate decrease in the risk premium, the impact of the fiscal consolidation may even be positive in the short-run, both in terms of GDP growth and households' welfare. This result is in line with the literature that highlights that fiscal contractions can have expansionary effects in some situations, namely if confidence in a country's public finance is low and the fiscal consolidation is pursued in a credible and consistent manner, fostering the sustainability of public finances in the long term.

The above results suggest that the appropriate fiscal consolidation strategy may not be identical for all economies. Sharp corrections are probably needed in countries that already face high and increasing foreign risk premium. Mild corrections are nevertheless more desirable if the risk premium is in a more comfortable situation and is not very sensible to fiscal developments.

5. Conclusions

In the present juncture, a credible fiscal consolidation strategy seems necessary in many euro area countries to bring the public debt ratio to a sustainable path. Moreover, some economies have been facing a surge in sovereign debt spreads and are being forced to take immediate and rapid measures to ensure the access of the public sector to the sovereign debt markets. However, debt reduction is painful for slow-growing economies, since it may imply a reduction of economic activity and welfare losses in the short-run. At the same time, lowering debt and thus reducing interest rate payments on outstanding government debt will bring long run benefits. In this context, evaluating the costs and benefits of fiscal consolidation and creating the conditions for a successful consolidation process have become an important policy issue.

This article analyses the impact on the macroeconomic scenario and on households' welfare of alternative fiscal consolidation strategies, using a dynamic general equilibrium model with non-Ricardian features (*PESSOA*). Simulations show that a fiscal consolidation, in general, implies a trade-off between the short-run costs and the long-run benefits. We also conclude that consolidation strategies based

on transfers to households and Government consumption cuts are the less penalizing for real GDP, private consumption, investment and welfare in the short-run. At the same time, long-term gains of fiscal consolidation are enhanced if the fiscal room created by lower Government interest outlays on outstanding debt is used to cut distortionary taxes, in particular, on labour. Therefore, well-designed consolidation strategies could minimize the short-term costs and enhance the long-run benefits. Additionally, we show that gains can be boosted if the fiscal consolidation strategy involves a tax reform that shifts the tax burden away from labour services towards the households' consumption expenditures, in a deficit-neutral way, encouraging savings and labour supply and enhancing competitiveness by a real exchange rate depreciation.

The results also suggest that a front-loading fiscal consolidation implies a deeper recession, with significant short-term losses in output, consumption, investment, hours worked and welfare, when compared with a more gradual consolidation strategy. Thus, if possible, a credible slow fiscal adjustment is in general more beneficial for the economy, a result that is in line with the literature pointing to the optimality of tax smoothing. However, those results are conditioned by the assumption of an unchanged risk premium and, therefore, do not take into account the likelihood that domestic interest rates could be correlated with the debt level. In this case, the balance of short-run costs and long-run benefits might be quite different. The results show that if a fiscal consolidation strategy is pursued in a credible and consistent manner and implies a significant decrease in the risk premium on domestic interest rates, the short-term costs are reduced and, in extreme cases, the short-run impact may be expansionary. Therefore, the appropriate fiscal consolidation strategy may not be identical across economies.

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LEARNING FROM THE PAST: FISCAL ADJUSTMENTS ON THE RUN-UP TO THE EURO AREA*

*Maria Manuel Campos***

ABSTRACT

This paper examines the fiscal adjustments that took place on the run-up to the euro area. OECD data are used to identify and characterize episodes of fiscal consolidation in a broad set of countries and within the 1980-2008 time-frame, but focusing, in particular, on those corresponding to the founding Member-states of the euro area and to the 1993-1997 period. Results suggest that, on the period prior to the inception of the euro area, cyclical and interest rate conditions made it easier to comply with the Maastricht criteria without requiring strong primary expenditure cuts, particularly as regards sensitive items such as social transfers and compensation of employees. This may explain why none of the fiscal adjustments identified in 1993-1997 in countries that would become members of the euro area was successful in persistently reducing public debt ratios.

1. Introduction

In the last years, fiscal deficits have been increasing across euro area countries partially as a result of the financial and economic crisis. Public debt-to-GDP ratios are also high (and rising) in several Member-states, not only due to the recent deterioration of public finances, but also as a result of high stocks of debt, contingent liabilities related to financial rescue operations and implicit liabilities associated with population ageing. Consequentially, in order to comply with the commitments imposed by the Stability and Growth Pact (SGP), the vast majority of Member-states is currently engaged in processes of fiscal adjustment. In fact, according to the European Commission's 2011 Spring Economic Forecasts, the general government deficit-to-GDP ratio is expected to decrease between 2010 and 2012 in most Member-states.

This across-the-board need to engage in fiscal consolidation is not a novelty among euro area countries. In fact, along the 1990s, the countries that were on their way to participate on the third stage of the European Monetary Union (EMU) had to bring down their public debt and deficit ratios in order to fulfill the convergence criteria set down by the Maastricht Treaty. To frame the consolidation efforts currently in progress it is crucial to understand the developments underpinning the adjustments that took place on the run-up to the euro area and which lessons can be drawn from them.

In this paper we identify and characterize episodes of fiscal adjustment across a broad set of OECD countries in the 1980-2008 period, but focusing more thoroughly on the eleven founding members of the euro area (and Greece) in the time frame bounded by the signing of the Maastricht Treaty and the assessment of the criteria for adopting the single currency (1993-1997). By performing an exercise similar

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to those in, for instance, Alesina and Perotti (1995), Alesina *et al*. (1998) and Alesina and Ardagna (2009), we identify several stylized facts generally presented in the literature on fiscal adjustments. Additionally, we show that the episodes that took place on the run-up to the euro area were mostly made on the revenue side, did not require particularly strong consolidation efforts and did not have persistent effects in reducing public debt and deficit ratios, with consolidation stalling after the assessment of the criteria. These results reinforce the general idea that successful fiscal adjustments require assertive and strong commitments and, in particular, should primarily rely on the expenditure side.

The article is organized as follows. Section 2 provides a brief description of the path that led to the adoption of the euro, emphasising the importance of fiscal adjustments in the context of the EMU and the SGP. Sections 3 and 4 pinpoint and characterize episodes of fiscal adjustment and the determinants of their (un)success, focusing more thoroughly on those referring to countries that in 1993-1997 were engaged in the fulfilment of the Maastricht convergence criteria. Finally, Section 5 concludes.

2. The path to the euro area - an overview[1]

The idea of creating an economic and monetary union among European Economic Community (EEC) members had been on the table since the late 1960s. However, only in 1989 the three stages that would culminate in the adoption of a single currency were formally set down in the Delors Report.

During the first stage, which started in July 1990, capital movements were liberalized within the EEC and the Maastricht Treaty, in force since 1993, established the criteria for joining the euro area. The main objective of the criteria was to ensure convergence between Member-states during stage two of the EMU and macroeconomic stability and currency credibility in the third stage. In particular, the countries aiming to participate in the euro area had to feature sound fiscal positions, stable exchange rates, low interest rates and price stability. Regarding, more specifically the criterion on sound fiscal positions, the Treaty states that, in order to ensure the sustainability of its public finances, in each Member-state the ratio of general government deficit to GDP should not be higher than 3 per cent. Additionally, the ratio of gross general government debt to GDP should not exceed 60 per cent. These requirements are expected to safeguard against the risk of a country becoming unable to service debt relying on its own tax revenue, thereby preventing the emergence of unsustainable fiscal positions (EMI (1995)).

In the second stage of the EMU (that began in January 1994) the SGP was adopted with the objective of monitoring budgetary developments and ensuring the fulfilment of the Maastricht fiscal criteria, not only at euro area's inception, but also on a sustained basis. In particular, the SGP consists of a more detailed set of rules that aim at enhancing the coordination of fiscal policies in the EMU. The Pact has both a preventive and a corrective dimension.

The preventive arm of the Pact is a surveillance mechanism that is supposed to avoid the violation of the fiscal criteria, mostly reflected on the existence of excessive deficits, i.e., deficit ratios to GDP above the 3 per cent reference value. Within this scope, Member-states should submit annual Stability or Convergence Programmes (respectively if they have already adopted the euro or not). According to the more recent version of the SGP, the Programmes should include a medium-term budgetary objective (MTO) and the adjustments required for fulfilling that goal. Based on recommendations from the European Commission, the ECOFIN Council assesses whether each country's MTO grants room of manoeuvre to avoid an excessive deficit, while ensuring the convergence of the debt ratio to prudent levels. The Council also supervises the implementation of the Programmes and, if required, proposes additional corrective measures. In spite of these preventive mechanisms, deficits may rise above the 3 per cent of GDP threshold, in which case Excessive Deficit Procedures (EDP), governed by the corrective arm of the

1 This section is mostly based on Obstfeld (1997), Cabral (2001) and Eichengreen and Wyplosz (1998).

Pact, are implemented.[2] Member-states under EDP should take effective action in order to correct the excessive deficit within the deadline set by the Council and non-compliance with its recommendations may prompt the imposition of sanctions.

In 1994, on the basis of the data then available, all EU Member-states featured excessive deficits, with the exception of Ireland and Luxembourg. Taking advantage of the 1990s' favourable economic context, most Member-states engaged in deficit correction efforts and in 1998 Greece was the only country with a deficit above the 3 per cent of GDP threshold. However, debt ratios remained above the 60 per cent of GDP reference value in the majority of countries and only France, Finland, Luxembourg and the United Kingdom featured lower figures. In the other Member-states the debt ratio was declining and approaching the reference value, hence the European Commission decided on the fulfillment of the criterion on government budgetary positions by every country except Greece (European Commission (1998)). Additionally, the 1998 European Monetary Institute Convergence Report stated that, on the basis of 1997 data, all Member-states except Greece and Sweden fulfilled the criteria on price stability and exchange and interest rates. Therefore, on the basis of the figures presented in Table 1[3], the Commission recommended the adoption of the single currency by Belgium, Germany, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland from January 1999 onwards. Greece qualified later and entered the third stage of EMU shortly after, in January 2001 (followed by Slovenia in 2007, Cyprus and Malta in 2008, Slovakia in 2009, and Estonia in 2011).

After 1997, fiscal consolidation stalled (or reversed) in several Member-states, but this was somewhat disregarded because nominal fiscal balances were improving. As this development was driven by favourable cyclical conditions, when growth rates diminished, circa 2002, fiscal balances began to deteriorate and the 3 per cent limit was exceeded in many Member-states, jeopardizing the credibility of the SGP and urging its revision (Fatas and Mihov (2009)). In 2005 a number of changes were introduced in the Pact, including the clarification of the definition of the MTO and the catching-up process necessary to reach it. The MTO is defined in terms of the cyclically adjusted balance, net of temporary measures, as a percentage of GDP. Its value takes into account the debt ratio and potential output growth, and thus can be differentiated among Member-states. Implicit liabilities shall also be relevant to determine MTOs, once the criteria and modalities are established by the European Council.

2 Note that the currently in force revised SGP, in addition to introducing the concept of MTO, has also broaden the scope of "exceptional circumstances" and "other relevant factors" under which the 3 per cent of GDP limit can be transcended without triggering an excessive deficit procedure.

3 Table 1 presents the exact data on the basis of the Commission's recommendation and figures are according to the ESA-79 national accounts system. This methodology was replaced by a new one, ESA-95, which is in force since 2000. Figures were accordingly revised and therefore data in Table 1 does not coincide with the values presented in the following tables. It is worth highlighting that, based on the current data, France, Spain and Portugal would not have qualified for adopting the euro in 1998 and the Greek fiscal developments would have been insufficient for joining the single currency in 2001 (see Table 2).

Table 1

DATA ON THE BASIS OF THE ASSESSMENT OF THE STABILITY AND GROWTH PACT CRITERIA

	Inflation	Government budgetary position: Deficit (% of GDP)	Public debt (% of GDP)				Long-term interest rates
				Change from previous year			
	Jan-98	1997	1997	1997	1996	1995	Jan-98
Reference Value	**2.7**	**3**	**60**	**-**			**7.8**
EU (15 countries)	1.6	2.4	72.1	-0.9	2	3	6.1
Belgium	1.4	2.1	122.2	-4.7	-4.3	-2.2	5.7
Germany	1.4	2.7	61.3	0.8	2.4	7.8	5.5
Ireland	1.2	-0.9	66.3	-6.4	-9.6	-6.8	6.2
Greece	5.2	4	108.7	-2.9	1.5	0.7	9.8
Spain	1.8	2.6	68.8	-1.3	4.6	2.9	6.3
France	1.2	3	58	2.4	2.9	4.2	5.5
Italy	1.8	2.7	121.6	-2.4	-0.2	-0.7	6.7
Luxembourg	1.4	-1.7	6.7	0.1	0.7	0.2	5.6
Netherlands	1.8	1.4	72.1	-5	-1.9	1.2	5.5
Austria	1.1	2.5	66.1	-3.4	0.3	3.8	5.6
Portugal	1.8	2.5	62	-3	-0.9	2.1	6.2
Finland	1.3	0.9	55.8	-1.8	-0.4	-1.5	5.9

Source: European Commission (1998).
Note: The figures are according to the ESA-79 methodology.

3. Identifying fiscal adjustments in the euro area

The limits imposed by the Maastricht Treaty, as requirements for entering the single currency area, played a highly relevant role in the candidates' fiscal policy in the years preceding the inception of the euro area. In particular, the criterion on the government budgetary position triggered important consolidations along the 1990s in the Member-states aiming to participate in the third stage of the EMU (Table 2). Indeed, within the 1993-1997 time span, Germany was the only country featuring a balance deterioration (although it remained above the -3 per cent of GDP balance threshold by the end of 1997), while the biggest improvements took place in Italy and Belgium. Table 2 points out that, after the introduction of the euro, deficits increased in several Member-states. This outcome, although partially explained by the deterioration of the macroeconomic scenario, raises the question of why were some consolidation efforts more effective and persistent than others. In this section, we undertake an exercise similar to those in, for instance Alesina and Perotti (1995), Alesina *et al*. (1998) and Alesina and Ardagna (2009), with the purpose of identifying in the euro area Member-states the empirical regularities usually found in the literature on fiscal adjustments.

In order to analyse the size and composition of the fiscal adjustments, we begin by measuring the fiscal stance in terms of "discretionary changes in the budgetary position of the government". As previously mentioned, budgetary developments are influenced by business cycle fluctuations and interest rate conditions. We are not interested in developments resulting from automatic responses to economic growth or changes in interest-related expenditure, which is ultimately related to a stock of public debt built-up along several years. Hence, with the purpose of identifying the changes in the budgetary position that derive from government's discretionary policy choices or structural trends, we use the annual change in the cyclically-adjusted primary deficit, as a percentage of potential GDP, as a measure of the

Table 2

GENERAL GOVERNMENT FISCAL BALANCE | AS A PERCENTAGE OF GDP

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Belgium	-8.2	-7.5	-5.2	-4.5	-4.0	-2.3	-1.0	-0.7	-0.1	0.4	-0.2	-0.2	-0.4	-2.8	0.2	-0.2	-1.2
Germany	-2.5	-3.0	-2.3	-9.7	-3.3	-2.6	-2.2	-1.5	1.3	-2.8	-3.6	-4.0	-3.8	-3.3	-1.6	0.2	0.0
Ireland	-2.9	-2.7	-2.0	-2.0	-0.1	1.4	2.3	2.6	4.8	0.9	-0.3	0.4	1.4	1.7	3.0	0.2	-7.2
Greece	-10.9	-11.9	-8.3	-9.1	-6.6	-5.9	-3.8	-3.1	-3.7	-4.4	-4.8	-5.7	-7.4	-5.3	-3.2	-4.0	-7.8
Spain	-4.0	-7.3	-6.8	-6.5	-4.9	-3.4	-3.2	-1.4	-1.0	-0.7	-0.5	-0.2	-0.4	1.0	2.0	1.9	-4.1
France	-4.5	-6.4	-5.5	-5.5	-4.0	-3.3	-2.6	-1.8	-1.5	-1.6	-3.2	-4.1	-3.6	-3.0	-2.3	-2.7	-3.4
Italy	-10.4	-10.1	-9.1	-7.4	-7.0	-2.7	-3.1	-1.8	-0.9	-3.1	-3.0	-3.5	-3.6	-4.4	-3.3	-1.5	-2.7
Luxembourg	-0.2	1.5	2.5	2.4	1.2	3.7	3.4	3.4	6.0	6.1	2.1	0.5	-1.1	0.0	1.3	3.7	2.5
Netherlands	-4.2	-2.8	-3.5	-9.2	-1.9	-1.2	-0.9	0.4	2.0	-0.3	-2.1	-3.2	-1.8	-0.3	0.5	0.2	0.7
Austria	-2.0	-4.4	-4.9	-5.9	-4.1	-2.0	-2.5	-2.4	-1.9	-0.2	-0.9	-1.6	-4.5	-1.7	-1.7	-0.7	-0.5
Portugal	-4.2	-7.5	-7.2	-5.0	-4.5	-3.5	-3.4	-2.8	-3.0	-4.3	-2.9	-3.0	-3.4	-6.1	-3.9	-2.7	-2.8
Finland	-5.4	-8.3	-6.7	-6.2	-3.5	-1.3	1.6	1.6	6.9	5.0	4.1	2.4	2.2	2.6	3.9	5.2	4.4

Source: OECD.

Note: The table presents the net lending (+) or net borrowing (-) of general government based on the ESA-95 methodology, including one-off proceeds relative to the allocation of mobile phone licences.

fiscal stance.[4] We computed this indicator for a sample of 19 countries (including the eleven euro area founding Member-states, Canada, Denmark, the United Kingdom, Greece, Japan, Norway, Sweden and the United States of America), from 1980 to 2008. As data is unavailable for some country-year pairs, our sample comprises a total of 493 observations.

Alesina and Perotti (1995) proposes the following classification of the fiscal stance in terms of the magnitude of the annual change in the cyclically-adjusted primary balance as a percentage of GDP: years of neutral fiscal policy are those in which such variable stands between -0.5 and 0.5 p.p.; fiscal policy is considered to be loose for values between -0.5 and -1.5 p.p.; very loose for figures equal or below -1.5 p.p.; tight if it is between 0.5 and 1.5 p.p. and very tight for values equal or above 1.5 p.p. As most studies on this subject, we use the Alesina and Perotti (1995) classification of the fiscal stance and consider years of fiscal adjustment those in which the change in the cyclically adjusted primary balance is above 1.5 p.p. of GDP, in order to identify "large" changes in the fiscal stance and rule out minor adjustments. Note that this definition only allows the identification of yearly adjustments, which means that, when the measure of fiscal stance declines for consecutive years we consider several annual adjustments instead of a single, multi-year episode. Other studies, such as Barrios *et al*. (2010), follow slightly different approaches and consider adjustment episodes that last longer than one year. Adopting a multi-year definition would lead to the identification of a different number of episodes, but the underlying developments regarding the cyclically-adjusted primary deficit would be essentially the same.

Overall, we identified 60 episodes of fiscal adjustment, distributed as depicted in Table 3. This table shows, in the one hand, that the majority (39 out of 60) of the episodes of fiscal adjustment refers to euro area founding countries,[5] with the other nations featuring, on average, a looser fiscal stance. On the other

4 More precisely, we use OECD figures referring to the underlying primary balance, available on the Economic Outlook database. In addition to being corrected for the effects of the business cycle, the figures are also net of the impact of temporary measures (including those related to the selling of mobile phone licences). Throughout this paper, whenever cyclically-adjusted variables are mentioned, assume that they are also corrected for the impact of temporary measures (for more details regarding the methodology employed by the OECD for computing these variables, see Joumard, I. *et al*. (2008), "Accounting for one-off operations when assessing underlying fiscal positions", Working Paper 642, OECD.). Note, however, that it is impossible to completely isolate the policy induced effects. In fact, cyclical adjustment methodologies are unable to fully eliminate the effects of the business cycle and the identification of temporary operations demands a substantial amount of information. Moreover, a certain degree of endogeneity remains present, as governments' decisions are obviously influenced by the macroeconomic context.

5 Through this paper, whenever founding members of the euro area are mentioned, consider the eleven countries that adopted the euro in 1999 and Greece.

Table 3

EPISODES OF FISCAL ADJUSTMENT						
Austria	1984 ; [1]	1996 ; [1]	1997 ; [0]	2001 [0]		
Belgium	1982 ; [5]	1983 ; [4]	1984 ; [3]	1993 [1]		
Canada	1981 ; [0]	1986 ; [2]	1995 ; [2]	1996 ; [1]	1997 [0]	
Germany	- -					
Denmark	1983 ; [3]	1984 ; [2]	1985 ; [1]	1986; [0]	2005 [0]	
Spain	1992 [5]					
Finland	1981 ; [0]	1984 ; [0]	1988 ; [0]	1994 ; [6]	1998 ; [2]	2000 [0]
France	- -					
United Kingdom	1981 ; [1]	1997 ; [3]	1998 [2]			
Greece	1982 ; [1]	1986 ; [2]	1990 ; [4]	1994 ; [0]	1996; [0]	2005 [1]
Ireland	1983 ; [1]	1984 ; [0]	1987 ; [2]	1988 [1]		
Italy	1982 ; [2]	1993 ; [0]	1995 [2]			
Japan	1984 [1]					
Luxembourg	1993 ; [4]	1994 ; [3]	1997 [0]			
Netherlands	1983 ; [0]	1991 ; [0]	1993 [0]			
Norway	2000; [0]	2004 [2]	2006 [1]			
Portugal	1982 ; [2]	1983 ; [1]	1992 ; [0]	1995; [0]	2006 [1]	
Sweden	1983 ; [1]	1987 ; [0]	1996 ; [4]	1997 [3]		
United States	- -					

Source: Author's calculations.

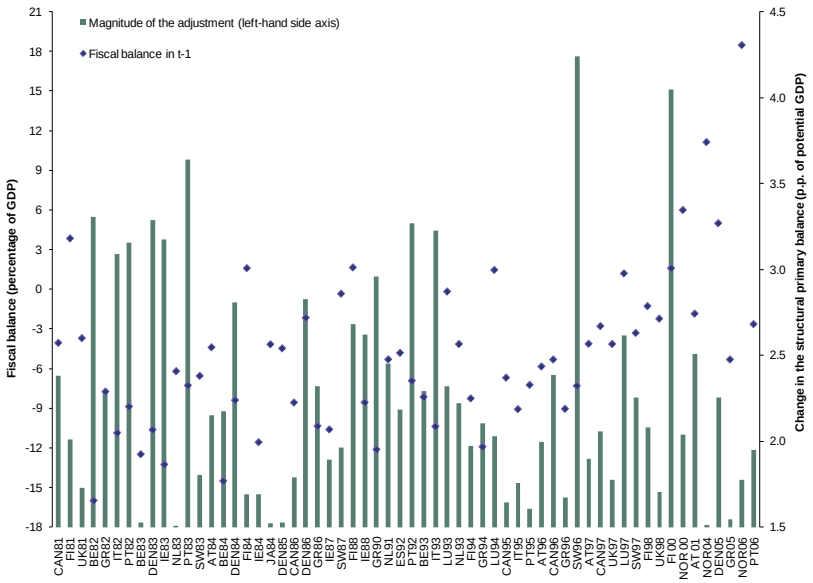
Note: The table lists all the episodes identified in the sample. Figures in brackets are the number of consecutive years during which, after the initial adjustment, the cyclically-adjusted primary balance continued to improve.

hand Table 3 also shows that episodes of fiscal adjustment are mostly concentrated in two periods, 1980-1984 and 1993-1997. Between 1985 and 1992 episodes of fiscal adjustment are less frequent in our sample, and the interruption of this period of generally looser fiscal policy coincides with the signature of the Maastricht Treaty. Moreover, our results also show that the majority of the adjustment episodes identified in 1993-1997 refer to developments regarding the euro area founding countries and that after 1997 (when the assessment underlying the decision to participate in the third stage of the EMU was made), the number of countries featuring loose fiscal stance has generally increased.

Chart 1 shows that, on average, there is no obvious relationship between the magnitude of the adjustments and the actual general government balance in the year preceding the episodes. In fact, on the one hand, several episodes correspond to situations in which countries recorded striking general government deficits in the previous year. On the other hand, the figure shows that some of the largest adjustments took place in countries with relatively comfortable fiscal positions, featuring small deficits or, in some cases, surpluses. It is also interesting to notice that in the period between the signing of the Maastricht

Chart 1

INITIAL FISCAL POSITION *VS* MAGNITUDE OF THE ADJUSTMENT



Source: Author's calculations based on data from the OECD.

Treaty and the assessment of the budgetary criteria, 10 out of 13 adjustment episodes identified in euro area countries correspond to situations in which the general government balance was below the -3 per cent of GDP threshold. This is consistent with the idea that, in these cases, deficit reduction efforts may have been triggered by the need to fulfill the prerequisites for adopting the euro.

Summary statistics in Table 4 show that in the whole sample the measure of fiscal stance is slightly negative (-0.08 p.p. of GDP), while in adjustment years the average primary deficit decline stands at 2.28 p.p. of GDP (and is explained, on average, by a 0.98 p.p. drop in primary expenditure and a 1.30 p.p. revenue increase). As pointed out in Table 4, figures computed only for euro area founding countries along the entire time span are not dramatically different from those referring to the whole sample, but within that sub-sample there is an interesting feature. In fact, although the episodes identified between 1993 and 1997 are, on average, less marked than those identified before 1993, they are achieved through sharper cuts in total expenditure. However, the figures for primary expenditure retrenchment are similar. Given that primary expenditure is the part of governments' spending that actually depends on its discretionary decisions, this finding suggests that the 1990's budgetary improvements have benefited from the decline in interest rates that took place in this period (on average, the change in interest payments in euro area founding countries in 1993-1997 is considerably smaller than the observed outside this interval) and did not result from particularly strong efforts in terms of expenditure retrenchment.

To answer the question of whether the tightening of fiscal policy observed on the run-up to the third stage of the EMU was triggered by the need to comply with the Maastricht budgetary criteria, we analysed the determinants of the probability to engage in fiscal consolidation. Results in Table 5 show that the estimated probability of engaging in fiscal adjustment is enhanced in the case of observations referring to the 1993-1997 period, but being a euro area country, *per se*, does not have a statistically significant impact (see the results obtained using specifications 1 and 2). Moreover, results based on specification 3 suggest that, even though observations referring to euro area Member-states and to the 1993-1997 period are estimated to have a higher probability to record fiscal adjustments (as shown by the positive sign of the marginal effect of the interaction between these variables), the impact of combining these two attributes is not statistically significant. Finally, in spite of the fact that variables

Table 4

AVERAGE CHANGE IN CYCLICALLY-ADJUSTED FISCAL VARIABLES | P.P. OF POTENTIAL GDP

	Number of observations	Change in the structural primary deficit	Change in the structural total expenditure	Change in the structural primary expenditure	Change in the structural total revenue
Entire sample	493	-0.08	0.03	0.05	0.13
		(1.32)	(1.1)	(1.02)	(1.03)
of which euro area countries	314	-0.10	0.07	0.07	0.16
		(1.36)	(1.2)	(1.11)	(1.08)
Episodes of fiscal adjustment	60	-2.28	-0.80	-0.98	1.30
		(0.65)	(0.98)	(0.78)	(0.86)
of which euro area countries	39	-2.35	-0.80	-0.99	1.36
		(0.63)	(1.03)	(0.79)	(0.93)
before 1993	21	-2.47	-0.61	-0.90	1.57
		(0.64)	(0.98)	(0.83)	(0.89)
in 1993-1997	13	-2.13	-0.72	-0.89	1.24
		(0.43)	(0.98)	(0.66)	(0.9)
after 1997	5	-2.43	-1.84	-1.66	0.77
		(0.97)	(0.89)	(0.77)	(1.04)

Source: Author's calculations based on data from the OECD.
Note: Standard-deviations in parentheses.

Table 5

DETERMINANTS OF THE PROBABILITY TO ENGAGE IN A FISCAL ADJUSTMENT

	Specification 1	Specification 2	Specification 3	Covariates description
$Balance_{(t-1)}$	-0.013*	0.004	0.004	General government balance in the previous year, % of GDP
	(0.007)	(0.006)	(0.006)	
$Excessive\ Deficit_{(t-1)}$	0.027	-0.071	-0.071	=1 if the general government deficit was above 3% of GDP in the previous year
	(0.046)	(0.051)	(0.051)	
$Public\ Debt_{(t-1)}$	-0.001*	-0.002*	-0.002*	Public debt in the previous year, % of GDP
	(0.001)	(0.001)	(0.001)	
$Excessive\ Public\ Debt_{(t-1)}$	0.042	-0.047	-0.046	=1 if the public debt was above 60% of GDP in the previous year
	(0.036)	(0.084)	(0.084)	
Favourable cyclical position	-0.005	-0.004	-0.005	=1 if the output gap increased vis-à-vis the previous year
	(0.032)	(0.031)	(0.031)	
Euro area membership	-0.015	-0.029	-0.038	=1 if the observation refers to an euro area Member-state
	(0.029)	(0.031)	(0.035)	
Period from 1993 to 1997	0.066	0.080*	0.053	=1 if the observation refers to a year between 1993 and 1997
	(0.043)	(0.045)	(0.072)	
Interaction effects[1]				
$Balance_{(t-1)}$*$Excessive\ Deficit_{(t-1)}$	-	-0.03	-0.03	
	-	(0.021)	(0.021)	
$Pub.\ Debt_{(t-1)}$*$Excess.Pub.Debt_{(t-1)}$	-	0.00	0.00	
	-	(0.001)	(0.001)	
Euro area membership*Period 1993-1997	-	-	0.03	
	-	-	(0.091)	
Observations	492.00	492.00	492.00	
Log-pseudolikelihood	-166.08	-157.72	-157.60	

Source: Author's calculations based on data from the OECD.
Notes: The table presents the estimated marginal effects of changes in the covariates on the probability to engage in a fiscal adjustment and the correspondent robust standard-errors (in parentheses). The dependent variable is a dummy that takes the value 1 for observations referring to country-year pairs for which a fiscal adjustment was identified. The marginal effects are evaluated at the mean of the covariates, except in the case of binary variables, for which they represent the discrete change from 0 to 1. Marginal effects tagged with * are significant, at least, at the 10% level. **(a)** The marginal effect of a change in two interacted variables, $x1$ and $x2$, was computed as $x = \frac{\Delta^2 F(u)}{\Delta x_1 \Delta x_2}$ or $x = \frac{\Delta \frac{\delta F(u)}{x_1}}{\Delta x_2}$ (respectively if $x1$ and $x2$ are dummy or if one of them is continuous) and the standard-errors were obtained using the Delta method. In both cases, we use the Stata *inteff* package, described in Norton *et al*. (2004).

representing indicators of the initial fiscal position (general government balance and public debt in the previous year) appear to have significant effects on the probability of undertaking fiscal adjustments, when covariates representing the interaction between those indicators and non-compliance with the criteria for accessing the third stage of the EMU are added to the equation (specifications 2 and 3), the respective estimated impact is not significant.

4. Determinants of success of fiscal adjustments: size vs composition

Alesina and Ardagna (2009) classify fiscal adjustments as successful or unsuccessful according to their ex-post performance in terms of public debt reduction. Based on the criterion proposed by these authors, we consider an episode of fiscal adjustment to be successful if, three years after its beginning, the cumulative decline in the debt to GDP ratio is sharper than 3.5 p.p. (which is the value of the 25th percentile of the distribution of the cumulative change in the debt ratio in all episodes). According to this definition, we identified 15 successful and 45 unsuccessful fiscal adjustments, of which 5 and 34, respectively, refer to euro area countries. Between 1993 and 1997, none of the 13 episodes identified within the euro area sub-sample is successful, suggesting that consolidation efforts on the run-up to the third stage of the EMU, although effective in terms of compliance with the budgetary criteria, do not seem to have had persistent effects in terms of public debt reduction.[6] In fact, we replicated the calculations presented so far but taking into account actual deficits and identified a higher number of adjustments within the 1993-1997 time span (19 instead of 13), which implies that cyclical and interest rate developments along this period had a positive impact on public finances. In particular, these developments seem to have made it easier to fulfill the requirements for joining the euro area without sizeable consolidation measures, which may explain the lack of persistence of the effects of the adjustments.

Standard-deviations presented in Table 6 provide evidence that, in successful and unsuccessful adjustments, the deficit reduction is, on average, statistically significant. Moreover, as shown in Chart 2, most adjustments in our sample are based on both expenditure retrenchment and revenue increase. In the majority of successful adjustments, cyclically-adjusted revenue improves (by 0.99 p.p., on average), but deficit reduction tends to be predominantly made on the expenditure side (primary expenditure declines, on average, by 1.34 p.p in these years). On the contrary, unsuccessful deficit reductions are revenue-based, with the contribution of cuts on the expenditure side averaging 38 per cent. Another interesting feature presented in Table 6 is the fact that successful adjustments are not necessarily those in which the cyclically-adjusted primary balance improves the most. Indeed, the average improvement in successful episodes is very similar to the one referring to the unsuccessful adjustments (2.32 and 2.27 p.p., respectively).

Our findings so far are broadly in line with those in Alesina *et al*. (1998), that suggests that the persistence of the effects of fiscal adjustments does not depend on the magnitude of the deficit cuts, relying, instead, on its composition. In fact, we estimated the probability of success of fiscal adjustments, using a probit specification[7], and found evidence that the only covariate that seems to be significant is the one referring to the change in the cyclically-adjusted primary expenditure. In particular, Table 7 shows that the probability of success is enhanced by sharper expenditure cuts (while greater revenue improve-

6 Previous empirical studies, such as Alesina and Perotti (1996b), assessed the success of fiscal adjustments according to the persistence of the decline in the primary deficit instead of focusing on the post-episode debt level. As pointed out in Barrios *et al*. (2010), both criteria for evaluating success entail pros and cons and this is a somewhat arbitrary choice. In order to assess the robustness of our findings, we checked if the adoption of alternative definitions would lead to significantly different results and concluded that it is not the case. For instance, defining successful adjustments as those in which, in the three years after the episode, the cyclically-adjusted deficit is, on average, at least 2 p.p. below the level recorded in the tightening year, would lead to the identification of 12 successful episodes (instead of 15), of which 2 would refer to euro area countries in the period between 1993 and 1997.

7 See Alesina and Ardagna (1998) and Barrios *et al*. (2010) for similar exercises.

Table 6

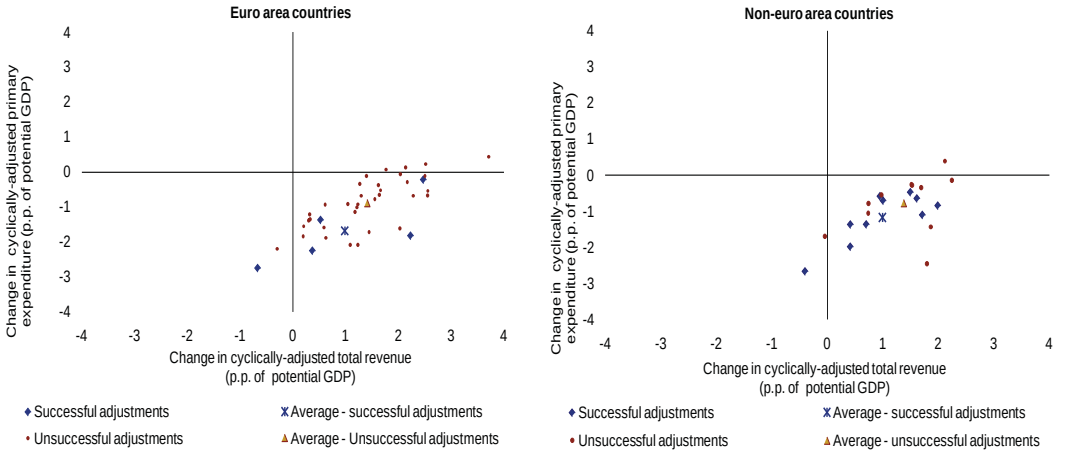
EPISODES OF FISCAL ADJUSTMENT: AVERAGE CHANGE IN CYCLICALLY-ADJUSTED FISCAL VARIABLES | P.P. OF POTENTIAL GDP

	Number of Observations	Change in structural primary deficit	Change in structural primary expenditure	Change in structural total revenue
Total				
Entire sample	493	-0.08	0.05	0.13
		(1.32)	(1.02)	(1.03)
of which euro area countries	314	-0.10	0.07	0.16
		(1.36)	(1.11)	(1.08)
Episodes of fiscal adjustment				
Entire sample	60	-2.28	-0.98	1.30
		(0.65)	(0.78)	(0.86)
of which euro area countries	39	-2.35	-0.99	1.36
		(0.63)	(0.79)	(0.93)
Successful episodes				
Entire sample	15	-2.32	-1.34	0.99
		(0.62)	(0.8)	(0.92)
of which euro area countries	5	-2.66	-1.68	0.98
		(0.84)	(0.97)	(1.33)
Unsuccessful episodes				
Entire sample	45	-2.27	-0.86	1.40
		(0.66)	(0.74)	(0.82)
of which euro area countries	34	-2.30	-0.89	1.41
		(0.6)	(0.73)	(0.87)

Source: Author's calculations based on data from the OECD.
Notes: Standard-deviations in parentheses; Figures are adjusted for the effects of the economic cycle, as well as temporary measures.

Chart 2

EPISODES OF FISCAL ADJUSTMENT: CONTRIBUTION OF THE EXPENDITURE AND REVENUE SIDES



Source: Author's calculations based on data from the OECD.

Table 7

PROBABILITY OF SUCCESS OF FISCAL ADJUSTMENTS			
	Probit Specification[a]	Heckman sample selection model[b]	Covariates description
Balance (*t-1*)	0.020	0.000	General government balance in the previous year, % of GDP
	(0.014)	(0.000)	
Public Debt (*t-1*)	0.003	0.000	Public debt in the previous year, % of GDP
	(0.003)	(0.000)	
Favourable cyclical position	0.196	0.005	=1 if the output gap increased vis-à-vis the previous year
	(0.171)	(0.008)	
Euro area membership	-0.226	-0.010	=1 if the observation refers to an euro area Member-state
	(0.138)	(0.011)	
Period from 1993 to 1997	-0.102	-0.001	=1 if the observation refers to a year between 1993 and 1997
	(0.101)	(0.005)	
Magnitude of the adjustment	-0.010	-0.002	Change in the cyclically-adjusted primary deficit, excluding one-off factors, p.p. of potential GDP
	(0.077)	(0.001)	
Change in primary expenditure	-0.200*	-0.052*	Change in the cyclically-adjusted primary expenditure, excluding one-off factors, p.p. of potential GDP
	(0.063)	(0.04)	
Number of observations	60	492	
Log-pseudolikelihood	-22.875	-174.259	

Source: Author's calculations.

Notes: The table presents the estimated marginal effect of changes in the covariates on the probability of success of fiscal adjustments, as well as the correspondent robust standard-errors (in parentheses).The marginal effects are evaluated at the mean of the covariates, except in the case of binary variables, for which they represent the discrete change from 0 to 1. * signals significance, at least, at the 10% level. **(a)** The dependent variable is a dummy that takes the value 1 when a fiscal adjustment is classified as successful. Thus this estimation is conditional on a fiscal adjustment being undertaken. **(b)** This specification is a Heckman probit two-step regression. The selection equation used in the first-step refers to the decision to undertake a fiscal adjustment and is the same as Specification 3 in Table 5. The dependent variable in the second-step equation is a dummy that equals 1 when a fiscal adjustment is classified as successful, but, as opposed to the probit specification, this estimation also takes into account observations for which fiscal consolidations were not identified. The null hypothesis of independence between the two equations is rejected ($p\text{-}value=0.00$), which justifies the usage of the Heckman method.

ments have a negative effect on the probability to succeed). Regarding the coefficient representing the magnitude of the adjustment, our results imply that sharper deficit reductions have a positive impact on the likelihood to succeed, but it is not statistically significant.

Following Barrios *et al*. (2010), in order to deal with a possible selection bias related to the fact that omitted factors that determine the decision to undertake a fiscal consolidation may be correlated with those that determine the persistence of its effects, we also estimate the probability of success using a Heckman probit selection model. The results based on this approach are broadly the same, but it is worth highlighting that, although the magnitude of the marginal effect of the change in the cyclically-adjusted primary expenditure is reduced by more than half, conclusions regarding its sign and significance still hold. Given that there is clear evidence about the importance of the composition of fiscal adjustments to explain its (un)success, in what follows we focus on the contribution of the major expenditure and revenue items for the fiscal balance improvements identified in both the successful and unsuccessful adjustments.

Table 8 depicts the composition of revenue developments in the fiscal adjustments identified in our sample. As previously mentioned, in both successful and unsuccessful fiscal balance improvements revenues tend to increase (by 0.88 p.p. and 1.43 p.p., respectively). Additionally, Table 8 shows that, in both cases, the most important share of revenue increases stems from improvements in tax receipts, especially those referring to direct taxes. Based on previous literature, we expect that, in successful adjustments, improvements in direct tax receipts are basically explained by the contribution of taxes on corporations. Such a development would not necessarily result from tax rate rises, but from a base effect related to an increase in profits that is usual during successful adjustments (as documented in Alesina and Perotti (1996a)). Additionally, in unsuccessful adjustments the contribution of taxes on households and corporations to increases in direct taxes tends to be quite similar. Regarding indirect taxes, we conclude that they increase more sharply in unsuccessful adjustments than in successful.

Table 8

COMPOSITION OF FISCAL ADJUSTMENTS: AVERAGE CHANGE IN SELECTED REVENUE ITEMS | P.P. OF GDP

	Number of observations	Change in total revenue	Change in direct taxes	Change in indirect taxes	Change in Social Security contributions
Total					
Entire sample	493	0.13	0.06	0.03	0.04
		(1.16)	(0.75)	(0.5)	(0.42)
of which euro area countries	314	0.16	0.07	0.05	0.05
		(1.16)	(0.71)	(0.5)	(0.46)
Episodes of fiscal adjustment					
Entire sample	60	1.29	0.83	0.34	0.10
		(0.96)	(0.67)	(0.55)	(0.45)
of which euro area countries	39	1.30	0.75	0.40	0.18
		(1)	(0.65)	(0.47)	(0.44)
in 1993-1997	13	1.13	0.81	0.43	0.12
		(0.68)	(0.59)	(0.34)	(0.32)
other years	26	1.38	0.72	0.39	0.22
		(1.13)	(0.69)	(0.53)	(0.49)
Successful episodes					
Entire sample	15	0.88	1.02	0.18	-0.19
		(0.84)	(0.62)	(0.5)	(0.27)
of which euro area countries	5	0.83	1.10	0.01	-0.25
		(1.24)	(0.92)	(0.64)	(0.36)
in 1993-1997	0	-	-	-	-
		-	-	-	-
other years	5	0.83	1.10	0.01	-0.25
		(1.24)	(0.92)	(0.64)	(0.36)
Unsuccessful episodes					
Entire sample	45	1.43	0.76	0.40	0.19
		(0.97)	(0.68)	(0.56)	(0.45)
of which euro area countries	34	1.36	0.70	0.46	0.25
		(0.96)	(0.61)	(0.42)	(0.41)
in 1993-1997	13	1.13	0.81	0.43	0.12
		(0.68)	(0.59)	(0.34)	(0.32)
other years	21	1.51	0.63	0.48	0.33
		(1.09)	(0.62)	(0.47)	(0.45)

Source: Author's calculations based on data from the OECD.

Note: The episodes of fiscal adjustment were identified according to the measure of fiscal stance, based on the cyclically-adjusted primary deficit net of temporary measures. The remaining variables are not adjusted. Standard-deviations in parentheses.

Table 8 also shows that, albeit not striking, there are differences between developments in the sub-sample comprising euro area countries between 1993 and 1997 and the remaining observations. In particular, our results show that revenue as a whole tends to increase less sharply in the adjustments selected in that sub-sample, but tax revenue typically features bigger enhancements. Given that Alesina and Ardagna (2009) has shown that fiscal adjustments based on tax revenue are less likely to be successful, these developments on the revenue side may explain why, out of the 13 episodes identified in euro area countries between 1993 and 1997, none has had persistent effects in terms of public debt reduction.

Regarding the developments on the expenditure side, as shown in Table 6, their contribution is more important in successful adjustments than in unsuccessful. The fact that budgetary improvements with more persistent effects are achieved through expenditure retrenchment rather than revenue increases is a feature commonly identified in the literature (see, for instance, Alesina and Ardagna (2009)). In order to analyse the composition of expenditure cuts in fiscal adjustments, we present, in Table 9, a breakdown by its major components.

Table 9 shows that, in successful adjustments, the items compensation of employees and social transfers explain together 60 per cent of the drop in primary expenditure, both declining significantly in these

years.[8] On the other hand, while public investment also typically decreases during successful adjustments, subsidies tend to remain relatively stable (even increasing in the successful episodes identified within the euro area sample). The composition of expenditure retrenchment in unsuccessful adjustments is quite different. In these cases, the bulk of the expenditure contraction relies on important cuts on public investment and compensation of employees, subsidies feature small retrenchments, while social transfers slightly increase.

The analysis of Table 9 also points to several interesting features regarding developments in the 1993-1997 period in countries that were then on the path to participate on the third stage of the EMU. In the first place, as previously mentioned, there is evidence that cuts in primary expenditure tend to be

Table 9

COMPOSITION OF FISCAL ADJUSTMENTS: AVERAGE CHANGE IN SELECTED PRIMARY EXPENDITURE ITEMS | P.P. OF GDP

	Number of observations	Change in primary expenditure	Change in prim. expend. excluding comp. of employees	Change in compensation of employees	Change in social transfers	Change in subsidies	Change in public investment
Total							
Entire sample	493	0.06	0.10	-0.04	0.07	-0.04	-0.03
		(1.72)	(1.49)	(0.4)	(0.63)	(0.22)	(0.29)
of which euro area countries	314	0.10	0.12	-0.02	0.09	-0.04	-0.03
		(1.68)	(1.46)	(0.4)	(0.64)	(0.24)	(0.3)
Episodes of fiscal adjustment							
Entire sample	60	-1.05	-0.73	-0.32	-0.14	-0.08	-0.28
		(1.59)	(1.31)	(0.49)	(0.61)	(0.27)	(0.35)
of which euro area countries	39	-0.76	-0.52	-0.24	0.01	-0.04	-0.34
		(1.53)	(1.28)	(0.49)	(0.58)	(0.3)	(0.41)
in 1993-1997	13	-0.64	-0.41	-0.23	0.03	-0.04	-0.33
		(1.09)	(0.92)	(0.37)	(0.39)	(0.28)	(0.57)
other years	26	-0.82	-0.57	-0.24	0.01	-0.05	-0.34
		(1.73)	(1.44)	(0.55)	(0.66)	(0.32)	(0.31)
Successful episodes							
Entire sample	15	-2.07	-1.47	-0.60	-0.64	-0.02	-0.24
		(0.9)	(0.77)	(0.22)	(0.44)	(0.27)	(0.28)
of which euro area countries	5	-2.40	-1.83	-0.57	-0.96	0.15	-0.44
		(0.85)	(0.72)	(0.2)	(0.53)	(0.38)	(0.38)
in 1993-1997	0	-	-	-	-	-	-
		-	-	-	-	-	-
other years	5	-2.40	-1.83	-0.57	-0.96	0.15	-0.44
		(0.85)	(0.72)	(0.2)	(0.53)	(0.38)	(0.38)
Unsuccessful episodes							
Entire sample	45	-0.71	-0.48	-0.23	0.03	-0.10	-0.30
		(1.64)	(1.36)	(0.53)	(0.57)	(0.27)	(0.38)
of which euro area countries	34	-0.52	-0.33	-0.19	0.16	-0.07	-0.32
		(1.47)	(1.23)	(0.5)	(0.43)	(0.29)	(0.41)
in 1993-1997	13	-0.64	-0.41	-0.23	0.03	-0.04	-0.33
		(1.09)	(0.92)	(0.37)	(0.39)	(0.28)	(0.57)
other years	21	-0.44	-0.28	-0.16	0.24	-0.10	-0.31
		(1.68)	(1.41)	(0.58)	(0.44)	(0.29)	(0.29)

Source: Author's calculations.

Notes: The episodes of fiscal adjustment were identified according to the measure of fiscal stance, based on the cyclically-adjusted primary deficit net of temporary factors. The remaining variables are not adjusted. Standard-deviations in parentheses.

8 It should be emphasised that, as unemployment benefits are an important share of social transfers, the evolution of this item is particularly sensitive to cyclical conditions. In order to assess whether the decrease in social transfers just described is reflecting the behaviour of automatic stabilizers, we analysed the change in the cyclical component of expenditure during adjustment episodes. We concluded that in the majority of successful episodes the change in the cyclical component was negative. This implies that the developments regarding social transfers presented in Table 9 do not seem to be primarily driven by cyclical conditions, thus do not reflect the impact of automatic stabilizers.

less marked in these episodes. Moreover, in the entire sample, most of expenditure retrenchment in adjustment years is made by cutting down expenses related to public investment and compensation of employees, but the contribution of the latter item is relatively lower in the 1993-1997 period.

Previous literature (Alesina and Perotti (1996a) or Alesina *et al*. (1998)) has shown that adjustments with less persistent effects tend to rely on cuts in public investment and leave transfers, subsidies and compensation of employees almost unchanged, whilst in successful adjustments governments typically do not refrain from cutting these outlays. Therefore, the composition of expenditure retrenchments on the run-up to the euro area depicted in Table 9 may explain why, out of the 5 successful adjustments identified in Member-states, none is within the 1993-1997 time span.

5. Concluding remarks

This article identifies and characterizes episodes of fiscal adjustment in a broad OECD sample, but focusing more thoroughly on those that took place in countries that along the 1990s were on their way to adopt the euro.

In the first place, results show that the fiscal consolidations identified in the OECD sample comply with several stylized facts generally pointed out in previous literature on this subject. In particular, it is concluded that the success of deficit correction efforts does not rely on the magnitude of the adjustments, but especially on their composition: fiscal adjustments based on expenditure cuts tend to be more successful than those relying primarily on the revenue side. Moreover, in successful adjustments the bulk of expenditure decline consists of cuts in transfers and compensation of employees, while in unsuccessful adjustments expenditure retrenchment primarily relies on cuts in public investment.

Regarding, more specifically, the founding countries of the euro area, results show that the adjustments identified in 1993-1997 were not successful in persistently reducing the deficit and public debt ratios. This is not a surprising outturn, given that these adjustments were mostly made on the revenue side rather than based on expenditure retrenchment. In fact, there is evidence that no major cuts were undertaken in primary expenditure items such as social transfers and compensation of employees. In particular, regarding cuts in the latter of these items, results show that its contribution to savings in primary expenditure is less relevant in the adjustments identified in the 1993-1997 period in euro area Member-states than in the entire OECD sample.

These results suggest that compliance with the Maastricht criteria was achieved through a reduction of interest payments and, consequently, total expenditure, without major discretionary retrenchment in primary expenditure items. Against the current background of low economic growth and upward pressure on several Member-states' financing costs, it is clear that correcting fiscal imbalances requires governments to adopt strong and assertive strategies. To ensure the persistence of the effects of the adjustments currently in progress, efforts should be mostly concentrated on expenditure retrenchment. In this context, the control of the public wage bill can play an important role, especially in the case of countries with high public employment and where there is evidence of wage premia in the public sector. A more thorough analysis of the relationship between fiscal adjustments and developments regarding the public wage bill will be addressed in future research.

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RATIONAL *VS.* PROFESSIONAL FORECASTS*

*João Valle e Azevedo***

ABSTRACT

We compare theoretical and empirical forecasts computed by rational agents living in a model economy to those produced by professional forecasters. We focus on the variance of the prediction errors as a function of the forecast horizon and analyze the speed with which it converges to a constant (which can be seen as a measure of the speed of convergence of the economy to the steady state). We look at a standard sticky-prices-wages model, concluding that it delivers a strong theoretical forecastability of the variables under scrutiny, at odds with the data (professional forecasts). The flexible prices-wages version delivers a forecastability closer to the data and performs relatively better empirically (with actual data), but mainly because forecasts deviate little from the unconditional mean. These results can be interpreted in at least two ways: first, actual deviations from the steady-state are not persistent, in which case the implications of the specific formulation of nominal rigidities for short-run dynamics are unrealistic; second, exogenous (or unmodelled) steady-state shifts attributable to, *e.g.*, changes in monetary-policy, taxation, regulation or in the growth of the technological frontier, occur in such a way as to strongly limit the performance of professional forecasters.

1.Introduction

Despite tremendous efforts over the past decades, macroeconomic forecasting seems as difficult as before. For most variables forecast accuracy is low, naive models prove hard to beat and sophisticated statistical methods provide marginal (if any) improvements at long horizons. This degree of uncertainty should perhaps be considered a feature of the economy, as the same difficulty characterizes professional forecasts (say, from the Philadelphia Survey of Professional Forecasters, henceforth Phil-SPF, the Federal Reserve Green Book, Fed Green-Book, or the European Central Bank Survey of Professional Forecasters, ECB-SPF). Still, there is clear evidence they rank very well in comparison with various statistical methods, being less prone to the structural instabilities of macroeconomic time series (*e.g.*, Faust and Wright, 2007 and Bernanke and Boivin, 2003 for evidence on Green-Book forecasts or Ang, Bakeart and Wei, 2007 for Phil-SPF inflation forecasts). Moreover, they can be seen as a fortunate aggregation of various individual forecasts that probably adapt fast to changes in the economy, each using different data, different methods and even some judgment. The question we address is whether the behavior of these forecasts shares characteristics of theoretical and empirical forecasts produced by typical dynamic stochastic general equilibrium (DSGE) models. We will call the first set of forecasts Professional" and the latter Rational". We view Professional forecasts as the best publicly available proxy for the forecasts produced by well

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informed agents in the economy, providing a natural benchmark against which to confront the forecasts produced by rational agents living in a model economy that is taken seriously. We assess the fit of models to data by analyzing the differences in the relative performance of Rational vs Professional forecasts, paying special attention to the variance of the forecast errors as a function of the forecast horizon as well as to the speed with which it converges to a constant (the speed with which the forecasts converge to the unconditional mean of the variables under scrutiny). We view this exercise as useful to understand in which dimensions (or for which variables) theoretical models provide a reasonable description of the process (or speed) of convergence of the economy to the steady-state. We will interpret small differences in forecast accuracy (as a function of the forecast horizon) in the two worlds (Rational and Professional) as sign that the model is able to replicate an important dimension of actual data.

Our benchmark model economy will be the one discussed in Smets and Wouters (2007) in its New-Keynesian (NK) and Real Business Cycle (RBC) versions (*i.e.*, with and without nominal rigidities). The comparison of the two paradigms is instructive. In fact, nominal rigidities (along with real features adding persistence such as habit formation and investment adjustment costs) are often incorporated with the justification that they enable the models to replicate the persistence of the response to various shocks identified with vector autoregressions, *i.e.*, impulse response functions that are still alive" after two or even three years horizons. This translates into theoretical forecastability of the corresponding variables at very long horizons. However, we conclude that for the growth of real variables such as consumption, investment or output, Professional forecasters don't do better than the mean at horizons greater than 3 or 4 quarters. The notable exception is the unemployment rate (which we take as a proxy for hours worked in the theoretical model). For nominal interest rates both forecasters and agents that know the economy (in a sticky price model) can form forecasts that are superior to the mean at very long horizons (which simple time series models also can due to the very high persistence of nominal rates). For inflation, forecasters still add to the mean after 5 quarters, but little, whereas the standard sticky-price-wage model (under standard parametrizations) is still far from the mean of the process at long horizons, clearly at odds with the data. The RBC version is silent with respect to nominal rates and inflation but delivers forecasts of real variables that are closer (in terms of relative performance with respect to the unconditional mean and speed of convergence) to Professional forecasts. The notable exception relates to hours. Once we use these models to forecast actual data, the performance is extremely weak but less so with the RBC version (mainly because forecasts converge to the unconditional mean more rapidly). Again, the exception to this pattern is found with hours/unemployment.

The remainder of the article is organized as follows: Section 2 shows that, for a host of variables, the predictive power of Professional forecasts vanishes fast as the forecast horizon increases, *i.e.*, the gains (if any) that one obtains by using these forecasts instead of a (real-time) estimate of the unconditional mean of the variables are small. Section 3 confronts these facts with the theoretical and empirical performance of a standard DSGE model, whereas section 4 pays special attention to what occurs during recessions. Section 5 concludes.

2. Professional Forecasts: how much they deliver

Here we assess the predictive power of U.S. Professional forecasts, measuring simply their performance relative to an estimate of the unconditional mean of the variables analyzed.[1] In this way we investigate how informative these forecasts are and until when (in terms of forecast horizon) they provide relevant signal relative to what can be viewed as a steady-state forecast. It is still early to conduct a similar and conclusive analysis with euro area data due to sample size restrictions while for the purposes of our study the origin of the data is not relevant.

1 Analysis of the forecast performance of Phil-SPF is routinely conducted at the Federal Reserve Bank of Philadelphia, see Stark (2010) for a recent discussion.

2.1. Data

We analyze 15 macroeconomic indicators from the Phil-SPF,[2] namely: Nominal output measured by GNP/GDP (NOUTPUT), Real GNP/GDP (ROUTPUT), Industrial Production Index - Total (IPT), Real Personal Consumption Expenditures - Total (RCON), Net Exports (NETEXP), GDP deflator (GDPDEF), Consumer Price Index (CPI), Real Gross Private Domestic Investment -- Residential (RINVRESID), Real Gross Private Domestic Investment -- Nonresidential (RINVBF), Real Government Consumption and Gross Investment -- State and Local (RGLS), Real Government Consumption and Gross Investment -- Federal (RGF), Housing Starts (HSTARTS), unemployment (UNRATE), 3 -month T-bill rate (TB3MS) and 10 year T-bond rate (GS10). All data is firstly aggregated quarterly when necessary (to be consistent with the variables forecasted in the Phil-SPF) and except for unemployment and interest rates, all data is in growth rates. We look only at point forecasts and define these as the median forecast (across all respondents) in every release of the survey (results with the mean forecast are very similar). The individual respondent's point forecast are generally close to the central tendencies of their subjective distributions (*e.g.*, Engelberg *et al*. 2009) while there is clear evidence that this aggregation produces forecasts that are in general superior to individual forecasts. Obviously, a not so straightforward aggregation can result in forecast improvements, and this can be achieved even when there is (as in Phil-SPF) entry and exit of forecasters, see Capistrán and Timmerman (2009).

Fed Green-Book forecasts will not be analyzed here, please refer to the working paper version of this article, but we can refer that Phil-SPF forecasts represent best practice, or close to best practice, within professional forecasts. In any case, we should refer that Romer and Romer (2000), using data until 1991, have shown that Fed-Green Book forecasts of inflation and real GDP are statistically unbiased and dominate private sector forecasts (*i.e.*, suggesting that the Federal Reserve had considerably more information beyond what is known to the private sector). The period of Great Moderation"[3] between 1982-2007 has affected the time-series properties of many variables as well as the performance of Professional forecasts. In particular, D'Agostino and Whelan (2008) show that the superior forecast performance of the Fed-Green Book deteriorated considerably after 1991, with Phil-SPF forecasts taking the lead. We have reached similar conclusions. In the remainder of the paper we will thus focus exclusively on Phil-SPF forecasts, regarding them as a proxy of the best forecasts produced by well-informed agents in the economy.

2.2. Methodology

We begin our analysis by taking the real-time vintage data from 1968q4 through 1981q3 - h quarters, for $h = 1,\ldots,5$.[4] We then estimate the unconditional mean of the variables under scrutiny by simply computing the average of each variable for this vintage, which is our benchmark forecast for 1981q3. As a reference, we also compute forecasts from an estimated Direct Autoregression (AR) using data through 1981q3 - h. We repeat this procedure using the vintage from 1968q4 through 1981q4 - h, $h = 1,\ldots,5$ and so forth until 2009q2. It should be noted that most variables are available with a delay of one quarter. Hence, to properly compare these benchmark forecasts with Phil-SPF's and Fed-Green Book's forecasts we re-label the forecast horizon so that the information sets with each method approximately coincide (so, the h step ahead, with $0 \leq h \leq 4$, Phil-SPF's and Green-Book's forecasts will be considered as $h+1$ step ahead forecasts since the latest observation of the variable to be forecasted does not in general

2 For complete information on the survey's background see http://www.philadelphiafed.org/research-and-data/real-time-center/survey-of-professional-forecasters/spf-documentation.pdf as well as Zarnowitz (1969), Zarnowitz and Braun (1992) and Croushore (1993).

3 See, *e.g.*, McConnell and Perez-Quiros (2000), Stock and Watson (2003) and Giannone, Lenza and Reichlin (2008).

4 These series were retrieved from the Philadelphia Fed website. http://www.phil.frb.org/research-and-data/real-time-center/real-time-data/data-files/. See, *e.g.*, Croushore and Stark (2001, 2003) for a discussion of real-time data.

refer to the forecast moment,[5] which is approximately the middle of the quarter since at least 1990q3[6]). We then compare the forecast accuracy of the different surveys' predictions, AR and also real-time average by computing the ratio of Root Mean Square Forecast Error (RMSFE) of both the AR and Professional forecasts relative to the benchmark forecast (real-time average). It should be noted that the forecast error is defined as the difference between the forecast and the corresponding observation of the latest vintage of data available (results considering the h quarters ahead vintage alter little the results, at least in relative terms, see also Stark 2010 for a thorough analysis of this issue). Following Fair and Shiller (1989) we also run the following forecast encompassing regression:

$$y_{t+h} = \alpha + \beta_0 f^{\text{real}}_{t+h} + \beta_1 f^{x}_{t+h} + \varepsilon_{t+h} \quad (1)$$

where y_{t+h} is the observation of the variable forecasted, f^{real} is the forecast from the real-time average, f^{x} is the forecast from the candidate model x, in our case either the AR process or the Professional forecasts and ε_{t+h} is a regression error. Obviously, if $\beta_1 \neq 0$ then forecasts from candidate model x add information relative to the "real-time average". Both the RMSFE ratios and the β_1 coefficients are computed and presented for the full sample as well as for an aggregation of recession quarters as defined by the National Bureau of Economic Research (NBER).

It is important to note that a forecast performing as well as an estimate of the unconditional mean in terms of RMSFE (or encompassed by it, in which case $\beta_1 = 0$) may nonetheless be useful if it can more often accurately predict the direction of change in the actual series (Joutz and Stekler, 2000). With this in mind we will examine the sign forecast accuracy of the forecasts by constructing the following two-by-two contingency table in which the actual and forecast data for each quarter are classified (i) by whether the actual change in a given variable is positive (+) or negative/zero (-,0), and (ii) whether the forecast correctly or incorrectly predicted the sign:

Contingency Table	
$n_{11} : \Delta y_{t+h}(+), \Delta f^{x}_{t+h}(+)$	$n_{12} : \Delta y_{t+h}(-,0), \Delta f^{x}_{t+h}(+)$
$n_{21} : \Delta y_{t+h}(+), \Delta f^{x}_{t+h}(-,0)$	$n_{22} : \Delta y_{t+h}(-,0), \Delta f^{x}_{t+h}(-,0)$

where the actual change is $\Delta y_{t+h} = y_{t+h} - y_t$ and the predicted change is $\Delta f^{x}_{t+h} = f^{x}_{t+h} - y_t$. Note that y_t is the most recent (quarterly) value known at the time of the forecast. The main diagonal cells include numbers of correct sign forecasts and the the other cells include the numbers of incorrect sign forecasts. We then test the null hypothesis of no association between the frequency of actual and predicted changes (because correct predicted changes will always occur, what matters is whether their frequency is higher than what would be expected if actual and predicted changes were completely unrelated).

2.3. Results and Discussion

2.3.1. Forecast Accuracy

Our main empirical results regarding forecast accuracy of Phil-SPF forecasts are presented in Table 1, referring to the 15 macroeconomic variables defined before. It contains the ratio of the Root Mean Square Forecast Error (RMSFE) of both the AR and Professional forecasts relative to the benchmark forecast (real-time average) as well as the estimate of β_1 resulting from OLS estimation of Eq. (1) at different forecast horizons. Results are presented for the full sample and for an aggregation of recession periods.

5 This does not apply, *e.g.*, to interest rates, whose quarterly average is to be forecasted but are obviously available in the middle of the quarter, when the forecast is made.

6 The timing of the previous American Statistical Association/NBER survey (that was taken by the Philadelphia FED) is not known exactly but it is believed that it followed closely Phil-SPF's.

Table 1 (to be continued)

FORECAST PERFORMANCE OF THE PHILADELPHIA'S SURVEY OF PROFESSIONAL FORECASTERS																					
Espec.	Real Time Average (RMSFE)	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF-OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF - OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF - OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF-OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
Time/H		1				2				3					4			5			
NOMINAL GNP/GDP (NOUTPUT)																					
Full	2.93	1.06	0.04	0.68	0.11**	1.13	0.01	0.81	0.11*	1.18	0.03	0.93	0.05	1.19	0.02	0.99	0.03	1.21	-0.004	1.07	0.02
Rec.	3.29	1.48	0.1	0.79	0.12	1.55	0.22	1.05	0.09	1.64	0.09	1.30	0.02	1.62	0.32	1.42	0.01	1.66	0.41*	1.56	0.02
PNB/PIB REAL (ROUTPUT)																					
Full	3.02	0.86	0.03	0.66	0.26***	0.89	0.07	0.78	0.21*	0.94	0.15	0.91	0.01	0.96	0.38	0.96	-0.09	1.01	0.13	0.98	-0.03
Rec.	3.05	1.30	-0.01	0.72	0.11	1.36	0.11	1.05	-0.15	1.45	0.09	1.33	-0.31	1.48	0.88*	1.46	-0.34*	1.52	0.58	1.49	0.31*
INDUSTRIAL PRODUCTION INDEX – TOTAL (IPT)																					
Full	4.92	0.76	0.75***	0.65	0.49***	0.94	1.85***	0.91	0.23	0.98	1.71***	1.07	-0.12	1.16	0.2	1.13	-0.23	1.18	-0.18	1.18	-0.27
Rec.	5.84	0.92	0.73***	0.76	0.52***	1.24	0.56***	1.19	0.13	1.30	0.52***	1.48	-0.2	1.59	0.36	1.59	-0.25	1.59	-0.24	1.66	-0.23
REAL PERSONAL CONSUMPTION EXPENDITURES – TOTAL (RCON)																					
Full	2.87	0.75	0.35*	0.68	0.42***	0.76	0.33	0.74	0.57**	0.77	0.35	0.78	0.35	0.8	0.69	0.84	-0.24	0.86	-0.15	0.83	0.34
Rec.	2.02	1.25	0.37	0.97	0.29*	1.28	0.38	1.10	0.45**	1.33	0.5	1.18	-0.19	1.49	0.91**	1.42	-0.45	1.58	-0.001	1.42	0.23
CONSUMER PRICE INDEX (CPI)																					
Full	2.13	1.41	-0.28	0.56	1.40***	1.44	-0.38	0.78	0.78***	1.46	-0.35	0.85	0.56***	1.50	-0.24	0.88	0.42***	1.56	-0.15	0.89	0.39**
Rec.	3.17	1.24	-0.06	0.51	0.89***	1.28	-0.22	0.74	0.52**	1.30	-0.11	0.81	0.46**	1.34	-0.07	0.85	0.43**	1.35	-0.07	0.86	0.41**
REAL GROSS PRIVATE DOMESTIC INVESTMENT – RESIDENTIAL (RINVRESID)																					
Full	19.76	0.6	0.19*	0.61	0.21***	0.73	0.41***	0.76	-0.02	0.81	0.59***	0.88	-0.05	0.86	0.11	0.95	-0.12	0.87	0.09	0.97	-0.17*
Rec.	20.27	0.55	0.09	0.42	0.04	0.79	0.29	0.76	-0.12	0.91	0.52	1.02	-0.03	0.95	0.06	1.17	-0.08	0.95	0.15	1.19	-0.07
REAL GROSS PRIVATE DOMESTIC INVESTMENT – NONRESIDENTIAL (RINVBF)																					
Full	10.20	0.83	0.20***	0.65	0.19*	0.84	0.23**	0.73	0.18	0.91	0.22	0.79	0.2	0.99	0.08	0.9	0.15	1.05	-0.18	0.94	0.16
Rec.	11.61	1.02	0.24*	0.71	-0.02	1.07	0.32	0.78	-0.26	1.16	0.54	0.88	-0.26	1.22	0.65	1.00	-0.24	1.30	0.11	1.08	0.17
REAL GOVERNMENT CONSUMPTION AND GROSS INVESTMENT – STATE AND LOCAL (RGLS)																					
Full	3.02	0.83	0.31*	0.82	0.19***	0.84	0.16	0.82	0.35***	0.82	0.11	0.83	0.24*	0.82	0.36**	0.85	0.48***	0.83	0.49**	1.01	0.06
Rec.	2.61	1.08	0.73***	1.08	0.001	1.05	0.41**	1.04	-0.06	1.04	0.14	1.03	-0.06	1.03	0.43**	0.98	0.19	1.05	0.56**	0.99	-0.01

Table 1 (continued)

FORECAST PERFORMANCE OF THE PHILADELPHIA'S SURVEY OF PROFESSIONAL FORECASTERS																					
Espec.	Real Time Average (RMSFE)	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF-OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF - OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF - OLS	Rel. RMSFE AR	β_1 AR OLS	Rel. RMSFE SPF	β_1 SPF-OLS
Time/H	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
		1				2				3						4			5		
REAL GOVERNMENT CONSUMPTION AND GROSS INVESTMENT – FEDERAL (RGF)																					
Full	7.22	1.03	-0.03	0.95	-0.11**	1.02	0.08	0.96	-0.01	1.08	0.06	0.98	0.08	1.06	0.01	1.01	0.11	1.01	0.06	0.96	0.06
Rec.	7.52	1	-0.002	0.89	0.17***	0.86	0.09	0.91	-0.13	1.02	-0.01	0.93	-0.04	1.04	0.02	0.98	-0.08	0.92	0.16	0.97	-0.07
HOUSING STARTS (HSTARTS)																					
Full	29.32	1.02	0.39	0.84	1.02***	1.04	0.04	1.03	0.72**	1.10	-0.92	1.11	0.42	1.07	0.03	1.18	-0.14	1.05	0.83	1.16	-0.29
Rec.	34.00	0.88	0.39	0.59	1.55***	0.96	-0.79	1.21	0.61	1.05	-7.44**	1.37	0.56	0.97	-0.19	1.46	0.4	0.94	0.77	1.37	0.75
GROSS DOMESTIC PRODUCT: IMPLICIT PRICE DEFLATOR (GDPDEF)																					
Full	1.92	1.43	0.22	0.67	0.49***	1.44	0.14	0.7	0.58***	1.44	0.08	0.72	0.63***	1.53	0.07	0.75	0.65***	1.59	0.07	0.77	0.53***
Rec.	2.15	1.56	0.04	0.72	0.44*	1.58	-0.26	0.73	0.52**	1.59	-0.14	0.75	0.67**	1.68	0.03	0.77	0.63**	1.67	-0.04	0.76	0.55**
CIVILIAN UNEMPLOYMENT RATE (UNRATE)																					
Full	1.71	0.21	-0.03	0.2	-0.06*	0.22	0.02	0.22	-0.09**	0.25	0.03	0.24	0.09	0.33	0.04	0.3	0.12*	0.41	0.04*	0.36	0.11**
Rec.	2.23	0.26	-0.01	0.24	-0.14*	0.28	0.11	0.25	-0.15**	0.31	0.14*	0.28	0.26*	0.37	0.13**	0.3	0.25***	0.39	0.12*	0.37	0.22***
NET EXPORTS OF GOODS AND SERVICES (NETEXP)																					
Full	55.59	0.89	-0.04	2.32	0.02***	0.46	-0.22	2.00	-0.02	1.21	-0.07	1.98	-0.01	0.99	-0.06	1.77	-0.02	1.19	-0.05	1.68	-0.02
Rec.	111.91	0.12	-0.02	0.29	0.42	0.07	-0.24	0.27	0.56	0.09	-0.32	0.28	0.47	0.1	-0.41	0.28	0.15	0.14	-0.49	0.29	0.01
10-YEAR TREASURY CONSTANT MATURITY RATE (GS10)																					
Full	1.98	0.14	0.89***	0.38	0.69***	0.16	0.81	0.33	1.04***	0.19	0.71***	0.32	1.08***	0.22	0.69***	0.32	1.08***	0.26	0.64***	0.33	1.06***
Rec.	2.58	0.07	0.73***	0.25	-0.08	0.11	0.72***	0.23	0.93***	0.16	0.56***	0.21	1.03***	0.19	0.49***	0.21	1.04***	0.24	0.44***	0.21	1.08***
3-MONTH TREASURY BILL (TB3MS)																					
Full	2.01	0.32	0.96***	0.09	0.99***	0.33	1.07***	0.22	0.99***	0.37	1.07***	0.25	1.02***	0.46	1.05***	0.28	1.08***	0.53	1.24***	0.33	1.15***
Rec.	2.83	0.36	0.87***	0.09	1.05***	0.33	1.00	0.28	1.02***	0.32	0.99***	0.28	1.06***	0.35	0.98***	0.26	1.14***	0.40	1.15***	0.27	1.24***

Source: Author's calculations.

Notas: The table comprises the forecasting performance results of 15 macroeconomic variables referred in the text in which the first column indicates whether one is taking the full-sample period (1981:3-2009:2) ("Full") or the aggregation of recession periods ("Rec") – simple combination of the 4 main recessions as identified by the NBER. Variables names are in accordance to the Philadelphia Fed's designation. The remaining of the table is organized as follows: row 2 identifies the specification; row 3 indicates the forecast horizon ranging from $h=1$ a $h=5$. Column 1 reports the Root Mean Squared Forecast Error (RMSFE) associated to using the real-time average as forecast for each vintage available at the forecast date (available at http://www.phil.frb.org/research-and-data/real-time-center/real-time-data/data-files/). Columns 2,6,10,14 and 18 report RMSFE obtained from an Autoregressive (AR) process relative to the real-time RMSFE – a value larger than one indicates that the AR's RMSE is larger than the real-time RMSFE and this is emphasized by a grey shade throughout the table's entries. Columns 4,8,12,16 and 20 report the relative RMSFE obtained from using the Survey of Professional Forecasters' (SPF) predictions to the Real Time RMSFE – a value larger than one indicates that the SPF's RMSFE is larger than the real-time RMSFE and this is emphasized by a grey shade throughout the table's entries. Columns 3,7,11,15 and 19 (5,9,13,17 and 21) report the coefficient β_1 resulting from OLS estimation of Equation (1) for forecast accuracy at different time horizons for the comparison of real-time and the AR process (SPF); *,**,*** denote significance at 10,5 and 1% levels, respectively (*i.e.*, rejection of the null hypothesis that the coefficient β_1 is zero).

The main conclusions follow:

- considering the full sample, Phil-SPF forecasts add signal relative to the benchmark (real-time average) only up to $h = 2$ when looking at the significance of the β_1 coefficients. The exceptions are Phil-SPF's CPI inflation, unemployment and interest rates predictions throughout the different forecast horizons and Phil-SPF's RGLS (State and Local Government Consumption and Gross investment growth) up to $h = 4$.

- considering the full sample, the relative (to the real-time average) RMSFE for Phil-SPF's forecasts is clearly less than one for all horizons only in the case of unemployment, interest rates and, in a lesser extent, inflation (CPI and GDP deflator). In the case of 10 year bond interest rates the AR outperforms Phil-SPF whereas for the 3-month T bill rate the opposite is true. For output (nominal and real) and specially industrial production, housing starts and net exports this ratio indicates mostly useless Phil-SPF forecasts at horizons greater than or equal to $h = 2$. For consumption, investment (residential and non-residential) and Government expenditures (federal and local) there is still some superiority on average (relative to the real-time average) at horizons $h = 3, 4, 5$. In these cases however, it would in general suffice to use a simple autoregression as the rel. RMSFE compares favorably with Phil-SPF's.

- for all variables except (again) interest rates, inflation and unemployment, Phil-SPF (and AR) forecasts that correspond to recession periods have a quite poor performance relative to the real-time average except at $h = 1$. Afterwards the rel. RMSFEs are higher than those obtained with the full sample and more frequently well above 1. This evidence is in line with *e.g.* Zarnowitz (1992) , Zarnowitz and Braun (1992), McNees (1992) and McNees and Ries (1983) who reported a number of systematic errors made by forecasters regarding recession periods. For $h = 2$, β_1 is nonetheless still significant for Phil-SPF in the case of consumption and for AR forecasts in the cases of state and local government expenditures, non-residential private investment and industrial production, despite the fact that rel. RMSFE is above 1.

Putting it simply, this exercise shows that for most variables a real-time estimate of the conditional mean is a hard to beat forecast even at short horizons. Regarding unemployment, nominal interest rates and inflation, Professional forecasts do contain relevant information beyond that of our crude benchmark forecast. In these cases, however, it is more clear that the distance between these forecasts and the real-time average forecast is surely overstated, in the sense that the latter is supposed to measure a steady-sate value that may be varying over time (*e.g.*, due to changes in monetary policy or labor market institutions). This is not damaging for our purposes as it allows us to refer to this distance as an upper bound on what a theoretical model (without regime shifts in monetary policy or labor market institutions) ought to deliver in terms of forecast accuracy relative to the steady-state forecast.

2.3.2. Sign forecast accuracy

Table 2 reports the cell counts for the contingency table described in section 2.2 and p-values for the null hypothesis of no association between actual and predicted changes for the Phil-SPF and real-time average forecasts. First, it is clear that most p-values for Phil-SPF forecasts are less than 0.1, or the null hypothesis of no association between actual and predicted changes is rejected, indicating that, in general, these forecasts accurately predict the direction of change in the actual series more often than what luck would determine. What is more interesting for our purposes is to compare the behavior of Professional forecasts to that of the benchmark (real-time average) forecast. First, we observe that for $h = 1, 2$ Phil-SPF's forecasts are, in general, clearly more informative than the real-time average (lower associated p-values), according to this criterion. Second, for real output Phil-SPF's forecasts do not clearly look more useful than the benchmark at $h = 3, 4, 5$. But the main result emerging from Table 2 is that at horizons greater than $h = 2$ and for all other variables except interest rates, CPI inflation, unemployment and to a lesser extent State and local Government spending, the null of no association (no valuable prediction of the direction of change) is either rejected for both Phil-SPF and real-time average forecasts or,

Table 2

SIGN FORECAST ACCURACY TESTS PHIL-SPF | REAL-TIME AVERAGE

H	Variable	p-value	
		Phil-SPF	Real-Time
1		0.00	0.03
2		0.00	0.06
3	NOUTPUT	0.17	0.15
4		0.16	0.11
5		0.08	0.14
1		0.15	0.09
2		0.08	0.16
3	IPT	0.07	0.16
4		0.17	0.14
5		0.17	0.16
1		0.00	0.05
2		0.00	0.00
3	HSTARTS	0.05	0.15
4		0.15	0.16
5		0.03	0.15
1		0.00	0.13
2		0.00	0.07
3	RCONS	0.00	0.15
4		0.02	0.03
5		0.00	0.05
1		0.00	0.08
2		0.00	0.07
3	RINVBF	0.01	0.07
4		0.01	0.06
5		0.00	0.07
1		0.04	0.14
2		0.01	0.17
3	RINVRESID	0.00	0.00
4		0.00	0.00
5		0.00	0.00
1		0.00	0.18
2		0.00	0.13
3	RGF	0.19	0.00
4		0.11	0.00
5		0.19	0.00
1		0.00	0.16
2		0.00	0.17
3	RGLS	0.09	0.08
4		0.05	0.15
5		0.08	0.16
1		0.00	0.15
2		0.00	0.16
3	UNRATE	0.00	0.16
4		0.00	0.16
5		0.03	0.15
1		0.11	0.02
2		0.11	0.03
3	NETEXP	0.15	0.03
4		0.15	0.02
5		0.16	0.02
1		0.00	0.01
2		0.00	0.00
3	CPI	0.06	0.14
4		0.01	0.11
5		0.02	0.12
1		0.00	0.09
2		0.00	0.09
3	TB3MS	0.00	0.09
4		0.00	0.17
5		0.00	0.16
1		0.00	0.19
2		0.00	0.16
3	GS10	0.00	0.16
4		0.00	0.15
5		0.00	0.17
1		0.01	0.02
2		0.00	0.05
3	GDPDEF	0.16	0.03
4		0.12	0.03
5		0.16	0.03
1		0.00	0.14
2		0.00	0.15
3	ROUTPUT	0.11	0.17
4		0.14	0.11
5		0.10	0.17

Sources: Author's calculations.

Notes: P-value (or Fisher's exact test) is for testing the null hypothesis of no association between the direction of change in the actual $\Delta Y_{t+h} = Y_{t+h} - Y_{t-1}$ and forecast $\Delta \hat{Y}_{t+h} = \hat{Y}_{t+h} - Y_{t-1}$ series.

when the null is not rejected for Phil-SPF forecasts, it is often rejected in the case of real-time average forecasts. All in all, the main message is that (with the exceptions mentioned) Professional forecasts certainly loose marginal informational content when compared to the benchmark after 2/3 quarters, in line with the previous subsection.

3.How does a Standard DSGE model forecast?

3.1.The model

We move now towards the core of the article, comparing the results above with the theoretical and empirical forecast performance of the medium-scale model analyzed and estimated in Smets and Wouters (2007) (henceforth SW07), based on Smets and Wouters (2003) and Christiano *et al*. (2005). The model has many of the features now popular in the growing so-called DSGE literature[7] including monopolistic competition in the goods and labour markets, ingredients aimed at improving the fit of the model to observables such as habit formation in consumption, investment adjustment costs, variable capacity utilization (all of these implying amplification of the effects of shocks) and crucially, nominal frictions such as sticky prices and wages along with partial backward-looking indexation. Monetary policy follows a Taylor rule and has real effects when nominal frictions are important. Seven shocks are included (total factor productivity, investment productivity, monetary policy, government spending, risk premium along with price and wage markup shocks) as well as seven observables: output, investment, consumption, wages (all in log differences, or growth rates) as well as inflation, nominal interest rates and (log of) hours. We use exactly the same data treatment as in SW07, implying that the match between the model's variables and Phil-SPF's counterparts is not perfect. Specifically, SW07 observables for output, consumption, investment and wages are expressed in per capita (working age population) terms and nominal interest rates are measured with the Federal funds rate (quite close to the 3-month T-bill rate from Phil-SPF nonetheless). The inflation measure in the model is GDP deflator inflation (*i.e.*, perfect match with Phil-SPF) whereas (minus) Phil-SPF's unemployment, while following closely hours, surely drifts somehow from the concept in the model.

We analyze the forecast performance of two versions of SW07: the original one featuring nominal rigidities, or New-Keynesian (NK) version, and another where we shut down these rigidities (RBC version, where we further reduce the observables by eliminating inflation and nominal interest rates). We use Smets and Wouters's estimated parameters (mode of the posterior distribution, obtained from combining the likelihood function with a set of independent priors for the 41 structural parameters included in the model) using data from 1984q1 through 2004q2. We choose this sample to avoid quibbles regarding the onset of the "Great Moderation" and likely changes in monetary policy within the period starting in 1966q1 (SW07's beginning of the sample). We arguably go against the RBC version by not re-estimating the model, *i.e.*, we keep fixed the structural parameters not related to nominal rigidities. Forecasts of the observables are just conditional expectations given the model and are obtained with the Kalman filter, which is also used to derive the theoretical covariances of the forecast errors for various horizons.[8]

We start with a theoretical analysis of the forecastability of the various variables implied by the model , *i.e.*, we assume the model is the economy and derive analytically the standard deviation of the forecast errors at various horizons. The (artificial) sample size is set at $T = 160$ (thinking in 40 year of post-war quarterly data). Chart 1 presents the theoretical relative (to the standard deviation of the variables) root

7 See, *e.g.*, Adolfson et. al. (2007, 2008) and Christiano *et al*. (2009) for further (and growing) models.

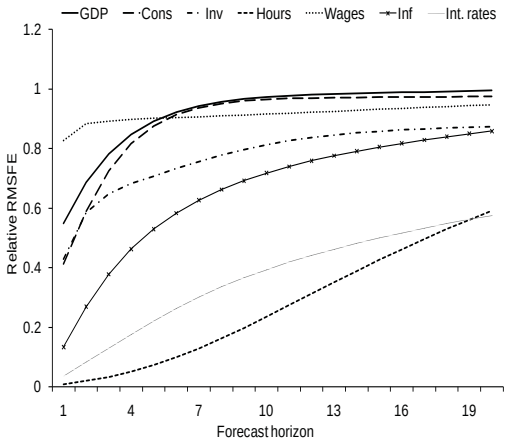
8 For the theoretical analysis this only implies that agents would be using a minimum mean square criterion if they were to pick this as a point forecast, *i.e.*, they know the parameters of the model and produce conditional expectations given the state space model. Regarding the empirical analysis in the paper, it is fair to say that Bayesian estimation of the models would make natural using as point forecasts the mean of the predictive density of future observations, see *e.g.*, Adolfson, Lindé, and Villani (2007).

mean squared forecast error (RMSFE) for output, consumption, investment, inflation, hours, nominal interest rate and wages of the original SW07 (NK version). As easily concluded, for nominal interest rates, inflation but also hours, there is a very strong predictability at short horizons, the relative RMSFE converges slowly and after 20 quarters this ratio is still around 0.4 for inflation and nominal interest rates and 0.7 for hours. For consumption, output and investment the initial level lies around 0.45-0.55 but convergence is fast except for investment. Wages is the least predictable variable, with a relative RMSFE starting around 0.8. All this means that a rational agent understanding this economy should be able to forecast in such a way as to beat clearly the unconditional mean in the case of hours, inflation, nominal interest rates even at very long horizons. For consumption, output and specially investment, he would clearly beat the mean even at 6 quarters ahead.

In the case of the RBC version (Chart 2) the conclusions are naturally quite different. The model becomes silent with respect to inflation and nominal interest rates but for the remaining variables the convergence of the RMSFE towards the standard deviation of the variables is much faster. For output, the relative RMSFE is around 0.8 for 1-step ahead forecasts and above 0.9 afterwards. For consumption and investment the speed of convergence is lower but clearly higher than that of the sticky prices/wages version. For wages, there is only significant predictability at 1-step ahead whereas for hours convergence of the RMSFE towards the standard deviation is slow but at a level clearly above that of the NK version. Now, it is important to note that this feature of the specific NK model analysed here is certainly common to any model featuring price and wage setting frictions along with an important indexation mechanism (to target or current inflation or a combination of the two) aimed at rationalizing the observed persistence of inflation, see *e.g.*, the models in Christiano *et al*. (2005), Adolfson *et al*. (2007), Ireland (2007) or Schorfheide (2005). This occurs because indexation generates high persistence in inflation and in other variables (and thus strong forecastability). In other way, any deviation of inflation from target in this kind of world represents a persistent (forecastable) deviation of the economy from its steady state.

Chart 1

RELATIVE RMSFE OF SW07 | NK VERSION

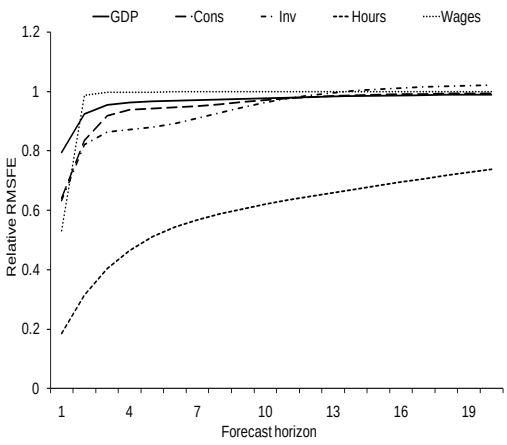


Source: Author's calculations.

Note: This figure presents the relative (to the standard deviation of the variables) RMSFE for each macro variable of interest at different forecast horizons (up to 20).

Chart 2

RELATIVE RMSFE OF SW07 | RBC VERSION



Source: Author's calculations.

Note: This figure presents the relative RMSFE for each macro variable of interest at different forecast horizons (up to 20).

3.2. Model *vs.* Data

Here we confront the results in section 2, regarding Phil-SPF's forecasts, with the theoretical and empirical forecast accuracy of the NK and RBC versions of SW07 analyzed above. To be clear, we view the relative (to the standard deviation) RMSFE of well-informed agents in the economy (Professional forecasters), as a statistic that should be matched by a realistic DSGE model, just as it should deliver steady-state ratios, volatilities and correlations that are close to what is observed in the data. *E.g.*, if this relative RMSFE for output growth at 1 quarter horizon is 0.3 in the model and 0.8 in the case of Professional forecasters (data), we view this as an indication that the model delivers a forecastability that is at odds with the data. And similarly if after 10 quarters the model is still able to clearly outperform the mean whereas Professional forecasters don't. Comparison of Professional and Rational (given the model) forecasts can thus inform theory or at least show the limitations of the theoretical models, even though the mapping from Rational to Professional forecasts may be considered loose.

If nothing else, we believe Professional forecasts allow us to measure how fast (from the perspective of the forecasters) the economy is moving towards the steady-state. Specifically, we can measure this convergence to the steady-state through the speed with which the RMSFE converges to the standard deviation of the variables. In fact, if after some time (horizon) the forecast is (on average) very close to the unconditional mean of the variable under scrutiny, this means the forecaster believes the economy (or at least that variable) takes as much time to reach the steady-state (in the absence of unpredictable shocks). With rational expectations this must be a characteristic of the process generating the data.[9]

Now, results in the previous section suggest that for most real variables (and in particular output, investment and consumption) Professional forecasts loose grip after 2 quarters, meaning that using as forecast an estimate of the unconditional mean of the variables does not imply loosing valuable information. Professional forecasts of unemployment and nominal interest rates are still clearly superior to the mean after one year whereas for inflation (CPI and GDP) there is forecastability but in a lesser extent. Notice further that we are using as benchmark a real-time estimate of the mean. If this mean is time-varying or shifts occasionally, *e.g.*, if the steady-state changes due to changes in taxation or in monetary policy (that changes for instance target inflation), the real-time average will not be efficient whereas professional forecasters are probably aware of these shifts. This is useful for our purposes as it allows us to interpret the relative RMSFE of Professional forecasts (which is thus deflated) as a **lower bound** on what a realistic theoretical model (without steady-state shifts) ought to deliver in terms of forecast accuracy relative to the steady-state forecast. Similarly then, in the mapping from Professional forecasts to the theoretical performance of SW07, we must see the model as corrected for regime changes, hence we cannot be as demanding when using the models in a pseudo out-of sample forecasting exercise with actual data.

Table 3 compares the results, for the theoretical and empirical (with actual data) relative (to the standard deviation) RMSFE of the NK and RBC versions of SW07, vis-a-vis that obtained with Phil-SPF forecasts. In the analysis of the empirical performance we focus on the sample 1981q3- 2009q2 (coinciding with the previous SPF's evaluation sample). If we take first the theoretical rel. RMSFE for output and investment, it is clear that the distance between the rel. RMSFE of Phil-SPF and that of the theoretical model is in general smaller for the RBC model, clearly so for all h in the case of investment and for $h = 3, 4, 5$ in the case of output. At $h = 1, 2$ in the case of output, the RBC has a clearly lower forecastability. This result for output and investment contrasts to what obtains with the NK version, where the strong predictability at $h = 1$ and even at long horizons is at odds with Phil-SPF. In the case of consumption the RBC is more successful at matching the data when $h = 1, 2$, whereas for $h = 3, 4, 5$ the evidence favors the NK version (notice however that it may well be the case that the rel. RMSFE obtained with Phil-SPF may not be statistically different from 1). With respect to hours/unemployment (we recall that

9 We are certainly aware of the difficulty of characterizing as rational a consensus (mean or median) forecast, see *e.g.*, Bonham and Cohen (2001). Rationality should arguably be analysed at the individual level but exit and entry of forecasters in the surveys makes this a difficult task.

Phil-SPF forecasts unemployment, which explains nonetheless around 80% of the variation in hours), the RBC is closer to Phil-SPF at all horizons, although the rel. RMSFE is consistently above that of Phil-SPF for $h \geq 2$. This is in clear contrast with the strong predictability implied by the NK model. The RBC version is silent with respect to the nominal interest rate and inflation but for the NK model it is clear that while the behavior of the rel RMSFE function is very close to that of Phil-SPF in the case of nominal interest rates, for inflation the very high forecastability of the NK model does not match data from Phil-SPF forecasts. We notice also that even if the rational agent uses the forecasts produced by the univariate representation of inflation given the model (NK univariate, *i.e.*, using only past inflation to produce the forecast), the strong forecastability of inflation is almost unchanged. This seems a consequence of the degree of backward looking behavior (indexation) of inflation in the NK model. Once the rational agent observes current inflation and its history, information on other shocks is almost irrelevant to form the conditional expectation of inflation at some point in the future. If the model is realistic, this implies that a forecaster would only need to nail the univariate representation of inflation in order to obtain a close to efficient forecast.

Now, demanding from the models forecasts of actual data changes radically, in absolute terms, the picture above, with a clear deterioration of the empirical counterpart of the statistics above.[10] Nonetheless, Table 3 (bottom panel) shows that for real output and investment the RBC is close to Phil-SPF (and dramatically superior to the NK version). For wages (no data for Phil-SPF) the performance of both models is very similar whereas for consumption both the RBC and NK versions have a very weak performance (although the latter performs relatively better at horizons greater than 5 quarters, despite the fact that forecasts are close to the mean). For nominal interest rates , the NK model is close to Phil-SPF at $h = 1,2$ but it drifts quite fast afterwards, becoming useless after 6 quarters (in clear contrast with the theoretical result). For inflation, the empirical performance of the NK model is beyond terrible, a qualification also deserved for the behavior of the RBC version with respect to hours (in this case the NK version is clearly more informative but not much compared to Phil-SPF at $h > 2$). As far as we are aware, only Rubaszek and Skrzypczynski (2008) compared forecasts from a (3 equations prototypical) DSGE model to SPF forecasts while using real-time data for estimation and forecasting (instead of the latest vintage of data and a fixed set of parameters, useful for our purposes). Their sample size is also larger than usual, spanning 1994:q1-2006:q2. The main conclusions are that while for a few horizons in the case of GDP growth the DSGE model seems to outperform SPF (not statistically significant difference in accuracy), in the case of inflation and short-term nominal interest rate SPF clearly outperforms the DSGE model.[11] All in all, the results above suggest that the nominal rigidities apparatus of the NK model, which greatly amplifies the effects of shocks, tended to produce an excessively large theoretical forecastability, extending over long horizons. This seems clearly at odds with the data. The stripped down flexible prices version (RBC) delivers a forecastability resembling more that of the Phil-SPF while performing relatively better empirically (the important exception relates to hours/unemployment). This is due to the fact that deviations from the steady-state tend to be small, hence forecasts (conditional expectations) are closer to the mean of the variables. Thus, not taking risks (or not assuming a detailed knowledge of short-run dynamics) compensated in this context. The RBC model seemed more immune to misspecification (notice also that the RBC version was not even re-estimated, it keeps all the parameters from the estimated NK model). Next we repeat the analysis for recession periods.

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10 Again, it is fair to recognize that the literature aknowledges the likely misspecification of DSGE models. *E.g.*, Del Negro *et al*. (2007) approximate a DSGE model by a vector autoregression (VAR) and then relax the implied cross-equation restrictions in order to improve fit. It is possible to optimally relax these restrictions and it is found that forecast accuracy improvements obtain.

11 Edge *et al*. (2010) do compare the forecast performance of an alternative DSGE model to Green-Book forecasts from 1996 through 2004, arguing for a positive contribution of the model in some instances (specially for output growth).

Table 3

RELATIVE RMSFE OF SPF'S FORECASTS *VIS-A-VIS* THE THEORETICAL AND EMPIRICAL NK AND RBC MODELS' PREDICTIONS

PANEL A - THEORETICAL

Variáveis	Modelo	Horizon												
		1	2	3	4	5	6	8	10	12	14	16	18	20
Real GDP growth	**SPF**	0.66	0.78	0.91	0.96	0.98	-	-	-	-	-	-	-	-
	RBC	0.79	0.92	0.96	0.96	0.97	0.97	0.97	0.98	0.98	0.98	0.99	0.99	0.99
	NK	0.55	0.69	0.78	0.85	0.89	0.92	0.96	0.97	0.98	0.98	0.99	0.99	1.00
Consumption	**SPF**	0.68	0.74	0.78	0.84	0.83	-	-	-	-	-	-	-	-
	RBC	0.64	0.83	0.92	0.94	0.94	0.95	0.96	0.97	0.98	0.99	0.99	0.99	0.99
	NK	0.41	0.59	0.72	0.82	0.88	0.91	0.95	0.97	0.97	0.97	0.97	0.97	0.98
RNR investment	**SPF**	0.65	0.73	0.79	0.90	0.94	-	-	-	-	-	-	-	-
	RBC	0.63	0.82	0.86	0.87	0.88	0.89	0.93	0.96	0.99	1.00	1.01	1.02	1.02
	NK	0.43	0.59	0.65	0.68	0.71	0.73	0.78	0.81	0.84	0.85	0.86	0.87	0.87
Hours	**SPF**	0.20	0.22	0.24	0.30	0.36	-	-	-	-	-	-	-	-
	RBC	0.18	0.31	0.40	0.47	0.51	0.54	0.59	0.62	0.65	0.67	0.69	0.72	0.74
	NK	0.01	0.02	0.03	0.05	0.07	0.10	0.16	0.24	0.31	0.39	0.46	0.53	0.59
Wages	**SPF**	-	-	-	-	-	-	-	-	-	-	-	-	-
	RBC	0.53	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	NK	0.83	0.88	0.89	0.90	0.90	0.90	0.91	0.92	0.92	0.93	0.94	0.94	0.95
Inflation	**SPF**	0.67	0.70	0.72	0.75	0.77	-	-	-	-	-	-	-	-
	Univariate (NK-based)	0.14	0.29	0.40	0.49	0.55	0.60	0.68	0.73	0.77	0.80	0.82	0.85	0.86
	NK	0.13	0.27	0.38	0.46	0.53	0.58	0.66	0.72	0.76	0.79	0.82	0.84	0.86
Interest Rates	**SPF**	0.09	0.22	0.25	0.28	0.33	-	-	-	-	-	-	-	-
	Univariate (NK-based)	0.14	0.29	0.40	0.49	0.55	0.60	0.68	0.73	0.77	0.80	0.82	0.85	0.86
	NK	0.04	0.08	0.13	0.18	0.22	0.26	0.33	0.39	0.44	0.48	0.52	0.55	0.58

PANEL B - EMPIRICAL

Variáveis	Modelo	Horizon												
		1	2	3	4	5	6	8	10	12	14	16	18	20
Real GDP growth	**SPF**	0.66	0.78	0.91	0.96	0.98	-	-	-	-	-	-	-	-
	RBC	0.84	0.86	0.99	1.02	1.13	1.16	1.20	1.23	1.23	1.20	1.18	1.14	1.13
	NK	1.66	1.71	1.76	1.62	1.73	1.58	1.36	1.21	1.13	1.11	1.09	1.09	1.09
Consumption	**SPF**	0.68	0.74	0.78	0.84	0.83	-	-	-	-	-	-	-	-
	RBC	1.19	1.31	1.47	1.67	1.73	1.79	1.68	1.59	1.43	1.26	1.20	1.09	1.06
	NK	2.00	2.05	1.76	1.42	1.36	1.28	1.02	0.95	0.90	0.91	0.93	0.95	1.00
RNR investment	**SPF**	0.65	0.73	0.79	0.90	0.94	-	-	-	-	-	-	-	-
	RBC	0.66	0.93	1.07	1.10	1.06	1.02	0.95	0.96	0.99	1.03	1.10	1.13	1.15
	NK	1.23	2.15	2.75	2.96	2.91	2.76	2.22	1.84	1.50	1.31	1.23	1.18	1.17
Hours	**SPF**	0.20	0.22	0.24	0.30	0.36	-	-	-	-	-	-	-	-
	RBC	0.96	0.96	0.97	0.98	0.98	0.99	1.02	1.02	1.06	1.09	1.14	1.17	1.19
	NK	0.09	0.26	0.47	0.66	0.79	0.92	1.11	1.26	1.30	1.26	1.27	1.23	1.29
Wages	**SPF**	-	-	-	-	-	-	-	-	-	-	-	-	-
	RBC	0.98	0.99	1.01	1.02	1.02	1.03	1.04	1.02	1.05	1.06	1.09	1.12	1.14
	NK	1.08	0.97	0.97	0.98	0.99	1.00	1.02	1.03	1.07	1.09	1.13	1.16	1.18
Inflation	**SPF**	0.67	0.70	0.72	0.75	0.77	-	-	-	-	-	-	-	-
	NK	4.13	4.63	4.71	4.33	4.00	3.70	3.06	2.38	2.22	2.19	2.13	2.21	2.22
Interest Rates	**SPF**	0.09	0.22	0.25	0.28	0.33	-	-	-	-	-	-	-	-
	NK	0.06	0.19	0.39	0.64	0.90	1.11	1.48	1.68	1.85	2.00	2.09	2.15	2.21

Sources: Author's calculations

Notes: This table presents the relative (to the standard deviation of the variables) RMSFE at different forecast horizons, from h=1,…,20 for the SPF, theoretical and empirical NK and RBC models. Panel A also includes the univariate version of the NK SW07 model for both inflation and interest rates.

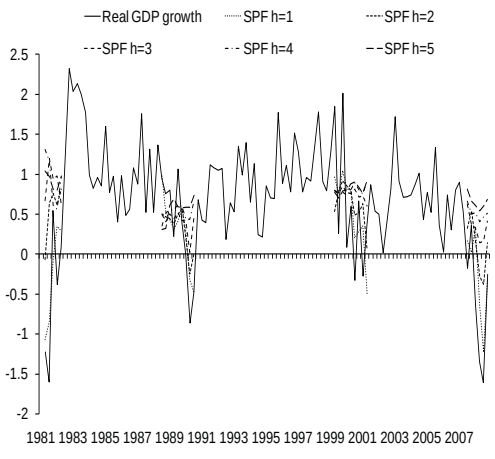
4. How do Rational and Professional Forecasts behave during Recessions?

There is clear evidence that macroeconomic forecasts fail to predict business-cycle's turning points and, moreover, forecasting the beginning of a recession one or two quarters in advance never occurred. In this aspect data (professional forecasts) are in line with standard models, where recessions must be seen as the result of large exogenous shocks (or at least unpredictable shocks in size and moment). Hence, one should not demand (or expect) accurate forecasts referred to the first period (quarter) of a recession. Afterwards, the theoretical mechanisms embodied in the models should be helpful in determining the path of observed variables.

Here we show that the conclusions above seem to carry over to recession[12] periods, and are certainly magnified. That is, the performance of the NK version of SW07 is quite poor compared to that of the RBC version. First, we recall that Professional forecasts (from the Fed-Green Book or SPF) have a poorer (relative to an estimate of the unconditional mean) performance during recession periods, specially at horizons greater or equal to 3 quarters. The exceptions occur with inflation and nominal interest rates as well as with housing market variables for short horizons (housing starts and residential investment). Despite this, they are clearly more accurate than model forecasts. To analyze this we simply plot the various forecast (Phil-SPF, NK and RBC) for $h = 1,\ldots,5$ for real GDP growth, inflation and interest rates (Chart 3) Analysis of other real variables conveys a very similar message. As easily seen, Professional forecasts of real GDP have no clue about the beginning and dynamics of recessions with an anticipation of 2 or more quarters $(h \geq 3)$ whereas 1 quarter earlier they have some signal and for the current quarter they are accurate ($h = 1$, we recall that one step ahead forecasts in the case of Professional forecasts is really a nowcast). Now, although the RBC model performs poorly relative to professional forecasts, the characterization is very similar. The RBC obviously does not anticipate the recessions but provides signal about subsequent developments when $h = 1,2$. The performance of the NK model is clearly very weak, specially during the last recession, where observed deflation and very low nominal interest rates contribute to forecasts that never consider consecutive negative growth (but instead a quick way out of the recession). This is clearly not the case in the 1991 and 2001 recessions. Again, the defensive" (or close to steady-state) dynamics implicit in the RBC version seem to at least produce forecasts that have some signal (although definitely close to the steady-state, or unconditional mean). For inflation and nominal interest rates we observe that professional forecasts are very accurate at short horizons and convey some signal at longer horizons. For nominal interest rates, the NK model does not produce out of bounds forecasts, but they are weak compared to those of surveys. For inflation, NK forecasts are very poor and do seem out of bounds, except during the last recession.

Chart 3 (to be continued)

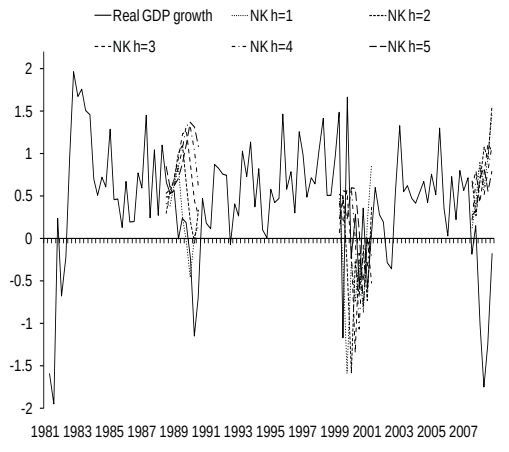
REAL GDP GROWTH AND SPF FORECASTS AT NBER RECESSIONS



Source: Author's calculations.

Note: This figure presents both the actual realization and SPF forecasts for real GDP growth between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

REAL GDP GROWTH AND NK FORECASTS AT NBER RECESSIONS



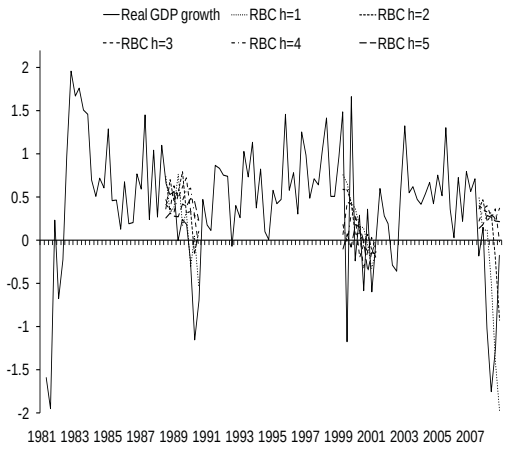
Source: Author's calculations.

Note: This figure presents both the actual realization and NK forecasts for real GDP growth between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

12 As identified by the NBER dates. For the purposes of this section we include a quarter before and a quarter after the recessions to capture turning points.

Chart 3 (to be continued)

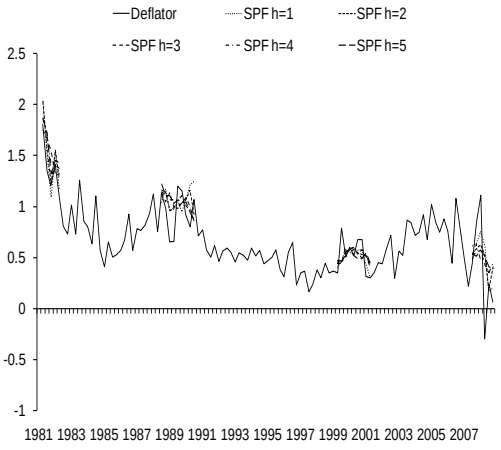
REAL GDP GROWTH AND RBC FORECASTS AT NBER RECESSIONS



Source: Author's calculations.

Note: This figure presents both the actual realization RBC forecasts for real GDP growth between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

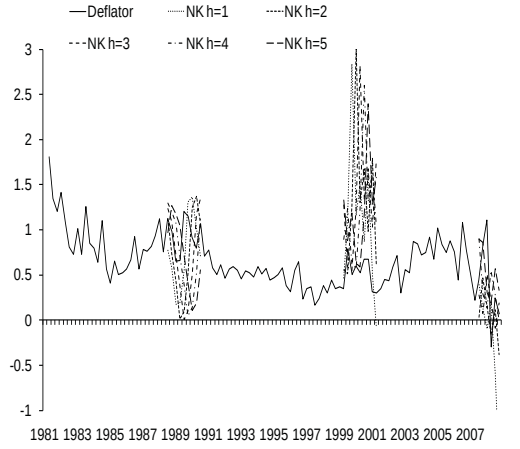
GDP DEFLATOR INFLATION AND SPF FORECASTS AT NBER RECESSIONS



Source: Author's calculations.

Note: This figure presents both the actual realization and predicted SPF values for inflation (GDP deflator) between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

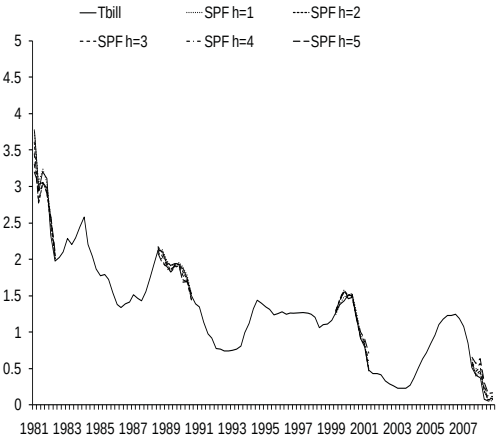
GDP DEFLATOR INFLATION AND NK FORECASTS AT NBER RECESSIONS



Source: Author's calculations.

Note: This figure presents both the actual realization and NK forecasts of GDP inflation between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

T-BILL RATE AND SPF FORECASTS AT NBER RECESSIONS

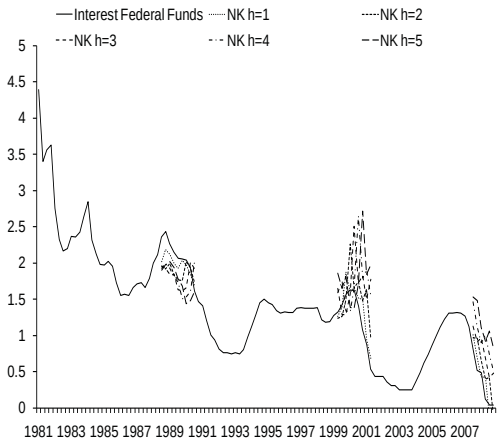


Source: Author's calculations.

Note: This figure presents both the actual realization and SPF forecasts for interest rates (T bill) between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

Chart 3 (continued)

FEDERAL FUNDS RATE AND NK FORECASTS AT NBER RECESSIONS



Source: Author's calculations.

Note: This figure presents both the actual realization and NK forecasts for interest rates (Federal Funds rate) between 1981 and 2009, the latter set plotting only observations at different horizons (1 to 5) for recession periods as identified by the NBER.

5.Concluding remarks

It seems unwise to expect too much from macroeconomic forecasts. For what really matters (real variables, but except for unemployment) best practice has little to say at horizons greater than 2, 3 quarters. If statistics derived from these facts inform general equilibrium modelling, in the sense that a rational agent understanding the economy should deduce similar statistics, they probably say the economy has not been deviating too much from the steady-state. In the theoretical models, this should translate into low forecastability (relative to a naive, or steady-state forecast and, again, except for unemployment - hours) of most variables. This occurs with the RBC version of the model analyzed here but clearly not with the NK version. Furthermore, even recognizing limitations in a model without nominal frictions and correspondingly limited departures from the steady-state, the fact is that empirical forecasts seem to indicate that the model less prone to misspecification is the RBC version. Forecasts are closer to naive (or to steady-state values) but provide some signal. The alternative (relying on a particular description of nominal rigidities) is not reliable. In our view, and given the effects of the inclusion of nominal frictions on forecast performance (theoretical and empirical), care should be taken at least on the way trend inflation (or varying central bank target) is modeled. In the model analyzed here and many others, the central bank target (steady-state inflation) is fixed, which implies that any deviation of inflation from target is necessarily interpreted by the model as a deviation from the steady-state (inflation gap). In order to improve fit the models must then include indexation mechanisms. In this respect we are persuaded by Cogley and Sbordone's (2008) analysis that once movements in trend inflation are taken into account, the (backward looking) indexation component of a general New-Keynesian Phillips curve is not needed to fit the data well. If indexation is incorrectly assumed, it implies a supposedly high theoretical forecastability of inflation (even if a rational agent only looks at past inflation) as we have shown. This is clearly at odds with the data (Professional forecasts) and does not survive a forecast evaluation with actual data. Another interpretation of the results rests on the observation that theoretical models used to fit several decades of data are likely missing relevant changes in monetary policy, product and labor market regulation, taxation or in the trend growth of technology. If these changes are reasonably unpredictable, there is potential compatibility between professional forecasters having a hard time and the NK model becoming seriously misspecified only along those dimensions, *i.e.*, nominal rigidities can play an important role which is hidden due to lack of control for what can be seen as steady-state shifts.

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QUARTERLY SERIES FOR THE PORTUGUESE ECONOMY

III

UPDATING 1977-2010

QUARTERLY SERIES FOR THE PORTUGUESE ECONOMY: 1977-2010

As has been the case since 2004, this section of the *Summer Economic Bulletin* releases updated quarterly long series for the Portuguese economy. The update released in this Bulletin has the same breakdown as before and includes for the first time quarterly series for the year 2010.

However, relatively to the previous release, some methodological adjustments were made with impact in the series content and, in some cases, implying more significant revisions in their quarterly profile than usual.

In particular, reference should be made to the total consistency between the demand components currently published and the more recent series from Quarterly National Accounts released by Statistics Portugal (*INE*) in June 2011.

In what concerns the main demand components, the published data for the period from 1995 onwards coincides with official quarterly data from *INE*, in nominal terms and in volume. The volume chained linked series are evaluated at reference year 2006 and the generality of main aggregates of demand are directly obtained by summing up the elementary series. For this reason, the current database does not include the variables evaluated at previous year prices which were previously used in the chained-linked process for the period posterior to 1995.

By its turn, the series of disposable income for the period from first quarter of 1999 onwards, do not coincide with data published by *INE* in Quarterly Accounts by Institutional Sector, only due to the fact that series were seasonally adjusted, using across the board the well known procedure X12-ARIMA procedure.

For the period not covered by current publications of *INE* (previous to 1995 for the demand components and to 1999 for the disposable income components), as for the data concerning labour market, the methodology underlying the construction of these series did not undergo significant changes vis-à-vis that presented in detail in the article "Quarterly series for the Portuguese economy: 1977-2003" published in the June 2004 issue of the *Economic Bulletin*. Basically, the procedure consists in previously retropolating the annual values from Quarterly National Accounts using the growth rates of Historical Series from the Banco de Portugal. Then, the annual series are disaggregated into quarterly figures using related indicators when possible and according to the methodology presented in the article above cited. The aggregation of volume data is based on variables evaluated at previous year prices, which explains that chain-linked data do not result by sum of the respective components.

Quarterly series for the 1977-2010 period are presented in the following tables.

An electronic version is available on the website of Banco de Portugal.

MAIN EXPENDITURE COMPONENTS

	1977				1978				1979			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	594.6	631.4	669.7	696.0	728.4	757.4	802.7	856.6	884.0	934.6	1005.0	1094.4
Public consumption	116.6	123.9	131.2	139.5	147.9	156.2	164.7	173.9	183.3	195.1	209.2	225.9
GFCF	292.7	312.0	314.8	326.6	319.3	335.6	375.7	388.9	486.5	523.0	560.6	589.3
Change in inventories	27.7	30.5	36.1	44.5	55.7	56.2	46.1	25.4	-6.0	-15.8	-4.1	29.2
Exports of goods and services	132.5	145.6	153.2	164.3	176.6	189.8	215.9	247.8	283.4	323.6	361.5	403.6
Goods	86.4	94.6	99.2	104.4	111.8	120.9	136.1	158.1	181.4	205.0	229.8	256.5
Services	46.1	51.0	54.0	59.9	64.8	68.9	79.7	89.8	101.9	118.6	131.7	147.0
Imports of goods and services	225.9	266.4	275.8	297.5	302.9	305.3	335.7	356.0	385.8	434.4	504.3	564.5
Goods	192.9	229.0	236.6	255.7	258.8	259.2	285.5	301.6	326.5	368.3	424.0	475.9
Services	33.1	37.4	39.2	41.8	44.1	46.1	50.2	54.3	59.3	66.2	80.4	88.6
GDP	938.2	977.1	1029.2	1073.4	1125.0	1189.9	1269.5	1336.7	1445.4	1526.1	1627.9	1777.8
Chain-linked volume (reference year 2006)												
Private consumption (residents)					9479.6	9467.4	9569.3	9704.2	9804.6	9950.7	10110.2	10311.4
Public consumption					2661.3	2699.4	2741.9	2785.2	2830.4	2883.5	2943.9	3010.6
GFCF					3738.1	3738.8	3963.0	3865.0	4538.5	4614.9	4671.9	4618.1
Exports of goods and services					1423.0	1447.0	1562.1	1680.6	1826.7	1968.7	2083.6	2162.9
Goods					771.2	790.9	836.9	906.6	979.5	1046.4	1104.4	1148.5
Services					761.3	763.2	852.0	906.2	995.2	1088.7	1157.5	1198.0
Imports of goods and services					1884.0	1826.7	1837.2	1849.9	1866.0	1955.3	2087.7	2175.5
Goods					1486.7	1437.6	1443.7	1450.8	1459.6	1527.6	1610.7	1681.2
Services					410.0	403.9	409.9	417.6	427.0	450.5	513.5	530.7
GDP					17244.1	17480.3	17986.4	17951.7	18899.6	19082.5	19308.3	19692.3
Deflator (2006=1)												
Private consumption (residents)					0.0768	0.0800	0.0839	0.0883	0.0902	0.0939	0.0994	0.1061
Public consumption					0.0556	0.0579	0.0601	0.0625	0.0648	0.0677	0.0711	0.0750
GFCF					0.0854	0.0898	0.0948	0.1006	0.1072	0.1133	0.1200	0.1276
Exports of goods and services					0.1241	0.1312	0.1382	0.1475	0.1551	0.1644	0.1735	0.1866
Goods					0.1450	0.1529	0.1627	0.1743	0.1852	0.1959	0.2081	0.2234
Services					0.0852	0.0903	0.0936	0.0991	0.1024	0.1090	0.1137	0.1227
Imports of goods and services					0.1608	0.1672	0.1827	0.1924	0.2068	0.2222	0.2416	0.2595
Goods					0.1741	0.1803	0.1977	0.2079	0.2237	0.2411	0.2632	0.2831
Services					0.1076	0.1142	0.1225	0.1301	0.1390	0.1469	0.1565	0.1670
GDP					0.0652	0.0681	0.0706	0.0745	0.0765	0.0800	0.0843	0.0903

MAIN EXPENDITURE COMPONENTS

	1980				1981				1982			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	1262.3	1333.7	1389.1	1477.1	1548.2	1649.8	1732.6	1814.4	1900.9	1977.7	2049.2	451.1
Public consumption	263.2	281.4	299.3	315.6	330.5	345.2	359.7	376.7	397.7	421.7	451.1	1035.8
GFCF	578.8	591.0	633.9	736.9	779.1	859.7	872.2	902.3	941.3	987.0	1035.8	102.0
Change in inventories	117.8	130.4	122.0	92.5	77.2	76.1	89.3	116.7	128.0	123.1	102.0	700.3
Exports of goods and services	456.7	463.2	475.3	484.9	515.5	525.0	538.9	554.1	583.0	655.4	700.3	473.4
Goods	289.7	289.8	293.3	299.2	313.5	324.2	334.3	353.9	378.6	442.0	473.4	227.0
Services	167.1	173.3	182.1	185.7	202.0	200.8	204.6	200.3	204.4	213.4	227.0	1144.8
Imports of goods and services	685.6	727.7	774.2	814.5	931.1	940.7	954.2	1018.3	1099.0	1144.2	1144.8	962.3
Goods	568.6	596.3	634.0	662.9	767.8	777.1	784.4	851.2	921.0	965.8	962.3	182.5
Services	117.0	131.3	140.2	151.6	163.3	163.6	169.8	167.1	177.9	178.4	182.5	3193.7
GDP	1993.3	2071.9	2145.4	2292.4	2319.4	2515.1	2638.5	2746.0	2852.0	3020.8	3193.7	
Chain-linked volume (reference year 2006)												11596.6
Private consumption (residents)	10907.1	11062.6	11148.9	11152.8	11238.1	11301.0	11350.8	11480.3	11565.3	11612.0	11596.6	3530.7
Public consumption	3150.3	3211.5	3267.4	3313.9	3351.4	3379.0	3400.2	3419.5	3447.7	3485.4	3530.7	4742.2
GFCF	4046.0	3983.9	4070.6	4472.7	4501.6	4833.1	4800.7	4742.6	4709.4	4740.1	4742.2	2366.4
Exports of goods and services	2228.9	2207.8	2158.2	2143.1	2162.0	2157.8	2146.7	2117.9	2144.3	2239.3	2366.4	1368.3
Goods	1178.2	1151.4	1115.7	1104.7	1106.0	1121.7	1135.0	1147.3	1188.8	1273.8	1368.3	1113.4
Services	1244.4	1261.1	1250.6	1247.9	1274.3	1239.3	1198.1	1133.9	1099.7	1091.0	1113.4	2686.6
Imports of goods and services	2404.8	2468.7	2501.9	2497.9	2527.8	2596.7	2664.8	2724.6	2747.1	2682.6	2686.6	2090.1
Goods	1825.0	1854.4	1880.0	1874.7	1896.8	1968.7	2024.5	2103.8	2123.5	2085.4	2090.1	631.8
Services	642.4	691.2	699.3	702.2	711.3	696.6	707.9	667.3	668.8	633.3	631.8	20827.4
GDP	19702.7	19768.2	19873.6	19824.3	19962.3	20418.2	20407.9	20371.6	20479.3	20861.0	20827.4	
Deflator (2006=1)												0.1767
Private consumption (residents)	0.1157	0.1206	0.1246	0.1324	0.1378	0.1460	0.1526	0.1580	0.1644	0.1703	0.1767	0.1278
Public consumption	0.0835	0.0876	0.0916	0.0952	0.0986	0.1022	0.1058	0.1102	0.1154	0.1210	0.1278	0.2184
GFCF	0.1431	0.1483	0.1557	0.1648	0.1731	0.1779	0.1817	0.1903	0.1999	0.2082	0.2184	0.2959
Exports of goods and services	0.2049	0.2098	0.2202	0.2262	0.2384	0.2433	0.2510	0.2616	0.2719	0.2927	0.2959	0.3460
Goods	0.2459	0.2517	0.2629	0.2708	0.2834	0.2890	0.2945	0.3084	0.3185	0.3470	0.3460	0.2039
Services	0.1343	0.1374	0.1456	0.1488	0.1586	0.1620	0.1708	0.1766	0.1859	0.1956	0.2039	0.4261
Imports of goods and services	0.2851	0.2948	0.3095	0.3261	0.3683	0.3623	0.3581	0.3737	0.4000	0.4265	0.4261	0.4604
Goods	0.3115	0.3216	0.3372	0.3536	0.4048	0.3947	0.3875	0.4046	0.4337	0.4631	0.4604	0.2888
Services	0.1821	0.1900	0.2005	0.2159	0.2296	0.2348	0.2398	0.2504	0.2661	0.2817	0.2888	0.1533
GDP	0.1012	0.1048	0.1080	0.1156	0.1162	0.1232	0.1293	0.1348	0.1393	0.1448	0.1533	0.1541

MAIN EXPENDITURE COMPONENTS

	1983				1984				1985			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	2202.8	2319.1	2496.0	2675.8	2795.6	2956.0	3153.2	3218.9	3376.0	3493.3	3589.0	3739.9
Public consumption	478.5	508.7	534.6	560.7	586.2	615.1	647.5	686.8	727.9	776.7	826.0	876.8
GFCF	1105.8	1171.3	1243.2	1280.6	1235.6	1312.1	1333.2	1422.4	1465.0	1511.7	1536.4	1621.2
Change in inventories	64.8	35.1	12.8	-2.1	-9.5	-12.0	-9.8	-2.7	9.3	16.8	20.0	18.8
Exports of goods and services	769.1	860.3	973.9	1081.2	1176.8	1294.9	1412.1	1523.0	1654.9	1727.4	1741.7	1790.0
Goods	521.6	590.9	676.1	748.1	826.3	901.1	994.7	1068.0	1153.9	1210.7	1222.7	1238.2
Services	247.5	269.4	297.8	333.1	350.5	393.8	417.5	455.0	500.9	516.7	519.0	551.7
Imports of goods and services	1166.1	1226.9	1353.2	1480.5	1524.0	1619.9	1750.2	1822.0	1918.8	1940.7	1908.3	1994.7
Goods	971.5	1025.5	1133.6	1249.7	1271.9	1355.9	1464.3	1521.7	1599.7	1606.3	1579.6	1649.5
Services	194.6	201.5	219.7	230.8	252.1	264.0	285.9	300.3	319.1	334.4	328.7	345.2
GDP	3455.0	3667.6	3907.2	4115.7	4260.8	4546.1	4786.0	5026.4	5314.3	5585.2	5804.8	6051.9
Chain-linked volume (reference year 2006)												
Private consumption (residents)	11555.3	11515.2	11479.0	11388.1	11350.1	11314.5	11336.8	11331.0	11272.3	11315.5	11354.1	11490.6
Public consumption	3575.6	3607.3	3621.1	3618.5	3608.3	3603.6	3613.1	3641.6	3686.7	3744.9	3807.8	3868.8
GFCF	4795.7	4810.4	4759.8	4561.9	4300.3	4369.3	4225.3	4252.8	4244.2	4253.3	4200.2	4278.3
Exports of goods and services	2499.2	2583.2	2669.4	2762.3	2852.6	2976.2	3084.7	3187.8	3300.0	3324.4	3313.3	3329.5
Goods	1456.3	1520.1	1570.9	1631.8	1686.4	1753.0	1824.7	1886.5	1938.6	1973.1	1966.7	1964.3
Services	1158.0	1171.0	1210.0	1241.5	1280.0	1346.6	1382.3	1427.2	1502.7	1477.9	1472.6	1501.1
Imports of goods and services	2639.8	2567.3	2510.5	2436.6	2434.6	2469.4	2530.5	2541.4	2569.3	2603.1	2594.1	2677.2
Goods	2055.2	1997.9	1944.4	1885.1	1865.4	1896.5	1937.8	1947.4	1968.4	1994.7	2001.3	2065.8
Services	618.6	603.0	604.8	590.4	618.5	620.2	644.3	645.3	653.1	660.9	636.0	655.7
GDP	20858.0	20958.7	21040.3	21020.7	20619.4	20862.1	20749.3	20960.7	20957.5	21023.5	21104.1	21302.9
Deflator (2006=1)												
Private consumption (residents)	0.1906	0.2014	0.2174	0.2350	0.2463	0.2613	0.2781	0.2841	0.2995	0.3087	0.3161	0.3255
Public consumption	0.1338	0.1410	0.1476	0.1550	0.1625	0.1707	0.1792	0.1886	0.1974	0.2074	0.2169	0.2266
GFCF	0.2306	0.2435	0.2612	0.2807	0.2873	0.3003	0.3155	0.3345	0.3452	0.3554	0.3658	0.3789
Exports of goods and services	0.3077	0.3330	0.3648	0.3914	0.4125	0.4351	0.4578	0.4777	0.5015	0.5196	0.5257	0.5376
Goods	0.3582	0.3887	0.4304	0.4585	0.4900	0.5140	0.5451	0.5661	0.5952	0.6136	0.6217	0.6304
Services	0.2137	0.2300	0.2461	0.2683	0.2738	0.2924	0.3020	0.3188	0.3334	0.3496	0.3524	0.3675
Imports of goods and services	0.4417	0.4779	0.5390	0.6076	0.6260	0.6560	0.6917	0.7169	0.7468	0.7456	0.7356	0.7451
Goods	0.4727	0.5133	0.5830	0.6630	0.6818	0.7150	0.7556	0.7814	0.8127	0.8053	0.7893	0.7985
Services	0.3146	0.3341	0.3632	0.3909	0.4076	0.4257	0.4438	0.4654	0.4886	0.5060	0.5168	0.5265
GDP	0.1656	0.1750	0.1857	0.1958	0.2066	0.2179	0.2307	0.2398	0.2536	0.2657	0.2751	0.2841

MAIN EXPENDITURE COMPONENTS

	1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	3967.3	4205.1	4351.9	4556.0	4674.0	4920.4	5072.0	5264.3	5675.2	5939.1	6261.6	6612.6
Public consumption	922.9	963.9	996.7	1023.8	1053.3	1092.5	1154.4	1226.7	1323.0	1357.4	1413.0	1488.0
GFCF	1594.7	1706.2	1786.2	1889.8	2038.0	2158.5	2305.4	2445.2	2664.6	2763.8	2956.8	3035.7
Change in inventories	13.2	18.8	35.8	64.1	103.7	134.4	156.2	169.1	173.1	163.0	138.8	100.6
Exports of goods and services	1823.5	1901.4	1985.5	2127.9	2201.1	2370.6	2454.4	2577.0	2675.2	2724.4	2900.7	3101.7
Goods	1251.7	1303.8	1356.2	1447.1	1499.5	1589.1	1657.8	1737.3	1822.5	1879.9	2006.3	2118.8
Services	571.8	597.6	629.3	680.8	701.6	781.5	796.6	839.7	852.7	844.5	894.4	982.8
Imports of goods and services	1996.4	2009.4	2080.1	2326.2	2495.1	2699.9	2941.9	3163.4	3411.0	3529.7	3853.1	3909.1
Goods	1670.0	1656.0	1726.4	1936.6	2089.1	2259.5	2477.6	2667.7	2876.9	2980.3	3265.8	3277.2
Services	326.4	353.4	353.8	389.6	406.1	440.4	464.2	495.7	534.1	549.4	587.3	631.9
GDP	6325.2	6786.0	7076.0	7335.5	7575.1	7976.5	8200.5	8518.8	9100.1	9418.0	9817.8	10429.4
Chain-linked volume (reference year 2006)												
Private consumption (residents)	11706.0	12068.6	12215.0	12555.5	12629.2	13037.3	13121.3	13317.7	13918.2	14165.8	14375.6	14731.1
Public consumption	3924.2	3966.2	3997.7	4020.0	4044.3	4087.6	4157.8	4251.7	4361.9	4430.5	4510.9	4603.5
GFCF	4153.5	4305.3	4450.6	4533.9	4832.5	5002.5	5292.4	5389.8	5758.5	5830.8	6021.5	6080.9
Exports of goods and services	3408.7	3477.9	3621.8	3759.1	3856.2	4013.2	4059.7	4091.0	4130.6	4166.6	4371.6	4610.5
Goods	2007.1	2056.0	2130.3	2208.6	2265.5	2321.0	2348.5	2362.2	2402.9	2482.7	2604.0	2750.8
Services	1543.7	1560.6	1644.2	1710.7	1754.8	1887.1	1908.0	1930.1	1919.2	1837.4	1929.1	2027.1
Imports of goods and services	2800.1	2973.3	3166.5	3426.1	3605.7	3813.4	4010.5	4240.9	4491.6	4714.4	4879.0	4971.4
Goods	2203.3	2341.6	2523.5	2731.2	2895.6	3061.8	3229.3	3413.2	3619.6	3822.4	3945.3	3997.7
Services	619.4	654.6	650.4	702.4	715.5	757.7	784.7	831.8	875.2	888.6	933.2	979.6
GDP	21240.2	21669.7	21919.8	22107.5	22741.4	23323.9	23508.9	23455.1	24275.8	24235.7	24730.5	25444.9
Deflator (2006=1)												
Private consumption (residents)	0.3389	0.3484	0.3563	0.3629	0.3701	0.3774	0.3865	0.3953	0.4078	0.4193	0.4356	0.4489
Public consumption	0.2352	0.2430	0.2493	0.2547	0.2604	0.2673	0.2776	0.2885	0.3033	0.3064	0.3132	0.3232
GFCF	0.3839	0.3963	0.4013	0.4168	0.4217	0.4315	0.4356	0.4537	0.4627	0.4740	0.4910	0.4992
Exports of goods and services	0.5349	0.5467	0.5482	0.5661	0.5708	0.5907	0.6046	0.6299	0.6477	0.6539	0.6635	0.6727
Goods	0.6237	0.6341	0.6366	0.6552	0.6619	0.6847	0.7059	0.7355	0.7585	0.7572	0.7704	0.7703
Services	0.3704	0.3829	0.3827	0.3979	0.3998	0.4141	0.4175	0.4350	0.4443	0.4596	0.4636	0.4849
Imports of goods and services	0.7130	0.6758	0.6569	0.6790	0.6920	0.7080	0.7335	0.7459	0.7594	0.7487	0.7897	0.7863
Goods	0.7580	0.7072	0.6841	0.7091	0.7215	0.7380	0.7672	0.7816	0.7948	0.7797	0.8278	0.8198
Services	0.5269	0.5399	0.5439	0.5547	0.5675	0.5812	0.5916	0.5960	0.6103	0.6183	0.6294	0.6450
GDP	0.2978	0.3132	0.3228	0.3318	0.3331	0.3420	0.3488	0.3632	0.3749	0.3886	0.3970	0.4099

MAIN EXPENDITURE COMPONENTS

	1989				1990				1991			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	6723.5	6929.3	7221.5	7430.0	7835.6	8243.8	8670.3	9083.0	9552.4	10020.5	10448.5	10761.7
Public consumption	1578.6	1674.1	1758.0	1842.6	1916.6	2014.6	2133.7	2280.3	2457.4	2612.8	2750.3	2847.3
GFCF	3100.1	3195.7	3351.2	3524.9	3602.0	3698.0	3788.5	3924.2	3978.2	4079.6	4274.2	4334.1
Change in inventories	48.2	43.0	84.9	173.9	310.0	367.9	347.6	249.0	72.2	-45.6	-104.2	-103.9
Exports of goods and services	3318.9	3470.7	3659.5	3924.1	4087.3	4247.8	4255.6	4336.6	4258.2	4359.2	4389.2	4438.8
Goods	2300.0	2421.8	2546.4	2709.2	2825.4	2901.4	2933.2	2891.1	2882.4	2858.0	2931.3	2983.4
Services	1019.0	1048.9	1113.0	1215.0	1261.9	1346.3	1322.3	1445.4	1375.8	1501.2	1457.9	1455.5
Imports of goods and services	4099.4	4165.2	4403.1	4614.0	5014.8	4960.3	5247.1	5470.8	5465.5	5506.6	5732.3	5761.9
Goods	3491.6	3484.4	3685.1	3886.3	4202.6	4137.8	4352.3	4582.8	4579.6	4564.9	4707.4	4750.4
Services	607.8	680.8	718.0	727.7	812.2	822.5	894.8	888.0	885.9	941.6	1024.9	1011.4
GDP	10669.9	11147.6	11672.0	12281.5	12736.7	13611.8	13948.5	14402.3	14853.0	15520.1	16025.6	16516.3
Chain-linked volume (reference year 2006)												
Private consumption (residents)	14573.9	14744.1	14964.7	15195.6	15550.5	15932.0	16309.8	16659.5	17045.1	17520.7	17893.9	18131.3
Public consumption	4709.6	4797.2	4869.1	4923.8	4961.2	5035.5	5146.8	5297.5	5490.6	5633.5	5721.8	5754.0
GFCF	5990.7	6043.3	6123.5	6304.1	6316.7	6367.0	6375.0	6513.1	6424.4	6480.2	6656.6	6670.4
Exports of goods and services	4799.9	4908.8	5143.5	5407.8	5581.2	5718.0	5692.9	5720.0	5589.4	5701.5	5721.9	5785.8
Goods	2881.7	2991.1	3123.7	3275.4	3385.5	3463.3	3486.2	3442.7	3420.5	3433.0	3505.4	3601.0
Services	2081.2	2055.9	2171.4	2297.4	2363.2	2429.2	2357.9	2464.8	2321.6	2452.2	2370.8	2312.6
Imports of goods and services	4959.9	5061.7	5233.2	5457.5	5768.8	5970.9	6187.1	6240.0	6281.5	6442.5	6681.7	6854.5
Goods	4033.7	4064.1	4201.3	4416.4	4632.3	4826.4	4971.5	5042.0	5098.4	5204.3	5348.9	5528.4
Services	919.1	1005.4	1040.2	1039.7	1144.9	1144.5	1223.8	1198.5	1179.3	1239.8	1345.4	1329.8
GDP	25518.7	25862.4	26433.7	27149.0	27617.2	28102.2	28135.9	28594.6	28618.6	29034.3	29251.3	29352.0
Deflator (2006=1)												
Private consumption (residents)	0.4613	0.4700	0.4826	0.4890	0.5039	0.5174	0.5316	0.5452	0.5604	0.5719	0.5839	0.5935
Public consumption	0.3352	0.3490	0.3611	0.3742	0.3863	0.4001	0.4146	0.4304	0.4476	0.4638	0.4807	0.4948
GFCF	0.5175	0.5288	0.5473	0.5591	0.5702	0.5808	0.5943	0.6025	0.6192	0.6296	0.6421	0.6498
Exports of goods and services	0.6915	0.7070	0.7115	0.7256	0.7323	0.7429	0.7475	0.7581	0.7618	0.7646	0.7671	0.7672
Goods	0.7981	0.8097	0.8152	0.8271	0.8346	0.8378	0.8414	0.8398	0.8427	0.8325	0.8362	0.8285
Services	0.4896	0.5102	0.5126	0.5288	0.5340	0.5542	0.5608	0.5864	0.5926	0.6122	0.6150	0.6294
Imports of goods and services	0.8265	0.8229	0.8414	0.8454	0.8693	0.8307	0.8481	0.8767	0.8701	0.8547	0.8579	0.8406
Goods	0.8656	0.8574	0.8771	0.8800	0.9072	0.8573	0.8755	0.9089	0.8982	0.8772	0.8801	0.8593
Services	0.6614	0.6771	0.6903	0.6999	0.7094	0.7186	0.7312	0.7409	0.7512	0.7595	0.7618	0.7606
GDP	0.4181	0.4310	0.4416	0.4524	0.4612	0.4844	0.4958	0.5037	0.5190	0.5345	0.5479	0.5627

MAIN EXPENDITURE COMPONENTS

	1992				1993				1994			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	11055.2	11495.4	11750.8	11955.3	12185.0	12268.0	12589.6	12853.9	12994.1	13313.6	13519.1	13787.3
Public consumption	2925.4	2986.9	3060.5	3123.0	3197.1	3260.3	3318.6	3377.6	3417.8	3477.5	3544.9	3611.3
GFCF	4688.5	4750.3	4811.6	4797.1	4434.0	4551.1	4380.9	4460.9	4575.8	4600.3	4623.6	4867.3
Change in inventories	-44.4	-20.9	-33.4	-81.9	-166.4	-192.9	-161.4	-72.0	75.5	179.2	239.3	255.7
Exports of goods and services	4504.6	4538.4	4420.5	4352.3	4315.4	4333.7	4624.8	4749.6	4779.3	5065.6	5193.0	5510.3
Goods	3072.8	3116.3	3046.4	3017.1	3008.4	3055.0	3220.0	3338.0	3466.1	3699.8	3895.9	4158.7
Services	1431.8	1422.1	1374.2	1335.2	1307.0	1278.7	1404.8	1411.6	1313.2	1365.8	1297.1	1351.7
Imports of goods and services	5908.2	5940.0	5971.0	5871.9	5920.1	5823.6	5966.3	6269.5	6272.6	6518.8	6782.7	7213.0
Goods	4905.2	4946.0	4910.3	4840.7	4705.3	4667.6	4771.4	4989.6	5182.5	5414.3	5685.9	5953.0
Services	1003.0	994.0	1060.6	1031.2	1214.9	1156.0	1194.8	1279.9	1090.2	1104.5	1096.8	1259.9
GDP	17221.1	17810.0	18039.0	18273.8	18045.1	18396.7	18786.3	19100.5	19569.8	20117.5	20337.2	20818.9
Chain-linked volume (reference year 2006)												
Private consumption (residents)	18302.3	18579.9	18720.6	18905.6	19023.9	18964.2	19101.4	19143.5	19000.1	19211.5	19226.5	19354.2
Public consumption	5727.8	5707.4	5695.0	5691.3	5699.1	5714.5	5739.7	5774.2	5814.3	5852.6	5884.6	5910.4
GFCF	7157.7	7197.9	7223.8	7110.9	6547.4	6612.0	6307.3	6290.3	6426.5	6420.8	6431.7	6697.9
Exports of goods and services	5889.3	5892.3	5835.5	5737.9	5679.6	5622.1	5859.6	5935.6	5965.1	6174.6	6343.3	6598.6
Goods	3701.6	3780.6	3766.5	3741.6	3724.6	3731.2	3815.7	3935.7	4081.1	4258.4	4475.5	4693.5
Services	2312.8	2208.8	2157.0	2069.0	2025.4	1948.0	2124.3	2061.3	1914.7	1939.4	1866.0	1893.6
Imports of goods and services	7085.0	7291.4	7450.8	7377.8	7473.5	7264.5	7228.7	7479.0	7472.1	7772.4	8124.1	8574.1
Goods	5746.1	5939.3	6009.9	5951.6	5821.9	5696.4	5666.2	5822.1	6038.1	6321.5	6668.0	6917.9
Services	1337.7	1346.7	1444.9	1430.0	1681.0	1592.0	1586.6	1686.8	1436.6	1448.4	1446.0	1660.5
GDP	30249.1	30295.3	30130.3	30121.4	29618.0	29811.6	29991.1	29843.1	30298.3	30458.9	30267.7	30413.0
Deflator (2006=1)												
Private consumption (residents)	0.6040	0.6187	0.6277	0.6324	0.6405	0.6469	0.6591	0.6714	0.6839	0.6930	0.7032	0.7124
Public consumption	0.5107	0.5233	0.5374	0.5487	0.5610	0.5705	0.5782	0.5849	0.5878	0.5942	0.6024	0.6110
GFCF	0.6550	0.6600	0.6661	0.6746	0.6772	0.6883	0.6946	0.7092	0.7120	0.7165	0.7189	0.7267
Exports of goods and services	0.7649	0.7702	0.7575	0.7585	0.7598	0.7708	0.7893	0.8002	0.8012	0.8204	0.8187	0.8351
Goods	0.8301	0.8243	0.8088	0.8064	0.8077	0.8188	0.8439	0.8481	0.8493	0.8688	0.8705	0.8860
Services	0.6191	0.6439	0.6371	0.6453	0.6453	0.6564	0.6613	0.6848	0.6859	0.7043	0.6951	0.7138
Imports of goods and services	0.8339	0.8147	0.8014	0.7959	0.7921	0.8016	0.8254	0.8383	0.8395	0.8387	0.8349	0.8412
Goods	0.8537	0.8328	0.8170	0.8134	0.8082	0.8194	0.8421	0.8570	0.8583	0.8565	0.8527	0.8605
Services	0.7498	0.7381	0.7341	0.7211	0.7227	0.7261	0.7531	0.7588	0.7589	0.7625	0.7585	0.7588
GDP	0.5693	0.5879	0.5987	0.6067	0.6093	0.6171	0.6264	0.6400	0.6459	0.6605	0.6719	0.6845

MAIN EXPENDITURE COMPONENTS

	1995				1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	14103.2	14430.4	14329.8	14445.7	14834.3	15021.9	15435.9	15527.0	15884.6	15989.4	16428.8	16638.1
Public consumption	3703.3	3784.0	3855.7	3927.8	3987.2	4065.3	4130.1	4198.1	4283.2	4381.1	4478.6	4594.7
GFCF	4999.9	5161.1	4995.2	5103.9	5087.9	5382.7	5650.2	5886.7	6063.1	6486.1	6692.5	6820.8
Change in inventories	226.6	206.9	202.1	182.5	160.0	141.6	136.3	120.4	125.3	113.1	120.9	123.6
Exports of goods and services	5881.1	5770.1	5972.5	6241.3	6354.7	6310.9	6321.3	6376.8	6562.2	6954.1	7139.9	7417.5
Goods	4440.1	4305.3	4450.0	4717.2	4869.8	4839.3	4859.3	4858.6	5024.3	5307.6	5477.7	5708.7
Services	1441.0	1464.8	1522.5	1524.1	1484.9	1471.6	1462.0	1518.2	1537.9	1646.5	1662.2	1708.8
Imports of goods and services	7397.7	7480.7	7297.9	7601.5	7813.0	7849.6	8013.7	8366.1	8471.0	8844.6	9276.2	9724.4
Goods	6151.5	6223.0	6085.6	6293.3	6593.9	6604.7	6761.1	7037.4	7271.1	7517.9	7882.1	8156.1
Services	1246.2	1257.7	1212.3	1308.2	1219.1	1244.9	1252.6	1328.7	1199.9	1326.7	1394.1	1568.3
GDP	21516.4	21871.8	22057.4	22299.7	22611.1	23072.8	23660.1	23742.9	24447.4	25079.2	25584.5	25870.3
Chain-linked volume (reference year 2006)												
Private consumption (residents)	19396.8	19746.8	19525.4	19537.3	19992.5	20043.0	20350.7	20348.6	20664.0	20696.0	21111.1	21212.9
Public consumption	5916.7	5976.2	6034.0	6088.9	6137.1	6173.7	6197.6	6215.6	6240.1	6287.0	6363.3	6466.5
GFCF	6806.2	6950.2	6741.2	6737.3	6648.1	7024.0	7375.5	7644.9	7709.9	8196.3	8353.7	8497.2
Exports of goods and services	6971.7	6730.6	7002.9	7326.2	7379.5	7453.3	7593.1	7616.8	7678.8	8067.6	8081.5	8352.1
Goods	4960.3	4690.2	4885.3	5219.0	5379.9	5479.5	5626.4	5565.1	5678.2	5932.8	5950.9	6193.7
Services	2011.4	2040.4	2117.6	2107.2	1999.6	1973.8	1966.7	2051.7	2000.6	2134.8	2130.6	2158.4
Imports of goods and services	8835.0	8823.0	8559.3	8768.9	8990.2	9039.3	9332.2	9668.7	9753.7	10050.8	10325.4	10775.6
Goods	7133.2	7156.5	6983.0	7095.9	7373.3	7430.5	7742.2	8045.9	8167.9	8435.6	8614.8	8983.2
Services	1701.8	1666.5	1576.3	1673.0	1616.9	1608.8	1590.0	1622.8	1585.8	1615.2	1710.6	1792.4
GDP	30507.4	30814.3	30979.8	31145.7	31392.5	31856.1	32348.4	32368.0	32688.9	33316.4	33670.0	33898.0
Deflator (2006=1)												
Private consumption (residents)	0.7271	0.7308	0.7339	0.7394	0.7420	0.7495	0.7585	0.7631	0.7687	0.7726	0.7782	0.7843
Public consumption	0.6259	0.6332	0.6390	0.6451	0.6497	0.6585	0.6664	0.6754	0.6864	0.6969	0.7038	0.7105
GFCF	0.7346	0.7426	0.7410	0.7576	0.7653	0.7663	0.7661	0.7700	0.7864	0.7913	0.8011	0.8027
Exports of goods and services	0.8436	0.8573	0.8529	0.8519	0.8611	0.8467	0.8325	0.8372	0.8546	0.8620	0.8835	0.8881
Goods	0.8951	0.9179	0.9109	0.9039	0.9052	0.8832	0.8637	0.8730	0.8848	0.8946	0.9205	0.9217
Services	0.7164	0.7179	0.7190	0.7233	0.7426	0.7456	0.7434	0.7400	0.7687	0.7713	0.7802	0.7917
Imports of goods and services	0.8373	0.8479	0.8526	0.8669	0.8691	0.8684	0.8587	0.8653	0.8685	0.8800	0.8984	0.9024
Goods	0.8624	0.8696	0.8715	0.8869	0.8943	0.8889	0.8733	0.8747	0.8902	0.8912	0.9149	0.9079
Services	0.7323	0.7547	0.7691	0.7819	0.7540	0.7738	0.7878	0.8188	0.7567	0.8214	0.8150	0.8750
GDP	0.7053	0.7098	0.7120	0.7160	0.7203	0.7243	0.7314	0.7335	0.7479	0.7528	0.7599	0.7632

MAIN EXPENDITURE COMPONENTS

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	16891.0	17305.4	17588.0	18059.6	18377.6	18614.3	19043.3	19323.2	19873.0	20000.7	20439.1	20663.2
Public consumption	4706.4	4817.0	4922.1	5008.1	5095.2	5209.7	5354.5	5535.7	5712.5	5886.0	6045.6	6185.0
GFCF	7180.4	7407.7	7452.6	7815.7	7762.7	7938.8	8226.7	8412.6	8975.6	8573.7	8873.6	8815.5
Change in inventories	243.1	272.5	315.0	336.8	425.0	458.0	433.9	414.5	277.1	278.6	188.3	213.3
Exports of goods and services	7567.8	7780.1	7893.1	7583.9	7772.5	7842.1	8145.3	8377.7	8898.6	8835.0	9346.0	9759.2
Goods	5679.3	5848.0	5803.4	5649.6	5773.4	5829.2	6070.5	6189.0	6610.4	6498.8	6981.6	7182.6
Services	1888.5	1932.1	2089.7	1934.3	1999.1	2012.9	2074.8	2188.7	2288.2	2336.2	2364.4	2576.6
Imports of goods and services	10057.2	10258.8	10269.5	10456.5	10528.8	10728.5	11339.3	11796.7	12728.2	12285.9	12684.6	13133.4
Goods	8414.3	8756.1	8783.8	8873.0	9018.4	9210.2	9738.9	10144.4	10988.8	10495.0	10923.1	11305.8
Services	1642.9	1502.7	1485.7	1583.5	1510.4	1518.3	1600.4	1652.3	1739.4	1790.9	1761.5	1827.6
GDP	26531.5	27323.9	27901.3	28347.6	28904.2	29334.4	29864.4	30267.0	31008.6	31288.1	32208.0	32502.8
Chain-linked volume (reference year 2006)												
Private consumption (residents)	21459.5	21859.7	22082.3	22511.2	22863.6	23010.5	23351.2	23529.0	24034.7	23871.0	24135.3	24248.3
Public consumption	6585.1	6695.2	6785.4	6852.3	6902.4	6951.3	7006.8	7074.8	7155.5	7238.9	7322.8	7402.8
GFCF	8948.2	9027.1	9101.8	9553.3	9544.4	9566.9	9792.6	9930.2	10416.8	9856.9	10107.5	9977.8
Exports of goods and services	8574.9	8685.7	8940.6	8657.1	8831.6	8902.6	9145.3	9313.5	9776.8	9469.8	9874.4	10258.4
Goods	6219.8	6327.7	6432.2	6341.3	6437.4	6491.5	6685.6	6750.0	7132.2	6802.9	7196.9	7347.1
Services	2355.1	2358.0	2508.4	2315.8	2394.2	2411.1	2459.7	2563.5	2644.6	2666.9	2677.5	2911.3
Imports of goods and services	11366.9	11621.6	11787.8	12127.8	12404.1	12548.9	12922.2	13252.3	13905.4	13272.5	13314.7	13476.9
Goods	9398.0	9788.4	9964.1	10149.6	10473.4	10624.8	10922.4	11226.9	11822.0	11178.2	11273.6	11393.3
Services	1968.9	1833.2	1823.7	1978.2	1930.7	1924.1	1999.8	2025.4	2083.4	2094.3	2041.1	2083.6
GDP	34351.4	34841.3	35351.2	35774.3	36116.3	36305.8	36735.1	36882.1	37691.1	37369.2	38204.4	38508.3
Deflator (2006=1)												
Private consumption (residents)	0.7871	0.7917	0.7965	0.8022	0.8038	0.8089	0.8155	0.8213	0.8268	0.8379	0.8469	0.8522
Public consumption	0.7147	0.7195	0.7254	0.7309	0.7382	0.7495	0.7642	0.7825	0.7983	0.8131	0.8256	0.8355
GFCF	0.8024	0.8206	0.8188	0.8181	0.8133	0.8298	0.8401	0.8472	0.8616	0.8698	0.8779	0.8835
Exports of goods and services	0.8826	0.8957	0.8828	0.8760	0.8801	0.8809	0.8907	0.8995	0.9102	0.9330	0.9465	0.9513
Goods	0.9131	0.9242	0.9022	0.8909	0.8969	0.8980	0.9080	0.9169	0.9268	0.9553	0.9701	0.9776
Services	0.8019	0.8194	0.8331	0.8353	0.8350	0.8348	0.8435	0.8538	0.8652	0.8760	0.8831	0.8850
Imports of goods and services	0.8848	0.8827	0.8712	0.8622	0.8488	0.8549	0.8775	0.8902	0.9153	0.9257	0.9527	0.9745
Goods	0.8953	0.8945	0.8815	0.8742	0.8611	0.8669	0.8916	0.9036	0.9295	0.9389	0.9689	0.9923
Services	0.8344	0.8197	0.8147	0.8005	0.7823	0.7891	0.8003	0.8158	0.8349	0.8551	0.8630	0.8771
GDP	0.7724	0.7842	0.7893	0.7924	0.8003	0.8080	0.8130	0.8206	0.8227	0.8373	0.8430	0.8440

MAIN EXPENDITURE COMPONENTS

	2001				2002				2003			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	20971.1	21158.2	21256.1	21489.8	21810.0	22005.9	22303.2	22273.9	22365.6	22470.8	22830.5	23132.1
Public consumption	6284.0	6404.3	6492.3	6590.1	6683.9	6772.3	6855.8	6926.5	6984.8	7033.5	7092.0	7162.7
GFCF	8676.0	9095.5	9161.2	9335.4	9187.5	9146.8	8847.1	8796.7	8567.4	8350.1	8452.6	8476.5
Change in inventories	253.2	291.0	360.5	97.5	14.5	45.8	91.7	52.7	-165.6	-67.9	-14.4	101.4
Exports of goods and services	9524.7	9476.4	9231.4	9520.5	9449.7	9752.2	9796.9	9798.8	9958.5	9677.2	9925.0	10070.2
Goods	7121.5	7012.6	6803.7	6931.8	6901.7	7200.5	7194.7	7241.1	7415.6	7176.3	7314.7	7466.1
Services	2403.2	2463.8	2427.7	2588.7	2548.0	2551.7	2602.2	2557.7	2542.9	2500.9	2610.3	2604.1
Imports of goods and services	12971.6	13148.4	12842.4	12569.7	12558.2	12679.0	12649.6	12583.0	12385.4	11937.0	12419.8	12645.9
Goods	11196.7	11331.6	11096.8	10846.6	10789.2	10888.0	10914.6	10841.1	10681.6	10273.6	10739.8	10925.1
Services	1774.9	1816.8	1745.6	1723.1	1769.0	1791.0	1735.0	1741.9	1703.8	1663.4	1680.0	1720.8
GDP	32737.4	33277.0	33659.1	34463.6	34587.4	35044.0	35245.1	35265.6	35325.3	35526.7	35865.9	36297.0
Chain-linked volume (reference year 2006)												
Private consumption (residents)	24280.2	24356.2	24320.0	24545.3	24710.5	24747.2	24756.3	24579.4	24495.3	24481.0	24713.0	24877.1
Public consumption	7474.2	7536.7	7589.3	7630.9	7661.6	7680.2	7689.9	7692.8	7694.6	7695.0	7707.7	7735.3
GFCF	9740.9	10180.2	10234.6	10455.8	10205.3	9991.8	9616.9	9513.5	9205.7	9068.9	9184.5	9081.9
Exports of goods and services	10092.2	9944.7	9852.2	10203.2	10134.9	10352.4	10339.6	10376.5	10608.6	10428.4	10755.5	10906.2
Goods	7376.3	7150.1	7110.7	7309.3	7271.0	7527.1	7509.6	7607.8	7883.2	7734.7	7951.0	8137.7
Services	2715.9	2794.6	2741.5	2893.9	2863.9	2825.3	2830.0	2768.7	2725.4	2693.7	2804.5	2768.5
Imports of goods and services	13515.9	13686.6	13677.4	13625.1	13537.9	13584.3	13631.4	13498.2	13234.2	13130.2	13688.6	13954.3
Goods	11495.3	11625.3	11700.7	11641.3	11535.2	11576.1	11710.5	11575.5	11364.6	11296.8	11826.5	12061.7
Services	2020.6	2061.3	1976.7	1983.8	2002.7	2008.2	1920.9	1922.7	1869.6	1833.4	1862.1	1892.6
GDP	38290.5	38607.1	38655.3	39205.2	39214.1	39253.7	38825.7	38564.0	38640.2	38523.1	38598.0	38644.6
Deflator (2006=1)												
Private consumption (residents)	0.8637	0.8687	0.8740	0.8755	0.8826	0.8892	0.9009	0.9062	0.9131	0.9179	0.9238	0.9299
Public consumption	0.8408	0.8497	0.8555	0.8636	0.8724	0.8818	0.8915	0.9004	0.9078	0.9140	0.9201	0.9260
GFCF	0.8907	0.8935	0.8951	0.8928	0.9003	0.9154	0.9200	0.9247	0.9307	0.9207	0.9203	0.9333
Exports of goods and services	0.9438	0.9529	0.9370	0.9331	0.9324	0.9420	0.9475	0.9443	0.9387	0.9280	0.9228	0.9233
Goods	0.9655	0.9808	0.9568	0.9484	0.9492	0.9566	0.9581	0.9518	0.9407	0.9278	0.9200	0.9175
Services	0.8849	0.8816	0.8855	0.8945	0.8897	0.9032	0.9195	0.9238	0.9330	0.9284	0.9308	0.9406
Imports of goods and services	0.9597	0.9607	0.9390	0.9225	0.9276	0.9334	0.9280	0.9322	0.9359	0.9091	0.9073	0.9062
Goods	0.9740	0.9747	0.9484	0.9317	0.9353	0.9406	0.9320	0.9366	0.9399	0.9094	0.9081	0.9058
Services	0.8784	0.8814	0.8831	0.8686	0.8833	0.8918	0.9032	0.9060	0.9113	0.9073	0.9022	0.9092
GDP	0.8550	0.8619	0.8707	0.8791	0.8820	0.8928	0.9078	0.9145	0.9142	0.9222	0.9292	0.9393

MAIN EXPENDITURE COMPONENTS

	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	23436.2	23761.1	24030.8	24368.1	24568.4	24990.0	24897.6	25389.8	25771.6	26052.5	26333.9	26588.6
Public consumption	7245.3	7370.6	7519.6	7704.6	7883.5	8016.1	8081.9	8097.6	8075.0	8073.7	8097.2	8175.5
GFCF	8559.9	8689.5	8700.3	8750.2	8713.0	8911.7	8842.4	8945.7	9096.4	9080.1	8881.8	8831.8
Change in inventories	104.8	231.7	340.9	433.2	179.4	245.5	244.1	243.5	431.2	193.6	293.3	269.8
Exports of goods and services	10206.0	10594.5	10415.4	10658.8	10212.9	10573.9	10848.1	11033.8	11763.9	12275.2	12717.2	12956.3
Goods	7484.2	7660.4	7716.0	7953.8	7485.2	7722.4	7948.9	8006.3	8514.8	8901.0	9228.4	9329.4
Services	2721.8	2934.1	2699.4	2705.0	2727.7	2851.5	2899.2	3027.5	3249.1	3374.2	3488.8	3626.9
Imports of goods and services	12931.1	13470.9	13626.3	14265.9	13686.1	14228.0	14423.9	14852.5	15744.6	15818.2	16095.0	16027.3
Goods	11194.4	11665.9	11738.3	12329.4	11806.3	12208.2	12432.7	12695.5	13425.6	13511.6	13793.8	13636.8
Services	1736.7	1805.0	1888.0	1936.5	1879.8	2019.8	1991.2	2157.0	2319.0	2306.6	2301.2	2390.5
GDP	36621.1	37176.5	37380.7	37649.0	37871.1	38509.2	38490.2	38857.9	39393.5	39856.9	40228.4	40794.7
Chain-linked volume (reference year 2006)												
Private consumption (residents)	25074.3	25245.3	25389.7	25485.8	25579.0	25906.2	25558.7	25838.6	26014.9	26122.4	26255.8	26353.5
Public consumption	7780.0	7846.3	7931.5	8025.7	8112.4	8169.1	8187.2	8167.6	8130.5	8099.6	8088.5	8102.9
GFCF	9188.3	9124.6	9126.1	9096.7	9085.2	9212.8	9018.2	9053.1	9116.2	9043.4	8890.6	8839.9
Exports of goods and services	10992.2	11252.1	11007.9	11194.0	10765.7	11209.1	11249.0	11325.6	11939.4	12308.3	12600.9	12864.0
Goods	8118.4	8187.8	8183.1	8387.1	7909.9	8249.2	8279.9	8250.0	8672.8	8937.5	9113.3	9250.1
Services	2873.8	3064.3	2824.8	2806.9	2855.8	2959.9	2969.1	3075.6	3266.6	3370.8	3487.6	3613.9
Imports of goods and services	14070.7	14406.7	14537.9	15089.0	14491.7	14954.2	14862.9	15113.9	15707.1	15804.9	16098.0	16075.2
Goods	12196.8	12462.6	12515.0	13024.5	12516.2	12850.9	12817.2	12915.9	13373.2	13504.2	13806.1	13684.3
Services	1873.9	1944.1	2022.9	2064.5	1975.5	2103.3	2045.7	2198.0	2333.9	2300.7	2291.9	2390.9
GDP	39085.1	39415.3	39217.3	39094.0	39356.8	39826.1	39372.8	39442.9	39888.5	40036.6	40001.8	40346.7
Deflator (2006=1)												
Private consumption (residents)	0.9347	0.9412	0.9465	0.9561	0.9605	0.9646	0.9741	0.9826	0.9906	0.9973	1.0030	1.0089
Public consumption	0.9313	0.9394	0.9481	0.9600	0.9718	0.9813	0.9871	0.9914	0.9932	0.9968	1.0011	1.0090
GFCF	0.9316	0.9523	0.9533	0.9619	0.9590	0.9673	0.9805	0.9881	0.9978	1.0041	0.9990	0.9991
Exports of goods and services	0.9285	0.9416	0.9462	0.9522	0.9487	0.9433	0.9644	0.9742	0.9853	0.9973	1.0092	1.0072
Goods	0.9219	0.9356	0.9429	0.9483	0.9463	0.9361	0.9600	0.9705	0.9818	0.9959	1.0126	1.0086
Services	0.9471	0.9575	0.9556	0.9637	0.9551	0.9634	0.9765	0.9844	0.9946	1.0010	1.0003	1.0036
Imports of goods and services	0.9190	0.9350	0.9373	0.9455	0.9444	0.9514	0.9705	0.9827	1.0024	1.0008	0.9998	0.9970
Goods	0.9178	0.9361	0.9379	0.9466	0.9433	0.9500	0.9700	0.9829	1.0039	1.0005	0.9991	0.9965
Services	0.9268	0.9285	0.9333	0.9380	0.9516	0.9603	0.9734	0.9813	0.9936	1.0026	1.0041	0.9998
GDP	0.9370	0.9432	0.9532	0.9630	0.9623	0.9669	0.9776	0.9852	0.9876	0.9955	1.0057	1.0111

MAIN EXPENDITURE COMPONENTS

	2007				2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption (residents)	27018.6	27506.3	27783.1	28327.0	28506.9	28755.2	29134.1	28560.1	27510.2	27453.8	27772.6	28149.1
Public consumption	8275.1	8383.0	8446.2	8474.7	8489.5	8555.6	8669.3	8817.8	9138.6	9114.8	9267.5	9250.9
GFCF	9306.9	9240.8	9352.1	9729.3	9816.2	9907.0	9734.3	9176.9	8414.2	8431.8	8685.0	8017.0
Change in inventories	141.5	303.3	281.2	296.7	218.2	332.8	353.0	279.1	-95.4	-181.6	42.0	262.6
Exports of goods and services	13380.8	13525.8	13695.9	13895.6	14382.2	14288.5	14347.8	12783.3	11176.9	11459.1	12194.9	12312.0
Goods	9556.9	9604.0	9647.4	9730.4	10091.4	10102.7	10215.9	8707.4	7411.8	7684.9	8449.6	8440.1
Services	3823.9	3921.8	4048.5	4165.2	4290.8	4185.8	4131.9	4075.9	3765.1	3774.2	3745.3	3871.9
Imports of goods and services	16220.2	16787.6	17237.1	17799.8	18356.5	18677.3	19098.1	16992.8	14397.7	14344.2	15601.6	15445.9
Goods	13811.2	14298.4	14662.2	15124.4	15739.1	15970.4	16345.3	14293.9	11933.5	11806.9	13150.3	12971.0
Services	2409.0	2489.2	2574.9	2675.4	2617.4	2706.9	2752.8	2698.9	2464.2	2537.3	2451.3	2474.9
GDP	41902.7	42171.6	42321.4	42923.5	43056.5	43161.8	43140.4	42624.4	41746.8	41933.7	42360.4	42545.7
Chain-linked volume (reference year 2006)												
Private consumption (residents)	26583.5	26763.6	26913.3	27134.8	27147.2	27102.3	27396.7	27163.0	26599.1	26675.7	27058.9	27259.0
Public consumption	8131.0	8154.0	8160.3	8150.0	8135.8	8142.6	8180.5	8250.9	8473.2	8412.3	8518.2	8498.9
GFCF	9149.1	9065.7	9123.1	9492.8	9385.0	9319.8	9140.0	8871.7	8175.5	8213.4	8374.6	7815.1
Exports of goods and services	13152.2	13287.0	13470.5	13570.1	13814.6	13651.7	13582.8	12381.3	11166.2	11566.2	12267.0	12237.1
Goods	9432.0	9485.3	9520.5	9596.5	9810.0	9733.7	9708.8	8537.2	7487.2	7899.2	8663.0	8483.0
Services	3720.2	3801.7	3950.0	3973.6	4004.6	3918.0	3874.0	3844.1	3679.0	3667.0	3604.0	3754.1
Imports of goods and services	16213.1	16662.5	17054.4	17267.4	17340.0	17329.1	17638.2	16462.0	14588.0	14761.3	16119.3	16007.0
Goods	13845.8	14247.3	14559.8	14676.5	14830.7	14755.0	15046.2	13883.9	12197.0	12305.3	13742.6	13634.1
Services	2367.3	2415.2	2494.6	2590.9	2509.3	2574.1	2592.0	2578.1	2391.0	2456.0	2376.7	2372.9
GDP	40944.3	40933.7	40896.9	41322.6	41306.0	41238.6	41036.5	40502.5	39713.4	39999.0	40201.9	40055.3
Deflator (2006=1)												
Private consumption (residents)	1.0164	1.0278	1.0323	1.0439	1.0501	1.0610	1.0634	1.0514	1.0343	1.0292	1.0264	1.0327
Public consumption	1.0177	1.0281	1.0350	1.0398	1.0435	1.0507	1.0598	1.0687	1.0785	1.0835	1.0880	1.0885
GFCF	1.0172	1.0193	1.0251	1.0249	1.0459	1.0630	1.0650	1.0344	1.0292	1.0266	1.0371	1.0258
Exports of goods and services	1.0174	1.0180	1.0167	1.0240	1.0411	1.0466	1.0563	1.0325	1.0010	0.9907	0.9941	1.0061
Goods	1.0132	1.0125	1.0133	1.0140	1.0287	1.0379	1.0522	1.0199	0.9899	0.9729	0.9754	0.9949
Services	1.0279	1.0316	1.0249	1.0482	1.0715	1.0684	1.0666	1.0603	1.0234	1.0292	1.0392	1.0314
Imports of goods and services	1.0004	1.0075	1.0107	1.0308	1.0586	1.0778	1.0828	1.0322	0.9870	0.9717	0.9679	0.9649
Goods	0.9975	1.0036	1.0070	1.0305	1.0613	1.0824	1.0863	1.0295	0.9784	0.9595	0.9569	0.9514
Services	1.0176	1.0306	1.0322	1.0326	1.0431	1.0516	1.0620	1.0469	1.0306	1.0331	1.0314	1.0430
GDP	1.0234	1.0302	1.0348	1.0387	1.0424	1.0466	1.0513	1.0524	1.0512	1.0484	1.0537	1.0622

MAIN EXPENDITURE COMPONENTS

	2010			
	Q1	Q2	Q3	Q4
Current prices (EUR millions)				
Private consumption (residents)	28419.7	28710.8	29002.4	29158.3
Public consumption	9277.7	9516.3	8961.9	9219.1
GFCF	8371.5	8246.2	8222.3	7938.5
Change in inventories	-45.9	-15.4	-83.1	175.0
Exports of goods and services	12455.4	13142.1	13945.2	13921.5
Goods	8543.4	9040.1	9719.0	9715.4
Services	3912.0	4102.0	4226.2	4206.1
Imports of goods and services	15451.3	16678.1	16539.2	17171.5
Goods	12922.6	14006.3	13840.3	14494.9
Services	2528.7	2671.8	2698.9	2676.6
GDP	43027.1	42921.9	43509.5	43240.9
Chain-linked volume (reference year 2006)				
Private consumption (residents)	27375.0	27509.6	27611.3	27565.4
Public consumption	8532.3	8792.9	8331.9	8637.6
GFCF	7974.0	7768.9	7747.7	7504.5
Exports of goods and services	12191.9	12672.6	13317.8	13192.9
Goods	8440.8	8769.8	9342.5	9192.1
Services	3751.1	3902.8	3975.3	4000.8
Imports of goods and services	15492.7	16187.2	16321.1	16612.7
Goods	13087.9	13671.1	13782.3	14111.0
Services	2404.8	2516.1	2538.8	2501.7
GDP	40413.8	40561.2	40686.6	40437.1
Deflator (2006=1)				
Private consumption (residents)	1.0382	1.0437	1.0504	1.0578
Public consumption	1.0874	1.0823	1.0756	1.0673
GFCF	1.0498	1.0614	1.0613	1.0578
Exports of goods and services	1.0216	1.0370	1.0471	1.0552
Goods	1.0122	1.0308	1.0403	1.0569
Services	1.0429	1.0510	1.0631	1.0513
Imports of goods and services	0.9973	1.0303	1.0134	1.0336
Goods	0.9874	1.0245	1.0042	1.0272
Services	1.0515	1.0619	1.0631	1.0699
GDP	1.0647	1.0582	1.0694	1.0693

PRIVATE CONSUMPTION (RESIDENTS)

	1977				1978				1979			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	594.6	631.4	669.7	696.0	728.4	757.4	802.7	856.6	884.0	934.6	1005.0	1094.4
Durables	66.8	72.7	73.8	74.5	78.6	82.0	86.8	89.3	96.2	99.2	114.4	124.8
Non-durables	527.7	558.7	595.9	621.5	649.8	675.5	715.9	767.3	787.8	835.4	890.6	969.6
Chain-linked volume (reference year 2006)												
Private consumption					9479.6	9467.4	9569.3	9704.2	9804.6	9950.7	10110.2	10311.4
Durables					879.9	888.3	906.3	903.1	961.8	957.9	999.4	1058.4
Non-durables					8637.5	8614.9	8697.6	8839.3	8873.1	9026.6	9140.8	9277.0
Deflator (2006=1)												
Private consumption					0.0768	0.0800	0.0839	0.0883	0.0902	0.0939	0.0994	0.1061
Durables					0.0893	0.0923	0.0958	0.0989	0.1000	0.1036	0.1144	0.1179
Non-durables					0.0752	0.0784	0.0823	0.0868	0.0888	0.0925	0.0974	0.1045

GROSS FIXED CAPITAL FORMATION

	1977				1978				1979			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	292.7	312.0	314.8	326.6	319.3	335.6	375.7	388.9	486.5	523.0	560.6	589.3
Machinery and equipment	52.6	65.7	70.4	76.0	75.7	82.2	85.3	83.7	87.6	96.4	107.7	114.3
Transport material	41.2	46.1	47.4	48.6	48.2	49.8	50.7	50.3	51.7	54.3	57.1	57.1
Construction	185.6	184.4	181.2	184.9	180.0	186.4	222.9	237.3	329.5	353.1	375.3	395.5
Other	13.3	15.8	15.8	17.1	15.4	17.1	16.8	17.5	17.7	19.2	20.4	22.4
Chain-linked volume (reference year 2006)												
Gross fixed capital formation					3738.1	3738.8	3963.0	3865.0	4538.5	4614.9	4671.9	4618.1
Machinery and equipment					416.0	435.4	430.4	402.6	402.8	427.3	450.5	442.1
Transport material					379.6	362.8	338.0	307.1	291.3	289.9	289.9	275.2
Construction					3004.9	2972.7	3370.2	3386.0	4403.4	4440.4	4440.8	4419.4
Other					181.3	187.2	171.8	164.4	159.4	160.7	168.7	169.9
Deflator (2006=1)												
Gross fixed capital formation					0.0854	0.0898	0.0948	0.1006	0.1072	0.1133	0.1200	0.1276
Machinery and equipment					0.1819	0.1888	0.1981	0.2079	0.2175	0.2256	0.2392	0.2585
Transport material					0.1271	0.1373	0.1501	0.1639	0.1773	0.1872	0.1971	0.2073
Construction					0.0599	0.0627	0.0661	0.0701	0.0748	0.0795	0.0845	0.0895
Other					0.0849	0.0913	0.0976	0.1066	0.1113	0.1194	0.1211	0.1319

PRIVATE CONSUMPTION (RESIDENTS)

	1980				1981				1982			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	1182.1	1262.3	1333.7	1389.1	1477.1	1548.2	1649.8	1732.6	1814.4	1900.9	1977.7	2049.2
Durables	150.3	154.9	178.7	177.9	193.2	195.3	202.9	209.5	209.9	223.0	226.4	230.7
Non-durables	1031.8	1107.4	1154.9	1211.1	1283.9	1352.8	1446.9	1523.1	1604.5	1677.9	1751.4	1818.5
Chain-linked volume (reference year 2006)												
Private consumption	10638.0	10907.1	11062.6	11148.9	11152.8	11238.1	11301.0	11350.8	11480.3	11565.3	11612.0	11596.6
Durables	1105.9	1140.4	1187.8	1173.4	1170.1	1155.1	1119.0	1123.2	1096.1	1133.1	1095.6	1098.3
Non-durables	9556.1	9790.3	9894.4	9998.5	10006.8	10113.3	10223.2	10269.1	10437.6	10478.1	10573.8	10554.5
Deflator (2006=1)												
Private consumption	0.1111	0.1157	0.1206	0.1246	0.1324	0.1378	0.1460	0.1526	0.1580	0.1644	0.1703	0.1767
Durables	0.1359	0.1358	0.1505	0.1516	0.1651	0.1691	0.1813	0.1865	0.1915	0.1968	0.2066	0.2101
Non-durables	0.1080	0.1131	0.1167	0.1211	0.1283	0.1338	0.1415	0.1483	0.1537	0.1601	0.1656	0.1723

GROSS FIXED CAPITAL FORMATION

	1980				1981				1982			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	545.1	578.8	591.0	633.9	736.9	779.1	859.7	872.2	902.3	941.3	987.0	1035.8
Machinery and equipment	128.2	139.7	149.5	161.3	178.0	186.8	204.0	204.2	217.1	228.4	232.3	231.2
Transport material	60.2	64.1	70.5	81.3	95.9	105.7	113.4	109.1	106.6	105.7	106.4	109.6
Construction	334.0	349.1	344.1	361.3	428.7	449.1	505.8	519.6	541.7	566.4	605.9	651.0
Other	22.7	26.0	26.8	30.1	34.3	37.6	36.6	39.2	36.9	40.8	42.4	44.0
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	4060.6	4046.0	3983.9	4070.6	4472.7	4501.6	4833.1	4800.7	4742.6	4709.4	4740.1	4742.2
Machinery and equipment	466.4	469.8	501.6	528.3	555.5	559.6	604.2	606.2	590.7	583.1	574.6	560.4
Transport material	281.2	281.6	303.5	331.9	362.9	378.5	401.5	394.9	373.8	361.7	359.2	362.7
Construction	3540.6	3501.9	3254.1	3225.2	3627.9	3622.5	3911.2	3865.6	3893.5	3894.4	3950.9	3994.7
Other	172.1	176.7	188.1	194.5	210.6	210.4	211.1	217.3	202.8	202.5	212.4	204.1
Deflator (2006=1)												
Gross fixed capital formation	0.1342	0.1431	0.1483	0.1557	0.1648	0.1731	0.1779	0.1817	0.1903	0.1999	0.2082	0.2184
Machinery and equipment	0.2749	0.2973	0.2981	0.3053	0.3204	0.3338	0.3377	0.3369	0.3675	0.3917	0.4043	0.4125
Transport material	0.2143	0.2277	0.2322	0.2448	0.2644	0.2792	0.2823	0.2763	0.2853	0.2923	0.2963	0.3022
Construction	0.0943	0.0997	0.1058	0.1120	0.1182	0.1240	0.1293	0.1344	0.1391	0.1454	0.1534	0.1630
Other	0.1320	0.1470	0.1427	0.1547	0.1630	0.1785	0.1732	0.1806	0.1819	0.2014	0.1996	0.2154

PRIVATE CONSUMPTION (RESIDENTS)

	1983				1984				1985			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	2202.8	2319.1	2496.0	2675.8	2795.6	2956.0	3153.2	3218.9	3376.0	3493.3	3589.0	3739.9
Durables	262.5	267.2	284.8	291.4	292.4	303.1	333.5	335.0	362.2	366.5	387.3	388.8
Non-durables	1940.3	2051.9	2211.1	2384.4	2503.2	2652.9	2819.7	2883.9	3013.8	3126.7	3201.7	3351.1
Chain-linked volume (reference year 2006)												
Private consumption	11555.3	11515.2	11479.0	11388.1	11350.1	11314.5	11336.8	11331.0	11272.3	11315.5	11354.1	11490.6
Durables	1125.6	1108.5	1085.6	1058.1	1025.0	1031.1	1055.9	1052.3	1044.0	1032.7	1046.5	1036.8
Non-durables	10478.0	10458.0	10449.0	10389.6	10391.1	10347.1	10339.5	10338.0	10288.6	10345.7	10369.2	10519.6
Deflator (2006=1)												
Private consumption	0.1906	0.2014	0.2174	0.2350	0.2463	0.2613	0.2781	0.2841	0.2995	0.3087	0.3161	0.3255
Durables	0.2333	0.2410	0.2624	0.2754	0.2853	0.2940	0.3159	0.3184	0.3469	0.3549	0.3701	0.3750
Non-durables	0.1852	0.1962	0.2116	0.2295	0.2409	0.2564	0.2727	0.2790	0.2929	0.3022	0.3088	0.3186

GROSS FIXED CAPITAL FORMATION

	1983				1984				1985			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	1105.8	1171.3	1243.2	1280.6	1235.6	1312.1	1333.2	1422.4	1465.0	1511.7	1536.4	1621.2
Machinery and equipment	244.1	255.3	286.1	282.1	259.9	293.5	303.1	331.7	325.0	322.0	334.8	371.2
Transport material	121.0	128.9	139.5	132.2	112.2	113.0	109.5	116.2	115.4	118.1	126.8	145.0
Construction	684.4	726.5	751.6	800.6	814.0	851.2	869.4	918.1	966.6	1009.5	1007.0	1028.5
Other	56.3	60.7	66.0	65.7	49.5	54.4	51.3	56.4	58.0	62.1	67.9	76.6
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	4795.7	4810.4	4759.8	4561.9	4300.3	4369.3	4225.3	4252.8	4244.2	4253.3	4200.2	4278.3
Machinery and equipment	566.6	568.1	570.0	496.2	461.9	498.6	484.2	492.9	481.2	476.8	483.5	507.7
Transport material	381.1	387.7	381.3	326.0	280.7	273.8	252.6	252.2	249.9	256.1	268.9	292.8
Construction	3948.2	3956.5	3896.4	3965.0	3853.1	3861.6	3762.4	3777.3	3784.0	3797.1	3660.9	3648.2
Other	254.1	250.2	249.4	222.4	170.0	172.3	158.8	159.3	170.8	170.4	185.6	191.9
Deflator (2006=1)												
Gross fixed capital formation	0.2306	0.2435	0.2612	0.2807	0.2873	0.3003	0.3155	0.3345	0.3452	0.3554	0.3658	0.3789
Machinery and equipment	0.4308	0.4493	0.5020	0.5685	0.5627	0.5887	0.6259	0.6729	0.6755	0.6752	0.6924	0.7311
Transport material	0.3175	0.3324	0.3658	0.4054	0.3996	0.4127	0.4333	0.4606	0.4618	0.4613	0.4715	0.4951
Construction	0.1734	0.1836	0.1929	0.2019	0.2113	0.2204	0.2311	0.2431	0.2554	0.2658	0.2751	0.2819
Other	0.2216	0.2426	0.2647	0.2956	0.2911	0.3158	0.3234	0.3541	0.3395	0.3647	0.3659	0.3991

PRIVATE CONSUMPTION (RESIDENTS)

	1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	3967.3	4205.1	4351.9	4556.0	4674.0	4920.4	5072.0	5264.3	5675.2	5939.1	6261.6	6612.6
Durables	392.2	424.3	464.0	487.8	547.1	599.5	618.8	638.6	772.6	849.2	910.9	991.9
Non-durables	3575.1	3780.8	3887.9	4068.3	4126.9	4321.0	4453.2	4625.7	4902.7	5089.9	5350.7	5620.7
Chain-linked volume (reference year 2006)												
Private consumption	11706.0	12068.6	12215.0	12555.5	12629.2	13037.3	13121.3	13317.7	13918.2	14165.8	14375.6	14731.1
Durables	996.8	1052.4	1096.9	1163.4	1218.9	1313.4	1295.4	1357.4	1515.7	1633.6	1673.1	1790.9
Non-durables	10787.6	11092.3	11189.4	11458.8	11467.5	11772.3	11879.8	12006.7	12425.3	12532.8	12699.4	12918.2
Deflator (2006=1)												
Private consumption	0.3389	0.3484	0.3563	0.3629	0.3701	0.3774	0.3865	0.3953	0.4078	0.4193	0.4356	0.4489
Durables	0.3935	0.4032	0.4231	0.4192	0.4488	0.4564	0.4777	0.4704	0.5097	0.5198	0.5444	0.5538
Non-durables	0.3314	0.3409	0.3475	0.3550	0.3599	0.3670	0.3749	0.3853	0.3946	0.4061	0.4213	0.4351

GROSS FIXED CAPITAL FORMATION

	1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)	1594.7	1706.2	1786.2	1889.8	2038.0	2158.5	2305.4	2445.2	2664.6	2763.8	2956.8	3035.7
Gross fixed capital formation	363.8	420.7	441.6	499.2	521.3	577.6	619.6	679.5	728.7	774.0	823.6	827.8
Machinery and equipment	149.2	175.6	200.0	225.7	257.5	284.3	270.3	307.7	324.5	339.7	354.1	376.8
Transport material	1004.6	1020.5	1055.2	1064.0	1164.7	1191.7	1306.5	1341.5	1479.0	1509.5	1630.9	1672.3
Construction	77.1	89.4	89.3	100.8	94.6	104.9	109.0	116.5	132.4	140.6	148.1	158.9
Other												
Chain-linked volume (reference year 2006)	4153.5	4305.3	4450.6	4533.9	4832.5	5002.5	5292.4	5389.8	5758.5	5830.8	6021.5	6080.9
Gross fixed capital formation	500.0	547.6	575.1	620.0	654.8	716.0	775.4	800.6	845.9	876.2	883.3	892.3
Machinery and equipment	302.1	335.8	377.1	399.9	449.9	481.9	456.1	492.1	513.7	531.1	536.3	573.7
Transport material	3492.2	3496.5	3538.7	3489.1	3720.1	3715.5	3974.0	3977.2	4284.8	4263.8	4479.5	4451.3
Construction	190.2	202.9	209.8	213.9	207.3	219.5	236.8	235.6	260.7	267.9	276.6	288.0
Other												
Deflator (2006=1)	0.3839	0.3963	0.4013	0.4168	0.4217	0.4315	0.4356	0.4537	0.4627	0.4740	0.4910	0.4992
Gross fixed capital formation	0.7275	0.7683	0.7679	0.8052	0.7961	0.8067	0.7991	0.8487	0.8615	0.8834	0.9324	0.9277
Machinery and equipment	0.4940	0.5229	0.5304	0.5644	0.5722	0.5900	0.5926	0.6252	0.6317	0.6396	0.6604	0.6567
Transport material	0.2877	0.2919	0.2982	0.3050	0.3131	0.3207	0.3288	0.3373	0.3452	0.3540	0.3641	0.3757
Construction	0.4055	0.4405	0.4258	0.4715	0.4563	0.4779	0.4606	0.4946	0.5076	0.5248	0.5354	0.5516
Other	0.3974	0.4143	0.4334	0.4520	0.4561	0.4478	0.4643	0.4711	0.5123	0.4902	0.5520	0.5100

PRIVATE CONSUMPTION (RESIDENTS)

	1989				1990				1991			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	6723.5	6929.3	7221.5	7430.0	7835.6	8243.8	8670.3	9083.0	9552.4	10020.5	10448.5	10761.7
Durables	985.1	915.5	950.1	971.7	1036.7	1082.2	1156.1	1193.3	1256.8	1316.7	1405.6	1419.7
Non-durables	5738.3	6013.8	6271.4	6458.2	6798.9	7161.6	7514.2	7889.8	8295.6	8703.8	9042.8	9342.0
Chain-linked volume (reference year 2006)												
Private consumption	14573.9	14744.1	14964.7	15195.6	15550.5	15932.0	16309.8	16659.5	17045.1	17520.7	17893.9	18131.3
Durables	1760.8	1648.7	1661.5	1684.6	1771.0	1825.2	1896.5	1949.4	1992.6	2091.5	2191.5	2211.8
Non-durables	12791.1	13111.1	13322.5	13531.3	13787.1	14112.3	14412.8	14706.9	15050.9	15420.4	15684.1	15902.5
Deflator (2006=1)												
Private consumption	0.4613	0.4700	0.4826	0.4890	0.5039	0.5174	0.5316	0.5452	0.5604	0.5719	0.5839	0.5935
Durables	0.5595	0.5553	0.5718	0.5768	0.5854	0.5929	0.6096	0.6121	0.6307	0.6296	0.6414	0.6419
Non-durables	0.4486	0.4587	0.4707	0.4773	0.4931	0.5075	0.5214	0.5365	0.5512	0.5644	0.5766	0.5875

GROSS FIXED CAPITAL FORMATION

	1989				1990				1991			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	3100.1	3195.7	3351.2	3524.9	3602.0	3698.0	3788.5	3924.2	3978.2	4079.6	4274.2	4334.1
Machinery and equipment	822.1	856.3	888.0	937.4	990.2	1009.2	1073.1	1089.1	1127.6	1124.8	1134.9	1139.8
Transport material	359.5	347.0	372.6	406.4	390.2	417.1	395.7	430.8	397.5	430.5	447.5	455.0
Construction	1767.8	1830.2	1925.6	2012.0	2048.3	2086.6	2132.2	2201.0	2259.2	2322.2	2479.0	2522.8
Other	150.7	162.2	165.0	169.1	173.4	185.1	187.6	203.2	194.0	202.2	212.9	216.5
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	5990.7	6043.3	6123.5	6304.1	6316.7	6367.0	6375.0	6513.1	6424.4	6480.2	6656.6	6670.4
Machinery and equipment	855.8	885.5	903.9	962.2	1007.9	1039.6	1094.5	1134.4	1121.9	1125.5	1132.7	1137.4
Transport material	521.6	512.7	507.0	540.5	532.6	565.4	529.6	572.6	553.8	592.1	593.9	602.7
Construction	4545.7	4542.7	4612.7	4647.4	4568.4	4486.5	4419.8	4405.4	4373.5	4369.3	4549.9	4534.4
Other	268.1	278.2	279.5	280.0	284.0	295.2	301.9	320.4	316.4	320.9	336.5	343.5
Deflator (2006=1)												
Gross fixed capital formation	0.5175	0.5288	0.5473	0.5591	0.5702	0.5808	0.5943	0.6025	0.6192	0.6296	0.6421	0.6498
Machinery and equipment	0.9606	0.9670	0.9824	0.9742	0.9824	0.9708	0.9805	0.9601	1.0051	0.9994	1.0019	1.0021
Transport material	0.6891	0.6767	0.7350	0.7519	0.7325	0.7377	0.7472	0.7524	0.7176	0.7270	0.7534	0.7550
Construction	0.3889	0.4029	0.4175	0.4329	0.4484	0.4651	0.4824	0.4996	0.5166	0.5315	0.5448	0.5564
Other	0.5622	0.5831	0.5905	0.6041	0.6105	0.6273	0.6213	0.6342	0.6130	0.6300	0.6327	0.6305

PRIVATE CONSUMPTION (RESIDENTS)

	1992				1993				1994			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	11055.2	11495.4	11750.8	11955.3	12185.0	12268.0	12589.6	12853.9	12994.1	13313.6	13519.1	13787.3
Durables	1525.1	1597.9	1585.4	1636.6	1589.2	1525.4	1556.5	1552.7	1592.6	1634.7	1627.1	1713.3
Non-durables	9530.1	9897.5	10165.3	10318.7	10595.8	10742.6	11033.1	11301.2	11401.5	11678.9	11892.0	12074.0
Chain-linked volume (reference year 2006)												
Private consumption	18302.3	18579.9	18720.6	18905.6	19023.9	18964.2	19101.4	19143.5	19000.1	19211.5	19226.5	19354.2
Durables	2340.5	2434.6	2354.5	2421.4	2283.8	2181.8	2164.6	2137.3	2139.4	2184.9	2127.5	2225.3
Non-durables	15933.7	16110.1	16342.1	16454.8	16722.6	16772.6	16929.4	17001.4	16855.2	17019.0	17097.1	17118.8
Deflator (2006=1)												
Private consumption	0.6040	0.6187	0.6277	0.6324	0.6405	0.6469	0.6591	0.6714	0.6839	0.6930	0.7032	0.7124
Durables	0.6516	0.6563	0.6734	0.6759	0.6958	0.6992	0.7191	0.7265	0.7444	0.7482	0.7648	0.7699
Non-durables	0.5981	0.6144	0.6220	0.6271	0.6336	0.6405	0.6517	0.6647	0.6764	0.6862	0.6956	0.7053

GROSS FIXED CAPITAL FORMATION

	1992				1993				1994			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	4688.5	4750.3	4811.6	4797.1	4434.0	4551.1	4380.9	4460.9	4575.8	4600.3	4623.6	4867.3
Machinery and equipment	1127.6	1121.3	1132.5	1116.2	1070.1	1135.1	1070.3	1073.0	1055.6	1014.8	980.7	1027.2
Transport material	505.7	511.3	505.4	468.4	439.1	437.1	405.4	411.8	445.9	488.3	450.0	626.6
Construction	2831.6	2892.7	2949.6	2983.0	2715.7	2764.6	2706.0	2770.0	2854.3	2866.6	2969.4	2956.0
Other	223.5	225.0	224.2	229.5	209.1	214.3	199.1	206.1	220.0	230.7	223.6	257.5
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	7157.7	7197.9	7223.8	7110.9	6547.4	6612.0	6307.3	6290.3	6426.5	6420.8	6431.7	6697.9
Machinery and equipment	1145.6	1164.3	1188.6	1168.7	1142.9	1178.2	1118.3	1084.2	1050.6	1011.3	993.7	1017.5
Transport material	669.6	662.8	648.5	595.3	572.2	573.9	523.6	507.2	576.8	627.1	577.1	794.7
Construction	4997.8	5020.8	5033.5	5000.1	4470.3	4477.7	4324.3	4373.2	4461.3	4436.8	4550.5	4485.0
Other	348.4	347.5	340.9	349.6	314.4	319.3	294.0	302.7	325.6	340.2	329.6	378.0
Deflator (2006=1)												
Gross fixed capital formation	0.6550	0.6600	0.6661	0.6746	0.6772	0.6883	0.6946	0.7092	0.7120	0.7165	0.7189	0.7267
Machinery and equipment	0.9843	0.9631	0.9528	0.9551	0.9364	0.9634	0.9571	0.9896	1.0048	1.0034	0.9869	1.0095
Transport material	0.7552	0.7714	0.7793	0.7869	0.7674	0.7617	0.7742	0.8119	0.7731	0.7786	0.7799	0.7885
Construction	0.5666	0.5761	0.5860	0.5966	0.6075	0.6174	0.6258	0.6334	0.6398	0.6461	0.6525	0.6591
Other	0.6417	0.6475	0.6576	0.6564	0.6650	0.6713	0.6774	0.6808	0.6759	0.6783	0.6783	0.6811

PRIVATE CONSUMPTION (RESIDENTS)

	1995				1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	14103.2	14430.4	14329.8	14445.7	14834.3	15021.9	15435.9	15527.0	15884.6	15989.4	16428.8	16638.1
Durables	1669.1	1778.3	1730.2	1631.7	1838.8	1809.2	1930.8	1921.6	1984.4	1983.3	2070.1	2092.1
Non-durables	12434.1	12652.1	12599.6	12814.0	12995.5	13212.7	13505.1	13605.4	13900.2	14006.1	14358.7	14546.0
Chain-linked volume (reference year 2006)												
Private consumption	19396.8	19746.8	19525.4	19537.3	19992.5	20043.0	20350.7	20348.6	20664.0	20696.0	21111.1	21212.9
Durables	2124.7	2245.5	2169.5	2029.4	2288.0	2237.7	2369.7	2336.7	2394.7	2381.8	2478.2	2499.7
Non-durables	17272.1	17501.3	17355.9	17507.9	17704.5	17805.3	17981.0	18011.9	18269.3	18314.2	18632.9	18713.2
Deflator (2006=1)												
Private consumption	0.7271	0.7308	0.7339	0.7394	0.7420	0.7495	0.7585	0.7631	0.7687	0.7726	0.7782	0.7843
Durables	0.7856	0.7919	0.7975	0.8040	0.8037	0.8085	0.8148	0.8224	0.8287	0.8327	0.8353	0.8369
Non-durables	0.7199	0.7229	0.7260	0.7319	0.7340	0.7421	0.7511	0.7554	0.7609	0.7648	0.7706	0.7773

GROSS FIXED CAPITAL FORMATION

	1995				1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	4999.9	5161.1	4995.2	5103.9	5087.9	5382.7	5650.2	5886.7	6063.1	6486.1	6692.5	6820.8
Machinery and equipment	1084.2	1109.1	1082.9	1122.7	1179.8	1178.6	1236.4	1312.1	1343.5	1400.8	1476.2	1506.1
Transport material	429.5	537.6	463.1	507.4	495.5	544.3	567.1	604.6	610.7	715.7	733.7	827.4
Construction	3252.5	3277.9	3211.0	3234.3	3171.5	3415.9	3598.2	3714.9	3845.1	4095.6	4197.2	4189.5
Other	233.7	236.5	238.2	239.5	241.1	243.9	248.5	255.1	263.8	274.0	285.4	297.8
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	6806.2	6950.2	6741.2	6737.3	6648.1	7024.0	7375.5	7644.9	7709.9	8196.3	8353.7	8497.2
Machinery and equipment	1064.3	1086.6	1098.1	1099.6	1107.8	1116.7	1176.1	1243.7	1233.5	1292.5	1338.1	1410.5
Transport material	541.9	675.7	567.7	614.1	605.1	665.7	695.8	735.7	728.6	851.2	871.6	979.2
Construction	4865.8	4850.1	4735.6	4681.3	4590.7	4897.1	5155.4	5312.0	5384.6	5678.7	5758.4	5709.5
Other	334.2	337.8	339.8	342.3	344.5	344.5	348.2	353.5	363.2	373.9	385.6	398.0
Deflator (2006=1)												
Gross fixed capital formation	0.7346	0.7426	0.7410	0.7576	0.7653	0.7663	0.7661	0.7700	0.7864	0.7913	0.8011	0.8027
Machinery and equipment	1.0187	1.0207	0.9862	1.0210	1.0650	1.0554	1.0513	1.0550	1.0892	1.0838	1.1032	1.0678
Transport material	0.7926	0.7956	0.8157	0.8262	0.8189	0.8176	0.8150	0.8218	0.8382	0.8408	0.8418	0.8450
Construction	0.6684	0.6758	0.6781	0.6909	0.6909	0.6975	0.6979	0.6993	0.7141	0.7212	0.7289	0.7338
Other	0.6993	0.7001	0.7010	0.6997	0.6999	0.7080	0.7137	0.7216	0.7263	0.7328	0.7401	0.7482

PRIVATE CONSUMPTION (RESIDENTS)

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	16891.0	17305.4	17588.0	18059.6	18377.6	18614.3	19043.3	19323.2	19873.0	20000.7	20439.1	20663.2
Durables	2185.2	2312.0	2387.5	2600.3	2672.1	2696.0	2753.0	2729.6	3006.4	2762.4	2836.0	2887.4
Non-durables	14705.8	14993.4	15200.5	15459.3	15705.5	15918.3	16290.3	16593.6	16866.6	17238.3	17603.1	17775.8
Chain-linked volume (reference year 2006)												
Private consumption	21459.5	21859.7	22082.3	22511.2	22863.6	23010.5	23351.2	23529.0	24034.7	23871.0	24135.3	24248.3
Durables	2610.7	2739.8	2820.5	3053.5	3143.0	3158.9	3217.5	3173.0	3456.2	3166.6	3227.7	3282.1
Non-durables	18848.8	19119.9	19261.8	19457.7	19720.6	19851.6	20133.7	20356.0	20578.5	20704.4	20907.6	20966.2
Deflator (2006=1)												
Private consumption	0.7871	0.7917	0.7965	0.8022	0.8038	0.8089	0.8155	0.8213	0.8268	0.8379	0.8469	0.8522
Durables	0.8370	0.8439	0.8465	0.8516	0.8502	0.8535	0.8556	0.8603	0.8699	0.8724	0.8786	0.8797
Non-durables	0.7802	0.7842	0.7892	0.7945	0.7964	0.8019	0.8091	0.8152	0.8196	0.8326	0.8419	0.8478

GROSS FIXED CAPITAL FORMATION

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	7180.4	7407.7	7452.6	7815.7	7762.7	7938.8	8226.7	8412.6	8975.6	8573.7	8873.6	8815.5
Machinery and equipment	1562.9	1752.6	1725.5	1744.8	1716.3	1775.9	1892.6	1924.0	2014.6	2033.2	2094.9	2024.0
Transport material	816.1	844.3	851.1	999.7	930.7	954.3	969.0	960.5	1070.4	985.8	965.3	1069.9
Construction	4490.5	4486.4	4538.0	4719.5	4750.7	4830.9	4975.7	5128.8	5483.9	5144.1	5402.0	5310.6
Other	310.9	324.4	338.0	351.7	365.0	377.7	389.4	399.3	406.7	410.6	411.4	411.0
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	8948.2	9027.1	9101.8	9553.3	9544.4	9566.9	9792.6	9930.2	10416.8	9856.9	10107.5	9977.8
Machinery and equipment	1474.9	1575.6	1560.7	1622.6	1659.5	1666.8	1754.1	1766.9	1830.4	1812.4	1855.7	1742.5
Transport material	979.2	1012.2	1022.7	1163.7	1089.5	1103.3	1108.3	1087.5	1196.1	1101.9	1072.6	1187.9
Construction	6086.7	6019.2	6085.6	6320.1	6332.3	6321.4	6444.6	6584.5	6898.2	6451.8	6692.3	6563.8
Other	407.4	420.1	432.8	446.9	463.1	475.4	485.6	491.3	492.1	490.8	486.9	483.6
Deflator (2006=1)												
Gross fixed capital formation	0.8024	0.8206	0.8188	0.8181	0.8133	0.8298	0.8401	0.8472	0.8616	0.8698	0.8779	0.8835
Machinery and equipment	1.0597	1.1123	1.1056	1.0753	1.0342	1.0655	1.0790	1.0889	1.1006	1.1218	1.1289	1.1615
Transport material	0.8334	0.8341	0.8322	0.8591	0.8542	0.8650	0.8743	0.8832	0.8949	0.8946	0.9000	0.9007
Construction	0.7378	0.7453	0.7457	0.7467	0.7502	0.7642	0.7721	0.7789	0.7950	0.7973	0.8072	0.8091
Other	0.7631	0.7722	0.7810	0.7870	0.7882	0.7945	0.8019	0.8127	0.8265	0.8366	0.8449	0.8499

PRIVATE CONSUMPTION (RESIDENTS)

	2001				2002				2003			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	20971.1	21158.2	21256.1	21489.8	21810.0	22005.9	22303.2	22273.9	22365.6	22470.8	22830.5	23132.1
Durables	2770.4	2717.7	2651.1	2675.4	2719.7	2727.2	2615.6	2451.9	2393.3	2343.3	2466.1	2489.3
Non-durables	18200.7	18440.5	18605.0	18814.4	19090.3	19278.7	19687.6	19822.0	19972.3	20127.5	20364.4	20642.8
Chain-linked volume (reference year 2006)												
Private consumption	24280.2	24356.2	24320.0	24545.3	24710.5	24747.2	24756.3	24579.4	24495.3	24481.0	24713.0	24877.1
Durables	3114.9	3035.2	2936.3	2937.0	2960.6	2943.5	2792.7	2602.2	2536.5	2480.7	2608.9	2626.1
Non-durables	21165.3	21321.0	21383.7	21608.3	21749.9	21803.7	21963.6	21977.2	21958.8	22000.3	22104.1	22251.0
Deflator (2006=1)												
Private consumption	0.8637	0.8687	0.8740	0.8755	0.8826	0.8892	0.9009	0.9062	0.9131	0.9179	0.9238	0.9299
Durables	0.8894	0.8954	0.9029	0.9109	0.9186	0.9265	0.9366	0.9422	0.9435	0.9446	0.9453	0.9479
Non-durables	0.8599	0.8649	0.8701	0.8707	0.8777	0.8842	0.8964	0.9019	0.9095	0.9149	0.9213	0.9277

GROSS FIXED CAPITAL FORMATION

	2001				2002				2003			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	8676.0	9095.5	9161.2	9335.4	9187.5	9146.8	8847.1	8796.7	8567.4	8350.1	8452.6	8476.5
Machinery and equipment	2130.9	2128.3	2049.0	2013.3	1967.5	1955.4	1898.4	1907.1	1805.6	1751.7	1839.2	1862.2
Transport material	882.4	945.5	894.0	928.6	864.1	868.6	802.7	780.0	730.5	768.5	748.4	750.0
Construction	5250.2	5601.3	5781.9	5934.6	5872.1	5818.9	5630.8	5592.3	5517.9	5319.4	5353.1	5345.4
Other	412.5	420.4	436.3	458.9	483.8	503.9	515.2	517.3	513.4	510.5	511.9	518.9
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	9740.9	10180.2	10234.6	10455.8	10205.3	9991.8	9616.9	9513.5	9205.7	9068.9	9184.5	9081.9
Machinery and equipment	1867.7	1886.9	1855.3	1897.3	1804.2	1782.6	1734.6	1743.5	1686.4	1679.4	1779.7	1778.1
Transport material	949.2	1015.6	965.5	989.3	934.8	904.7	825.8	815.7	759.1	799.2	779.7	787.1
Construction	6444.3	6794.3	6917.0	7051.1	6926.3	6747.0	6491.4	6389.7	6203.6	6039.5	6075.5	5963.7
Other	479.7	483.4	496.8	518.1	540.0	557.5	565.1	564.6	556.6	550.8	549.6	553.0
Deflator (2006=1)												
Gross fixed capital formation	0.8907	0.8935	0.8951	0.8928	0.9003	0.9154	0.9200	0.9247	0.9307	0.9207	0.9203	0.9333
Machinery and equipment	1.1409	1.1279	1.1044	1.0611	1.0905	1.0969	1.0944	1.0938	1.0707	1.0431	1.0334	1.0473
Transport material	0.9296	0.9310	0.9259	0.9386	0.9244	0.9601	0.9720	0.9562	0.9623	0.9616	0.9599	0.9529
Construction	0.8147	0.8244	0.8359	0.8417	0.8478	0.8624	0.8674	0.8752	0.8895	0.8808	0.8811	0.8963
Other	0.8599	0.8697	0.8782	0.8857	0.8959	0.9039	0.9117	0.9162	0.9224	0.9268	0.9314	0.9383

PRIVATE CONSUMPTION (RESIDENTS)

	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	23436.2	23761.1	24030.8	24368.1	24568.4	24990.0	24897.6	25389.8	25771.6	26052.5	26333.9	26588.6
Durables	2487.1	2540.1	2611.2	2657.3	2699.7	2887.1	2573.8	2739.9	2821.5	2825.1	2764.2	2791.8
Non-durables	20949.1	21221.0	21419.6	21710.8	21868.7	22102.9	22323.8	22649.9	22950.1	23227.4	23569.7	23796.8
Chain-linked volume (reference year 2006)												
Private consumption	25074.3	25245.3	25389.7	25485.8	25579.0	25906.2	25558.7	25838.6	26014.9	26122.4	26255.8	26353.5
Durables	2604.2	2644.7	2708.4	2738.2	2771.4	2959.6	2618.7	2765.8	2833.2	2825.9	2759.0	2784.5
Non-durables	22470.1	22600.6	22681.3	22747.6	22807.6	22946.6	22940.0	23072.8	23181.7	23296.5	23496.8	23569.0
Deflator (2006=1)												
Private consumption	0.9347	0.9412	0.9465	0.9561	0.9605	0.9646	0.9741	0.9826	0.9906	0.9973	1.0030	1.0089
Durables	0.9550	0.9604	0.9641	0.9705	0.9741	0.9755	0.9829	0.9906	0.9959	0.9997	1.0019	1.0026
Non-durables	0.9323	0.9390	0.9444	0.9544	0.9588	0.9632	0.9731	0.9817	0.9900	0.9970	1.0031	1.0097

GROSS FIXED CAPITAL FORMATION

	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)	8559.9	8689.5	8700.3	8750.2	8713.0	8911.7	8842.4	8945.7	9096.4	9080.1	8881.8	8831.8
Gross fixed capital formation	1906.5	1897.2	1912.5	1974.4	1929.8	1971.4	1970.2	1951.5	2020.2	2006.4	1963.4	2071.9
Machinery and equipment	741.3	743.3	694.2	775.6	738.7	759.3	769.0	817.0	792.0	903.2	817.0	776.2
Transport material	5382.9	5510.7	5550.1	5456.5	5504.0	5643.4	5566.3	5637.6	5738.2	5615.5	5535.6	5405.8
Construction	529.2	538.3	543.5	543.7	540.5	537.6	536.9	539.6	546.0	555.0	565.8	577.9
Other												
Chain-linked volume (reference year 2006)	9188.3	9124.6	9126.1	9096.7	9085.2	9212.8	9018.2	9053.1	9116.2	9043.4	8890.6	8839.9
Gross fixed capital formation	1852.1	1810.8	1852.9	1892.3	1889.4	1938.3	1915.6	1905.7	1944.2	1987.6	2058.8	2071.4
Machinery and equipment	769.7	770.9	720.7	806.1	763.0	786.3	771.2	822.0	806.0	895.0	810.5	777.1
Transport material	6002.8	5972.4	5980.5	5830.3	5873.3	5935.3	5783.1	5777.0	5814.2	5603.9	5457.6	5418.8
Construction	563.7	570.5	572.0	568.0	559.5	552.9	548.3	548.4	551.8	556.9	563.7	572.6
Other												
Deflator (2006=1)	0.9316	0.9523	0.9533	0.9619	0.9590	0.9673	0.9805	0.9881	0.9978	1.0041	0.9990	0.9991
Gross fixed capital formation	1.0294	1.0477	1.0322	1.0434	1.0214	1.0171	1.0285	1.0240	1.0391	1.0095	0.9537	1.0002
Machinery and equipment	0.9631	0.9642	0.9632	0.9622	0.9682	0.9657	0.9971	0.9939	0.9826	1.0092	1.0080	0.9988
Transport material	0.8967	0.9227	0.9280	0.9359	0.9371	0.9508	0.9625	0.9759	0.9869	1.0021	1.0143	0.9976
Construction	0.9388	0.9436	0.9502	0.9572	0.9660	0.9723	0.9792	0.9840	0.9895	0.9966	1.0037	1.0093
Other	0.9546	0.9228	0.9661	0.9366	0.9823	0.9528	0.9957	0.9660	1.0062	0.9803	1.0195	0.9940

PRIVATE CONSUMPTION (RESIDENTS)

	2007				2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Private consumption	27018.6	27506.3	27783.1	28327.0	28506.9	28755.2	29134.1	28560.1	27510.2	27453.8	27772.6	28149.1
Durables	2861.8	3059.9	2880.4	2908.2	2964.1	2880.2	2933.8	2832.4	2366.9	2384.2	2534.6	2578.2
Non-durables	24156.8	24446.4	24902.7	25418.8	25542.8	25875.0	26200.3	25727.7	25143.3	25069.6	25238.0	25570.9
Chain-linked volume (reference year 2006)												
Private consumption	26583.5	26763.6	26913.3	27134.8	27147.2	27102.3	27396.7	27163.0	26599.1	26675.7	27058.9	27259.0
Durables	2847.5	3043.4	2879.7	2925.5	2998.3	2920.6	2981.6	2880.1	2402.0	2442.8	2616.3	2688.1
Non-durables	23736.0	23720.2	24033.6	24209.3	24148.9	24181.7	24415.1	24282.9	24197.1	24232.9	24442.6	24570.9
Deflator (2006=1)												
Private consumption	1.0164	1.0278	1.0323	1.0439	1.0501	1.0610	1.0634	1.0514	1.0343	1.0292	1.0264	1.0327
Durables	1.0050	1.0054	1.0002	0.9941	0.9886	0.9862	0.9840	0.9834	0.9854	0.9760	0.9688	0.9591
Non-durables	1.0177	1.0306	1.0362	1.0500	1.0577	1.0700	1.0731	1.0595	1.0391	1.0345	1.0325	1.0407

GROSS FIXED CAPITAL FORMATION

	2007				2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Gross fixed capital formation	9306.9	9240.8	9352.1	9729.3	9816.2	9907.0	9734.3	9176.9	8414.2	8431.8	8685.0	8017.0
Machinery and equipment	2108.1	2124.0	2174.8	2272.2	2393.0	2437.1	2434.1	2270.5	2029.5	2121.3	2229.3	1838.7
Transport material	827.0	921.2	915.2	939.0	950.5	922.0	794.9	826.6	585.5	598.3	698.5	750.4
Construction	5780.9	5591.0	5643.5	5886.1	5828.9	5895.9	5849.3	5423.6	5145.6	5061.8	5109.1	4780.8
Other	590.9	604.6	618.6	632.0	643.8	652.0	656.0	656.2	653.6	650.4	648.1	647.1
Chain-linked volume (reference year 2006)												
Gross fixed capital formation	9149.1	9065.7	9123.1	9492.8	9385.0	9319.8	9140.0	8871.7	8175.5	8213.4	8374.6	7815.1
Machinery and equipment	2071.1	2176.6	2184.2	2264.0	2409.0	2439.9	2478.6	2346.6	2166.8	2275.9	2336.9	1967.3
Transport material	819.6	902.2	902.9	926.1	922.4	907.6	779.3	805.9	574.8	594.2	702.2	748.6
Construction	5676.8	5397.7	5436.4	5694.7	5443.6	5358.8	5267.9	5108.8	4825.8	4740.1	4736.0	4501.5
Other	581.6	589.2	599.6	608.0	610.0	613.5	614.2	610.4	608.1	603.2	599.5	597.7
Deflator (2006=1)												
Gross fixed capital formation	1.0172	1.0193	1.0251	1.0249	1.0459	1.0630	1.0650	1.0344	1.0292	1.0266	1.0371	1.0258
Machinery and equipment	1.0179	0.9758	0.9957	1.0036	0.9934	0.9989	0.9820	0.9676	0.9366	0.9321	0.9540	0.9346
Transport material	1.0090	1.0211	1.0136	1.0139	1.0305	1.0159	1.0200	1.0257	1.0186	1.0069	0.9947	1.0024
Construction	1.0183	1.0358	1.0381	1.0336	1.0708	1.1002	1.1104	1.0616	1.0663	1.0679	1.0788	1.0620
Other	1.0160	1.0261	1.0317	1.0395	1.0554	1.0628	1.0681	1.0750	1.0748	1.0782	1.0811	1.0827

PRIVATE CONSUMPTION (RESIDENTS)

	2010			
	Q1	Q2	Q3	Q4
Current prices (EUR millions)				
Private consumption	28419.7	28710.8	29002.4	29158.3
Durables	2649.6	2700.2	2622.4	2833.5
Non-durables	25770.1	26010.6	26380.0	26324.8
Chain-linked volume (reference year 2006)				
Private consumption	27375.0	27509.6	27611.3	27565.4
Durables	2766.3	2819.2	2716.3	2923.9
Non-durables	24608.7	24690.4	24895.0	24641.5
Deflator (2006=1)				
Private consumption	1.0382	1.0437	1.0504	1.0578
Durables	0.9578	0.9578	0.9654	0.9691
Non-durables	1.0472	1.0535	1.0597	1.0683

GROSS FIXED CAPITAL FORMATION

	2010			
	Q1	Q2	Q3	Q4
Current prices (EUR millions)				
Gross fixed capital formation	8371.5	8246.2	8222.3	7938.5
Machinery and equipment	2042.4	1860.2	1847.2	1878.3
Transport material	697.5	696.0	625.7	687.4
Construction	4984.0	5041.4	5099.8	4722.5
Other	647.6	648.6	649.6	650.3
Chain-linked volume (reference year 2006)				
Gross fixed capital formation	7974.0	7768.9	7747.7	7504.5
Machinery and equipment	2181.7	2007.1	2019.4	1988.6
Transport material	689.0	688.6	626.8	674.7
Construction	4504.8	4475.7	4507.0	4247.7
Other	598.5	597.5	594.5	593.5
Deflator (2006=1)				
Gross fixed capital formation	1.0498	1.0614	1.0613	1.0578
Machinery and equipment	0.9362	0.9268	0.9147	0.9445
Transport material	1.0123	1.0107	0.9982	1.0188
Construction	1.1064	1.1264	1.1315	1.1118
Other	1.0820	1.0855	1.0927	1.0957

HOUSEHOLDS' DISPOSABLE INCOME

	1977				1978				1979			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	606.5	615.0	632.4	657.2	688.9	720.2	749.1	776.1	801.9	839.0	883.4	939.1
Domestic transfers	98.5	100.0	102.9	107.3	113.2	118.5	123.3	127.5	131.2	138.5	149.5	164.1
External transfers	51.8	56.6	55.3	55.4	63.7	84.0	92.5	117.2	136.9	141.1	163.9	156.8
Corporate and property income	155.6	164.4	180.1	207.2	218.3	244.7	266.7	284.7	301.1	319.7	341.5	367.3
Direct taxes	30.5	31.1	32.2	34.0	36.4	39.2	42.5	46.3	50.5	54.1	57.3	59.9
Social Security contributions	96.2	97.9	101.3	106.4	113.3	119.4	124.8	129.4	133.2	140.2	150.3	163.6
Disposable income	785.8	807.0	837.1	886.7	934.4	1008.8	1064.3	1129.9	1187.5	1244.0	1330.7	1403.7

LABOUR MARKET

	1977				1978				1979			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4032.1	4028.9	4059.7	4063.4	4133.5	4143.1	4198.0	4213.6	4239.9	4259.6	4292.5	4314.8
Employment	3963.4	3954.6	3940.5	3926.9	3921.6	3917.2	3929.7	3943.4	3965.7	3988.6	4015.0	4041.8
Unemployment	195.1	199.1	203.1	217.9	215.3	228.4	230.5	234.6	234.7	235.3	235.3	235.2
Full-time equivalent employment	3752.0	3760.2	3778.4	3804.4	3834.5	3863.8	3890.5	3908.3	3930.8	3955.4	3978.3	4010.4
Employees	3183.8	3197.7	3227.4	3262.7	3300.1	3334.4	3356.6	3370.5	3380.3	3404.9	3426.8	3460.4
Other forms of employment	568.3	562.5	550.9	541.7	534.4	529.5	533.9	537.8	550.5	550.4	551.6	550.0
EUR thousands												
Compensation per employee	0.190	0.192	0.196	0.201	0.209	0.216	0.223	0.230	0.237	0.246	0.258	0.271
Per cent												
Unemployment rate	4.8	4.9	5.0	5.4	5.2	5.5	5.5	5.6	5.5	5.5	5.5	5.5

HOUSEHOLDS' DISPOSABLE INCOME

	1980				1981				1982			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	1004.5	1068.7	1133.1	1194.5	1252.8	1316.0	1385.4	1461.8	1545.2	1631.9	1723.1	1819.1
Domestic transfers	182.3	200.0	217.1	233.7	249.8	266.2	283.0	300.1	317.5	337.2	358.9	382.8
External transfers	178.8	179.2	190.9	191.3	202.8	229.7	219.9	225.2	232.4	257.0	270.2	289.2
Corporate and property income	389.6	421.9	457.7	494.2	540.9	581.2	628.4	678.6	725.4	778.7	832.5	887.6
Direct taxes	62.0	65.7	71.1	78.0	86.6	94.9	102.8	110.4	117.6	125.5	133.9	142.9
Social Security contributions	180.1	194.9	208.0	219.4	229.2	242.5	259.2	279.5	303.2	327.1	351.2	375.4
Disposable income	1513.1	1609.2	1719.8	1816.3	1930.6	2055.8	2154.6	2275.7	2399.7	2552.1	2699.6	2860.2

LABOUR MARKET

	1980				1981				1982			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4339.7	4342.5	4357.8	4370.4	4359.4	4368.6	4365.3	4355.0	4391.6	4393.2	4373.9	4372.5
Employment	4058.2	4074.6	4099.2	4123.2	4136.8	4150.4	4139.6	4127.6	4127.2	4124.8	4122.4	4119.3
Unemployment	232.1	221.2	229.1	221.6	239.7	237.5	241.4	240.9	234.1	237.5	231.0	231.9
Full-time equivalent employment	4030.7	4051.3	4060.9	4065.6	4050.7	4046.0	4046.3	4045.8	4078.0	4079.1	4073.5	4064.2
Employees	3497.5	3523.0	3542.9	3548.0	3540.9	3533.5	3529.1	3529.8	3534.6	3532.8	3528.4	3522.1
Other forms of employment	533.1	528.3	518.0	517.5	509.8	512.6	517.1	516.0	543.4	546.3	545.1	542.2
EUR thousands												
Compensation per employee	0.287	0.303	0.320	0.337	0.354	0.372	0.393	0.414	0.437	0.462	0.488	0.516
Per cent												
Unemployment rate	5.3	5.1	5.3	5.1	5.5	5.4	5.5	5.5	5.3	5.4	5.3	5.3

HOUSEHOLDS' DISPOSABLE INCOME

	1983				1984				1985			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	1908.6	1980.5	2031.9	2066.7	2142.5	2184.9	2255.4	2357.1	2490.1	2621.4	2752.1	2884.9
Domestic transfers	408.8	432.4	453.5	472.3	488.8	512.5	543.7	582.3	628.3	665.2	693.0	711.6
External transfers	283.2	280.6	304.2	310.8	371.8	365.7	397.2	415.6	391.2	413.0	449.0	509.8
Corporate and property income	920.2	1014.9	1134.2	1224.4	1334.6	1420.7	1493.8	1597.7	1624.9	1713.6	1812.4	1842.3
Direct taxes	152.5	162.5	172.7	183.3	194.2	208.3	225.8	246.5	270.6	284.7	288.9	283.3
Social Security contributions	399.8	421.7	441.1	458.0	472.4	490.3	511.9	537.1	565.8	595.9	627.4	660.2
Disposable income	2968.4	3124.1	3310.0	3433.0	3671.2	3785.1	3952.4	4169.2	4298.2	4532.7	4790.3	5005.2

LABOUR MARKET

	1983				1984				1985			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4320.2	4325.4	4333.9	4339.4	4396.9	4407.9	4436.3	4447.7	4442.2	4441.4	4428.5	4426.8
Employment	4108.1	4105.8	4103.4	4100.4	4104.8	4114.3	4115.6	4124.6	4127.0	4128.9	4133.7	4127.5
Unemployment	254.3	261.2	280.4	288.2	293.8	296.6	307.4	311.2	318.8	316.2	321.2	324.3
Full-time equivalent employment	4009.3	3990.6	3973.3	3964.1	4042.5	4040.9	4044.2	4049.5	4048.0	4047.5	4035.9	4022.6
Employees	3493.2	3471.7	3450.9	3435.8	3524.1	3508.8	3496.7	3492.6	3496.2	3493.3	3486.1	3478.8
Other forms of employment	516.1	518.9	522.4	528.3	518.4	532.1	547.5	556.9	551.8	554.3	549.8	543.8
EUR thousands												
Compensation per employee	0.546	0.570	0.589	0.602	0.608	0.623	0.645	0.675	0.712	0.750	0.789	0.829
Per cent												
Unemployment rate	5.9	6.0	6.5	6.6	6.7	6.7	6.9	7.0	7.2	7.1	7.3	7.3

HOUSEHOLDS' DISPOSABLE INCOME

	1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	3017.1	3151.7	3286.9	3423.6	3568.2	3715.5	3861.4	4001.6	4129.4	4284.5	4476.9	4704.1
Domestic transfers	721.2	743.2	777.8	824.9	884.5	934.0	973.2	1002.3	1021.3	1050.1	1088.8	1137.4
External transfers	484.5	485.3	482.0	494.7	564.1	580.7	601.2	615.4	625.6	636.1	644.8	655.0
Corporate and property income	1974.3	2037.1	2090.6	2171.0	2253.2	2333.4	2400.1	2475.9	2510.1	2601.1	2710.2	2880.2
Direct taxes	267.8	254.8	244.4	236.5	231.2	236.6	252.7	279.4	316.9	359.7	407.6	460.9
Social Security contributions	694.4	731.9	772.9	817.3	865.0	906.9	943.1	973.4	997.8	1031.4	1074.2	1126.1
Disposable income	5235.0	5430.6	5620.0	5860.4	6173.9	6420.1	6640.1	6842.5	6971.6	7180.7	7438.9	7789.7

LABOUR MARKET

	1986				1987				1988			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4394.3	4401.7	4416.0	4425.7	4455.2	4479.6	4501.3	4511.7	4522.6	4531.6	4558.9	4577.2
Employment	4112.6	4120.1	4149.2	4172.3	4198.8	4236.9	4266.1	4290.8	4320.1	4337.1	4353.5	4383.9
Unemployment	332.8	333.7	328.7	318.9	307.3	299.8	290.0	279.6	270.7	265.3	258.5	251.2
Full-time equivalent employment	3996.3	3992.3	4006.5	4024.3	4066.5	4101.8	4133.0	4158.0	4166.6	4186.8	4214.3	4256.8
Employees	3468.1	3466.1	3469.9	3479.7	3501.7	3529.2	3558.2	3584.5	3602.2	3624.2	3658.4	3700.8
Other forms of employment	528.2	526.2	536.6	544.6	564.8	572.6	574.7	573.5	564.4	562.7	556.0	556.0
EUR thousands												
Compensation per employee	0.870	0.909	0.947	0.984	1.019	1.053	1.085	1.116	1.146	1.182	1.224	1.271
Per cent												
Unemployment rate	7.6	7.6	7.4	7.2	6.9	6.7	6.4	6.2	6.0	5.9	5.7	5.5

HOUSEHOLDS' DISPOSABLE INCOME

	1989				1990				1991			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	4958.1	5208.6	5465.4	5714.2	5952.1	6207.0	6476.9	6765.2	7082.5	7407.6	7725.0	8055.5
Domestic transfers	1195.9	1256.7	1319.7	1385.0	1452.7	1530.4	1618.2	1716.1	1824.2	1938.8	2060.0	2187.9
External transfers	725.1	719.2	728.8	719.7	713.5	798.2	827.4	801.6	755.6	904.9	796.4	821.0
Corporate and property income	3076.6	3255.1	3415.6	3534.6	3672.6	3779.8	3933.0	4084.3	4286.8	4455.5	4607.4	4768.3
Direct taxes	519.4	565.3	598.8	619.8	628.2	645.5	671.4	706.2	749.7	806.3	876.0	958.7
Social Security contributions	1187.0	1247.6	1307.6	1367.1	1426.2	1489.9	1558.3	1631.4	1709.1	1798.8	1900.4	2013.9
Disposable income	8249.3	8626.6	9023.1	9366.7	9736.4	10180.0	10625.7	11029.7	11490.1	12101.6	12412.5	12860.1

LABOUR MARKET

	1989				1990				1991			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4646.8	4667.3	4698.2	4706.3	4694.6	4711.1	4711.3	4761.0	4762.9	4783.8	4750.9	4752.4
Employment	4415.5	4440.5	4465.1	4479.3	4491.0	4512.3	4553.0	4614.3	4673.6	4704.1	4706.6	4707.1
Unemployment	249.2	248.6	247.1	243.2	243.4	241.9	241.6	240.1	237.8	232.9	216.7	217.5
Full-time equivalent employment	4307.2	4340.5	4369.2	4381.8	4379.9	4384.2	4395.4	4415.2	4441.5	4455.4	4452.9	4453.2
Employees	3743.4	3774.9	3803.8	3819.9	3822.8	3825.8	3827.4	3829.8	3838.8	3844.3	3838.2	3832.9
Other forms of employment	563.8	565.7	565.5	561.9	557.0	558.4	568.0	585.4	602.6	611.0	614.7	620.4
EUR thousands												
Compensation per employee	1.324	1.380	1.437	1.496	1.557	1.622	1.692	1.766	1.845	1.927	2.013	2.102
Per cent												
Unemployment rate	5.4	5.3	5.3	5.2	5.2	5.1	5.1	5.0	5.0	4.9	4.6	4.6

HOUSEHOLDS' DISPOSABLE INCOME

	1992				1993				1994			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	8453.7	8747.7	9074.5	9203.2	9306.1	9403.4	9430.0	9469.4	9480.4	9565.9	9732.5	10005.8
Domestic transfers	2322.3	2434.5	2524.5	2592.3	2637.9	2684.8	2733.0	2782.4	2833.1	2895.2	2968.8	3053.9
External transfers	814.1	781.1	786.5	774.7	841.3	686.0	734.9	764.2	725.4	720.4	626.7	753.8
Corporate and property income	4847.4	4974.2	5050.5	5065.2	5142.2	5184.7	5215.6	5226.2	5283.0	5397.1	5542.3	5693.8
Direct taxes	1054.4	1121.3	1159.2	1168.2	1148.3	1138.2	1138.0	1147.6	1167.1	1185.0	1201.4	1216.3
Social Security contributions	2139.3	2250.4	2347.1	2429.5	2497.7	2540.6	2558.3	2550.8	2518.1	2534.8	2601.0	2716.4
Disposable income	13243.8	13566.0	13929.6	14037.8	14281.6	14280.2	14417.2	14543.8	14636.8	14858.8	15068.0	15574.7

LABOUR MARKET

	1992				1993				1994			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4749.3	4742.3	4755.8	4742.2	4736.1	4730.7	4718.2	4730.8	4743.7	4764.7	4804.3	4801.5
Employment	4736.8	4555.5	4571.3	4553.4	4525.9	4504.9	4472.5	4474.2	4470.2	4482.8	4510.8	4504.9
Unemployment	182.3	186.9	184.5	188.8	210.2	225.8	245.7	256.6	273.5	281.9	293.5	296.6
Full-time equivalent employment	4475.3	4470.4	4492.8	4464.4	4436.1	4419.7	4393.7	4387.7	4393.1	4396.3	4413.1	4427.5
Employees	3855.8	3847.5	3875.6	3831.2	3796.4	3773.2	3732.1	3709.6	3687.3	3670.3	3661.9	3672.4
Other forms of employment	619.4	622.8	617.2	633.2	639.8	646.6	661.6	678.0	705.8	726.0	751.2	755.2
EUR thousands												
Compensation per employee	2.192	2.274	2.341	2.402	2.451	2.492	2.527	2.553	2.571	2.606	2.658	2.725
Per cent												
Unemployment rate	3.8	3.9	3.9	4.0	4.4	4.8	5.2	5.4	5.8	5.9	6.1	6.2

HOUSEHOLDS' DISPOSABLE INCOME

	1995				1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	10450.0	10512.0	10593.4	10742.9	10963.1	11214.8	11513.6	11676.9	11916.1	12149.6	12473.2	12751.4
Domestic transfers	3150.5	3233.7	3303.6	3360.3	3403.6	3451.5	3504.1	3561.2	3622.9	3697.4	3784.6	3884.6
External transfers	583.9	610.6	635.5	678.9	686.0	662.2	655.6	648.2	720.7	731.1	736.7	723.2
Corporate and property income	5867.6	5973.3	6046.2	6116.1	6116.8	6068.9	6083.8	6100.2	6129.2	6125.1	6102.8	6171.5
Direct taxes	1229.6	1250.9	1280.1	1317.2	1362.2	1395.4	1416.8	1426.3	1423.9	1426.1	1432.9	1444.3
Social Security contributions	2996.7	3008.3	3031.4	3066.1	3112.3	3169.5	3237.8	3317.0	3407.3	3498.0	3589.2	3680.9
Disposable income	15825.6	16070.4	16267.3	16515.0	16695.0	16832.5	17102.6	17243.1	17557.8	17779.0	18075.1	18405.4

LABOUR MARKET

	1995				1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	4808.6	4805.5	4814.7	4844.0	4890.9	4878.3	4917.2	4914.7	4955.1	4988.4	5027.7	5039.7
Employment	4507.2	4504.2	4514.5	4536.4	4582.9	4564.2	4608.6	4609.4	4655.5	4695.8	4736.9	4757.9
Unemployment	301.4	301.3	300.3	307.6	308.1	314.2	308.6	305.3	299.6	292.6	290.8	281.7
Full-time equivalent employment	4431.1	4430.4	4418.1	4446.2	4467.7	4489.8	4523.0	4532.5	4559.6	4587.4	4645.5	4679.9
Employees	3677.3	3667.7	3653.4	3652.9	3666.5	3693.1	3737.8	3734.5	3759.9	3781.8	3833.1	3866.8
Other forms of employment	753.8	762.7	764.6	793.2	801.2	796.7	785.2	798.0	799.6	805.6	812.4	813.1
EUR thousands												
Compensation per employee	2.842	2.866	2.900	2.941	2.990	3.037	3.080	3.127	3.169	3.213	3.254	3.298
Per cent												
Unemployment rate	6.3	6.3	6.2	6.3	6.3	6.4	6.3	6.2	6.0	5.9	5.8	5.6

HOUSEHOLDS' DISPOSABLE INCOME

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	13034.1	13332.0	13570.8	13895.8	14189.3	14286.0	14433.9	14795.6	15309.7	15351.8	15886.6	16117.0
Domestic transfers	3997.3	4104.4	4205.8	4301.5	4405.8	4329.0	4542.7	4603.8	4685.4	5045.4	4949.4	5149.8
External transfers	755.5	747.4	768.8	743.4	749.4	758.1	858.3	768.9	818.9	888.1	845.4	924.3
Corporate and property income	6090.0	6140.8	6286.9	6402.3	6821.2	6688.4	7098.3	6839.2	6779.4	6894.0	7526.7	7581.6
Direct taxes	1460.4	1481.4	1507.5	1538.7	1552.0	1580.4	1621.6	1672.5	1725.1	1778.4	1820.0	1856.3
Social Security contributions	3773.1	3850.8	3914.0	3962.8	3924.8	4008.7	4065.1	4110.2	4309.4	4399.0	4531.2	4612.5
Disposable income	18643.4	18992.3	19410.6	19841.5	20689.0	20472.5	21246.5	21224.9	21558.8	22002.0	22856.9	23303.9

LABOUR MARKET

	1998				1999				2000			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	5088.9	5099.1	5079.1	5116.6	5113.0	5139.6	5140.6	5153.4	5193.5	5201.8	5249.9	5260.3
Employment	4805.7	4857.4	4837.9	4874.0	4882.3	4898.4	4920.5	4940.1	4978.9	4997.3	5038.8	5068.5
Unemployment	283.2	241.8	241.1	242.6	230.8	241.1	220.1	213.2	214.6	204.6	211.2	191.8
Full-time equivalent employment	4734.7	4789.3	4770.9	4808.0	4806.2	4827.0	4842.9	4869.6	4922.7	4942.7	4975.4	4999.6
Employees	3900.4	3937.1	3952.3	3994.0	4003.0	4011.1	4020.5	4042.0	4097.6	4117.0	4131.8	4143.1
Other forms of employment	834.3	852.2	818.6	814.1	803.2	815.9	822.5	827.6	825.1	825.7	843.6	856.6
EUR thousands												
Compensation per employee	3.342	3.386	3.434	3.479	3.545	3.562	3.590	3.660	3.736	3.729	3.845	3.890
Per cent												
Unemployment rate	5.6	4.7	4.7	4.7	4.5	4.7	4.3	4.1	4.1	3.9	4.0	3.6

HOUSEHOLDS' DISPOSABLE INCOME

	2001				2002				2003			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)	16182.6	16568.3	16512.0	16813.9	17169.7	17288.2	17453.9	17403.1	17518.1	17681.0	17998.2	18006.9
Compensation of employees	5249.8	5284.1	5571.0	5741.3	5806.6	5950.1	6077.0	5990.6	6157.3	6231.2	6165.3	6418.7
Domestic transfers	889.4	955.0	889.1	889.3	759.6	657.2	695.9	648.8	664.1	574.2	580.6	589.2
External transfers	7545.2	7635.7	7020.7	7138.6	7344.2	7427.4	7695.8	7477.0	7920.9	7893.9	8101.5	7713.3
Corporate and property income	1882.8	1898.1	1919.3	1926.8	1931.9	1938.5	1948.1	1952.9	1962.3	1964.3	1975.2	1963.1
Direct taxes	4591.6	4777.7	4759.1	4761.6	4897.6	4928.3	5058.4	5054.1	5150.2	5183.6	5166.2	5459.8
Social Security contributions	23392.6	23767.4	23314.4	23894.7	24250.6	24456.1	24916.0	24512.5	25147.9	25232.6	25704.2	25305.3
Disposable income												

LABOUR MARKET

	2001				2002				2003			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	5302.2	5310.9	5329.0	5358.8	5369.1	5408.9	5433.2	5420.2	5456.7	5458.4	5460.2	5465.7
Employment	5093.0	5097.5	5113.0	5143.2	5142.3	5154.8	5154.6	5097.5	5119.4	5112.9	5120.5	5119.0
Unemployment	209.2	213.4	216.0	215.5	226.8	254.1	278.5	322.7	337.3	345.5	339.7	346.7
Full-time equivalent employment	5011.8	5014.2	5023.2	5048.8	5057.3	5068.0	5066.7	5008.8	5016.1	5003.2	5002.9	4996.6
Employees	4164.4	4142.8	4169.5	4198.0	4222.4	4227.6	4240.1	4219.2	4199.2	4180.5	4181.1	4180.1
Other forms of employment	847.5	871.4	853.7	850.7	834.9	840.3	826.6	789.7	816.9	822.7	821.8	816.5
EUR thousands												
Compensation per employee	3.886	3.999	3.960	4.005	4.066	4.089	4.116	4.125	4.172	4.229	4.305	4.308
Per cent												
Unemployment rate	3.9	4.0	4.1	4.0	4.2	4.7	5.1	6.0	6.2	6.3	6.2	6.3

HOUSEHOLDS' DISPOSABLE INCOME

	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	18089.5	18281.6	18460.5	18698.5	18918.4	18956.0	19528.5	19795.6	19568.8	19759.3	19948.6	20219.6
Domestic transfers	6416.2	6548.3	6643.3	6742.0	6788.4	6903.9	6822.3	7098.2	7297.4	7576.5	7378.7	7832.3
External transfers	580.3	622.2	621.5	608.0	550.7	591.4	499.2	506.9	657.1	604.5	603.7	646.9
Corporate and property income	8167.6	8021.3	8382.2	8148.4	8597.1	8399.9	8648.4	8471.0	7844.0	9134.9	8509.8	8566.7
Direct taxes	1962.2	1964.5	1979.0	2007.3	2034.4	2063.6	2091.1	2120.5	2152.0	2196.3	2232.0	2296.0
Social Security contributions	5161.3	5274.2	5391.0	5470.9	5565.0	5622.5	5923.8	6055.7	6108.4	6113.4	6105.3	6174.4
Disposable income	26130.0	26234.6	26737.6	26718.7	27255.2	27165.1	27483.4	27695.4	27106.9	28765.4	28103.6	28795.1

LABOUR MARKET

	2004				2005				2006			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	5464.2	5478.3	5494.9	5513.9	5518.3	5536.6	5552.5	5571.8	5567.5	5590.6	5598.3	5592.7
Employment	5123.9	5117.8	5114.7	5134.8	5112.2	5123.5	5119.8	5134.7	5144.8	5170.7	5179.5	5142.8
Unemployment	340.3	360.5	380.1	379.2	406.1	413.2	432.8	437.1	422.7	419.9	418.8	449.9
Full-time equivalent employment	4999.9	4998.0	4991.0	5006.7	4981.2	4988.3	4979.9	4992.3	4987.0	5004.8	5005.0	4964.9
Employees	4189.6	4228.2	4199.6	4232.8	4211.1	4227.4	4227.3	4246.0	4261.6	4255.8	4276.9	4264.8
Other forms of employment	810.4	769.7	791.4	774.0	770.1	761.0	752.6	746.3	725.4	749.0	728.2	700.1
EUR thousands												
Compensation per employee	4.318	4.324	4.396	4.418	4.493	4.484	4.620	4.662	4.592	4.643	4.664	4.741
Per cent												
Unemployment rate	6.2	6.6	6.9	6.9	7.4	7.5	7.8	7.8	7.6	7.5	7.5	8.0

HOUSEHOLDS' DISPOSABLE INCOME

	2007				2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Current prices (EUR millions)												
Compensation of employees	20446.1	20655.7	20747.6	21007.3	21205.3	21367.5	21471.8	21616.4	21663.7	21664.1	21649.1	21795.0
Domestic transfers	7939.3	8096.0	7897.9	7923.1	8355.6	8190.1	8810.3	8869.2	9058.2	8943.3	9475.1	9460.7
External transfers	711.9	749.6	683.7	673.2	684.5	635.8	749.4	808.1	555.9	563.4	597.4	568.2
Corporate and property income	9345.0	8556.6	9743.9	8110.5	9873.7	8679.9	10016.2	8881.0	8846.6	8420.3	8827.4	8973.1
Direct taxes	2370.7	2416.5	2450.7	2485.1	2506.3	2516.7	2525.4	2528.2	2513.2	2543.9	2521.3	2521.1
Social Security contributions	6203.6	6251.2	6311.4	6414.8	6479.8	6820.5	6551.5	6802.2	6681.2	6695.2	6703.7	6674.0
Disposable income	29868.1	29390.3	30311.0	28814.1	31132.9	29536.1	31970.8	30844.4	30930.0	30351.8	31324.0	31602.0

LABOUR MARKET

	2007				2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Thousands of heads												
Labour force	5615.0	5597.5	5640.3	5620.2	5624.2	5639.7	5627.6	5607.9	5598.0	5585.4	5565.8	5581.6
Employment	5152.1	5143.8	5195.6	5187.3	5204.5	5217.8	5194.2	5174.7	5109.3	5067.2	5019.1	5020.6
Unemployment	462.9	453.8	444.8	432.9	419.7	421.9	433.4	433.1	488.7	518.1	546.7	561.0
Full-time equivalent employment	4974.8	4962.7	5009.2	4999.4	5015.1	5026.7	5000.8	4999.5	4930.8	4889.8	4849.2	4854.9
Employees	4269.0	4261.2	4276.4	4275.7	4282.2	4297.9	4261.7	4295.6	4237.4	4207.5	4189.2	4193.9
Other forms of employment	705.8	701.5	732.8	723.7	732.9	728.8	739.2	703.9	693.4	682.4	660.0	661.0
EUR thousands												
Compensation per employee	4.789	4.847	4.852	4.913	4.952	4.972	5.038	5.032	5.113	5.149	5.168	5.197
Per cent												
Unemployment rate	8.2	8.1	7.9	7.7	7.5	7.5	7.7	7.7	8.7	9.3	9.8	10.1

HOUSEHOLDS' DISPOSABLE INCOME

	2010			
	Q1	Q2	Q3	Q4
Current prices (EUR millions)				
Compensation of employees	21911.6	22140.8	21987.1	21969.7
Domestic transfers	9172.9	9364.9	9262.5	9083.2
External transfers	557.6	626.1	631.5	642.8
Corporate and property income	8475.2	8801.3	9540.0	10068.1
Direct taxes	2522.7	2522.0	2517.6	2504.4
Social Security contributions	6650.0	6717.5	6662.2	6736.2
Disposable income	30944.5	31693.6	32241.3	32523.2

LABOUR MARKET

	2010			
	Q1	Q2	Q3	Q4
Thousands of heads				
Labour force	5602.1	5582.6	5575.3	5563.1
Employment	5017.2	4983.3	4967.3	4944.9
Unemployment	584.9	599.3	608.0	618.2
Full-time equivalent employment	4843.9	4816.6	4793.2	4769.8
Employees	4204.1	4211.3	4188.3	4190.3
Other forms of employment	639.8	605.3	604.9	579.5
EUR thousands				
Compensation per employee	5.212	5.258	5.250	5.243
Per cent				
Unemployment rate	10.4	10.7	10.9	11.1