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Assessing the Macroeconomic Impact of Structural Reforms in Greece

March 2014

Preparation of a report providing an evaluation of macroeconomic impact of Greek reforms to improve the business environment and support growth and employment.

CONTRACT NUMBER - VT/2013/084

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1. Executive summary

The present Report, using a three-region version of the IMF GIMF, General Equilibrium model, calibrated for Greece and the rest of the euro area, assesses the potential impact of the wide-ranging and multi-dimensional structural reform package, aiming to redirect the Greek economy into a sustainable trajectory. However, reforms related to the labour market, which are now under implementation in Greece and generally add synergies and growth, are not considered in this Report.

Without intending to be exhaustive in terms of coverage, the report runs the gamut of the main structural reforms that are now under implementation in Greece. The empirical analysis focuses on four broad areas of reforms, namely: reforms improving the public procurement system; reforms related to the liberalization of the markets and the enhancement of competition; reforms related to the business environment; reforms reducing entry barriers and unnecessary regulations and promoting business investment; and reforms aiming to increase productivity in the intermediate production sector.

It is now well recognised that at the source of the deep recession and the ensuing sluggish recovery of the Greek economy was not the adjustment programme itself, but the prevailing nominal rigidities which strongly characterize the Greek economy. Structural reforms are lagging behind schedule in Greece and, in addition, were implemented in a regime of limited credibility due to the reactions of vested interests which are the strong opponents of reforms conducive to market liberalization. Nominal and real rigidities and the very sluggish implementation of structural reforms in a social setting where the agents foresee that sooner or later the reform process will be reversed were the main culprits for the high cost of the Greek adjustment. The necessary strong demand-contracting policy - for the rebalancing of the twin deficits - implemented in a rigid economy created the short-run inefficiencies and the sharp recession reflected in the observed data.

However, this Report conveys good news. Our simulations strongly support the implementation of structural reforms as a valuable and effective instrument to promote the Greek adjustment process and to underpin the recovery. The potential effects of the reforms on output, employment, productivity and competitiveness are sizable. Over the last years Greece has made a leap forward in addressing its fiscal and external imbalances, and the



achievements have been unprecedented and impressive. Now that the country is heading towards a new growth model, the effective completion of the structural reforms is of pivotal importance for the restructuring of the productive potential of the economy and for the increase of internal flexibility. We are moving in the right direction, but we need to do more.

2. Introduction

The Greek economy in the first decade of the 2000s, driven by extremely positive expectations, mainly due to the Greek entry into EMU, and easy credit conditions, expanded rapidly at rates well above its medium-term potential growth rate. Domestic demand and especially private consumption and housing building activity were the main drivers of growth, while the foreign sector acted most of the time as a drag, subtracting sizable percentage points from the rate of growth of the economy. This lopsided development of the Greek economy was accompanied by growing macroeconomic imbalances and considerable losses in the external competitive position of the country. A few figures will serve to illustrate the point. The public sector general government deficit deteriorated rapidly throughout the decade, reaching over 15 per cent of GDP in 2009. At the same time, as a result of the real exchange rate appreciation and the buoyant domestic demand, the current account of the balance of payments rose steadily from around 4 per cent of GDP in 2001 and reached very high levels exceeding the 15 per cent relative to GDP in 2009. Moreover, the general government debt- to-GDP ratio rose from 103.7 per cent in 2001 to about 148 per cent in 2010, while the international investment position of the country deteriorated dramatically. Moreover, in Q3 2008 GDP growth turned negative (-0.1%) on a year-on-year basis.

It is clear that the situation was unsustainable. Some type of debt restructuring in order to bring the public debt relative to GDP on a sustainable path was among the main policy options. By the end of 2009, rumours about the sustainability of Greece's public finances had mounted. In 2010 the economy gradually lost access to capital markets and in May 2010 Greece practically defaulted on its debt and formally agreed to implement a three-year economic adjustment programme co-financed by the European Union, the International Monetary Fund and the European Central Bank (the so called 'troika' of official creditors).



The financing of the Greek economy by our creditors was agreed in exchange for severe austerity programme aiming to stabilize the economy, restore competitiveness and through structural reforms to create an environment conducive to real economic development.

The rebalancing of the twin deficits (public and external) and the gradual return of the economy to its new equilibrium necessitates a downward GDP adjustment and an expenditure switch away from tradables towards non-tradables. This was a tough choice for a country like Greece belonging in a monetary union and therefore under a pegged currency. Of course the peg rules out any type of nominal devaluation. In this case the required real depreciation can occur only through a decline in nominal prices, the so-called 'internal devaluation'. However, the efficient adjustment of the economy was hindered by the prevailing nominal rigidities which strongly characterize the Greek economy and in particular the non-tradable sector (mainly services). The lack of the necessary nominal downward flexibility caused the high unemployment and the deep recession observed. Moreover, the recessionary impact of the internal devaluation process was reinforced by the severe austerity measures taken in order to restore public finances.

How well has this policy worked and how well it is working now?

First of all, we have to admit that the main policy objectives were achieved: to a great extent cost competitiveness was restored and by the end of 2013 the current account and the public sector deficit relative to GDP had been rebalanced. Greece consumes what it produces. The elimination of the huge twin deficits, in a relatively short period of time, is unprecedented for a country like Greece with a rather poor track record in restoring macroeconomic imbalances. However, the cost of the adjustment in terms of output and employment losses was also unprecedented by Greek and international historical standards as well.

Over the six-year period 2008-2013, Greece lost about 25% of its gross value added, and unemployment increased to the socially unacceptable level of around 27%. In addition, private consumption declined by around 30%, depicting the deterioration of the standards of living of Greek citizens in recent years. Moreover, there clear signs that the production potential of the economy was also adversely affected during the adjustment, although, at the current juncture, it is difficult to quantify the degree of the damage.

The economy is now struggling to recover; according to the latest release of the national accounts statistics, GDP growth rate recorded a 3.9 % decline in 2013, while for 2014 the

consensual view is for a modest expansion. Where did the policy prescription go wrong? Why did the internal devaluation process result in this huge output contraction belying all official forecasts? Why is Greece lagging behind other peripheral countries also hit by the crisis and why the peer countries are now in a better shape than Greece? These are the tough questions challenging the policy makers.

The poor performance of the Greek economy reflects to a large extent the policies pursued throughout the adjustment period. The basic policy design fault was the prioritization of the necessary demand contraction over structural reforms aiming to increase the flexibility and to improve the functioning of the price mechanism for a better and efficient allocation of resources. In other words, reforms aiming to reduce excessive rents and to increase competition in product markets, thereby creating a pro-business environment. Moreover, a package of structural reforms aiming to alleviate the perennial weaknesses of the public sector was instrumental for a successful implementation of the Greek stabilization programme. Structural reforms are lagging behind schedule in Greece and, in addition, were implemented in a regime of limited credibility due to the reactions of vested interests which are the strong opponents of reforms conducive to market liberalization. The very sluggish implementation of structural reforms in a social setting where the agents foresee that sooner or later the reform process will be reversed were the main culprits for the high cost of the Greek adjustment. The strong demand-contracting policy, implemented in a rigid economy, created short-run inefficiencies and the sharp recession reflected in the observed data.

On the back of these considerations, it is clear that at the source of the deep recession and the ensuing sluggish Greek recovery are the prevailing structural rigidities and inefficiencies in the economy. The present report using a model-based approach tries to assess the potential impact of the wide-ranging and multi-dimensional structural reform package, aiming to redirect the economy into a sustainable trajectory. The reported empirical results are based on considerations and information drawn from a similar research project, which is conducted in parallel and in close cooperation with this one, under the leadership of Professor S. Ioannides. Results from this companion research project are summarised in another report entitled ``The Microeconomic Effects of the Business Environment Reforms``. The reports are strongly interrelated and address practically the same issues, however from a different angle and perspective. The aim of both reports is to support policy making towards a more structural policy orientation. The first report is a narrative of the necessary

micro-interventions in order to improve business conditions and competitiveness in Greece. On the other hand, the simulation results contained in this Report, illustrate how the benign effects of the structural micro-interventions described and analysed in the narrative approach are translated into macroeconomic behaviour.

More precisely, the empirical analysis contained in this Report covers four distinct reform areas.

1. Reforms related to the strengthening of the public procurement system in the context of the ongoing fiscal stabilization policy.
2. Reforms related to the liberalization of the markets and the enhancement of competition.
3. Reforms related to the business environment, reducing entry barriers and unnecessary regulations and promoting business investment.
4. Reforms aiming to increase productivity in both the tradable and non-tradable sector.

Reforms in various areas of the Greek labour market which are now under implementation and could amplify the impact of the reforms in the product market are not considered in this Report.

The rest of this report is organized as follows. Section 3 provides a very brief overview of the Global Integrated Monetary and Fiscal (GIMF) model, Kumhof et al. (2010). GIMF is the IMF model used in this report for the implementation of the simulations. We focus mainly on features of the model relevant for the modelling of the structural reforms and on the calibration of the model to the Greek data. Section 4 presents the simulation results of the main policy experiments carried out, and Section 5 concludes.



3. The IMF's GIMF model, data, calibration and methodology

3.1 The GIMF model: some basic features

The simulations carried out in this Report use an annual three-region version of the IMF GIMF model. The model is calibrated for Greece, the euro area (excluding Greece) and the rest of the world. A complete description of the theoretical structure of the model and its basic properties can be found in Kumhof et al. (2010) and Anderson et al. (2013).

GIMF (Global Integrated Monetary and Fiscal model) is a dynamic stochastic general equilibrium model developed at the IMF and in wide use for the evaluation of the macro implications of structural reform programs and fiscal consolidation interventions. The GIMF model with its sound theoretical structure and its strong policy orientation is particularly well-suited for this type of policy analysis.

The model is micro founded with optimizing behaviour by households and firms. GIMF is characterized by Keynesian features which are derived from a number of nominal and real frictions ensuring smooth and realistic short-term responses to the structural policy shocks under examination.

On the production side, the model has two types of firms: intermediate goods producers (manufacturers) and final goods producers (distributors). All firms operate in monopolistic competition in their output market, so they are able to charge a mark-up over their marginal cost. Imperfect competition is introduced in the model through imperfect substitutability between product varieties. The mark-up is inversely related to the degree of substitutability as measured by the respective elasticity of substitution. Therefore, by increasing the elasticity of substitution among differentiated products we can simulate the impact of structural reforms that raises competition in the product market. In the input market, firms operate in perfect competition and factor prices reflect marginal productivities.

Manufacturers produce two types of intermediate goods: tradables and non-tradables by combining capital and labour. Tradable intermediate goods are combined with imported tradable intermediate goods to produce final goods (consumption, both private and public, investment and exports).



There are two types of households in GIMF, those which have perfect access to financial markets and those which are liquidity constrained. Both types of households consume goods, supply labour and pay taxes. The presence of the liquidity constrained households has two important implications for the properties of the model. First, it is a source of non-Ricardian behaviour in the model and, second, it improves the transition dynamics leading to a better capture of the short-run cyclicity observed in the data. The liquidity constrained households have no access to credit and cannot save. Therefore they consume all their wage income every period, as well as any transfers they receive from the government. Their consumption decisions are immediately adjusted to the changes in their disposable income, and this is reflected in output fluctuations.

The non-liquidity constrained households follow an overlapping generation model and maximize a utility function over a finite horizon subject to their intertemporal budget constraint. The main characteristic of this type of households is that they can perform consumption smoothing, alleviating the impact of shocks to the economy on their consumption behaviour.

GIMF has a rich fiscal policy setup. Fiscal policy is conducted using a variety of fiscal instruments related to spending and taxation. There are seven separate fiscal instruments: Four instruments on the expenditure side: government spending, government investment (infrastructure spending), general lump-sum transfers and lump-sum transfers targeted to liquidity-constrained households. And three instruments on the revenue side: consumption tax, corporate income tax and labour income tax. Government consumption spending is unproductive, while government investment spending augments the stock of public capital.

There is a fiscal rule in the model related to different fiscal instruments. The operation of the rule maintains the deficit-to-GDP ratio on target.

3.2 Data, calibration and methodology

The standard calibration of GIMF as in Anderson et al. (2012) is maintained for the euro area and the rest of the world. For Greece, the calibration of the key steady state ratio of the model is based on the official national accounts statistics and broadly matches their empirical counterparts over the period 2001-2007. For example, the share of private consumption and private investment is set to 63 percent and 19 percent respectively of nominal GDP, while the export and import shares are set to 27 percent each, ensuring



balanced trade in the long run. The net foreign assets relative to GDP are set to zero. The share of capital in the intermediate sector production technology is set to 40 percent and that of labour to 60 percent slightly adjusting for the number of self-employed. The production function is of the CES type, but for manufacturers is calibrated to the Cobb-Douglas case. The values for adjustment costs on the nominal side reflect the fact that in the non-tradable sector prices adjust more sluggishly than in the tradable sector. The assumed adjustment costs hinder a faster positive impact of the reforms on economic activity. The value of the parameter reflecting the wage growth adjustment cost is higher in Greece compared to the respective value for the euro area. The elasticity of substitution between foreign and domestic consumption in the distribution sector is set to 1.5.

The annual inflation rate is set equal to 2% in the steady state, consistent with the ECB's quantitative definition of price stability. The liquidity constrained households make up 35 percent of all households, against 25 percent in the euro area. The calibration of the rest of the parameters of the Greek block, such as for example the households' parameters, is based on information from previous studies, while some standard values of the literature are used as well. The price mark-up of the non-tradable sector is set to 1.35 against 1.12 in the euro area, while for the tradables is set to 1.15 against 1.1 in the euro area. In general, various studies conducted at the OECD suggest that the services sector in Greece is substantially restricted in comparison with other member states of the organisation, Jean and Nicoletti (2002). The numerical values for the mark-ups in our simulation are taken from the IMF Working Paper Anderson et al. (2012), documenting the GIMF model, and in addition we have been guided by the OECD study by Høj et al. (2007).

Finally, the fiscal parameters (shares) are taken from the respective official national accounts statistics.

Based on these parameters values, a steady state is defined for a base year and then the control solution is created. The impact of the structural reforms on the Greek economy is evaluated by simulating: A decline in the mark-ups in both tradables and non-tradables sectors, a fiscal policy shift from public consumption to public investment, a permanent increase in productivity in the intermediate production sector and an increase in private investment from both the demand and the supply sides. The design of these simulations in the context of the GIMF model frames the four structural interventions mentioned in the previous section in a coherent quantitative framework. The role of the model in this respect



is pivotal, first as a tool for the evaluation of the effectiveness of the structural reforms and then as an efficient communication device of the results.

In the next section, the evaluation of the results is done along two dimensions. First, we focus on a long-run steady state comparison among the main macro aggregates before and after the intervention and next we examine the transition path of the economy from the initial steady state to the new steady state.

4. Assessing the macroeconomic impact of structural reforms in Greece: empirical results

The aim of this section is to quantify the potential gains in the Greek economy that arise from the implementation of a wide-ranging structural reform package. The analysis covers the four reform areas discussed in Section 2, which address the key inefficiencies of the Greek economy.

4.1 Reforms related to the strength of the public procurement system

Reducing inefficient public spending is among the first priorities of the Greek government in the context of the ongoing fiscal adjustment programme. Available international evidence suggests that the system of public procurements is an area where the adoption of best practises is an important factor to achieve efficiency gains that are reflected in significant cost savings. The Report on micro interventions, dealing among other reforms with the public procurement system in Greece reveals clearly that the system of public procurements has ample room for improvement. The research contained in the micro Report addresses a wide range of issues and makes the point that a significant strengthening of the system is required in order to bring the country closer to the frontier of best practises. Of course several options can be pursued to strengthen the system and to reduce inefficient spending. What is important, however, is that the micro structural interventions in the procurement system, while they are efficiency-improving, at the same time are creating additional fiscal space with eventually short-run contracting implications on economic activity.

Based on these considerations, we are now in a position to make the link from the micro interventions to the macro implications and assessments. We assume that the government will use the additional fiscal space created by the structural interventions not to reduce the



public sector deficit, but instead it will use it in a more growth enhancing manner, in order to alleviate the recessionary impact of the restrictive fiscal policy.

From a model-based perspective, our approach consists in a simulation experiment aiming to quantify the impact, on the main macroeconomic aggregates, of a policy shift from public consumption (considered as unproductive) towards public investment (considered as productive), in a fiscally neutral way.

We assume, first, that the national accounts counterpart of the cost containment stemming from the micro interventions in the procurement system corresponds to an equivalent reduction in public consumption. Then the reduction in public consumption is fully offset by an equal increase in public investment. So deficit neutrality is maintained.

The simulation is implemented by permanently reducing public consumption and then immediately reversing the shock by a permanent increase in public investment of an equal amount. The difference between the resulting two scenarios, expressed in percentage deviations, constitutes a measure of the medium and long-run benign effects on the Greek economy arising from the combined effect of the direct structural intervention on the procurement system and the ensuing offsetting public expenditure switch.

Before presenting the results, a number of qualifying observations are necessary for a better understanding of the results.

The magnitude of the shock is set to 0.5 percentage points of steady state GDP. We are inclined to think that this estimate is on the safe side. Our decision relies heavily on considerations from Chapter 3 of the Micro-Report. The magnitude of the shock matters and affects the size of the response. However, the shock-response relationship is approximately linear, hence any re-scaling of the results could be easily done if there are doubts about the accuracy of the estimate of the shock.

Moreover, the duration of shocks is important and affects the results. In our case, the fiscal variables are permanently shocked, as we believe that the structural reforms will not be reversed in the coming years. The phasing of the shock is another factor influencing the results. We have assumed that the impact of the structural reforms on the fiscal variables is done in a two-year period (0.2 pp of steady state GDP in the first year, plus 0.3 pp in the second year). This assumption reflects some reasonable sluggishness in the implementation of the structural micro intervention. Last but not least, the impact of the reforms depends



also on agents' expectations about the credibility of the authorities in implementing the planned structural reform programme. The simulations in this section are implemented under the assumption that the reforms are perceived as fully credible by the public. This means that short-run gains from the reforms are immediately reflected in the dynamic adjustment path of the economy towards the new steady state. Table 4.1 summarises the results of this policy experiment.

Figure 7.1 in the Appendix shows the deviations of GDP private consumption and private investment from the public consumption reduction simulation. The sequence of shocks on both public and private investment has a strong direct impact on aggregate demand and activates all the components. The short run effect of these shocks is clearly positive, as the public investment multiplier is considerably higher relative to other fiscal instruments, including public consumption. Household incomes remained strong throughout the simulation period stimulating private consumption. The reason behind the medium and long-run behaviour of private consumption is that the offsetting adjustment is made through the public investment instrument and not by instruments related to direct taxation (personal or corporate). However, even if the offsetting adjustment is made through direct taxation, there is a slight long-run positive net effect on output and employment from the expenditure switch, as some preliminary simulations suggest.

In the long run, private output, consumption and investment are above the reference public consumption simulation, implemented in isolated mode, by 2.31%, 3.17% and 2.21% respectively.

The import share in final Greek consumption and investment goods is sizable, and this is taken into account in our calibration and reflected in the behaviour of imports in the short run, see Figure 7.1. The real exchange rate is appreciating in the short run in response to the rise of the real interest rate and reduced exports. On the net, the trade balance relative to GDP deteriorates in the short run, but the exchange rate effects recede in the medium and long run and the trade balance turns positive relative to the consumption simulation (Figure 7.12 & Figure 7.5).

The effect on hours worked are positive, but rather modest. The real wage increases throughout the simulation period as a reflection of the economy's wide productivity gains, arising from investment in infrastructures. It is recognised that infrastructural investment is more productive than public consumption which has an immediate effect on output on

impact but then the effect dissipates. Productivity gains influence positively real wages but on the other hand act as a drag on employment growth (Figure 7.3 & Figure 7.4).

Figure 7.5 & Figure 7.7 depicts the fiscally neutral nature of the two shocks. The symmetry of the charts confirms the neutrality of the shocks.

Table 4.1 portrays the numerical results of the combined simulations, in terms of percent deviations, for a five year horizon, for the year 15, as well as for the very long run steady state (SS) impact.

Table 4.1: Macroeconomic effects of a debt neutral fiscal policy switch (Percentage deviations from base)

	Year2	Year3	Year4	Year5	Yer15	SS	
GDP	0.37	0.39	0.29	0.20	0.15	1.39	2.31
Private Consumption	0.91	1.12	1.13	1.05	0.96	1.69	3.17
Investment	0.29	0.36	0.31	0.22	0.17	1.72	2.21
Exports	-0.19	-0.46	-0.70	-0.81	-0.78	0.91	1.38
Imports	0.56	0.73	0.79	0.78	0.75	0.62	0.47
Employment	0.44	0.38	0.25	0.18	0.17	0.21	0.38
Real wage	0.19	0.42	0.62	0.74	0.79	1.39	2.42
CA/GDP (diff)	-0.18	-0.26	-0.31	-0.33	-0.34	-0.25	0.10

All in all, reforms in the public sector procurement system could provide sizeable macroeconomic gains for the Greek economy either as deficit reducing intervention or as an output and employment enhancement, if combined with an accommodative fiscal reform expenditure shift.

4.2 Reforms improving the investment and business environment

Chapter 4 of the micro Report on micro interventions focuses on issues related to investment behaviour and makes clear that a large amount of key structural bottlenecks exist in Greece, which hinder investment decisions and doing business. There is a large number of structural micro interventions that are needed in order to fix fundamental inefficiencies of the business economy and promote an investment-friendly environment in Greece. On the other hand, these interventions have important economy-wide implications.

There is an extensive body of literature, both theoretical and empirical, confirming the beneficial impact on the economy from the implementation of pro-business structural reforms. Against this backdrop, the Greek government has recently taken important steps towards pro-business structural interventions. The programme goes in the right direction. However, while the beneficial impact of these reforms is unquestionable, their effects differ significantly across countries. This subsection presents the macroeconomic effects of an improvement in the investment and business environment in Greece. We focus in particular on reforms aiming to simplify the administrative procedures for investment, to shorten the time needed before a start-up can operate legally and to reduce administrative costs as well as fix starting costs.

The quantification of these reforms is not an easy task. In order to make the mapping from the reform space to the parameters variables of our model, the information contained in Chapter 4 of the micro Report was evaluated and used with some additional extraneous judgement.

A two-pillar approach is opted in the empirical analysis. The first pillar has a more long-run perspective and refers to the general pro-business interventions promoting private investment. These interventions cover a broad area of reforms, of a long-run nature, aiming to restore business confidence and ultimately support sustainable and inclusive growth. The improvement of the judicial system, the increase of the public administration efficiency, including a reduction in red tape and bureaucratic obstacles that hinder the decision making process, as well as the mitigation of the banking sector fragilities are considered as first rate priorities which are relevant for setting Greece on a stable growth path. The second pillar has a more short-run orientation and examines the short and medium run gains arising from the cost reduction and greater ease of doing business in Greece. The two pillars are of course self-reinforcing and provide a stronger investment profile than those observed in standard models. However, we believe that this approach is better suited for a country like Greece implementing a drastic and wide ranging pro-business structural programme driven from the demand and the supply side. In addition, this type of simulation provides a more realistic co-movement of investment and consumption, better capturing the usual data regularities observed over the business cycle. The design of the simulations as well as the size of the shocks and their time dimension relies on considerations derived from the aforementioned Chapter 4 of the Report.



The simulation exercise considers a permanent increase of private investment from the supply side, combined with a temporary but persistent increase in private investment from the demand side. The first simulation is implemented by shocking the long run component of private investment, from the supply side, in such a way that in the long run the investment to GDP ratio is one percentage point higher relative to the baseline. For the second simulation, private investment was shocked for only one year by one percentage point of steady state GDP on impact, and then the shock returns to base. The shock is propagated throughout the simulation period by a very persistent autoregressive scheme. This simulation reflects the short-run adjustment costs reduction arising from the relaxation of the entry barriers.

The execution of both simulations is sequential. The overall results for the main macro aggregates are presented in Figure 7.8-Figure 7.13 and Table 4.1, as per cent deviations from the baseline. Figure 7.12 & Figure 7.13 portray the disaggregated simulation results of each investment shock separately, providing additional information on the size of the responses of the respective shocks. It is clear that the permanent shock from the supply side has much more growth enhancing effects, compared to the short run transitory shock reflecting mainly the adjustment cost reductions.

The simultaneous increase of private investment from the demand and the supply side has an immediate strong impact on aggregate demand and output. The increase in aggregate demand will lead to higher inflationary pressures, but with only a minimal impact on the setting of the monetary policy rate, as Greece is only around 3% of the euro area. So the crowding out of real activity from monetary policy is minimal and therefore the real interest rate declines. With the increase in output and aggregate demand, firms increase their demand for both capital and labour, pushing the real wage up. Lower real interest rates and higher household incomes through higher wages and employment induce households to save less. Increasing household consumption reinforces the investment stimulus, and in the fifth year of the simulation period GDP is 3.04 pp higher relative to base. In response to the fall in the real interest rate, the real exchange rate depreciates in the medium run and foreign demand for Greek products increases. Exports, after a slight decline in the beginning of the simulation period due to supply constraints, increase steadily and in the long run exceed the baseline by 6.4 pp.

In the long run, GDP, private consumption and private investment are above the baseline by 7.8%, 9.9% and 8.0% respectively.



Table 4.1: Total macroeconomic effects of the combined supply and demand shocks (Percentage deviations from base)

	Year 1	Year2	Year3	Year4	Year5	Year15	SS
GDP	1.71	2.33	2.55	2.72	3.04	11,60	7,82
Private Consumption	3.04	4.02	4.24	4.17	4.09	8.89	9,86
Investment	4.73	8.91	12.24	14.73	16.54	20.40	8.01
Exports	-0.76	-1.83	-2.62	-2.77	-2.17	12.43	6.45
Imports	2.51	3.96	4.95	5.64	6.12	3.18	2.82
Employment	2.11	2.24	1.77	1.23	1.05	3.97	4.04
Real wage	0.83	1.93	2.91	3.63	4.08	8.40	7.84
CA/GDP(diff)	-0.80	-1.36	-1.79	-2.09	-2.27	-0.61	0.0

The message that emerges from the simulation results presented in this subsection highlights the strategic role of private investment for Greek economic growth. Wide ranging reforms addressing the key bottlenecks prevailing in the business sector, if combined with administrative simplification reforms aiming to reduce barriers to entry and to lower the cost of doing business, have sizeable effects on the Greek economy. Their prompt and consistent implementation is a priority.

4.3 Reforms increasing competition in the non-tradable sector

In the last years, several studies have addressed the issue of the macroeconomic impact of reform policies improving competition and promoting internal flexibility in the product market. The overwhelming majority of these studies found a strong long run impact of the reforms on output, employment and productivity. Bayoumi et al. (2004) using a standard general equilibrium simulation model found that greater competition produces large effects on macroeconomic performance in the euro area. Similar results are obtained by Forni, Gerali and Pisani (2008) for Italy. Bouis and Duval (2011) provide the same assessment for the OECD countries, while D' Auria et al. (2009) confirm the beneficial effects of structural reforms across the EU member states using the Commission QUEST III model. In the short run and especially in the very short run, the impact of structural reforms is smaller and

possibly slightly negative because of adjustment costs and other rigidities dampening the beneficial effects of the liberalisation process.

In Greece, model based empirical work carried out by Zonzilos (2010) also suggests that structural policies that would increase competition in product markets to the average level prevailing in the rest of the euro area countries could potentially rise GDP by around 13% in the long run and by 10% over a five year horizon. Similar results were obtained by Maliszewski (2013) in a recent IMF study conducted in the context of the regular examinations of the Greek economy.

In this subsection, competition-enhancing structural reforms in the intermediate production sector (non tradables and tradables) will be assessed by simulating a decline in the price mark-ups of the non-tradable and tradable goods. The reduction in the mark-ups captures a broad range of policies including the reduction in entry barriers, the opening-up of the services sector and in particular the professional services, as well as other policies aiming to increase internal flexibility. The presence of monopolistic competition in firms' output markets makes GIMF the appropriate tool to assess the effectiveness of pro-business structural reforms.

A number of aspects should be made clear before presenting the results. First, the simulations carried out for the assessment of the increase in competition are implemented under the assumption that the reforms are anticipated and perceived as fully credible by the public. This means that short run gains from the reforms are immediately reflected in the dynamic adjustment path of the economy towards the new steady state. Second, the mark-up shock is permanent in both sectors, however the shocks feed gradually into the economy as they are implemented using an autoregressive scheme. In practise this means that 95% of the mark-up adjustment to its long run level is completed in two years horizon. The mark-up in the non-tradable sector is reduced by 9ppt while in the tradable sector the mark-up is reduced by 5ppt. Given our baseline calibration, the assumed decline in the mark-ups means that in the long run the implementation of the respective reforms in the goods market will close half the gap of the prevailing competitive conditions between Greece and the rest of the euro area for the non-tradable sector and will close it fully for the tradable sector.

The decline in the price mark-up in the tradables and non-tradables sectors is simulated sequentially. The overall results for the main macro aggregates are presented in Figure 7.14 –Figure 7.18 and Table 4.1 contain the numerical results for the main aggregates as per cent

deviations from the baseline. Figure 7.19 & Figure 7.20 portray the disaggregated simulation results of each mark-up shock separately, providing additional information on the size of the responses to the respective shocks.¹

Our simulation suggests that the potential gains arising from the increase in competition in the intermediate production sector of the Greek economy are sizable. The lower mark-up in both sectors implies that GDP, consumption and investment, in the long run, will exceed the steady state baseline by 6.5%, 8.2% and 7.3% respectively - see Figure 7.14. The more direct effect of the increase in competition is the less restrictive supply conditions for labour and capital, therefore output from the supply side would potentially increase. For the demand side, the reduction in intermediate production cost stimulates the demand for the factors of production. Hours worked increase by more than 2% in the short run. This puts upward pressure on real wages, which in the long run increases by more than 7%. Real wage increases enhance households' disposable income, boosting further private consumption. The higher demand for capital also stimulates investment, which remains above base by around 8% over the simulation period. The relative price of non-tradables decline after the shock by around 2%, leading to real exchange rate depreciation, Figure 7.18. Exports are stimulated and remain markedly above base over the simulation period. Final goods prices remain close to base throughout the period under examination, as downward pressures from the supply side are counteracted by the strong domestic demand effect. Imports increase especially in the short run as a reflection of stronger domestic demand. In the long run imports are slightly above base, Figure 7.15.

The current account and the trade balance as per cent of GDP improve in the medium run, Figure 7.17. Employment (hours worked) after a short-run increase enters a declining path and in the medium and long run exceeds the steady state baseline by almost 1%, Figure 7.16. In the medium and long run, the demand effect on employment is outweighed by the sharp increase in real wages. Labour productivity in the long run will be higher by almost 8 percent and the unit labour cost would decline. The economy's competitiveness would improve after the shocks in both sectors.

It is worth noting that in these simulations we are focussing on the evaluation of the product market reforms. The mark-up in the labour market remains at base values. The relatively modest impact of the product market structural reforms on employment is a reflection of

¹ Results are presented only for the main demand components. Additional results could be provided on request.

our choice to concentrate on the product market and run the simulations in isolated mode by shocking only the price mark-up. In a more extended framework, taking into account reforms in the labour market as well as in the product market, results for employment and wages will differ significantly.

Table 4.3: Total macroeconomic effects of the increase in competition in tradables and non-tradables sectors.

	Year 1	Year2	Year3	Year4	Year5	Year15	SS
GDP	1.91	2.86	3.43	3.77	3.98	7.29	6.48
Private Consumption	3.16	4.40	4.97	5.22	5.26	6.90	8.19
Investment	3.60	6.04	7.58	8.48	8.96	9.70	7.27
Exports	0.12	0.35	0.63	0.92	1.26	7.01	4.95
Imports	2.25	3.25	3.72	3.90	3.88	1.84	1.69
Employment	1.81	2.48	2.38	1.79	1.27	1.24	0.75
Real wage	1.11	2.77	4.51	5.98	6.99	7.31	7.50
CA/GDP(diff)	-0.64	-0.94	-1.10	-1.17	-1.18	-0.31	0.10

Figures 7.19 & 7.20 displays the disaggregated results for each mark-up shock separately. It is clear that the permanent shock in the non-tradables sector has much more growth enhancing effects, compared to the shock in the tradables sector. This is reasonable and expected as in the non-tradables sector there is much more room to relax supply restrictions and the excessive rents of the incumbents.

4.4 Reforms increasing sector-wide productivity, (tradables and non-tradables sectors)

This subsection reports the results from simulations, aiming to highlight the macroeconomic impact of productivity enhancing policies. There are many similarities and complementarities between the simulation results contained in this section with the previous one concerning the effects of increasing competition in the product markets. We are interested in evaluating how the productivity improvement in the intermediate sector stemming from measures increasing competition could be amplified by additional productivity enhancing structural measures as personnel upgrading programmes, infrastructural investment etc. The simulations presented in this subsection do not intend to

highlight the macroeconomic impact of any specific intervention as described in the Micro-Report. Our objective is to give a broad quantitative assessment of the potential gains for the Greek economy, if a comprehensive package of structural reforms that increase the level of productivity in the intermediate sector is implemented.

The simulations exercise consists of a permanent increase in the level of sector wide productivity (non- factor specific) for both tradables and non tradables intermediate production. The simulation is implemented by shocking the long-run component of productivity, in such a way that in the long run the level of sector-wide productivity, in both sectors of the intermediate goods production, is higher by 1% relative to the baseline. The shock is permanent, but it is propagated in the economy gradually through a very persistent autoregressive scheme.

The increase in productivity in the tradables and non-tradables sectors is simulated simultaneously. The overall results for the main macro aggregates are presented in Figures 7.21-7.24. The numerical results for the main aggregates as percentage deviations from the baseline are contained in Table 4.1.

Table 4.4: Macroeconomic effects of permanent increase in sector wide productivity (Percentage deviations from base)

	Year 1	Year2	Year3	Year4	Year5	Year15	SS
GDP	0.72	1.22	1.65	1.95	2.12	2.61	2.17
Private Consumption	0.89	1.29	1.64	1.90	2.07	2.42	2.56
Investment	1.06	2.05	2.88	3.50	3.90	3.76	3.20
Exports	0.57	1.12	1.53	1.73	1.77	2.40	1.67
Imports	0.59	0.84	1.01	1.10	1.12	0.63	0.66
Employment	-0.59	-0.13	0.30	0.64	0.79	0.85	0.81
Real wage	0.27	0.76	1.35	1.92	2.38	2.70	2.89
CA/GDP(diff)	-0.08	-0.11	-0.12	-0.13	-0.14	0.04	0.05

The permanent increase in the level of productivity by 1% in both sectors implies that GDP, consumption and investment in the long run will exceed the study state baseline by 2.15%, 2.55% and 3.10% respectively, Figure 7.21. The increase in productivity boosts gradually the marginal product of the factors of production and reduces marginal production costs. The

decline in marginal costs exerts downward pressures on output prices. However, the decline in output prices is modest and transitory, as the induced demand effect outweighs the containment of the cost factors. In the medium run output prices practically return to base. Output from the supply side would potentially increase. For the demand side, the reduction in intermediate production cost stimulates the demand for the factors of production. Labour supply increases, and hours worked increase by more than 1% in the short run and remain at that level throughout the simulation period. This puts upward pressure on real wages which in the long run increase by about 3% more. Real wage increases enhance households' disposable income, boosting further private consumption. Exports are stimulated and remain markedly above base over the simulation period. Imports increase from the beginning of the simulation period and remain slightly above base in the medium run, Figure 7.22. The trade balance and the current account improve in the medium run, Figure 7.24.

4.5 Reforms increasing labour augmenting productivity, (tradables and non-tradables sector)

This subsection reports the results from simulations aiming to highlight the macroeconomic impact of policies enhancing labour augmenting productivity. This simulation is of course more restrictive than the one presented in subsection 4.4 above. The simulations presented in this subsection do not intend to highlight the macroeconomic impact of any specific intervention as described in the Micro-Report. Our objective is to quantitatively assess the potential gains for the Greek economy arising from the implementation of a package of structural reforms, for example reforms that decrease the regulatory burden of the economy, leading to an increase in the level of labour productivity in the intermediate sector.

The simulations exercise consists of a permanent increase in the level of labour augmenting productivity for both tradables and non tradables intermediate production. The simulation is implemented by shocking by 1% the long-run component of the stochastic process governing the respective productivities. The shock is implemented without any type of persistence and therefore the increase in labour productivities is immediate and permanent. The overall results for the main macro aggregates are presented in Figures 7.25-7.29. Table 4.5 comprises the numerical results for the main aggregates as percentage deviations from the baseline.



The increase in productivity and the ensuing rise in the marginal product of capital and labour induce an increase in the factors of production. This encourages production and stimulates investment demand. The increased demand for labour and capital boost wages as well as the rental price of capital to a higher level. Therefore, households' income is buttressed, which in turn strengthens private consumption and domestic demand, Figure 7.25. The permanent increase in private consumption, by more than 1% in the medium and long run, is also a reflection of households' upward revision of their permanent income expectations, triggered by the permanent increase in productivity that the reforms are expected to deliver. The increase in consumption coupled with the increase in investment shifts the level of GDP by 0.8 pp above base in the long run, Figure 7.25. In brief, the permanent improvement in labour productivity can make a substantial contribution to rising output in the Greek economy.

The increase in wages leads to an increase in labour supply, however the additional labour force is absorbed slowly, as demand responds sluggishly and consequently labour utilization remains slightly below base in the medium run.

In the very short run, the increase in productivity counteracts the demand effect on prices. Inflation falls at the beginning of the simulation period, then rebounds exceeding slightly the base, before returning back to base values in the medium run. The real effective exchange rate depreciates. Increased competitiveness stimulates exports throughout the simulation period. Exports are around 0.8 pp higher relative to base, reflecting market share gains of an equal amount, given the assumed constancy of foreign demand for Greek exportables. The current account balance relative to GDP remains close to base, as the pickup in domestic demand outpaces the substitution effect on imports, Figure 7.26, 7.28 and 7.29.

Table 4.5: Macroeconomic effects of permanent increase in labour augmenting productivity (Percentage deviations from base)

	Year 1	Year2	Year3	Year4	Year5	Year15	SS
GDP	0.34	0.52	0.66	0.76	0.81	0.88	0.75
Private Consumption	0.48	0.65	0.78	0.88	0.94	1.01	1.04
Investment	0.20	0.45	0.68	0.87	0.99	0.89	0.78
Exports	0.32	0.50	0.63	0.67	0.67	0.72	0.52
Imports	0.25	0.32	0.37	0.39	0.40	0.28	0.28

Employment	-0.51	-0.29	-0.13	-0.01	0.04	-0.09	-0.1
Real wage	0.09	0.24	0.42	0.59	0.73	0.78	0.84
CA/GDP(diff)	0	0.01	0.01	0.02	0.02	0.02	0.01

5. Conclusions

In this Report, using a three-region version of the IMF General Equilibrium model GIMF, calibrated for Greece and the rest of the euro area, we assess quantitatively the macroeconomic implications of a wide-ranging reform package in Greece. Without intending to be exhaustive in terms of coverage, the report runs the gamut of the main structural reforms that are now under implementation in Greece. The empirical analysis focuses on four broad areas of reforms, including: reforms improving the public procurement system' reforms related to the liberalization of the markets and the enhancement of competition' reforms related to the business environment, reducing entry barriers and unnecessary regulations; and reforms promoting business investment as well as reforms aiming to increase productivity in the intermediate production sector.

The report conveys good news. Our simulations strongly support the implementation of structural reforms. The potential effects of the reforms on output, employment, productivity and competitiveness are sizable. Over the last years Greece has made a leap forward in addressing its fiscal and external imbalances, and the achievement was unprecedented and impressive. Now that the country is heading towards a new growth model, the effective completion of the structural reforms is of pivotal importance for the restructuring of the productive potential of the economy. We are moving in the right direction, but we need to do more.

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7. Appendix (Simulations Charts)

7.1 Public Procurement Reforms

Box 7.1: Macroeconomic effects of a debt neutral fiscal expenditure switch.

Permanent reduction in Public Consumption by 0.5 ppt of ss GDP compensated by 0.5 ppt increase in Public Investment

Figure 7.1: Economic activity

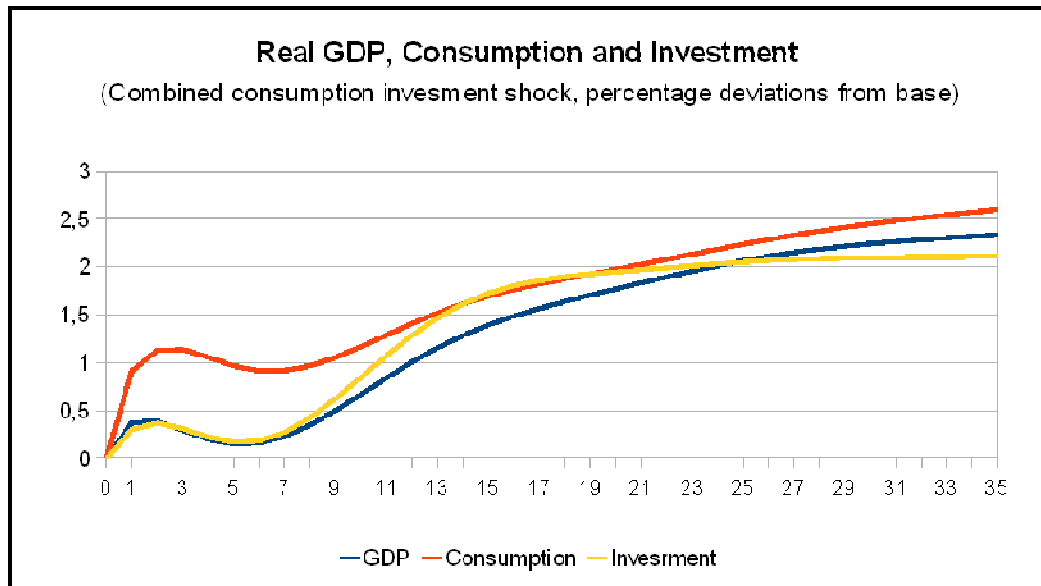


Figure 7.2: Economic activity

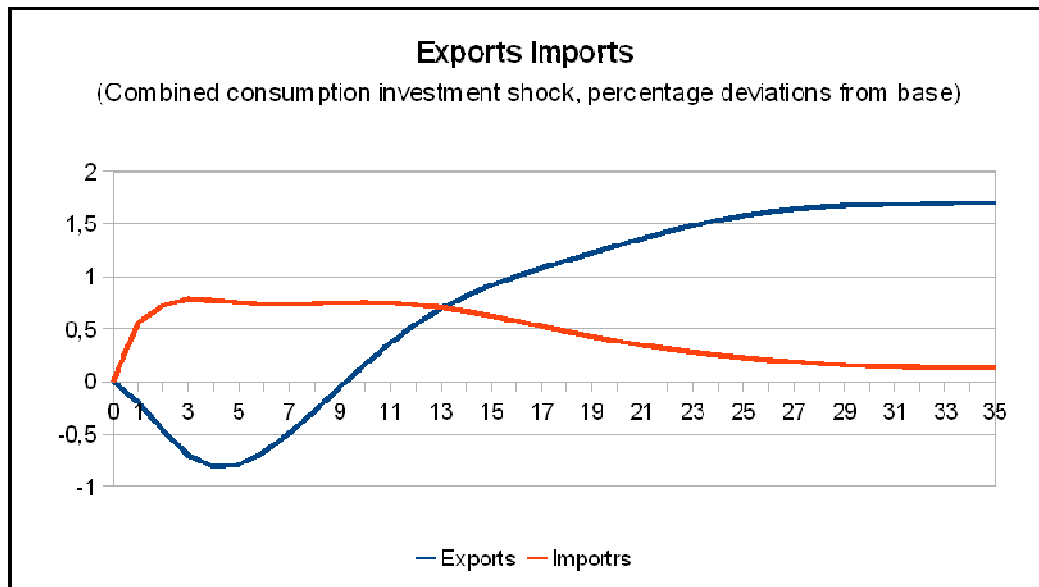


Figure 7.3: Labour Market

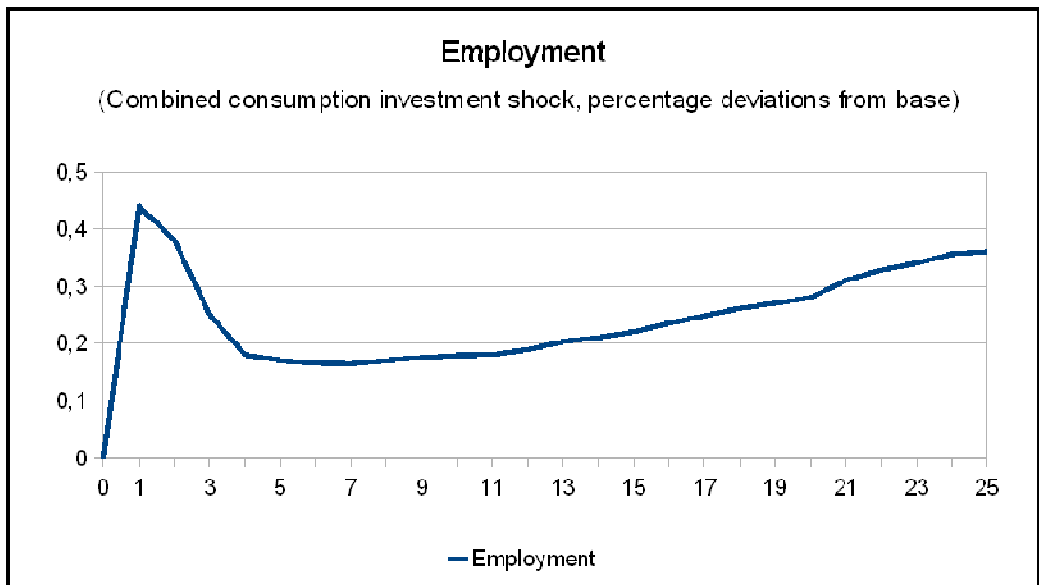


Figure 7.4: Labour Market

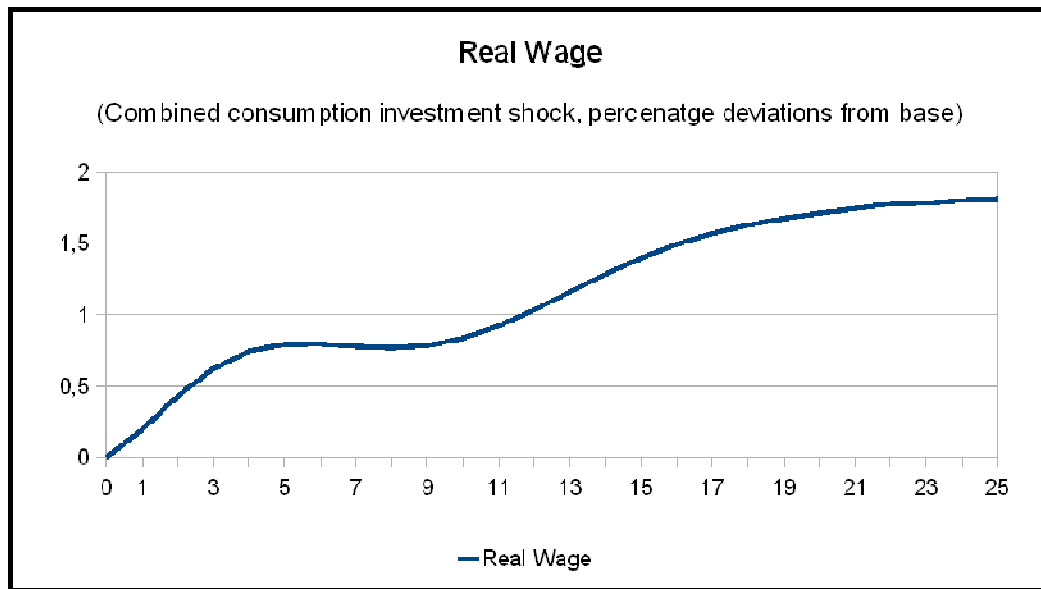


Figure 7.5: The current account and the Public Sector

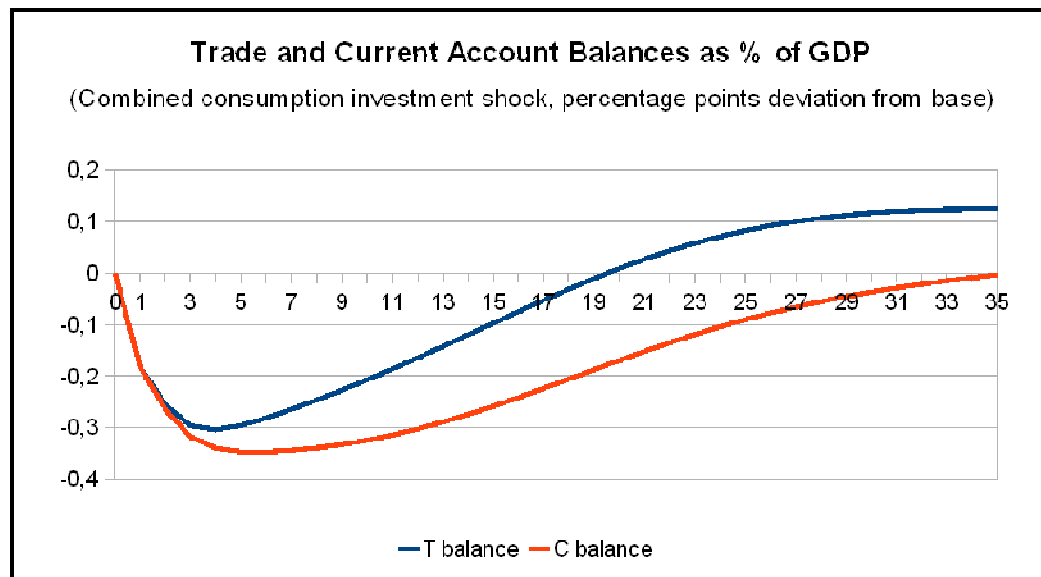


Figure 7.6: The current account and the Public Sector

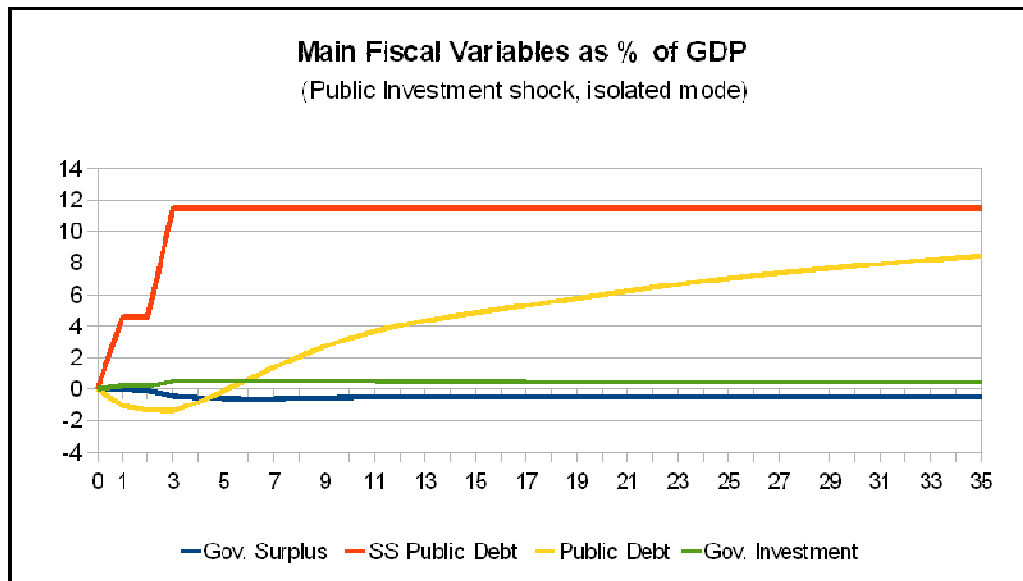
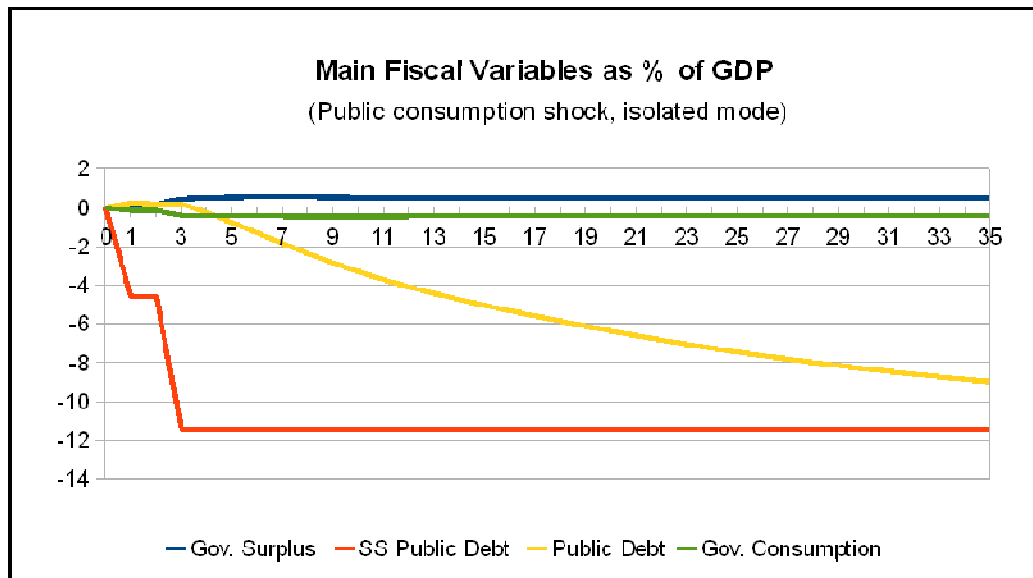


Figure 7.7: The current account and the Public Sector



7.2 Business Environment Reforms

Box 7.2: Total macroeconomic effects of the combined supply and demand investment shocks.

Permanent increase of private investment by 1 ppt of ss GDP and temporary but persistent reduction in short-run adjustment costs.

Figure 7.8: Real sector

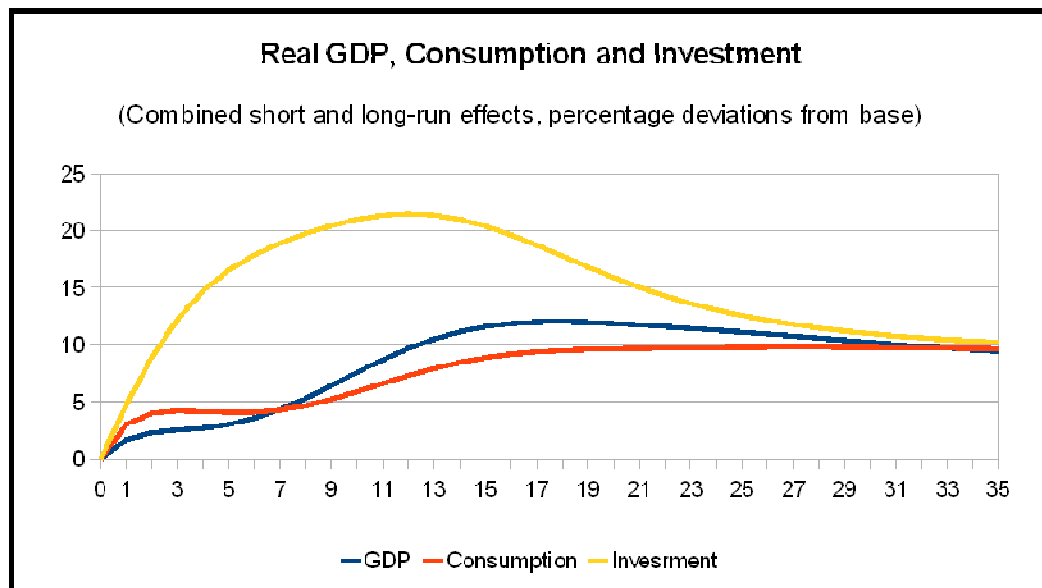


Figure 7.9: Real sector

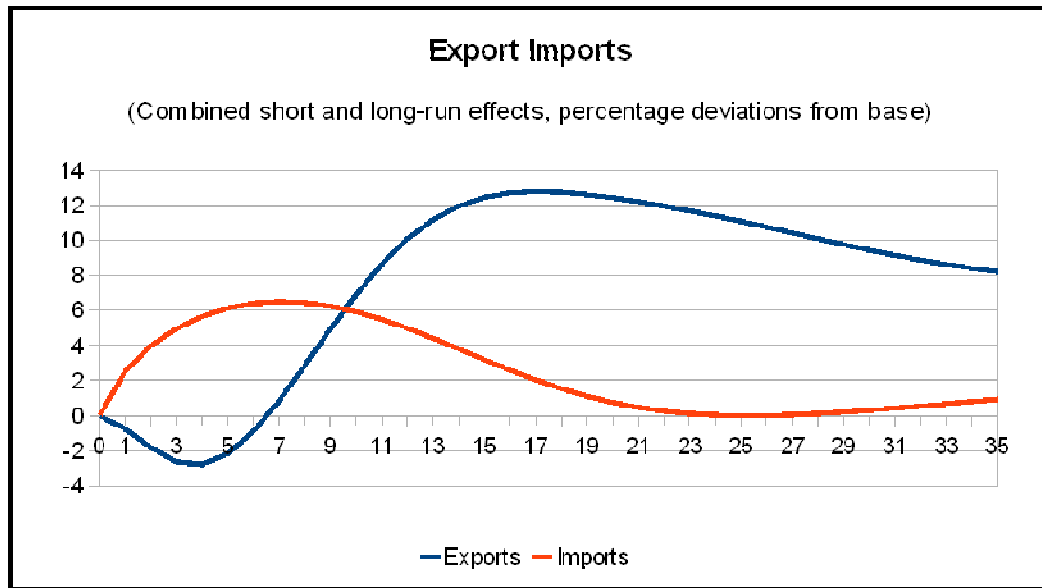


Figure 7.10: Labour Market

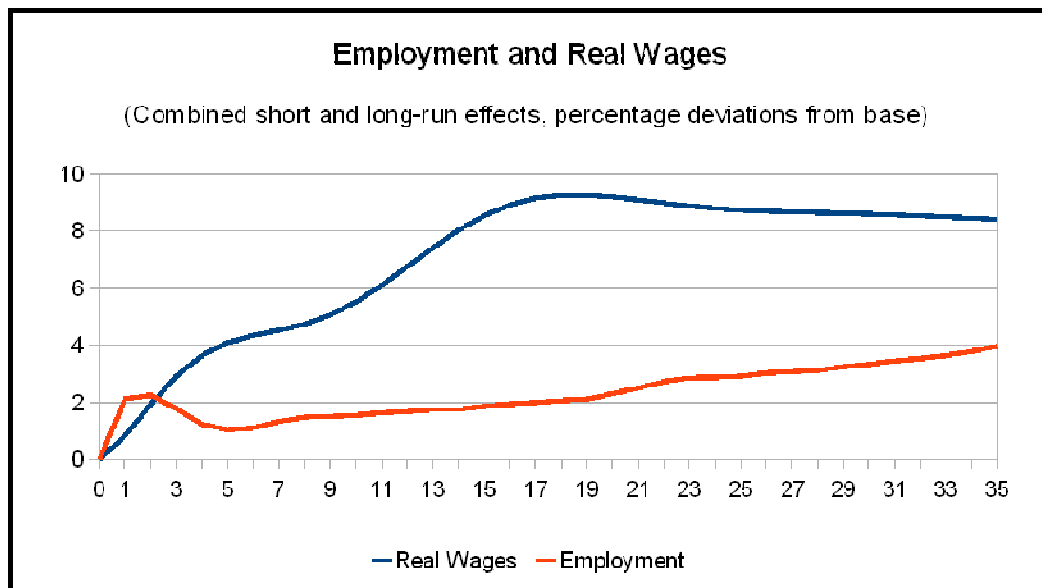


Figure 7.11: Trade and Current account balances

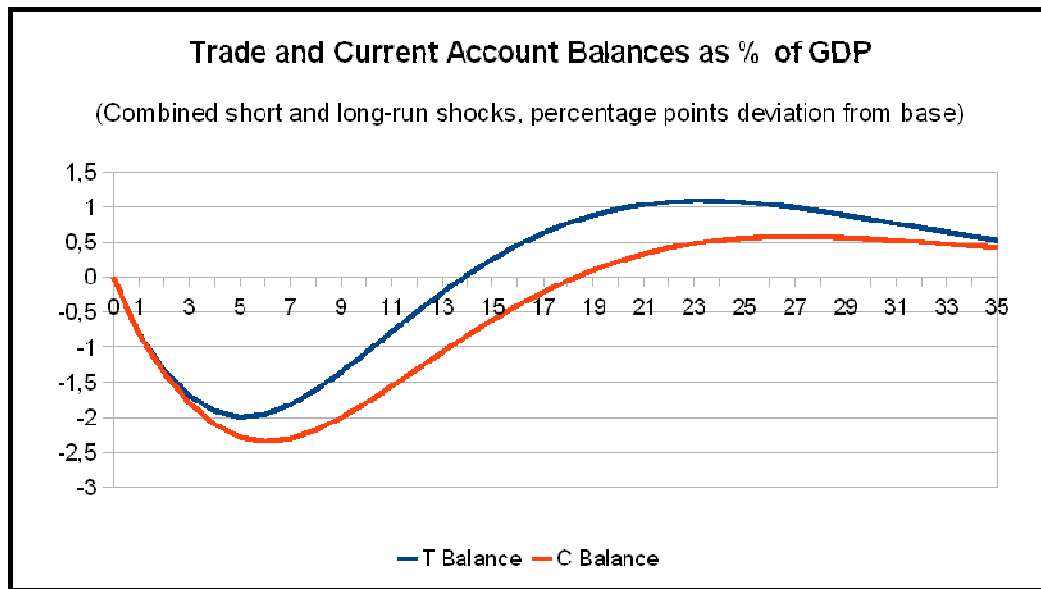


Figure 7.12: Disaggregated simulations results Macroeconomic effects of the investment supply shock

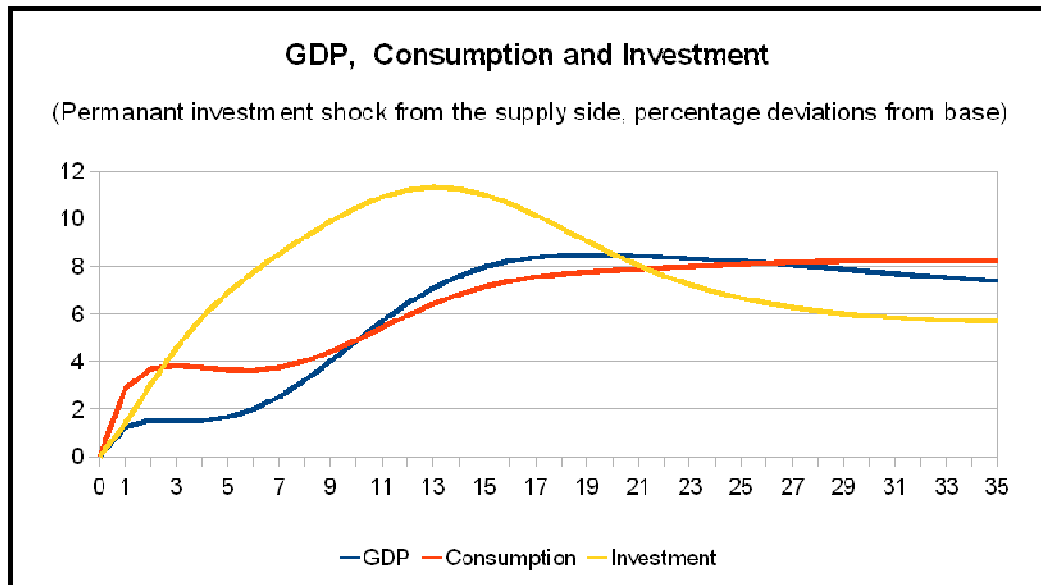
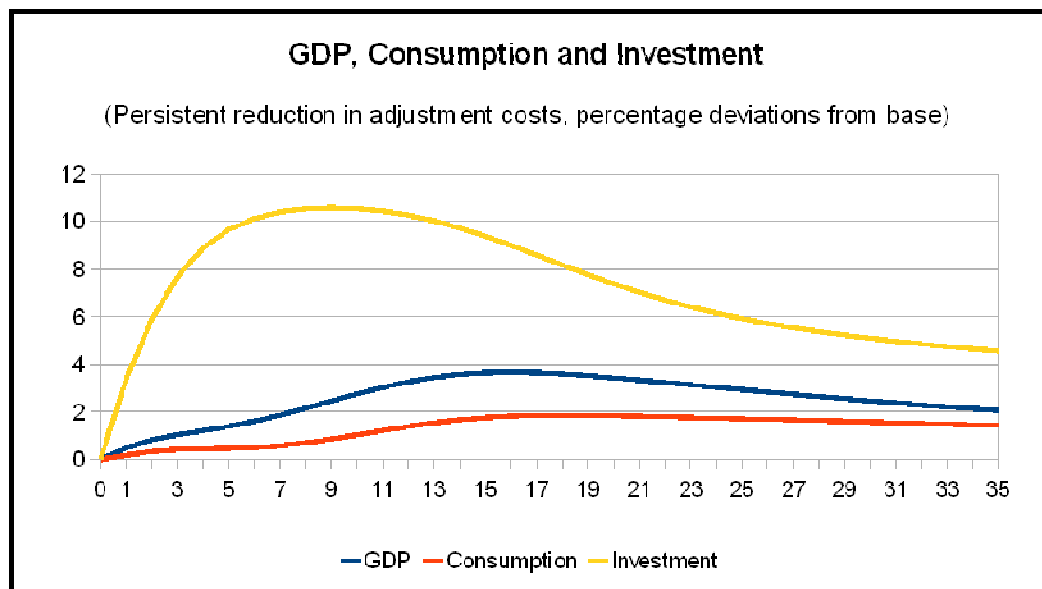


Figure 7.13: Disaggregated simulations results. Macroeconomic effects from the reduction in adjustment costs



7.3 Permanent increase in competition in the intermediate goods sector

Box 7.3 Macroeconomic effects of a permanent decrease in the price mark-up in both tradables and non tradables goods markets.

Permanent decrease in the price mark-up by 9 ppt in non tradables sector and by 5 ppt
in the tradables sector

Figure 7.14: Real sector

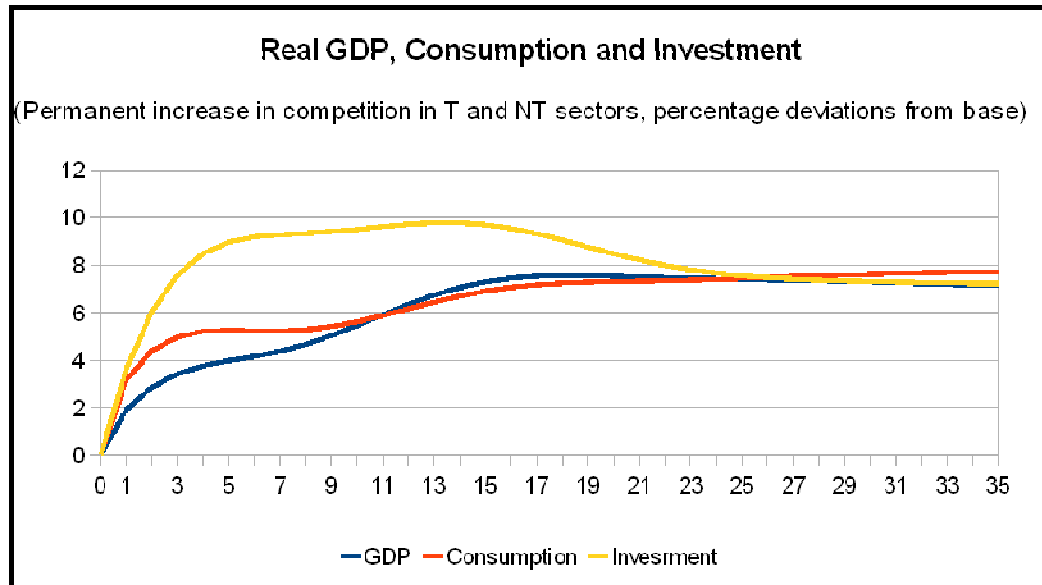


Figure 7.15: Real sector

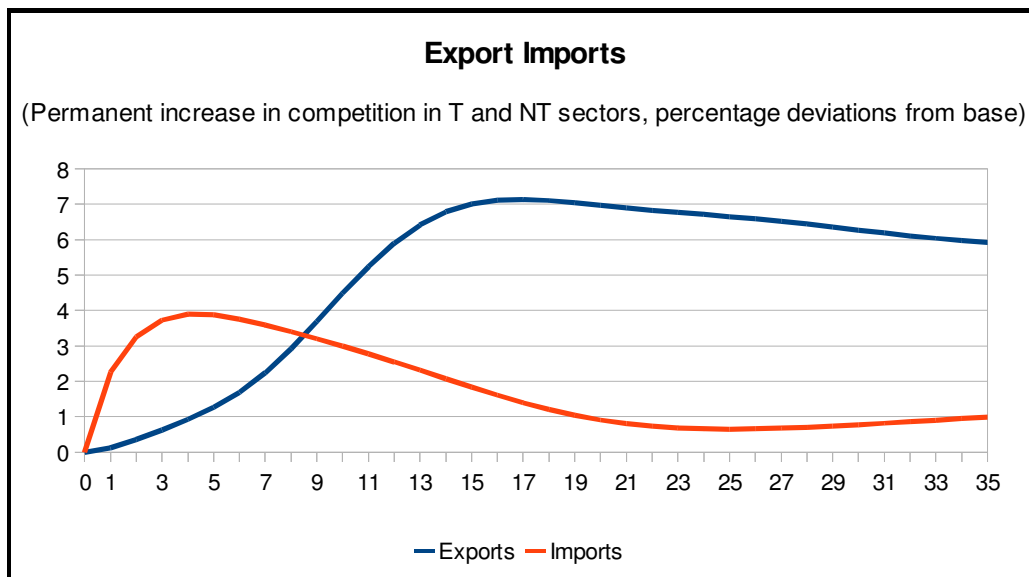


Figure 7.16: Labour market

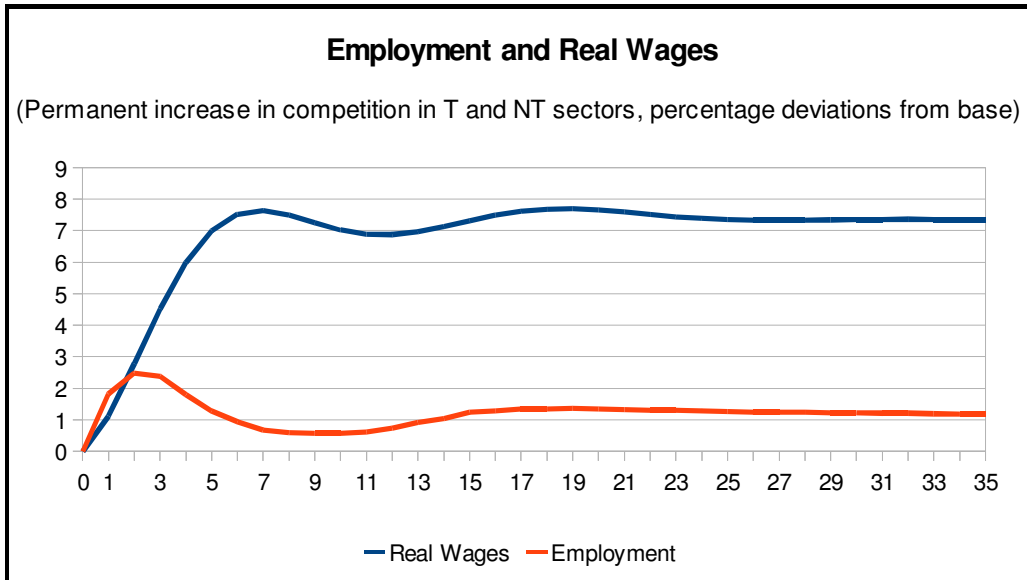


Figure 7.17: Current account balances

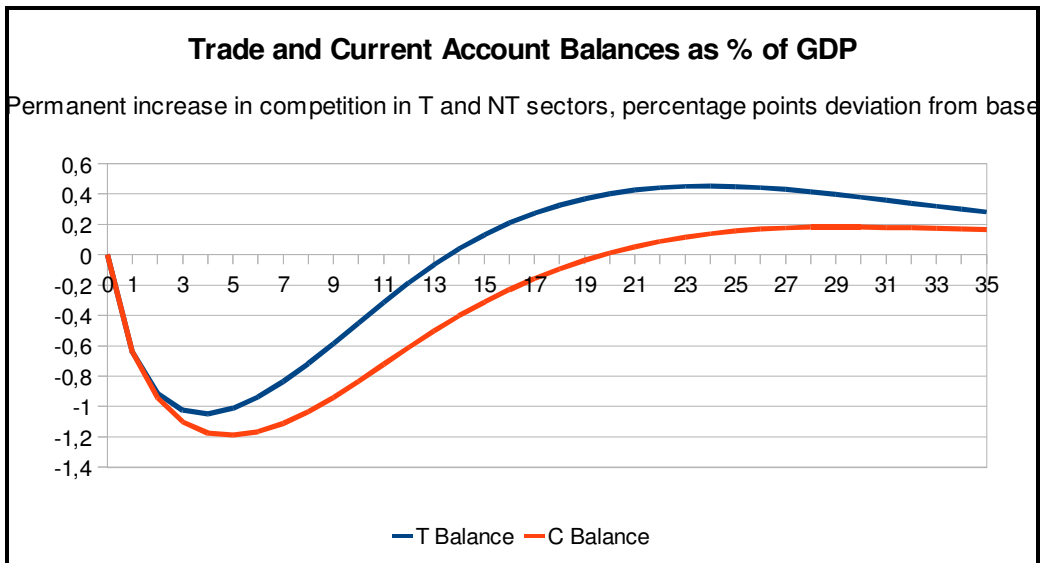


Figure 7.18: Real effective exchange rate

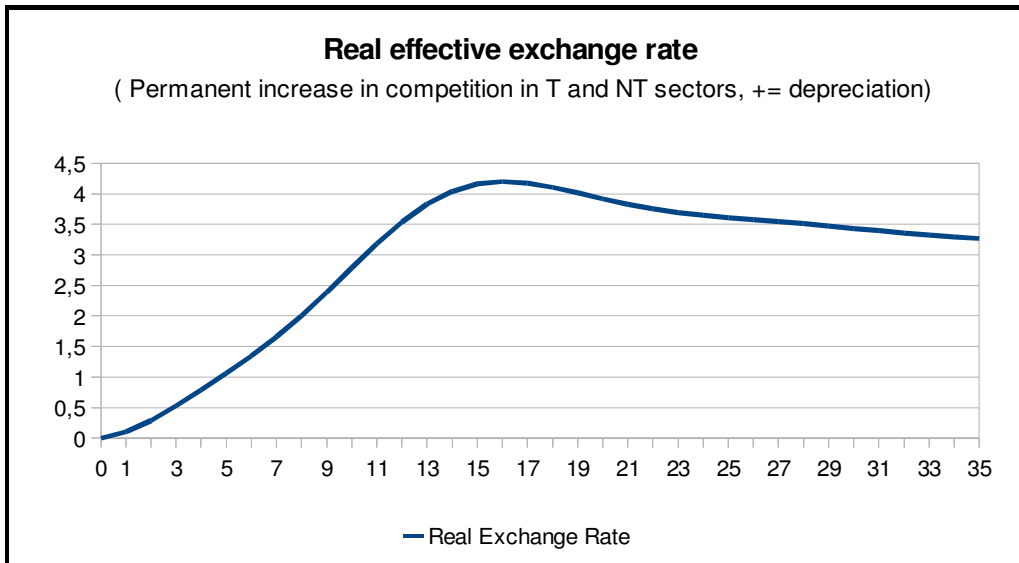


Figure 7.19: Disaggregated simulations results. Macroeconomic effects from the reduction in the non-tradable sector price mark-up.

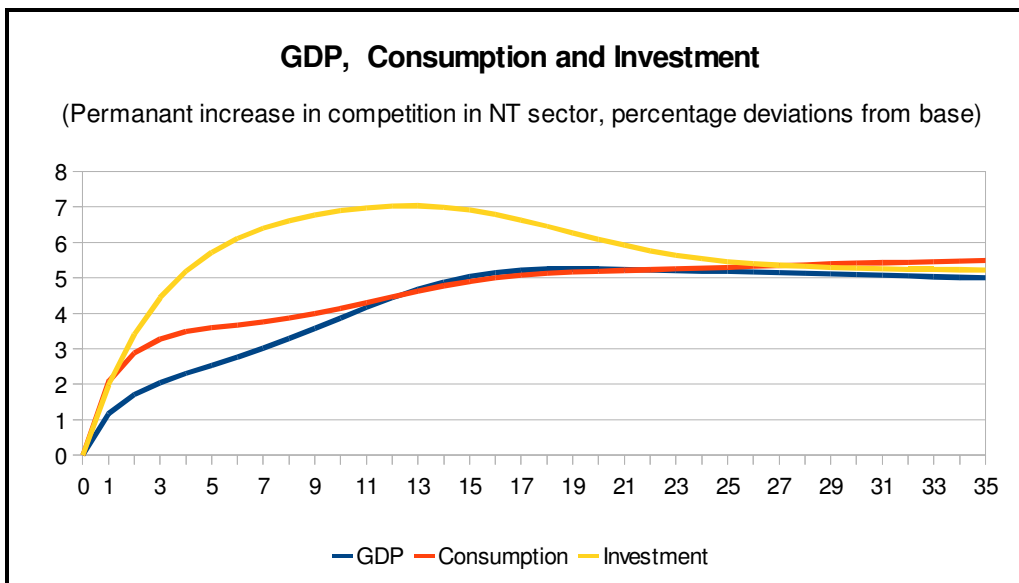
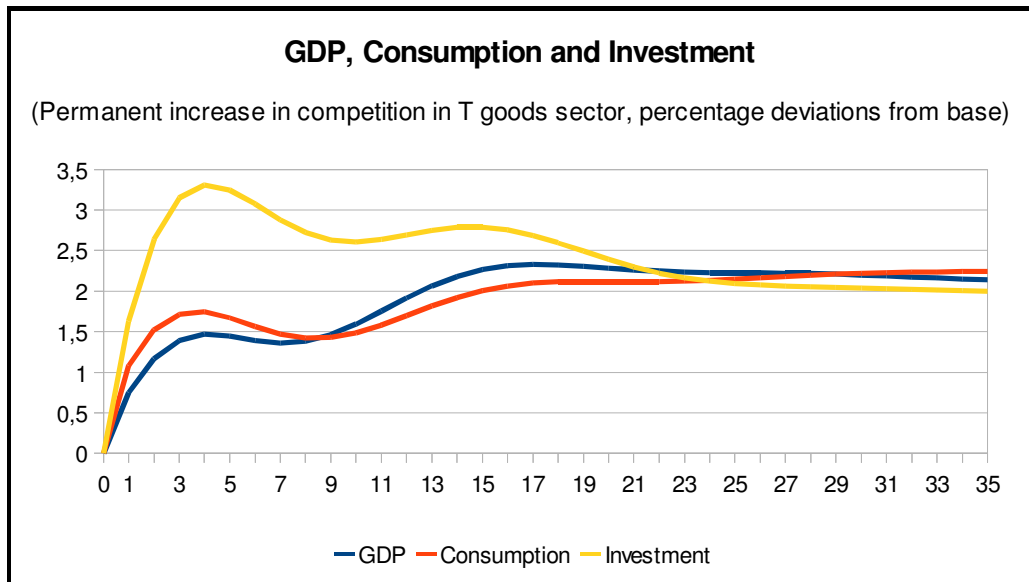


Figure 7.20: Disaggregated simulations results. Macroeconomic effects from the reduction in the tradable sector price mark-up.



7.4 Sector wide productivity increase

Box 7.4 Macroeconomic effects of a permanent sector wide productivity increase.

Permanent increase of sector wide productivity by 1 ppt, in both tradables and non tradables sectors

Figure 7.21: Real sector

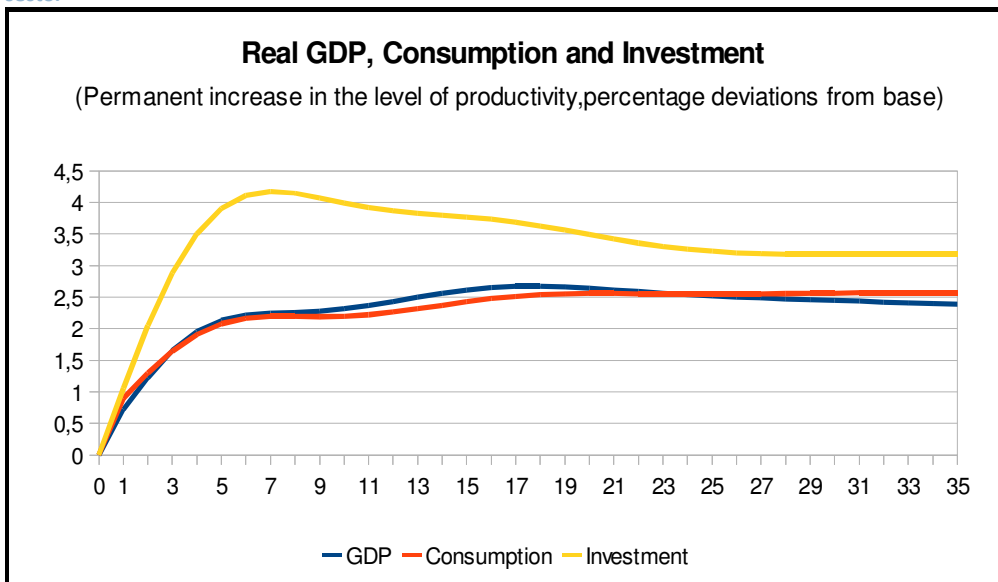


Figure 7.22: Real sector (exports imports)

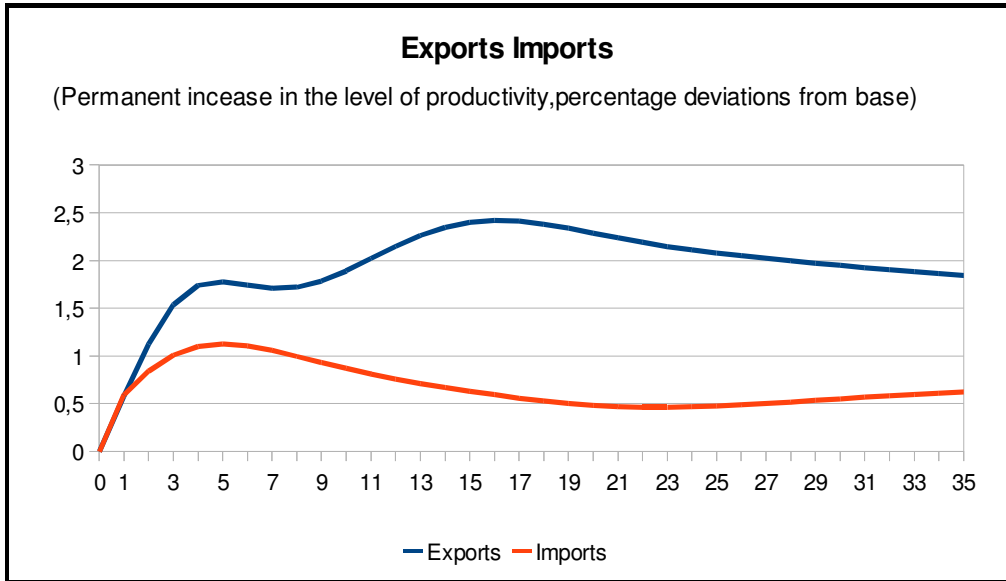


Figure 7.23: The labour market

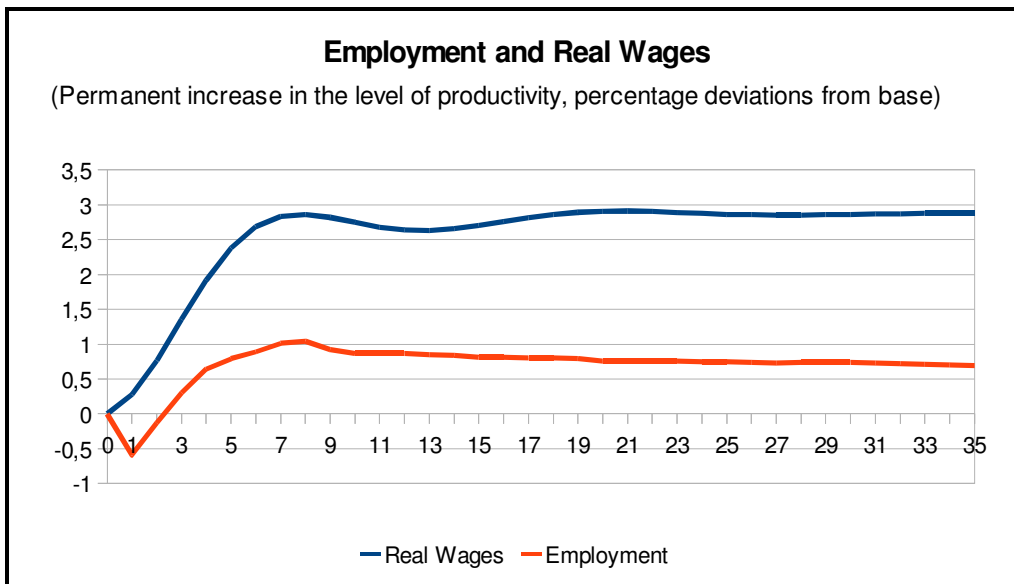
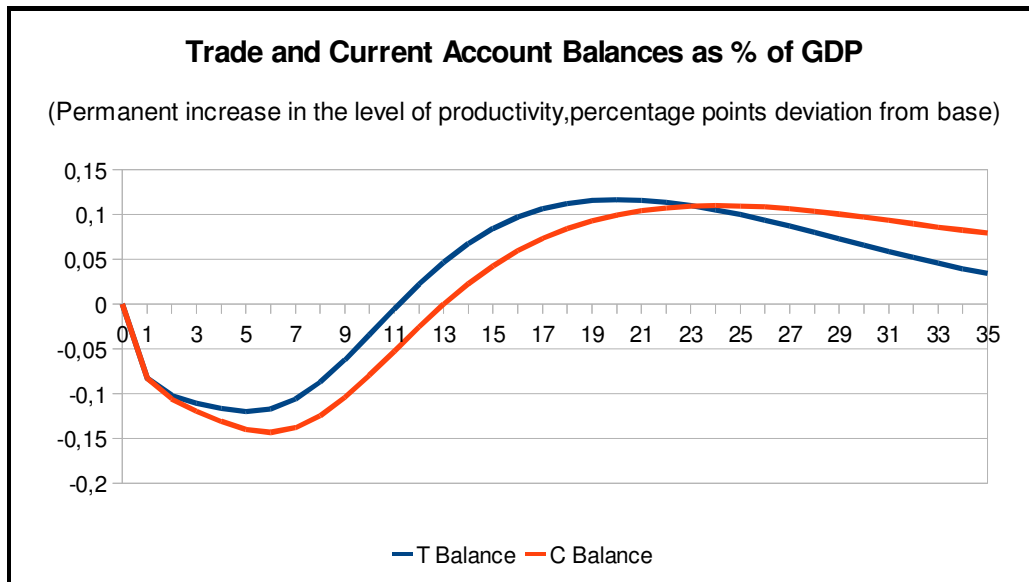


Figure 7.24: Trade and Current account balances



7.5 Labour augmenting productivity increase in the intermediate sector

Box 7.5 Macroeconomic effects of a permanent increase in labour productivity.

Permanent increase in the level of labour augmenting productivity by 1 ppt, in both tradables and non tradables intermediate sectors

Figure 7.25 Real sector



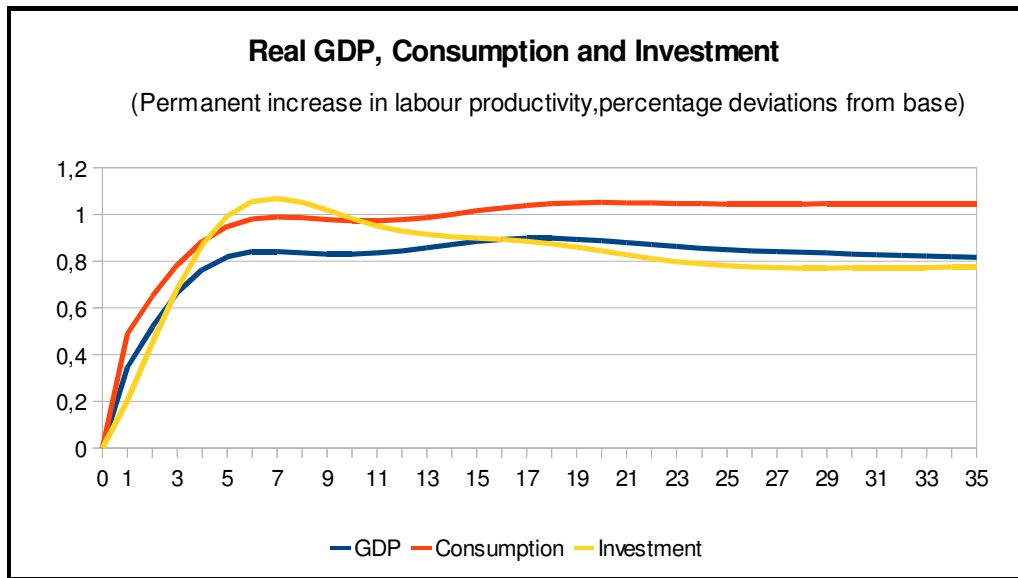


Figure 7.26: Real sector, exports imports

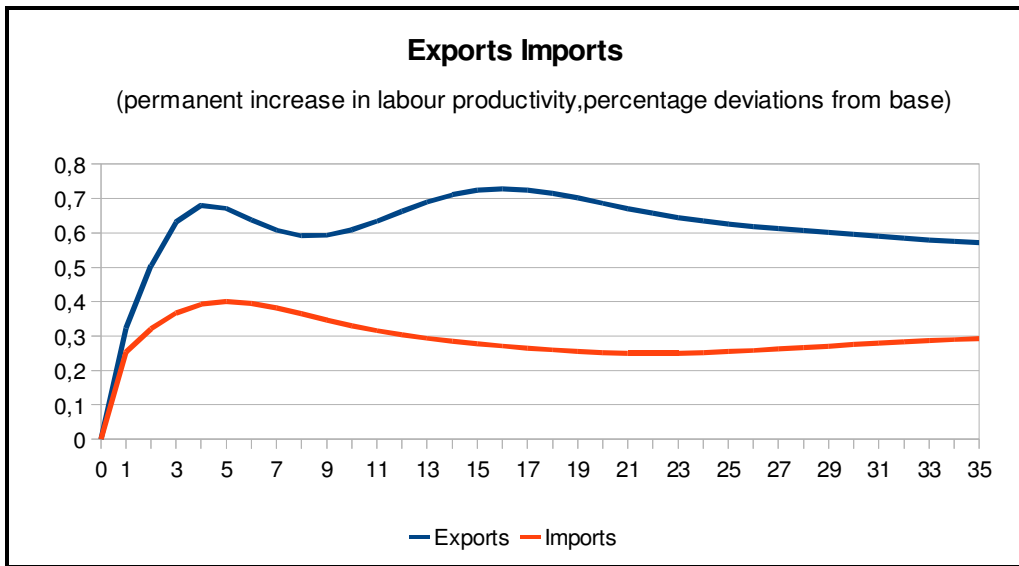


Figure 7.27: The labour market



Figure 7.28: Trade and current account balances

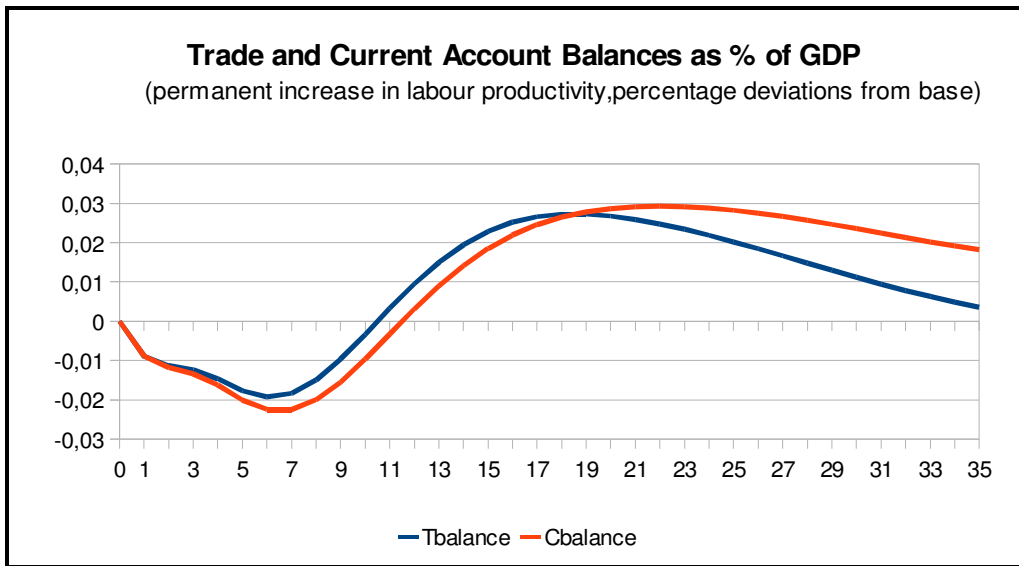


Figure 7.29: The real exchange rate

