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Discretionary fiscal policy and economic activity in Greece

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DISCRETIONARY FISCAL POLICY AND ECONOMIC ACTIVITY IN GREECE

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Abstract

This paper investigates the effects of discretionary fiscal policy changes on economic activity and its subcomponents in Greece in the period 2000-2011. Changes in government spending and net taxes have Keynesian effects. An increase in government consumption has the most pronounced positive effects on output growth, private consumption and non-residential investment, while it reduces residential investment. Cuts in the public investment programme crowd in private investment, but are associated negatively with the net exports ratio. Both indirect and direct tax hikes lower private consumption, private investment and output growth. Additionally, higher direct taxes, by lowering disposable income, reduce import demand, thus, improving the trade balance.

Keywords: Discretionary fiscal policy; economic growth; consumption; investment; net exports

JEL Classification: E62, O52, H30

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1. Introduction

Fiscal and external imbalances accompanied by sovereign debt financing problems have put Greece under joint EU-IMF surveillance since May 2010.¹ In the context of the EU-IMF financing agreement, the Greek authorities have been implementing the Economic Adjustment Programme (EAP) for Greece (IMF, 2010) since May 2010. Despite mixed or limited progress in structural reforms and the privatization agenda, the Greek authorities did rather well in terms of the fiscal adjustment program. The structural budget balance was reduced from -14.8% of GDP in 2009 to an estimated -1.0% of GDP in 2012 (European Commission, 2013).

Although the fiscal consolidation has been considered successful, it has come at a cost of a dramatic and continuing output contraction. The initial programme² foresaw that from a -2.0% growth rate in 2009, the economy would have reached a trough in 2010 and start recovering thereafter, with the growth rates being -4.0% in 2010, -2.6% in 2011 and 1.1% in 2012. However, the recession was deeper and more protracted, i.e., 3.1% in 2009, -4.9% in 2010, -7.1% in 2011, -6.4% in 2012. According to European Commission (2013) the output growth decline is projected to decelerate in 2013 (-4.2%), while a mild recovery of 0.6% is expected in 2014. Though, the OECD (2013) recently announced that it projects a contraction of 1.2% of GDP in 2014.

This dramatic output contraction reflects negative developments in private consumption, the biggest GDP sub-component³, which declined in real terms by 6.2% in 2010, 7.7% in 2011, and 9.1% in 2012, and is expected to decline by 6.9% in 2013 and 1.6% in 2014 before recovering in 2015 (see European Commission, 2013). In addition, gross fixed capital formation declined by 15.0% in 2010, 19.6% in 2011, 19.2% in 2012, and is projected to continue falling at a slowing pace in 2013 (by 4.0%), while a strong recovery is expected in 2014 (8.4%).⁴

¹ See Belke (2013) for an interesting discussion on debt mutualization in the context of the on-going Eurozone crisis, analyzing both the so-called 'North' and 'South' perspectives.

² See European Commission (2010).

³ The average share of private consumption to GDP in 2000-2011 is 72%.

⁴ At the same time on account of fiscal and macroeconomic developments there is a positive contribution from the external sector. The external balance of goods and services improved in 2009-2012 having a

Up until recently the main reasons for this dramatic output contraction was considered to be reform fatigue, political problems and a delay in the privatization process (European Commission, 2012a; IMF 2012a). However, recent IMF research (IMF, 2012c; Blanchard and Leigh, 2013) showed that fiscal multipliers have been underestimated by a factor of 2-3, implying that fiscal consolidation had much deeper recessionary effects. Both the European Commission (2012b) and the ECB (2012) expressed concerns about the validity of the IMF approach and findings suggesting that they might be driven by outliers, with one of them being Greece itself.

Driven by this discussion and need for continued fiscal consolidation in Greece in the years ahead⁵, this paper investigates the effects of fiscal policy on economic activity and its key sub-components. We intend to investigate the effect of discretionary fiscal policy changes on real GDP, private consumption, private residential and non residential investment and net exports in the period 2000-2011. Existing studies focusing on the effects of fiscal policy in Greece rely mostly on pre-2000 data (see Angelopoulos and Phillipopoulos, 2007; Lockwood et al. 2001). This is due to data issues that led to subsequent data revisions. Hence, the current study aims at fixing that missing link by studying the post-2000 effects of fiscal policy using quarterly data.

To extract the exogenous discretionary fiscal policy component we follow the fiscal policy rule literature e.g., Bohn (1998), Gali and Perotti (2003). According to Gali and Perotti (2003) the residuals of the fiscal policy rule correspond to the shock or exogenous discretionary component of fiscal policy. The extracted discretionary fiscal policy components are then inserted into regressions with dependent variables GDP growth, private consumption and private (residential and non-residential) investment growth, and net exports in order to assess their effects on each individual GDP component (while controlling for other relevant factors). Analogous exercises have been performed by

positive contributions on the change of GDP (due to falling imports and rising exports). It contributed 2.9 p.p. in 2010, 2. p.p. in 2011, 4.0 p.p. in 2012 and is expected to continue having a positive effect i.e., 2.7 p.p. in 2013 and 1.8 p.p. in 2014 (see European Commission, 2013), i.e. dampening the fall in GDP driven by final domestic demand. Nevertheless in the initial programme a bigger positive contribution was projected in the years 2010-2011 and a lower one later on, i.e. 3.5 p.p. in 2010, 3.2 p.p. in 2011, 1.7 p.p. in 2012 and 1.4 p.p. of GDP in 2013 (see European Commission 2010).

⁵ The Medium Term Fiscal Strategy 2013-2016 of the Greek government unveiled in Autumn 2012 includes consolidation measures amounting to 7.2% of GDP for the period 2013-2014 and an additional 2.5% of GDP measures for 2015-2016 (European Commission, 2012c).

Perotti (1999), Fatas and Mihov (2003, 2006), Tagkalakis (2008), Afonso et al. (2010) and more recently by Agnello et al. (2013).

According to our findings, discretionary fiscal policy changes have Keynesian type effects. Government spending cuts have no particular effect on the trade balance but decrease domestic demand components, lowering output growth, whereas, tax hikes lower disposable income and private spending. Cuts in government consumption have the most pronounced negative effects on output growth, private consumption and non-residential investment, while they have positive effects on residential investment (in line with the crowding out argument).

A reduction in the government wage bill lowers private consumption and output growth, but is associated positively with residential investment. Cuts in net transfers are associated with a fall in private investment and output growth. Cuts in the public investment programme crowd in private investment, but are associated negatively with the net exports ratio. Both indirect and direct tax hikes lower disposable income and discourage spending - in particular they lower private consumption, private investment and output growth. However, higher direct taxes, by lowering disposable income, reduce import demand, thus, improving the trade balance.

The remainder of the paper is organised as follows. The next section reviews the relevant literature on the effects of fiscal policy on economic activity. A subsection is devoted to studies referring to Greece. Section 3 presents data information and discusses in more detail the econometric methodology. In section 4 we present the main empirical findings. The last section includes a brief summary of the results and concluding remarks. An appendix provides additional data information and more details about the models that have been estimated.⁶

⁶ A supplementary material appendix provides additional data information and the full set of empirical estimates.

2. Relevant literature

There have been two strands in the literature that examine the growth effects of fiscal policy. First, the literature that investigates the short-run effects of fiscal policy on economic activity, and second, the literature that examines the effects of fiscal policy on long-term growth.

2.1 Short-run effects

According to the first strand of the literature, the key issue is the identification of fiscal policy shocks. Several studies rely on the so-called “narrative” approach of fiscal policy of Ramey and Shapiro 1998, Edelberg et al. (1999), Burnside, et al. (2004), Romer and Romer (2010) and Ramey (2011). Fiscal policy shocks are identified based either on the military build up of the Korean and Vietnam wars (defence budget expansions) or on announced and implemented changes in tax legislation (“narrative” of Presidential speeches and Congressional records). In the SVAR approach of Blanchard and Perotti (2002) fiscal shocks are identified based the assumption that discretionary fiscal policy does not respond to output within the quarter, while also estimating elasticities of fiscal variables with respect to some macroeconomic variables in order to net out the automatic effects of fiscal policy. Mountford and Uhlig (2009) identify fiscal policy shocks by imposing sign restrictions on the way fiscal and macroeconomic variables would have to behave.

Analogous studies have been undertaken for individual European countries (France, Spain, Italy and Germany). In most cases the effects point to a positive short-run effect on GDP following a government spending shock and a negative, but small, effect following a tax shock. See Biau and Girard (2005), Castro-Fernandez and Cos (2006), Giordano et al. (2007), Tenhofen et al (2010).⁷

A series of other papers in the same strand of the literature focus on the impact of fiscal policy in open economies. Under flexible exchange rates an increase in government

⁷ Belke (2009) highlights the important role that the prevailing uncertainty in times of crisis has in reducing the effectiveness of fiscal stimulus, which implies that option of waiting with discretionary fiscal policies in times of crisis may be valuable. According to the study of Belke (2009) the fiscal multiplier should be formulated endogenously with respect to the degree of political and economic uncertainty.

spending cannot stimulate demand because the exchange rate appreciates and capital inflows prevent interest rate from rising leading to lower net exports. Under fixed exchange rates fiscal policy is more effective, because real exchange rate appreciation pressures are offset by monetary policy. Moreover it is shown that changes in government savings should lead to changes in the current account, along with the twin deficits concept.

Beetsma and Giuliodori (2011) examining 10 EU countries find that an increase in government purchases raises output, consumption and investment and reduces the trade balance. The stimulating effect is weaker and the trade balance reduction is larger for more open economies due to the trade leakage effects. As shown by Corsetti et al. (2012) an increase in government spending has a small positive effect on output, no significant effect on consumption and a fall in investment and the trade balance.

However, studies like Kim and Roubini (2008) and Corsetti and Muller (2008) find evidence that fiscal shocks identified through short-run restrictions in SVARs do not lead to twin deficits. Instead, fiscal expansion and increases in budget deficits lead to real exchange rate depreciations and current account surpluses (or no impact). As Kim and Roubini (2008) point out the change in government savings appears to go both to changes in private savings and changes in investment.

Lane and Perotti (1998) find that the composition of fiscal policy and the exchange rate regime matter for the impact on trade balances. Higher wage government consumption lowers exports and causes the trade balance to deteriorate under flexible exchange rates. Under fixed exchange rates there is no real exchange appreciation so the trade balance is not affected. Non wage government consumption has limited effects on the trade balance. Monacelli and Perotti (2008) and Ravn et al (2007) find that an increase in government spending raises output and consumption and causes the trade balance to deteriorate , while the real exchange rate depreciates (in Australia, Canada, UK and the US). Benetrix and Lane (2010) find a real effective exchange rate appreciation following a positive government spending shock.

Alesina et al. (2000) in a panel of OECD countries find a sizeable negative effect of public spending—and in particular of its wage component—on profits and on business investment. The findings present evidence in favor of the “non-Keynesian” or expansionary effects of fiscal adjustments.⁸

2.2 Long-run effects

The second strand of the literature focuses on the effects of fiscal policy on long-term growth. According to neoclassical growth theory fiscal policy cannot affect the steady state or long-run growth rate, which is driven by the exogenous factors of population growth and technological progress (Chamley, 1986). Fiscal policy can only affect the transition path to the steady-state growth. However, the endogenous growth theory, based on contributions by Barro (1990), Barro and Sala-i-Martin (1992, 2003) and Mendoza et al. (1997), by allowing for distortionary taxes and productive government spending implies that fiscal policy can affect long-run growth. The conventional wisdom goes as follows: shifting the revenue stance away from distortionary forms of taxation and towards non-distortionary forms has a growth-enhancing effect, whereas switching expenditure from productive, and towards unproductive, forms is growth-retarding.

The predictions of these models are very important in the current juncture when considering the need for continuous fiscal consolidation. Consolidation could have direct negative effects on growth, if in particular it is targeted to productive spending components, like e.g., public investment or to increasing distortionary taxation (see Kneller et al., 1999; Bleaney et al. (2001), Gemmell et al., 2011; Égert et al., 2009).

According to Kneller et al., (1999) an increase in productive expenditures, when financed by some combination of non-distortionary taxation and non-productive expenditure, significantly enhances growth, and an increase in distortionary taxation significantly reduces growth. The authors suggest that increasing productive expenditure or reducing distortionary taxes by 1% of GDP can modestly increase the growth rate (by between 0.1 and 0.2% per year). More recently, Katsimi and Sarantidis (2011) find that

⁸ These effects are due to the wage and labor costs pressures that government employment creates on the private sector. Taxation has negative effects on profits and investment, however the effect of government spending on investment is larger than that of taxes.

productive expenditures such as capital expenditures, as well as transport and communication expenditure are associated with higher profits, while unproductive ones like government spending on wages and salaries have negative effects on profits. Both direct and indirect taxations reduces profits. Égert et al. (2009) show that there is positive impact of infrastructure investment on growth (although this effect varies across countries and sectors and over time).

At the same time fiscal consolidations can be expansionary as relevant theory has shown (see Giavazzi and Pagano, 1990; Alesina and Ardagna, 1998; Alesina and Ardagna, 2010; and Alesina, 2010). According to these studies fiscal adjustments could affect demand positively through confidence and wealth effects and offset the usual growth reductions following an increase in taxes and a decrease in government expenditure (i.e., the so-called Keynesian effects). This in turn improves long-term refinancing conditions, the return (i.e., the crowding-in) of private investment and, thus, the prospects for long-term growth.⁹ However, these non-Keynesian effects are more likely to occur if the debt to GDP ratio is very high and/or if firms and consumers are not credit constrained.

These non-Keynesian effects of fiscal consolidation have highlighted the importance of the composition of fiscal consolidation. Adjustment efforts targeted more on unproductive public spending rather taxes appear to have more long lasting effects on the consolidation effort itself and on growth recovery (see e.g., Alesina and Perotti, 1995; Alesina and Ardagna, 2010). Blöchliger et al., (2012) point out that successful consolidation was driven by spending cuts and to a lesser extent by revenue increases. Nevertheless, Molnar (2012) finds that in large consolidation efforts multiple instruments (revenue and spending) should be used to ensure a successful outcome.

According to Sutherland et al., (2012) and Hagemann (2012), consolidation programmes should target spending programmes more effectively by trying to increase the efficiency and effectiveness of spending (e.g., health and education spending and

⁹ In the case of euro area countries in EU-IMF programmes the medium to long-term benefits on non-Keynesian effects of fiscal policy would be the return to capital markets. However, Perotti (2012) challenges the view that fiscal consolidations will be expansionary in euro-area EU-IMF programme countries because currency depreciation is not an available option in their policy toolkit.

spending on social policies) and eliminate distortions in taxation and re-orientate taxation to minimise distortions (broaden tax base, cut tax expenditures reduce labour taxes, increase property taxes and environmental taxes). Similarly Arnold et al. (2011) show that policies that could boost recovery and future growth involve increasing the tax base by paying more emphasis to consumption taxes and immovable property; at the same time they argue that a reduction in income taxes and social security taxes on low incomes could accelerate recovery.¹⁰

Nevertheless, in cases of high debt countries such as Greece, fiscal consolidation can have positive medium and long-term effects on growth because it reduces sovereign risk premiums and long-term interest rates. This in turn boosts investment, increases capital deepening and raises long-term potential growth (see Kumar and Woo, 2010; Cecheritta and Rother, 2010; Reinhart and Rogoff, 2010). In addition, spending or debt-based fiscal rules contribute to improving economic growth (Afonso and Jalles, 2013).

2.3 Recent studies on Greece

There have not been many empirical studies investigating the effects of fiscal policy in Greece. This is due to data issues and subsequent data revisions. Existing studies rely mostly on pre-2000 data. Angelopoulos and Philippopoulos (2007) examining the period 1960-2000 found that a smaller public sector would be good for growth in Greece. This result applies in particular to government consumption and wage spending; public investment, by contrast, is good for growth. Taxes do not seem to matter for growth. Lockwood et al. (2001), examining the period 1960-1997, find strong evidence of interaction between politics and fiscal policy in Greece. Post-1974, a period

¹⁰ According to Keen and Syed (2006) an increased reliance on VAT revenue tends to be associated with a sharp reduction in net exports that quickly fades. The authors attribute this to unrelated movements in consumption, and conclude that there are no trade effects from VAT in either the short or the long run. Moreover, Mooij and Keen (2012) report that a ‘fiscal devaluation’ which involves shifting from social contributions to VAT as a way of mimicking a nominal devaluation could improve the trade balance in the short-run (by reducing the price of exports and increasing the price of imports), but the effects eventually disappear because the exchange rate and nominal wages adjust in the long run. Even if the exchange rate is fixed, domestic wages will adjust, because workers realizing that their real wage is reduced by the increased VAT rate, they (or their unions) will aim to increase their nominal wages, moving the real producer wage back towards the pre-reform equilibrium (a process that any wage indexation, of course, would accelerate). Due to wage adjustment, fiscal devaluation will have no long-run impact on product or labor market outcomes.

of fiscal laxity started which became worse in the late 1970s and continued until the early 1990s. From 1993, there were efforts to reverse this process and stabilize public finances so as to gain entry into European Monetary Union. The authors find strong evidence of pre-election fiscal euphoria under all administrations during 1960-1992. That is, during that period, immediate pre-election years are characterized by higher government expenditures and debt, and lower taxes. Such political cycles have become weaker since 1993.

More recently and in view of Greece's sovereign debt financing problems and the need for an ambitious fiscal consolidation effort, there have been a couple of OECD and IMF studies which include empirical estimates on the effects of fiscal policy in Greece (see OECD, 2011; Ivanova and Weber, 2011). In addition, the IMF in its successive reviews of the Economic Adjustment Programme of Greece made public that it has revised upwards the overall fiscal multiplier to around 1 (IMF 2013a) from its previously assumed value of 0.5 in IMF (2012a).

Turning to the links between Greece's fiscal and external imbalances, Brissimis et al. (2012) find that in the period 1960-2007 current accounts in Greece are affected by factors such as fiscal balances, competitiveness, real convergence, private investment and macroeconomic uncertainty and financial liberalization. An increase in the fiscal deficit is only partially offset by an increase in private saving, thus widening the current account deficit and providing evidence in favour of the twin deficit hypothesis and against Ricardian equivalence.

Monokrousos and Thomakos (2012) find that the trend deterioration in the country's external imbalance in 1999-2008 is explained by: (a) accumulated loss of price competitiveness against main trade-partner economies; (b) pronounced fiscal policy relaxation following the euro adoption – in line with the “twin deficit” hypothesis; and (c) domestic financial deepening in the aftermath of the adoption of the euro.

3. Empirical methodology

3.1 Discretionary fiscal policy

In order to extract the exogenous discretionary component of fiscal policy variables, we rely on the fiscal policy rule literature (see e.g. Bohn 1998, Gali and Perotti, 2003, Tagkalakis, 2011a). As stated by Gali and Perotti (2003), the residuals of the fiscal policy rule correspond to the shock or exogenous discretionary component of fiscal policy. Moreover, Perotti (1999) and Tagkalakis (2008) follow a similar approach which involves extracting fiscal shocks from estimated quasi-VARs, which are then used to estimate the effect of fiscal policy on private consumption. More recently Afonso et al. (2010) and Agnello et al. (2013) based on Fatas and Mihov (2003, 2006) used a similar technique to obtain the discretionary component of government spending. The typical fiscal policy rule used to extract the exogenous discretionary component of fiscal policy is the following:

$$G_t = \alpha * G_{t-1} + \beta * Y_t + \gamma * pb_{t-1} + \delta * debt_{t-1} + \zeta * X_{t-1} + \eta * EDP_t + \mu + \varepsilon_t \quad (1)$$

G stands for the dependent (fiscal) variable¹¹, Y is real GDP growth, pb is the primary balance to GDP ratio, and debt stands for the public debt ratio. Each fiscal variable is assumed to be determined by previous period decisions or persistence effects (G_{t-1}), by real economic developments and by initial fiscal conditions. EDP is a dummy variable taking the value 1 in the quarters when Greece was in periods of enhanced surveillance (i.e., under the Excessive Deficit Procedure and in the context of the EAP) and zero otherwise¹²; μ is a constant term, ε is a well behaved error term.

X stands for the additional control variables used, such as the change in private non-residential investment to GDP ratio, the unemployment rate, the change in the ratio

¹¹ The dependent variables used are: the change ($\Delta \ln$) in real government spending, the change ($\Delta \ln$) in real government consumption spending, the change ($\Delta \ln$) in real government gross fixed capital formation, the change ($\Delta \ln$) in real net government transfers the ($\Delta \ln$) change in real government compensation to employees. In the case of the government revenue related fiscal rules the following dependent variables were used: the change ($\Delta \ln$) in real net taxes, the change ($\Delta \ln$) in real current taxes on income and wealth, and the change ($\Delta \ln$) to real VAT revenues (see Appendix A.1).

¹² Greece has been in excessive deficit procedure from 2004 Q3 till 2007 Q2 and from 2009 Q1 till today. Moreover, since 2010 Q2 the Greek economy is under enhanced surveillance by the EU and the IMF.

of the population of working age to total population, and the change in the ratio of total employment to population of working age (see Appendix for data information). These additional control variables are used only in some of the regressions because we consider that the fiscal policy maker takes them into account when forming his or her policy decision. Specifically, the change ($\Delta \ln$) in private non-residential investment/GDP is inserted in the two public infrastructure regressions (the one expressed as a percent of GDP and the one in real percentage changes). This implies that the fiscal policy maker takes into account the behaviour of private investment when deciding public investment for the coming years (e.g., there might be co-financing in some projects from the private and the public sector). The unemployment rate is incorporated into the fiscal policy rules for net transfers and public employment. This implies that the policy maker takes labour market developments into account when designing government transfer programmes for the years to come and when adjusting public employment. There is anecdotal evidence that differed layers of the public sector in Greece used to provide employment on a part-time, contract-based, or even on a permanent basis in times of distress (but also in good times).

The change ($\Delta \ln$) in the ratio of the population of working age/total population is included in the two equations for net government transfers in order to control for the fact that fiscal transfers could increase when a bigger fraction of the population is either young or old and therefore cannot work. The change ($\Delta \ln$) in the ratio of total employment/population of working age is incorporated in the taxes related fiscal rules and controls for the fact that net tax revenues could behave in a different manner when a bigger rather than a smaller fraction of the population of working age is employed.

In addition, the tax revenue regressions include the change ($\Delta \ln$) in real share prices and the change ($\Delta \ln$) in real house prices. As has been shown in the relevant literature (see e.g., Eschenbanch and Schucknect, 2002; Tagkalakis 2011; Agnello et al., 2012), share and house prices could impact on tax revenues and primary balance developments. An increase in asset prices could boost tax revenues. If asset prices are omitted from the fiscal policy rule, then the resulting increase in tax revenues will be (mistakenly) perceived as a positive tax shock.

Moreover, in the case of the tax revenue fiscal rules we control for the unemployment rate. It could be the case that an increase in unemployment reduces taxes revenues above and beyond the effect of the growth rate of real GDP. Last but not least, in all fiscal policy rules we incorporate an election dummy taking a value of 1 in the quarters when national elections were held (2002 Q2, 2004 Q1, 2007 Q3, and 2009 Q4) and zero otherwise. As is well established in the literature (e.g., Lockwood et al., 2001), during election times revenue collection is reduced, government spending spikes and primary balances go off track. Therefore, in order to extract the true unanticipated discretionary fiscal policy change we have to control for the effect of elections.

The fiscal policy rule is estimated by means of instrumental variables where the contemporaneous value of real GDP growth is instrumented by its first and second lagged values. We do that in order to control, to the extent possible, for the likelihood that growth is endogenous. We do that , We correct for endogeneity and automatic (within the quarter) cyclical effects by instrumenting real GDP growth with its lagged values. Cyclical effects are netted out because the direct and automatic link between contemporaneous quarterly fiscal and economic activity variables is broken when we incorporate lagged (instead of contemporaneous) values of economic activity.¹³

3.2 The macroeconomic effects of the discretionary components of fiscal policy

To analyse the effects of discretionary fiscal policy changes on economic activity on each GDP component we use the partitioned regression analysis described in Greene (2003) and Hayashi (2000), i.e., first we formulate our output growth (private consumption, private investment and net exports) regressions. Next we partial out any contemporaneous (and lagged) effects between the right-hand-side variables (including the discretionary fiscal policy component). This allows us to obtain the true partial effect of discretionary fiscal policy on each macroeconomic variable (i.e., the discretionary fiscal component is independent of any influence from the other right-hand-side variables).

¹³ The empirical findings are presented in the Appendix A.2 (see Table 1).

Starting from real per capita GDP we estimate a growth equation (as in Arnold et al., 2011; Cecchetti et al., 2011; Easterly and Rebello, 1993; Furceri and Zdzienicka, 2011; Gemmell et al., 2011, Kneller et al., 1999, Kumar and Woo, 2010) augmented with the fiscal policy components extracted from the aforementioned fiscal rules. Hence, our preferred specification resembles more the aforementioned studies than the SVAR literature.¹⁴ The baseline specification includes no fiscal variables and was used in order to identify the appropriate lag length. The chosen lag length is 2 and reflects the presence of a well-behaved error term. We start from an empirical specifications of the form:¹⁵

$$\Delta \ln Y_t = \mu + trend + \alpha * \Delta \ln Y_{t-1} + \beta * \Delta \ln Y_{t-2} + \sum_{j=1}^{N_c} \gamma_{js}(L) * \Delta \ln \Phi_{j,t} + \sum_{j=1}^{N_f} \delta_{js}(L) * \Delta \ln G_{j,t} + \varepsilon_t \quad (2)$$

Where $\gamma_s(L) = \sum_{k=0}^2 \gamma_{sk} L^k$ and $\delta_s(L) = \sum_{k=0}^2 \delta_{sk} L^k$ are second-order polynomials in the lag operator (L), Y stands for the growth rate ($\Delta \ln$) of real GDP per capita, μ is the constant term and trend refers to the time trend and ε is a well-behaved error term. The vector Φ includes the independent variables affecting real per capita GDP growth, where $N_c=5$. These variables are the change ($\Delta \ln$) in the ratio of total employment to population of working age, the change ($\Delta \ln$) in the ratio of population of working age to total population, the change ($\Delta \ln$) in trade openness, the private debt of households and non-financial corporations to GDP and the change ($\Delta \ln$) in the ratio of export prices to import prices (the terms of trade).

Hence, the baseline specification follows both neoclassical and endogenous growth models. The ratio of total employment to population of working age is included in the regression to control for the impact of the increased labor input on output growth. When the ratio of the population of working age to total population increases so does the

¹⁴ We do not adopt the SVAR methodology of Blanchard and Perotti (2002) on the following grounds: given the short dataset we would have to consider at a maximum a (2 lag) 4-5 variable VAR, where we would have to alternate each GDP component in the analysis. Although the SVAR setting allows us to treat all variables as endogenous, the current specification allows the study of each GDP component separately, including more relevant short as well as long-term determinants. This would not be possible in the SVAR setting, unless we consider 5 different SVARs, one for each macroeconomic variable. In addition, the current setting allows us to have estimates that are comparable to earlier studies focusing on the pre-2000 Greek data. As more quarterly macroeconomic and fiscal data become available both the SVAR and the current specification (as in Agnello et al. 2013) would provide better estimates. This is left for future research.

¹⁵ The empirical specifications for the growth rate of private consumption, private non-residential and residential investment, and net exports are presented in the Appendix A.3. In Tables 2-3 we present the findings for the baseline specifications without fiscal variables.

availability of working age labor input which can boost growth.¹⁶ At the same time an increase in the number of working age population if it is linked to higher fertility rate can be associated negatively with GDP growth if it implies lower resources for the production of goods. An increase in trade openness and improved terms of trade are usually associated with higher output growth. In case of trade openness higher output growth can be promoted because of easier access to knowledge and technological developments, exploitation of scale economies and comparative advantage in exportable sectors. While positive effect of the terms of trade on growth results from the fact that an increase in the relative price of exports implies a transfer of income to the domestic economy. The private debt to GDP ratio reflects in part past investment decisions which can be associated with higher future capital and higher growth. At the same time it reflects improved access to credit which contributes to higher output growth.^{17,18} According to IMF(2013b) real private sector credit growth has been declining since 2011 in Greece and is expected to remain in negative territory till 2015, putting at risk the soundness of the projected economic recovery (from 2014 onwards).

The vector G includes unanticipated discretionary fiscal policy shocks, i.e., the innovations extracted from the fiscal policy rules. In line with Kneller et al., (1999), Gemmell et al., (2011), Perotti (1999) and Tagkalakis (2008), we incorporate simultaneously into the analysis both spending and revenue variables to better control for their possible interaction and impact on economic activity (i.e. $N_f=2$). For example, the effect of a government spending increase is different when it is followed by a tax hike in order finance increased spending.¹⁹

¹⁶ However, an increase in old-age means also increased saving and increased physical capital which can boost growth.

¹⁷ Due to the small time spanned by our analysis and the quarterly frequency of the data, we abstract (as in e.g., Furceri and Zdzienicka, 2011) from including explicit human capital measures which are more relevant for analyzing the effect on growth in annual data covering several decades.

¹⁸ There might be other factors that improve growth performance, such as improvements in institutions; these are captured by the time trend.

¹⁹ More specifically, when we include in the analysis the change ($\Delta \ln$) in various real spending categories, we control for revenue developments by including the change ($\Delta \ln$) in real net taxes. Similarly, in the case of taxes when we include the change in various real tax categories, we control for the change in real government spending.

As stated above, we want to extract the true partial effect of discretionary fiscal shocks in eq.(2) and this implies the need to ensure that any correlation (contemporaneously and with lags) between the right-hand-side (RHS) variables is netted out. In order to achieve that and following earlier studies (see Greene, 2003; Hayashi, 2000; Konstantinou and Tagkalakis, 2011), we implement a partial regression analysis in eq. (2). For example, to estimate the effects of the change of government spending on real per capita GDP growth, we first partial out the linear effects of both current and lagged values of the remaining RHS variables including the time trend; letting the English alphabet letter a, b, and c denote the coefficient estimates of these new “pure” variables, we then estimate:

$$\Delta \ln Y_t = \mu + a * \Delta \ln Y_{t-1} + b * \Delta \ln Y_{t-2} + \sum_{j=1}^{N_c} c_{js} (L) * \Delta \ln g_{j,t} + \eta_t \quad (3)$$

where again $c_s (L) = \sum_{k=0}^2 c_{sk} L^k$ is second-order polynomials in the lag operator (L).²⁰

4. Empirical findings

In this section we summarize the estimated effects of discretionary unanticipated fiscal policy changes on economic activity (real GDP) and its subcomponents, i.e., private consumption, private non-residential investment, housing investment, and net exports. The results are shown in Tables 4-13.²¹

An increase in real government spending boosts output growth (see Table 4). More specifically, a 1% increase in real government spending raises real per capita GDP growth by about 0.10% to 0.15% (respectively, in the short and long run). Turning to the economic activity sub-components we see that (as for output growth) it has positive effects on private consumption and net exports, but it has negative effects on both investment components (with the crowding out effect being at play here). However, in all

²⁰ The short-run effects are estimated as the total short-run impact of the variable of interest, namely for each variable s as: $c_{s,t} + c_{s,t-1} + c_{s,t-2}$, whereas the long-run effects are estimated as the total long-run impact of the variable of interest, namely $[(c_{s,t} + c_{s,t-1} + c_{s,t-2}) / (1-a-b)]$. By construction, the partition regression estimates ensure there is no issue of generated regressors. The same applies for the regressions for private consumption, private residential and non-residential investment and net exports presented in Appendix A.3.

²¹ The full set of findings is presented in Appendix A.3.

four cases the coefficient estimate of real government spending is not particularly significant (see Tables 4, 6, 8, 10 and 12).

A net tax hike, controlling for government spending, has negative effects on output growth and all its subcomponents. However, the effect is statistically significant only in the case of private consumption and housing investment. A 1% increase in real net taxes lowers the growth rate of private consumption per capita by about 0.15%-0.20% (or 0.11-0.14 p.p. of GDP taking into account that the average share of private consumption to GDP is 72%) and the growth rate of housing investment per capita by about 0.26%-0.48% (or 0.02-0.03 p.p. of GDP taking into account that the average share of housing investment to GDP is 7%), respectively, in the long and short run (see Tables 4, 6, 8, 10 and 12).

Note that a tax hike leads to two opposing effects. First, the income effect lowers domestic incomes and reduces domestic demand and demand for imports, improving the trade balance. Second, increases in taxation imply higher labour costs and higher tax burden in general (the cost effect), which translate into lower competitiveness that worsens export performance and causes the trade balance to deteriorate. The second effect dominates in the case of net exports (but the coefficient estimate is not particularly significant).

An increase in real government consumption boosts the growth rate of real per capita GDP. Namely, a 1% increase in the government consumption leads to a 0.20-0.22% increase in growth rate of real per capita GDP (see Table 4). The increase in real government consumption has positive effects on private consumption and non residential investment, and negative effects on housing investment, whereas net exports are not affected. In more detail, a 1% increase in the government consumption raises real private consumption per capita by 0.20-0.33% (0.14-0.24 p.p. of GDP), and private non residential investment by 1.3% in the short run (or about 0.013 p.p. of GDP taking into account that the average share of private non-residential investment to GDP is 10%), while reducing housing investment by 1.8%-3.4% (or about 0.13-0.24 p.p. of GDP), respectively in the long and short run (see Tables 6, 8, 10 and 12).

Controlling for spending developments in government consumption, we find that a tax rise impacts negatively on real GDP and all economic activity components in line with the Keynesian view. However, the effect is statistically significant only in the case of real GDP and housing investment. A 1% increase in real net taxes lowers per capita output growth by about 0.05-0.06% (see Table 4) and housing investment by about 0.87%-1.72% (or 0.06-0.12 p.p. of GDP), respectively in the long and short run (see Table 10).²²

As a next step we examine several spending subcategories, while controlling for net taxes. An increase in public investment have negative effects on output growth, private consumption, private non-residential investment. However, the coefficient estimates are statistically significant only in the case of private non-residential investment. By contrast, a pick up in public investment boosts net exports and residential investment (but the effect is significant only in the case of net exports).

In particular, a 1% increase in real gross fixed capital formation lowers private non residential investment growth by about 0.30%-0.52% or 0.03-0.05 p.p. of GDP (in line with the crowding out Keynesian argument), and raises net export to GDP ratio by about 0.22-0.37 p.p. of GDP, respectively, in the long and short run (see Tables 8 and 13). Hence, public investments, while crowding out private non-residential investment, do improve the productive capacity of domestic economy facilitating exports.²³ As previously, controlling for public investment changes, a pick up in real net taxes reduces output growth and all its subcomponents.

An increase in net government transfers raises output growth (by about 0.15% in the short run), as well as non-residential investment (by about 1.0%-1.4% or 0.1-0.14 p.p. of GDP, respectively in the long and short run). The coefficient estimates in the equations for the other components are not statistically significant. Increases in net transfers - that are considered as non-productive spending - fail to increase private consumption.

²² In the case of net exports the income effect that lowers import demand (and improves net exports) is outweighed by the cost effect that is associated with higher tax burden for firms which reduces exports (and reduces net exports).

²³ Alternatively, when spending increases and at the same time new taxes are imposed to finance the expansion the overall effect on net exports ratio is positive.

Controlling for net transfers, an increase in net taxes lowers most components of economic activity in a statistically significant manner (see Tables 4, 6, 8, 10 and 12).

An increase in the compensation of government employees (wage bill), though the Keynesian channel of higher domestic demand, has a positive and statistically significant effect on real GDP, private consumption, and marginally significant positive effect on net exports. While the effect on residential investment is negative and the effect on non-residential investment is not significant. Specifically, a 1% increase in compensation of government employees can boost output growth by about 0.14% to 0.18% (respectively in the short and long run), private consumption by about 0.24-0.48% or 0.17-0.35 p.p. of GDP (respectively in the long and short run), and net exports by about 1.03 p.p. of GDP (in the short run). While housing investment declines by about 1.5% to 2.9% or 0.1-0.2 p.p. of GDP (respectively in the long and short run); see Tables 4, 6, 8, 10 and 12.

The positive effect on growth and private consumption is explained by the direct demand effect (increased consumption from public sector workers that spills over to the rest of the economy). However, the positive and marginally significant effect on net exports is puzzling for two reasons. First, one would expect the trade balance to deteriorate following an expansionary fiscal policy action that boosts domestic demand which subsequently increases the demand for imports. Second, the expansion in the government wage bill, increases the wage pressure in the private sector raising labour costs (Alesina et al. 2002; Lane and Perotti 1998; 2003) which in turn worsens competitiveness and reduces exports.

However, net exports could increase if the better employment opportunities in the public sector could provide incentives to private sector employees to exert effort in order to achieve similar wage contracts something that could improve productivity and the quality of exports. Moreover, it could also induce exporting firms to improve employment conditions in the private sector in order to keep the most productive workers in place, which in turn leads to a productivity improvement, and in the enhancement of the quality exports and the likely increase in the net export ratio.

Alternatively, an increase in the government wage bill could be followed by higher future taxation and/or future fiscal troubles. This would depress demand and spending reducing import demand and improving the net exports ratio. A pick up in net taxes, controlling for the government wage-bill developments is associated negatively (though not always significantly) with all economic activity components.

Next we investigate disaggregated tax components (current taxes on income and wealth and VAT), while controlling for government spending developments. An increase in current taxes on income and wealth (or direct taxes) lowers all components of economic activity, and increases net exports (in line with the conventional wisdom that higher taxes lower disposable income and import demand and hence improve the trade balance); see Tables 5, 7, 9, 11 and 13.

A 1% direct tax hike lowers (focusing only on the statistically significant coefficient estimates) output growth by 0.1% (in the short run), and private consumption by about 0.32-0.34% or 0.23-0.24 p.p. of GDP (respectively in the long and short run), while raises the net exports ratio by about 0.48-0.73 p.p. of GDP (respectively in the long and short run).²⁴ Controlling for these tax policy changes, higher government spending increases per capita GDP growth (see Table 5).

A VAT tax hike has negative effects on economic activity, private consumption and private non-residential investment, while it has insignificant impact effects on the remaining components); see Tables 5, 7, 9, 11 and 13. In more detail, a 1% increase in real VAT revenues reduces output growth by 0.12-0.16%, private consumption by about 0.19% to 0.30% or 0.14-0.22 p.p. of GDP, and private investment by about 1.9%-2.9% or 0.2-0.3 p.p. of GDP (respectively in the long and short run). Controlling for the VAT tax hikes a spending increase raises output growth and private consumption.

²⁴ A direct tax hike has negative but insignificant effects on both private residential and non-residential investment in line with the argument suggested by Alesina et al (2002), i.e., an increase in labour taxes induces workers to demand higher pre-tax wages, reducing profits and investment spending.

5. Conclusions

This paper investigates the effects that discretionary fiscal policy changes have on economic activity in Greece in the period 2000-2011. It brings together several strands of the literature that investigate the short and long-run effects of fiscal policy on economic activity and the literature on fiscal policy rules.

The exogenous discretionary government spending and tax revenue changes are approximated by residuals extracted from augmented fiscal policy rules. These are then incorporated into the partition regression analysis in order to estimate the effects of various government spending and tax revenue components on real GDP, private consumption, private residential and non residential investment and net taxes.

Overall, what comes out of the analysis is that discretionary fiscal policy changes have Keynesian type effects. Increases in government spending boost demand components and output growth, while tax hikes lower disposable income and private spending. Government consumption spending has the most pronounced positive effects on output growth, private consumption and non-residential investment, while it has negative effects on residential investment. Increases in the government wage bill boost private consumption and output growth, but lower residential investment. Higher net transfers raise private investment and output growth. Public investment crowds out private investments, but is associated positively with the net export ratio. Both indirect and direct tax hikes lower disposable income and discourage spending, in particular, private consumption, private investment and output growth. However, direct tax hikes by lowering disposable income, they decrease import demand, thus, improving the trade balance.

Hence, given that the fiscal consolidation effort under the EAP has targeted spending cuts in government consumption, the wage bill, and social transfers and was accompanied by both direct and indirect tax hikes our findings verify that it did negatively affect real per capita GDP. At the same time, the direct tax hikes, in particular, have contributed to improving the net export position of the Greek economy. Moreover,

our findings do not provide support in favour of the expansionary fiscal consolidation hypothesis in Greece.²⁵

²⁵ There a number important aside finding (see Appendix A.3): (1) A more outward oriented economy, with improved terms of trade can contribute towards achieving a higher level of well-being for the Greek society. (2) A well developed financial system where there is easy access to credit to finance investment and consumption activities of the private sector has a strong positive association with the growth rate of real per capita investment, consumption and GDP. (3) On account of Greece's import dependence a well developed financial sector (improved access to credit) facilitates import demand and lowers net export to GDP ratio.

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APPENDIX

A.1 Data information

Using quarterly data for the period 2000-2011 we focus on the period that Greece was part of the euro area. Greece became part of the euro area on 1st January 2001 but its euro entry was already decided in 2000, therefore we start our data set in 2000 because expectations that euro area entry would occur were already formed.

Another reason to look at the post-2000 era relates to the fact it is only since 2000 that the statistical authorities of Greece have started the production and dissemination of quarterly non interpolated fiscal and economic activity data. It should be noted that all data have been approved by Eurostat, i.e., the data used in the analysis are not subject to any statistical deficiencies (see Eurostat, 2012).

Unfortunately we could not consider cash data (as e.g. Giordano et al, (2007) do for the case of Italy) because the available cash data that go back to the pre-2000 period cover only the central government, excluding general government entities like social security funds, local authorities and public enterprises. It should be recalled that the fiscal data problems that were identified in late 2009 and early 2010 were mainly related to deficiencies in data collection and reporting in these general government entities. Hence, if we had chosen to use these central government cash data then our fiscal data would not be fully representative of all general government operations that were undertaken. This would have allowed us to correctly assess the output effects of fiscal policy operations. At the same time it should be mentioned that since 2012 the General Accounting Office of the Hellenic Ministry of Finance does produce high quality cash general government data on a monthly basis. This is acknowledged in the latest European Commission assessment (European Commission 2012c).

The macroeconomic and fiscal data used in the analysis were all taken from the International Financial Statistics of the International Monetary Fund (IMF, 2012b), the OECD Economic Outlook and the OECD Quarterly National Accounts (OECD, 2012a, 2012b). The house price data are from the Bank of Greece (2012).

To correct for seasonal patterns in the quarterly data we have applied the census X12 filter. The fiscal variables used are: the primary balance to GDP ratio, the debt to GDP ratio. In addition the following government spending and revenue variables were first expressed in logarithmic terms (\ln), and were transformed in log differences ($\Delta \ln$) from t to $t-4$: real government spending, real government consumption spending, real government gross fixed capital formation, real net government transfers, real government compensation of employees, real net taxes, real current taxes on income and wealth, real VAT revenues.

Government spending and revenue variables were expressed in real terms after subtracting the log of the GDP deflator. For example in case of real government spending we have $\Delta[\ln(\text{government spending}) - \ln(\text{GDP deflator})]$ etc.

Net taxes are total revenue minus interest receipts minus capital revenue minus net government transfers. Net government transfers are government transfers paid minus those received.

We examine the effect of the fiscal variables on real per capita GDP growth, the growth of real per capita private consumption, real per capita private non-residential investment, real per capita residential investment, the percentage change in the net export to GDP ratio, the percentage change in private sector employment and the percentage change in unemployment. Real per capita GDP growth is constructed as follows: $\Delta[\ln(\text{GDP}) - \ln(\text{GDP deflator}) - \ln(\text{population})]$, where Δ stands for the difference from t to $t-4$. Similarly the growth rate of real per capita private non-residential investment is $\Delta[\ln(\text{private non residential investment}) - \ln(\text{GDP deflator}) - \ln(\text{population})]$, the growth rate real per capita residential investment is $\Delta[\ln(\text{residential investment}) - \ln(\text{GDP deflator}) - \ln(\text{population})]$, the percentage change in the net export to GDP ratio is $\Delta[\ln\{(\text{exports}) - \ln(\text{GDP})\} - \{\ln(\text{imports}) - \ln(\text{GDP})\}]$, the percentage change in private sector employment $\Delta[\ln(\text{private sector employment})]$ and the percentage change in unemployment $\Delta[\ln(\text{number of unemployed})]$.

We also incorporated into the analysis the following variables: the percentage change in real house prices $\Delta[\ln(\text{house prices}) - \ln(\text{GDP deflator})]$, the percentage change

in real share prices $\Delta[\ln(\text{share prices}) - \ln(\text{GDP deflator})]$, the growth rate of real net disposable income per capita $\Delta[\ln(\text{net disposable income}) - \ln(\text{GDP deflator}) - \ln(\text{population})]$, the private debt of households and non profit institutions servicing households as a ratio of GDP, and the percentage change in real domestic credit to the private sector as a ratio of GDP ($\Delta[\ln(\text{domestic credit to private sector}) - \ln(\text{GDP deflator})]$), the growth rate of real gross operating surplus per capita $\Delta[\ln(\text{gross operating surplus per capita}) - \ln(\text{GDP deflator}) - \ln(\text{population})]$, private debt of non-financial corporations to GDP, the percentage change in real effective exchange rate in ULC terms $\Delta[\ln(\text{real effective exchange rate})]$, the growth rate in real GDP per working age population $\Delta[\ln(\text{GDP}) - \ln(\text{GDP deflator}) - \ln(\text{population of working age 15-64})]$.

And the following variables: the percentage change in real GDP per working age population in the OECD $\Delta[\ln(\text{GDP OECD}) - \ln(\text{GDP deflator OECD}) - \ln(\text{population of working age 15-64 OECD})]$, the ratio of domestic credit to private sector to GDP, and the percentage change in crude oil prices in euro terms $\Delta[\ln(\text{price of crude oil in euro terms})]$, the growth rate of real GDP $\Delta[\ln(\text{GDP}) - \ln(\text{GDP deflator})]$, the percentage change in labour force participation $\Delta[\ln(\text{total employment} + \text{unemployment}) - \ln(\text{population of working age 15-64})]$, the percentage change in real wages $\Delta[\ln(\text{monthly earnings}) - \ln(\text{GDP deflator})]$, the percentage change in terms of trade $\Delta[\ln(\text{price of exports on goods and services/price of imports on goods and services})]$, and the ratio of manufacturing employment to total employment $[\ln(\text{manufacturing employment/total employment})]$, the percentage change in the ratio of total employment to population of working age $\Delta[\ln(\text{total employment}) - \ln(\text{population of working age 15-64})]$, the change in the ratio of population of working age to total population $\Delta[\ln(\text{population of working age 15-64}) - \ln(\text{total population})]$, the change in trade openness $\Delta[\ln(\text{exports+imports}) - \ln(\text{GDP})]$, the private debt (households and nonprofit institutions servicing households + non financial corporations) to GDP.

In addition, in the fiscal policy rules specifications we also used the following variables: the percentage change in private non-residential investment to GDP ratio $\Delta[\ln(\text{private non residential investment}) - \ln(\text{GDP})]$ and the unemployment rate. The election dummy variable takes value 1 in the quarters that national elections were held

(2002 Q2, 2004 Q1, 2007 Q3, and 2009 Q4) and zero otherwise. The EDP dummy variable takes value 1 from 2004 Q3 to 2007 Q2 and from 2009 Q1 till the end of the sample.²⁶

A.2 Fiscal policy responses –main findings

In the period under joint EU-IMF surveillance a counter cyclical fiscal tightening of the primary balance is the norm in Greece, with spending falling and net taxes increasing as GDP contracts (see European Commission, 2012).²⁷ However, our findings for the period 2000-2011 indicate that fiscal policy responded in a pro-cyclical manner in the period 2000-2011, with the fiscal position improving when real GDP is on the rise. In particular, real government spending does not respond to output growth movements, while net taxes increase following an output growth pick up (a 1% increase in real GDP growth raises net taxes by about 2.5%- Table 4). This implies that overall fiscal policy responded in a pro-cyclical manner in the period 2000-2011, with the fiscal position improving when real GDP is on the rise. Looking at the individual spending and tax components we find significant evidence that government consumption declines in a countercyclical manner when output growth improves (a 1% increase in real GDP leads to a 1.5% decline in real government consumption). Net transfers and compensation of employees show a negative but non significant response, whereas there is some evidence that public investment shows a positive co-movement with real GDP growth. Both current taxes on income and wealth (direct taxes) and VAT revenue have insignificant coefficient estimates. Though, direct taxes appear to have a negative and VAT revenue a positive association with real GDP.

As far as fiscal policy persistence is concerned we find that government consumption and net taxes are characterized by a positive and statistically significant persistence effect (lagged dependent variable). The initial budgetary conditions affected

²⁶ The descriptive statistics of the variables used in the analysis are not presented here due to space limitations.

²⁷ European Commission, 2012. Second Economic Adjustment Programme for Greece- First Review, December, Occasional Papers 123.

the fiscal policy behaviour of Greek authorities in 2000-2011. An increase in the debt to GDP ratio is followed by statistically significant decreases in government consumption and compensation of employees. While an increase in the debt ratio is associated negatively with current taxes on income and wealth and positively with VAT revenues.

Most spending and tax variables are not particularly reactive to the initial conditions in the primary balance ratio, while net taxes do respond negatively and significantly when primary balances improve. This implies that immediately after correcting a fiscal imbalance or improving temporarily the primary balance, the fiscal authorities immediately distributed the positive dividend via lower taxes, despite the high level of the debt ratio. A brief look at the additional control variables included in the fiscal policy rules we find that real share and real house prices have a positive effect on all tax categories, but their coefficient estimates are only statistically significant in the case of VAT revenues. Private non-residential investment and the unemployment rate have insignificant coefficient estimates. Whereas an increase in the share of the population of working age to total population decreases the need for government transfers to young and old age, but the coefficient estimate we find is not statistically significant. Contrary to what one might have expected an increase in the share of employment to population of working age (employment share) is associated negatively with net taxes. This could possibly reflect the higher share of self-employed individuals in Greece, that are usually characterized by low tax compliance.

Last but not least, election periods have quite significant negative effects on Greek public finances. In times of elections spending is increased, in particular, spending on government consumption and on compensation of employees. Interestingly, productive spending such as public investment is correlated negatively with the election dummy, though the coefficient estimate is not significant. Taxes decline in election periods, driven primarily by VAT revenues, i.e., the tax collection mechanism and tax controls relax in election periods increasing tax evasion. However, this effect is not visible in case of current taxes on income and wealth.

After having controlled for the role of initial fiscal conditions, GDP effects and other variables there is no significant additional effect coming from the Excessive Deficit

Procedure (EDP) dummy variable on government spending and tax components (on the contrary, VAT revenues declined and government consumption increased).

Table 1: Fiscal policy rules used to extract discretionary components of fiscal policy changes

Dependent variable:	Change in real government spending	Change in real government consumption spending	Change in real government gross fixed capital formation	Change in real government net transfers	Change in real government compensation of employees	Change in real government net taxes	Change in real government current taxes on income and wealth	Change in real VAT
Growth rate of real GDP (t)	-0.072 (-0.04)	-1.485 (-1.80)*	3.0616 (1.65)	-1.889 (-0.97)	-1.185 (-1.52)	2.497 (1.75)*	-2.533 (-1.31)	1.293 (1.10)
Primary balance/GDP (t-1)	0.0008 (0.14)	0.006 (1.40)	0.003 (0.23)	0.016 (1.28)	0.001 (0.20)	-0.035 (-3.49)***	-0.012 (-1.19)	-0.011 (-1.47)
Dependent variable(t-1)	0.409 (1.65)	0.803 (3.93)***	0.238 (0.77)	0.146 (0.83)	0.452 (1.44)	1.059 (4.27)***	0.004 (0.01)	0.022 (0.12)
Gross debt/GDP(t-1)	-0.002 (-1.03)	-0.004 (-2.22)**	0.001 (0.28)	-0.0001 (-0.04)	-0.004 (-2.54)**	-0.002 (-0.64)	-0.009 (-2.12)**	0.005 (1.71)*
Change in real house prices(t-1)						0.293 (0.50)	0.598 (0.87)	0.922 (2.23)**
Change in real share prices(t-1)						0.004 (0.06)	0.063 (1.06)	0.168 (2.95)***
Change in private non residential investment/GDP (t-1)			0.183 (0.52)					
Unemployment rate (t-1)				0.001 (0.09)		0.018 (1.66)	0.014 (1.08)	0.004 (0.42)

Table 1: (Continued)

Change in the population of working age/total population(t-1)				-47.994 (-1.20)				
Change in total employment/population of working age (t-1)						-2.451 (-1.98)*	-0.545 (-0.41)	0.288 (0.26)
EDP	0.007 (0.33)	0.030 (1.76)*	-0.033 (-0.54)	-0.105 (-1.26)	0.006 (0.30)	0.003 (0.09)	0.050 (1.49)	-0.091 (-2.75)***
Elections	0.097 (1.51)	0.111 (2.10)**	-0.081 (-1.40)	0.035 (0.93)	0.088 (2.15)**	-0.068 (-1.46)	0.034 (1.01)	-0.081 (-3.16)***
Constant	0.248 (0.98)	0.439 (2.23)**	-0.191 (-0.37)	0.101 (0.34)	0.475 (2.70)**	-0.112 (-0.47)	0.906 (2.18)**	-0.631 (-1.93)*
No. of Obs.	41	41	41	41	41	41	41	41
R-square	0.5719	0.5291	0.5003	0.0969	0.3746	0.5600	0.3220	0.6344
Endogeneity tests chi2(1)/ F(1,35) (p-values)	0.557593 (p = 0.4552)/0.431623 (p = 0.5157)	4.27261 (p = 0.0387)/ 3.32118 (p = 0.0775)	2.15175 (p = 0.1424)/ 1.80438 (p = 0.1886)	4.71804 (p = 0.0298)/ 5.79927 (p = 0.0222)	4.44082 (p = 0.0351)/ 4.21794 (p = 0.0480)	5.31014 (p = 0.0212)/ 4.78065 (p = 0.0370)	0.74733 (p = 0.3873)/0.534104 (p = 0.4708)	1.50283 (p = 0.2202)/ 1.03418 (p = 0.3176)
Partial R2	0.2674	0.2653	0.3573	0.2362	0.3743	0.2501	0.1310	0.2070
chi2(1) of over-identifying restrictions	1.83836 (p = 0.1751)	0.982564 (p = 0.3216)	0.791859 (p = 0.3735)	0.536902 (p = 0.4637)	0.534009 (p = 0.4649)	0.877272 (p = 0.3489)	0.262156 (p = 0.6086)	0.260484 (p = 0.6098)

Notes: IV 2sls regressions - The growth rate of real GDP (t) has been instrumented with its first and second lagged values. Robust standard errors. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively.

A.3 Economic activity and subcomponents: empirical specifications and findings for the control variables

A.3.1 Economic activity and sub-components: Empirical specifications

A.3.1.1 Private consumption

The equation estimated resembles a consumption function augmented with fiscal policy variables extracted from the aforementioned fiscal rules, it is based on earlier studies e.g., Attanasio (1999), Peek (1983), Skinner (1994, 1996), Carroll and Kimbal (1996), Carroll et al. (2011), Ludvigson and Steindel (1999) Ludwig and Slok (2004) Perotti (1999), Grant and Peltonen (2008) and Tagkalakis (2008). The baseline specification includes no fiscal variables and is used in order to identify the appropriate lag length. The chosen lag length is 2 and reflects the presence of well behaved error term. We start from an empirical specifications of the form:

$$\Delta \ln C_t = \mu + trend + \alpha * \Delta \ln C_{t-1} + \beta * \Delta \ln C_{t-2} + \sum_{j=1}^{N_c} \gamma_{js}(L) * \Delta \ln \Phi_{j,t} + \sum_{j=1}^{N_f} \delta_{js}(L) * \Delta \ln G_{j,t} + \varepsilon_t \quad (A.1)$$

Where $\gamma_s(L) = \sum_{k=0}^2 \gamma_{sk} L^k$ and $\delta_s(L) = \sum_{k=0}^2 \delta_{sk} L^k$ are second-order polynomials in the lag operator (L), C stands for the growth rate ($\Delta \ln$) of real private consumption per capita, μ is the constant term and trend refers to the time trend and ε is a well-behaved error term. The vector Φ includes the independent variables affecting the real per capita private consumption growth rate, where $N_c=5$. These variables are the percentage change ($\Delta \ln$) in real house and real share prices, the percentage change ($\Delta \ln$) in real net disposable income per capita, households' private debt to GDP ratio, and the percentage change ($\Delta \ln$) in domestic credit to the private sector.²⁸

To estimate the effects of the change in a fiscal variable ($\Delta \ln g$) on real per capita private consumption growth rate, we first partial out from both the linear effects of current and lagged values of the rest of RHS variables including the time trend; letting the English alphabet letter a, b, and c denote the coefficient estimates of these new “pure” variables, we then estimate:

$$\Delta \ln C_t = \mu + a * \Delta \ln C_{t-1} + b * \Delta \ln Y_{t-2} + \sum_{j=1}^{N_c} c_{js}(L) * \Delta \ln g_{j,t} + \eta_t \quad (A.2)$$

²⁸ Real house and real share prices are included in the regression in order to control for the wealth effect on private consumption (marginal propensity to consume out of wealth); net disposable income controls for the income effect (marginal propensity to consume out of income). Households' private debt to GDP ratio and the growth of domestic credit to the private sector control for the availability of credit (easiness of monetary conditions) and the impact it had on the increase in private consumption in Greece in the period 2000-2011. The vector G includes fiscal variables.

Where again $c_s(L) = \sum_{k=0}^2 c_{sk} L^k$ is second-order polynomials in the lag operator (L).

A.3.1.2 Private residential and non-residential investment

The baseline equation estimated resembles a q type investment equation studied previously in the literature (see e.g., Abel and Blanchard 1986; Alesina et al 2000; Caballero 1999; Gilchrist and Himmelberg 1995). The dependent variable is the growth rate of private investment per capita. The baseline specification includes no fiscal variables and was used in order to identify the appropriate lag length. The chosen lag length is 2 and reflects the presence of a well-behaved error term. Our empirical specifications is of the form:

$$\Delta \ln I_t = \mu + trend + \alpha * \Delta \ln I_{t-1} + \beta * \Delta \ln Y_{t-2} + \sum_{j=1}^{N_c} \gamma_{js}(L) * \Delta \ln \Phi_{j,t} + \sum_{j=1}^{N_f} \delta_{js}(L) * \Delta \ln G_{j,t} + \varepsilon_t \quad (A.3)$$

Where $\gamma_s(L) = \sum_{k=0}^2 \gamma_{sk} L^k$ and $\delta_s(L) = \sum_{k=0}^2 \delta_{sk} L^k$ are second-order polynomials in the lag operator (L), I stands for the growth rate ($\Delta \ln$) of real private non-residential investment per capita, μ is the constant term and trend refers to the time trend and ε is a well-behaved error term. The vector Φ includes the independent variables affecting the real per capita private non-residential investment growth rate, where $N_c=5$. These variables are: the percentage change ($\Delta \ln$) in real house and real share prices, the percentage change ($\Delta \ln$) in real gross operating surplus per capita, the ratio of private debt of non financial corporations to GDP, and the percentage change ($\Delta \ln$) in domestic credit to private sector.²⁹

As before we in order to estimate the effects of a change in a fiscal variable ($\Delta \ln g$) on the growth of real per capita private investment, we first partial out from both the linear effects of current and lagged values of the rest of RHS variables including the time trend; letting the English alphabet letter a, b, and c denote the coefficient estimates of these new “pure” variables, we then estimate:

$$\Delta \ln I_t = \mu + a * \Delta \ln I_{t-1} + b * \Delta \ln Y_{t-2} + \sum_{j=1}^{N_c} c_{js}(L) * \Delta \ln g_{j,t} + \eta_t \quad (A.4)$$

Where again $c_s(L) = \sum_{k=0}^2 c_{sk} L^k$ is second-order polynomials in the lag operator (L).

²⁹ Real share prices are included in the regression in order to control, as proxies, for marginal q, while real house prices control for possible interactions with the housing market. The gross operating surplus controls for the effect of profit on investment decisions. The ratio of private debt of non-financial corporations to GDP and the growth of domestic credit both control for the availability of credit (and the easiness of monetary conditions) and the impact that it had on private non-residential investment in Greece in the period 2000-2011. The vector G includes fiscal variables

Turning to residential investment, we estimate two specifications for housing investment analogous to equations (A.3) and (A.4) augmented with discretionary components of fiscal policy changes. The dependent variable is the growth rate of housing investment per capita. The control variables used are: the percentage change in real house and real share prices, the percentage change in real net disposable income per capita, private debt of households to GDP, and the percentage change in domestic credit to private sector. The baseline specification resembles housing investment functions studied previously in the literature (see e.g. Egebo et al 1990; Jacobsen et al 2007; Donatos 1995 etc), augmented with fiscal policy variables.³⁰³¹

A.3.1.3 Net exports to GDP

Our preferred baseline specification follows closely studies such as Lane and Perotti (1998, 2003) Keen and Syed (2006) , Mooij and Keen (2012) as well as previous studies on Greece, such as Brissimis et al. (2010), Monokroussos and Thomakos and (2012). The dependent variable is the change in the net exports to GDP ratio. The baseline specification includes no fiscal variables and was used in order to identify the appropriate lag length. The chosen lag length is 2 and reflects the presence of well behaved error term. We estimate an empirical specification of the form:

$$\Delta \ln NX_t = \mu + trend + \alpha * \Delta \ln NX_{t-1} + \beta * \Delta \ln NX_{t-2} + \sum_{j=1}^{N_c} \gamma_{js}(L) * \Delta \ln \Phi_{j,t} + \sum_{j=1}^{N_f} \delta_{js}(L) * \Delta \ln G_{j,t} + \varepsilon_t \quad (A.5)$$

Where $\gamma_s(L) = \sum_{k=0}^2 \gamma_{sk} L^k$ and $\delta_s(L) = \sum_{k=0}^2 \delta_{sk} L^k$ are second-order polynomials in the lag operator (L), NX stands for the change (Δ) in the net exports to GDP ratio, μ is the constant term and trend refers to the time trend and ε is a well behaved error term. The vector Φ includes the independent variables affecting the net exports ratio, where $N_c=5$. These variables are: the percentage change ($\Delta \ln$) in real effective exchange rate in ULC terms, the growth rate ($\Delta \ln$) of real GDP per working age population, the growth rate ($\Delta \ln$) of real GDP

³⁰ Housing investment and net disposable income are expressed in per capita terms to net out any population effects on housing investment demand.

³¹ Real house prices control for house price developments, real share prices are included in order to control for alternative financial type of investments – which could be considered substitutes. The net disposable income controls for the income effect. Private debt of households to GDP ratio controls for the level of households' liabilities, i.e., an overexposed household sector could be associated with lower housing investment. Finally, the growth rate of domestic credit controls for the availability of credit and easiness of monetary conditions; easy access to credit and housing loans facilitate housing investment.

per working age population in the OECD, the ratio of domestic credit to private sector to GDP, and the percentage change ($\Delta \ln$) in crude oil prices in euro terms.

The real effective exchange rate controls for the impact of competitiveness developments on Greece's external accounts. A real appreciation (an increase in the index used) causes competitiveness to deteriorate and lowers net exports. Real GDP per capita captures the impact on the demand for imports – an increase should decrease net exports. Real GDP per capita in OECD countries controls for foreign demand – higher foreign demand will lead to higher net exports. The ratio of domestic credit to private sector to GDP controls for credit conditions and credit availability. A developed financial sector facilitates trade operations and borrowing. Given that Greece runs persistent trade deficits, it is most likely that the net effect is positive, i.e., it facilitates imports; a finding reported by Brissimis et al (2010). Finally, given Greece's dependence on oil imports, higher oil prices in euro terms will reduce net exports. The vector G includes fiscal variables ($N_f=2$).³²

A.3.2 Findings

In this section we present the empirical estimates of the baseline specifications for real GDP and its subcomponents (Tables 5-6), as well as the full set of results for the effects of discretionary fiscal policy on GDP and other economic activity sub-components in Greece (Tables 7-16). Moreover, we present a brief discussion of the findings for the control variables in each regression.

A.3.2.1 Real GDP

Starting from the control variables of the output growth regression we see that increases in the ratio of total employment to the population of working age and in the ratio of the population of working age to total population are both associated negatively with the growth rate of real per capita GDP (see Table 5 baseline specification with no fiscal variables and

³² As before in order to estimate the effects of the change in a fiscal policy variable ($\Delta \ln g$) on the change in the net tax ratio, we first partial out from both the linear effects of current and lagged values of the rest of RHS variables including the time trend; letting the English alphabet letter a, b, and c denote the coefficient estimates of these new “pure” variables, we then estimate:

$$\Delta \ln NX_t = \mu + a * \Delta \ln NX_{t-1} + b * \Delta \ln NX_{t-2} + \sum_{j=1}^{N_c} c_{js} (L) * \Delta \ln g_{j,t} + \eta_t \quad (A.6)$$

Where again $c_s (L) = \sum_{k=0}^2 c_{sk} L^k$ is second-order polynomials in the lag operator (L)

Tables 7 and 8). This implies that further increasing the labour input will not necessarily result in higher per capita GDP.

There are mixed signs as regards openness to trade and terms of trade, but there is sufficient evidence that a more outward oriented economy, with better terms of trade, can contribute towards achieving a higher level of per capita GDP growth. Easy access to credit in order to finance investment and consumption activities of the private sector has a strong positive association with the growth of real per capita GDP.

A.3.2.2 Private consumption

Real house prices exert no particular effect on the growth rate of per capita private consumption and certainly not a positive one (see Table 5, baseline specification with no fiscal variables, and Tables 9-10). This is perhaps not surprising since mechanisms to withdraw household equity were not present in Greece. On the other hand, real share prices are associated with higher private consumption per capita, with the coefficient estimates being significant in Tables 9-10.

An increase in real per capita net disposable income affects positively and significantly private consumption. The effect is quite robust when no fiscal variables are included in the regression (Table 5), but the evidence is less clear cut when the discretionary fiscal policy components are taken into account (Tables 9-10).

Our findings indicate that households' private debt to GDP ratio is positively associated with private consumption per capita. This finding is particularly robust when taking into account government spending and revenue changes. This indicates that part of the consumption boost in Greece in the 2000s was loan-driven. There is evidence of a positive association between credit growth and private consumption. A well-developed financial system where there is easy access to credit to finance consumption needs, is positively associated with consumption growth (as the coefficient of the private debt to GDP ratio has shown). It should be taken into account that private debt to GDP has not risen to the point where it could pose concerns for households' balance sheets. If this had been the case, then we would have observed a negative effect on consumption growth, i.e., as households' liabilities rise, households would scale back consumption growth to the extent that it is driven by excess loans. In any case, on average, the findings indicate that when access to credit is

constrained and credit growth reduced, consumption growth will mostly likely moderate (see Table 5 and Tables 9-10).

A.3.2.3 Private residential and non residential investment

Given the volatile nature of private non-residential investment and the limitations of our sample, the coefficient estimates of some control variables in the partitioned regressions are changing sign and significance across specifications. This refers in particular to real house and share prices and gross operating surplus. Therefore, the evidence on these control variables is inconclusive. However, on average there is a evidence of a positive association with real house prices and private investment (see Table 5 and Tables 11-12). Real share prices exert a positive effect on private investment without taking into account fiscal variables. However, when controlling for government spending developments, this turns negative (it is negative and significant in case of government consumption, but positive in case of government investment). The gross operating surplus has a positive effect on private investment when no fiscal variables are considered (Table 5), but it produces mixed results when we take fiscal variables into account.³³

An increase in private debt of non-financial corporations to GDP ratio is positively associated with investment growth. Hence, the level of financial development and the easiness of credit availability and loans to firms facilitate investment spending. Rapid credit growth is associated positively with private non-residential investment spending when we take into account discretionary fiscal policy changes (see Tables 11-12).

Turning to the control variables of the housing investment specification we see that in most cases there is a positive association between real house prices and housing investment (see Table 6 in the Appendix and Tables 13-14). Whereas real share prices in most cases impact negatively on housing investment. An increase in real net disposable income per capita, boosts demand for housing (to buy or to rent), which in turn boosts housing investment. An over exposed household sector (having a high private debt to GDP ratio) can

³³ Keep in mind that the effect of fiscal variables on gross operating surplus has been netted out (and vice-versa).

become a disincentive for further housing investment. Finally, rapid credit growth translates into easier access to credit and hence increased investment in housing.³⁴

A.3.2.4 Net exports to GDP

Our findings suggest that, on average, an appreciation of the real effective exchange rate reduces net export (see Table 6 and Table 15).³⁵ An increase in real per capita GDP in Greece boosts import demand, lowering net exports, whereas an increase in real GDP per capita in OECD countries leads to higher export growth and increases Greece's net exports to GDP ratio. A developed financial sector as measured by a high ratio of domestic credit to private sector to GDP facilitates import demand and lowers net export to GDP ratio (in line with Brissimis et al. 2012 and Monokrousos and Thomakos, 2012). Finally, given Greece's dependence on oil imports, higher oil prices in euro terms will reduce net exports. (see Table 6 and Tables 15-16).

³⁴ However, in some of the specifications of partitioned regressions the findings are mixed. The effects for all control variables point to the opposite direction when controlling for public investment and net government transfers.

³⁵ However, in some of the specifications the evidence is mixed (e.g., in Table 16).

Table 2: Baseline specifications – no fiscal variables included (Partitioned Regression Results)

Dependent variable:	Growth rate of GDP per capita			Growth rate of real private consumption per capita			Growth rate of real private investment per capita	
Regressors	SR	LR	Regressors	SR	SR	Regressors	SR	LR
Change in total employment/population of working age	-0.566 (-1.51)	-1.262 (-2.41)**	Change in real house prices	-0.005 (-0.06)	-0.004 (-0.06)	Change in real house prices	1.099 (2.04)*	4.054 (1.20)
Change in population of working age/total population	-15.177 (-3.83)***	-32.263 (-3.15)***	Change in real share prices	0.016 (1.11)	0.016 (1.14)	Change in real share prices	0.351 (3.01)***	0.653 (1.42)
Change in trade openness	0.017 (0.33)	0.035 (0.34)	Change in real net disposable income per capita	0.692 (1.81)*	0.559 (1.84)*	Change in real gross operating surplus per capita	1.991 (2.61)**	2.424 (2.00)*
Private debt/GDP	0.0034 (2.46)**	0.0055 (4.05)***	Private debt/GDP	0.007 (1.01)	0.008 (0.96)	Private debt of non financial corporations/GDP	0.019 (1.77)*	0.018 (2.10)**
Change in terms of trade	0.358 (2.32)**	0.655 (3.27)***	Change in domestic credit to private sector	0.179 (1.64)	0.214 (1.41)	Change in domestic credit to private sector	-0.092 (-0.17)	-0.115 (-0.18)
<i>R-square</i>	0.9833		<i>R-square</i>	0.8919		<i>R-square</i>	0.9231	
N.obs	41		N.obs	37		N.obs	37	
LM test for ARCH effects (chi2(1)) (p-values)	0.378 (0.5387)		LM test for ARCH effects (chi2(1)) (p-values)	0.551 (0.4580)		LM test for ARCH effects (chi2(1)) (p-values)	0.017 (0.8973)	

Table 2: (Continued)

LM test for ARCH effects (chi2(2)) (p-values)	0.668 (0.7162)	LM test for ARCH effects (chi2(2)) (p-values)	0.558 (0.7565)	LM test for ARCH effects (chi2(2)) (p-values)	1.815 (0.4035)
BG(1) (p-values)	0.000(0.9942)	BG(1) (p-values)	0.034 (0.8535)	BG(1) (p-values)	2.531 (0.1116)
BG(2) (p-values)	2.718(0.2569)	BG(2) (p-values)	5.545 (0.0625)	BG(2) (p-values)	3.122 (0.2100)
Durbin (alt, 1) (p-values)	0.000(0.9959)	Durbin (alt, 1) (p- values)	0.016 (0.9004)	Durbin (alt, 1) (p- values)	1.248 (0.2639)
Durbin (alt, 2) (p-values)	1.420(0.4917)	Durbin (alt, 2) (p- values)	2.821 (0.2440)	Durbin (alt, 2) (p- values)	1.474 (0.4785)
Breusch-Pagan/Cook- Weisberg heteroskedasticity test (p- values)	3.74(0.0532)	Breusch- Pagan/Cook- Weisberg heteroskedasticity test (p-values)	0.04(0.8367)	Breusch- Pagan/Cook- Weisberg heteroskedasticity test (p-values)	0.08(0.7787)
F-stat (heterosk. Test) (p- values)	3.24(0.0798)	F-stat (heterosk. Test) (p-values)	0.03(0.8544)	F-stat (heterosk. Test) (p-values)	0.09(0.7696)
Ramsey RESET test (p- values)	2.14(0.1291)	Ramsey RESET test (p-values)	1.46(0.2646)	Ramsey RESET test (p-values)	2.33(0.1158)

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square and the other reported statistics refer to the multiple correlation coefficient of the original regression specification.

***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 3: Baseline specifications – no fiscal variables included (Partitioned Regression Results)

Dependent variable:	Growth rate of net exports/GDP			Growth rate of real housing investment per capita	
Regressors	SR	LR	Regressors	SR	LR
Change in real effective exchange rate (in ulc terms)	-0.498 (-1.07)	-0.335 (-1.16)	Change in real house prices	4.891 (5.59)***	3.555 (11.24)***
Change in real GDP per working age population	-5.069 (-4.45)***	-3.648 (-12.68)***	Change in real share prices	-0.098 (-2.10)**	-0.106 (-2.67)**
Change in real GDP per working age population in OECD	4.824 (4.41)***	3.559 (8.00)***	Change in real net disposable income per capita	4.309 (2.40)**	3.058 (3.27)***
Domestic credit to private sector/GDP	-0.025 (-2.73)**	-0.017 (-3.96)***	Private debt of households/GDP	-0.121 (-4.24)***	-0.094 (-4.45)***
Change in crude oil prices (euro)	-0.176 (-3.10)***	-0.137 (-4.97)***	Change in domestic credit to private sector	1.288 (2.40)**	1.739 (3.07)***
<i>R-square</i>	0.8466		<i>R-square</i>	0.9637	
N.obs	42		N.obs	37	
LM test for ARCH effects (chi2(1)) (p-values)	2.571 (0.1089)		LM test for ARCH effects (chi2(1)) (p-values)	0.039 (0.8440)	
LM test for ARCH effects (chi2(2)) (p-values)	5.059 (0.0797)		LM test for ARCH effects (chi2(2)) (p-values)	0.408 (0.8153)	
BG(1) (p-values)	1.976 (0.1598)		BG(1) (p-values)	4.376 (0.0364)	
BG(2) (p-values)	5.600 (0.0608)		BG(2) (p-values)	8.581 (0.0137)	
Durbin (alt, 1) (p-values)	1.086 (0.2973)		Durbin (alt, 1) (p-values)	2.281 (0.1310)	
Durbin (alt, 2) (p-values)	3.231 (0.1988)		Durbin (alt, 2) (p-values)	4.831 (0.0893)	
Breusch-Pagan/Cook-Weisberg heteroskedasticity test (p-values)	0.19(0.6590)		Breusch-Pagan/Cook-Weisberg heteroskedasticity test (p-values)	1.65 (0.1993)	
F-stat (heterosk. Test) (p-values)	0.30(0.5876)		F-stat (heterosk. Test) (p-values)	1.12 (0.2979)	
Ramsey RESET test (p-values)	2.83(0.0648)		Ramsey RESET test (p-values)	0.69 (0.5715)	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square and the other reported statistics refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 4: The effects of fiscal policy on real GDP

	[1]		[2]		[3]		[4]		[5]	
Regressors	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR
Change in total employment/population of working age	-0.277 (-0.53)	-0.453 (-0.62)	0.212 (0.48)	0.354 (0.42)	-0.242 (-0.61)	-0.622 (-0.74)	0.699 (1.81)*	2.364 (1.27)	-0.272 (-0.58)	-0.415 (-0.66)
Change in population of working age/total population	-10.838 (-2.67)**	-14.219 (-1.93)*	-2.105 (-0.74)	-2.547 (-0.71)	-8.104 (-2.56)**	-18.151 (-2.31)**	-7.257 (-1.98)*	-12.237 (-1.29)	-7.144 (-1.36)	-17.257 (-1.00)
Change in trade openness	-0.037 (-0.63)	-0.032 (-0.57)	0.067 (1.58)	0.057 (1.56)	0.048 (0.63)	0.098 (0.66)	0.086 (1.70)*	0.162 (2.04)*	0.014 (0.18)	0.014 (0.18)
Private debt/GDP	0.003 (1.42)	0.003 (2.60)* *	0.003 (2.15)**	0.002 (3.07)***	0.003 (2.30)**	0.005 (3.50)***	0.001 (1.34)	0.002 (1.58)	0.003 (2.10)**	0.004 (3.96)***
Change in terms of trade	0.315 (1.93)*	0.280 (1.97)*	0.094 (0.67)	0.077 (0.74)	0.494 (2.12)**	0.785 (1.73)*	0.006 (0.06)	0.013 (0.06)	0.115 (0.76)	0.109 (0.75)
<i>Change in real government spending</i>	<i>0.104 (2.24)**</i>	<i>0.145 (2.04)* *</i>								

Table 4: (Continued)

<i>Change in real government consumption spending</i>			<i>0 .196</i> (3.30)***	<i>0 .222</i> (3.24)** *						
<i>Change in real government gross fixed capital formation</i>					<i>-0.028</i> (-1.24)	<i>-0.053</i> (-1.12)				
<i>Change in real government net transfers</i>							<i>0 .148</i> (1.71)*	<i>0 .204</i> (1.65)		
<i>Change in real government compensation of employees</i>									<i>0.137</i> (1.91)*	<i>0.166</i> (1.95)*
<i>Change in real government net taxes</i>	<i>-0.026</i> (-0.66)	<i>-0.026</i> (-0.67)	<i>-0.059</i> (-1.82)*	<i>-0.052</i> (-2.01)**	<i>-0.007</i> (-0.17)	<i>-0.018</i> (-0.17)	<i>-0.027</i> (-0.73)	<i>-0.049</i> (-0.80)	<i>-0.028</i> (-0.72)	<i>-0.029</i> (-0.76)
R-squared	0.9911		0.9946		0.9900		0.9902		0.9891	
Nobs	40		40		40		40		40	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 5: The effects of fiscal policy on real GDP

	[1]		[2]	
Regressors	SR	LR	SR	LR
Change in total employment/population of working age	-1.059 (-1.69)	-1.197 (-3.15)***	-0.944 (-2.56)**	-0.828 (-3.95)***
Change in population of working age/total population	-14.866 (-2.90)***	-17.174 (-2.58)**	-10.433 (-2.64)**	-13.002 (-2.36)**
Change in trade openness	-0.037 (-0.92)	-0.026 (-0.88)	0.059 (2.39)**	0.034 (3.08)***
Private debt/GDP	0.003 (1.87)*	0.003 (3.40)***	0.005 (3.35)***	0.003 (5.69)***
Change in terms of trade	0.478 (3.02)***	0.387 (3.84)***	0.390 (3.24)***	0.239 (4.51)***
<i>Change in real government spending</i>	<i>0.106</i> <i>(2.21)**</i>	<i>0.140</i> <i>(1.83)*</i>	<i>0.139</i> <i>(3.21)***</i>	<i>0.134</i> <i>(3.29)***</i>
<i>Change in real government current taxes on income and wealth</i>	<i>-0.111</i> <i>(-1.78)*</i>	<i>-0.102</i> <i>(-1.44)</i>		
<i>Change in real VAT</i>			<i>-0.162</i> <i>(-2.37)**</i>	<i>-0.121</i> <i>(-3.40)***</i>
R-squared	0.9901		0.9924	
Nobs	40		40	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 6: The effects of fiscal policy on private consumption

	[1]		[2]		[3]		[4]		[5]	
Regressors	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR
Change in real house prices	-0.118 (-1.70)*	-0.072 (-1.60)	-0.032 (-0.42)	-0.021 (-0.41)	-0.004 (-0.06)	-0.002 (-0.06)	-0.047 (-0.43)	-0.027 (-0.43)	0.057 (0.78)	0.030 (0.80)
Change in real share prices	0.029 (2.12)**	0.022 (2.75)**	0.018 (1.51)	0.015 (1.76)*	0.030 (2.96)***	0.015 (3.39)***	0.026 (1.79)*	0.0202 (2.03)**	0.023 (2.01)**	0.016 (2.43)**
Change in real net disposable income per capita	0.0007 (0.000)	0.0004 (0.000)	-0.130 (-0.65)	-0.074 (-0.65)	-0.126 (-0.50)	-0.058 (-0.49)	0.396 (1.68)	0.251 (1.75)*	-0.013 (-0.08)	-0.006 (-0.08)
Private debt/GDP	0.021 (4.90)***	0.013 (4.34)***	0.019 (2.95)***	0.014 (2.97)***	0.022 (3.41)***	0.014 (3.89)***	0.019 (3.25)***	0.015 (3.07)***	0.022 (3.44)***	0.015 (3.70)***
Change in domestic credit to private sector	0.071 (0.74)	0.056 (0.78)	0.094 (0.97)	0.084 (0.99)	-0.097 (-0.97)	-0.084 (-0.88)	0.052 (0.48)	0.058 (0.46)	0.129 (1.24)	0.130 (1.16)
<i>Change in real government spending</i>	<i>0.059</i> <i>(0.72)</i>	<i>0.042</i> <i>(0.73)</i>								
<i>Change in real government consumption spending</i>			<i>0.334</i> <i>(3.13)***</i>	<i>0.198</i> <i>(3.75)***</i>						

Table 6 : (Continued)

<i>Change in real government gross fixed capital formation</i>	-0.043 (-1.34)	-0.026 (-1.54)								
<i>Change in real government net transfers</i>							-0.099 (-1.27)	-0.072 (-1.13)		
<i>Change in real government compensation of employees</i>									0.482 (4.70)***	0.235 (5.41)***
<i>Change in real government net taxes</i>	-0.196 (-3.08)**	-0.145 (-3.99)***	-0.086 (-1.03)	-0.060 (-1.12)	-0.183 (-2.95)***	-0.137 (-3.55)***	-0.147 (-2.09)**	-0.118 (-2.21)**	-0.112 (-1.68)	-0.068 (-1.90)*
R-squared	0.9698		0.9642		0.9740		0.9567		0.9732	
Nobs	37		37		37		37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 7: The effects of fiscal policy on private consumption

Regressors	[1]		[2]	
	SR	LR	SR	LR
Change in real house prices	-0.198 (-2.02)**	-0.147 (-2.12)**	-0.063 (-0.71)	-0.039 (-0.71)
Change in real share prices	0 .012 (1.07)	0 .011 (1.08)	0.028 (2.33)**	0.017 (2.76)**
Change in real net disposable income per capita	0 .534 (1.11)	0 .379 (1.05)	-0.132 (-0.44)	-0.067 (-0.44)
Private debt/GDP	0 .008 (1.35)	0 .007 (1.26)	0.021 (4.27)***	0.014 (4.39)***
Change in domestic credit to private sector	0 .287 (1.78)*	0 .241 (1.98)**	0.343 (2.33)**	0.251 (3.00)***
<i>Change in real government spending</i>	<i>0 .119</i> <i>(0.82)</i>	<i>0 .113</i> <i>(0.85)</i>	<i>0.197</i> <i>(1.84)*</i>	<i>0.142</i> <i>(1.88)*</i>
<i>Change in real government current taxes on income and wealth</i>	<i>-0.341</i> <i>(-2.07)**</i>	<i>-0.316</i> <i>(-2.08)**</i>		
<i>Change in real VAT</i>			<i>-0.295</i> <i>(-3.67)***</i>	<i>-0.185</i> <i>(-4.69)***</i>
R-squared	0.9382		0.9658	
Nobs	37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 8: The effects of fiscal policy on private non-residential investment

	[1]		[2]		[3]		[4]		[5]	
Regressors	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR
Change in real house prices	0.583 (0.88)	1.397 (0.73)	0.412 (0.70)	0.673 (0.66)	0.935 (1.41)	2.586 (0.92)	0.863 (1.95)*	2.223 (1.83)*	0.947 (1.54)	1.981 (1.33)
Change in real share prices	-0.204 (-1.45)	-0.133 (-1.68)	-0.338 (-2.82)**	-0.169 (-3.24)***	0.322 (1.75)*	0.433 (1.23)	0.088 (0.92)	0.080 (0.80)	-0.097 (-0.93)	-0.057 (-0.97)
Change in real gross operating surplus per capita	-2.727 (-2.68)**	-1.696 (-2.85)** *	-3.125 (-2.88)***	-2.141 (-3.20)***	0.581 (0.38)	0.371 (0.38)	-3.922 (-4.59)***	-2.553 (5.69)***	-2.563 (-2.65)**	-1.74 (-2.68)***
Private debt of non financial corporations/GDP	0.007 (0.69)	0.004 (0.70)	0.015 (1.74)*	0.009 (1.93)*	0.034 (3.14)***	0.021 (3.60)***	0.012 (1.59)	0.008 (1.69)	0.021 (2.74)**	0.012 (3.30)***
Change in domestic credit to private sector	0.413 (0.83)	0.345 (0.88)	1.284 (2.41)**	0.941 (2.64)**	0.279 (0.60)	0.194 (0.62)	0.463 (0.86)	0.445 (0.93)	1.716 (2.99)***	1.256 (3.30)***
<i>Change in real government spending</i>	<i>-0.405</i> <i>(-0.91)</i>	<i>-0.268</i> <i>(-0.93)</i>								
<i>Change in real government consumption spending</i>			<i>1.325</i> <i>(1.90)*</i>	<i>1.054</i> <i>(1.57)</i>						

Table 8: (Continued)

<i>Change in real government gross fixed capital formation</i>					<i>-0.523</i> <i>(-4.59)***</i>	<i>-0.297</i> <i>(-4.32)***</i>				
<i>Change in real government net transfers</i>							<i>1.384</i> <i>(3.64)***</i>	<i>0.995</i> <i>(3.21)***</i>		
<i>Change in real government compensation of employees</i>									<i>1.153</i> <i>(1.48)</i>	<i>0.861</i> <i>(1.41)</i>
<i>Change in real government net taxes</i>	<i>-1.075</i> <i>(-1.42)</i>	<i>-0.759</i> <i>(-1.65)</i>	<i>-0.939</i> <i>(-1.32)</i>	<i>-0.678</i> <i>(-1.58)</i>	<i>-0.562</i> <i>(-1.08)</i>	<i>-0.333</i> <i>(-1.14)</i>	<i>-1.657</i> <i>(-3.13)***</i>	<i>-1.236</i> <i>(-3.29)***</i>	<i>-1.288</i> <i>(-1.74)*</i>	<i>-0.846</i> <i>(-2.22)**</i>
R-squared	0.9606		0.9590		0.9543		0.9565		0.9550	
Nobs	37		37		37		37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 9: The effects of fiscal policy on private non residential investment

	[1]		[2]	
Regressors	SR	LR	SR	LR
Change in real house prices	0.717 (1.01)	2.116 (0.70)	-1.251 (-2.05)*	-1.479 (-2.45)**
Change in real share prices	-0.061 (-0.34)	-0.052 (-0.036)	0.187 (1.53)	0.138 (1.44)
Change in real gross operating surplus per capita	1.242 (1.90)*	0.952 (1.74)*	-0.632 (-0.72)	-0.402 (-0.72)
Private debt of non financial corporations/GDP	0.017 (1.30)	0.013 (1.51)	0.016 (2.05)	0.008 (2.18)**
Change in domestic credit to private sector	0.281 (0.39)	0.244 (0.40)	2.314 (2.52)**	1.637 (3.31)***
<i>Change in real government spending</i>	<i>-0.169</i> <i>(-0.32)</i>	<i>-0.167</i> <i>(-0.33)</i>	<i>0.527</i> <i>(0.91)</i>	<i>0.387</i> <i>(0.89)</i>
<i>Change in real government current taxes on income and wealth</i>	<i>-0.242</i> <i>(-0.26)</i>	<i>-0.184</i> <i>(-0.27)</i>		
<i>Change in real VAT</i>			<i>-2.949</i> <i>(-3.02)***</i>	<i>-1.938</i> <i>(-3.29)***</i>
R-squared	0.9560		0.9579	
Nobs	37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 10: The effects of fiscal policy on housing investment

	[1]		[2]		[3]		[4]		[5]	
Regressors	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR
Change in real house prices	6.777 (7.29)** *	3.629 (19.19) ***	5.652 (6.82)***	2.9976 (17.82)* **	-0.115 (-2.03)**	-0.095 (-2.18)**	-0.092 (-1.75)*	-0.096 (-2.04)**	5.525 (6.75)***	2.959 (20.96)** *
Change in real share prices	-0.137 (-2.68)**	-0.102 (-3.68)** *	-0.084 (-1.59)	-0.063 (-1.82)*	7.268 (3.71)***	4.474 (5.20)***	4.180 (2.24)**	3.007 (3.07)***	-0.117 (-2.85)***	-0.073 (-3.48)***
Change in real net disposable income per capita	7.881 (3.90)** *	4.145 (6.34)* **	12.100 (7.19)***	5.376 (13.43)* **	-0.139 (-3.65)***	-0.092 (-3.79)***	-0.130 (-3.78)***	-0.102 (-2.99)**	8.805 (6.29)***	4.261 (9.23)***
Private debt of households/GDP	-0.193 (-5.40)***	-0.096 (-6.94)** *	-0.173 (-4.21)***	-0.106 (-4.62)***	1.767 (2.31)**	2.222 (2.98)***	0.962 (1.85)*	1.501 (2.16)**	-0.198 (-5.37)***	-0.115 (-6.19)***
Change in domestic credit to private sector	1.831 (3.36)** *	1.239 (4.39)* **	1.291 (2.92)***	1.079 (2.97)** *	-0.115 (-2.03)**	-0.095 (-2.18)**	-0.092 (-1.75)*	-0.096 (-2.04)**	0.614 (1.08)	0.758 (1.12)
<i>Change in real government spending</i>	<i>-0.561 (-1.41)</i>	<i>-0.411 (-1.41)</i>								

Table 10: (Continued)

<i>Change in real government consumption spending</i>			-3.441	-1.811						
			(-6.42)***	(-9.00)***						
<i>Change in real government gross fixed capital formation</i>					0.186	0.125				
					(1.58)	(1.78)				
<i>Change in real government net transfers</i>							-0.028	-0.023		
							(-0.09)	(-0.09)		
<i>Change in real government compensation of employees</i>									-2.977	-1.512
									(-5.95)***	(-9.10)***
<i>Change in real government net taxes</i>	-0.476	-0.262	-1.716	-0.868	-0.346	-0.228	-0.416	-0.312	-1.360	-0.626
	(-2.21)**	(-2.17)**	(-5.79)***	(-6.87)***	(-1.36)	(-1.38)	(-1.77)*	(-1.77)*	(-6.85)***	(-7.20)***
R-squared	0.9700		0.9766		0.9679		0.9719		0.9825	
Nobs	37		37		37		37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 11: The effects of fiscal policy on housing investment

	[1]		[2]	
Regressors	SR	LR	SR	LR
Change in real house prices	6.306 (6.32)***	3.693 (16.31)***	6.678 (6.83)***	3.801 (18.21)***
Change in real share prices	-0.151 (-2.73)**	-0.117 (-3.56)***	-0.124 (-2.59)***	-0.098 (-3.47)***
Change in real net disposable income per capita	8.385 (3.61)***	4.361 (6.28)***	7.945 (4.07)***	3.980 (6.24)***
Private debt of households/GDP	-0.223 (-5.67)***	-0.108 (-10.52)***	-0.192 (-5.23)***	-0.095 (-7.47)***
Change in domestic credit to private sector	2.525 (3.23)***	1.707 (5.07)***	2.082 (3.30)***	1.455 (4.03)***
<i>Change in real government spending</i>	<i>-0.202 (-0.65)</i>	<i>-0.146 (-0.66)</i>	<i>-0.334 (-0.81)</i>	<i>-0.243(-0.82)</i>
<i>Change in real government current taxes on income and wealth</i>	<i>-0.779 (-1.42)</i>	<i>-0.458 (-1.47)</i>		
<i>Change in real VAT</i>			<i>-0.396 (-1.36)</i>	<i>-0.224(-1.34)</i>
R-squared	0.9687		0.9695	
Nobs	37		37	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 12: The effects of fiscal policy on net exports

	[1]		[2]		[3]		[4]		[5]	
Regressors	SR	LR	SR	LR	SR	LR	SR	LR	SR	LR
Change in real effective exchange rate (in ulc terms)	-0.367 (-0.42)	-0.212 (-0.43)	-1.729 (3.31)***	-1.077 (-3.86)***	-2.217 (-3.95)***	-1.339 (-4.83)***	-1.007 (-2.31)**	-0.695 (-2.71)**	-1.674 (-2.53)**	-1.014 (-3.03)***
Change in real GDP per working age population	-5.278 (-3.06)***	-3.158 (-4.13)** *	-6.884 (-5.93)***	-4.062 (-10.87)** *	-7.507 (-6.98)***	-5.075 (-16.85)***	-6.162 (-4.37)***	-4.269 (-10.21)***	-8.071 (-5.39)***	-4.584 (-11.71)***
Change in real GDP per working age population in OECD	4.164 (2.90)** *	2.621 (4.02)* **	4.851 (4.71)***	2.934 (5.60)** *	5.503 (6.65)***	3.711 (10.64)***	3.564 (3.15)***	2.898 (7.66)***	5.289 (4.55)***	3.176 (7.39)***
Domestic credit to private sector/GDP	-0.023 (-2.35)**	-0.014 (-3.01)** *	-0.019 (-1.68)	-0.0115 (-1.99)*	-0.019 (-2.28)***	-0.012 (-2.43)**	-0.019 (-2.82)***	-0.015 (-3.01)***	-0.016 (-2.27)**	-0.009 (-2.68)**
Change in crude oil prices (euro)	-0.194 (-3.82)***	-0.113 (-4.94)** *	-0.181 (4.09)***	-0.109 (-4.58)***	-0.191 (-4.69)***	-0.112 (-4.65)***	-0.143 (-3.41)***	-0.103 (-4.03)***	-0.228 (-2.80)**	-0.132 (-3.38)**
<i>Change in real government spending</i>	<i>0.621 (1.21)</i>	<i>0.389 (1.30)</i>								

Table 12: (Continued)

<i>Change in real government consumption spending</i>	<i>0 .002</i>	<i>0 .001</i>								
	<i>(0.000)</i>	<i>(0.000)</i>								
<i>Change in real government gross fixed capital formation</i>					<i>0 .369</i>	<i>0 .223</i>				
					<i>(2.94)***</i>	<i>(2.72)***</i>				
<i>Change in real government net transfers</i>							<i>0 .227</i>	<i>0 .154</i>		
							<i>(0.78)</i>	<i>(0.76)</i>		
<i>Change in real government compensation of employees</i>									<i>1.029</i>	<i>0.661</i>
									<i>(1.73)*</i>	<i>(1.60)</i>
<i>Change in real government net taxes</i>	<i>-0.437</i>	<i>-0.276</i>	<i>-0.477</i>	<i>-0.336</i>	<i>-1.102</i>	<i>-0.816</i>	<i>-0.115</i>	<i>-0.082</i>	<i>-0.513</i>	<i>-0.313</i>
	<i>(-1.55)</i>	<i>(-1.63)</i>	<i>(-1.09)</i>	<i>(-1.11)</i>	<i>(-2.95)***</i>	<i>(-2.85)***</i>	<i>(-0.44)</i>	<i>(-0.45)</i>	<i>(-1.37)</i>	<i>(-1.53)</i>
R-squared	0.9201		0.9102		0.9336		0.9319		0.9197	
Nobs	40		40		40		40		40	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

Table 13: The effects of fiscal policy on net exports

	[1]		[2]	
Regressors	SR	LR	SR	LR
Change in real effective exchange rate (in ulc terms)	1.350 (2.25)**	0.853 (2.06)**	1.193 (1.11)	0.774 (0.97)
Change in real GDP per working age population	-2.462 (-1.65)	-1.679 (-1.82)*	-3.416 (-1.71)*	-2.180 (-2.03)**
Change in real GDP per working age population in OECD	2.525 (2.04)**	1.694 (2.57)**	3.263 (2.74)**	2.079 (3.62)***
Domestic credit to private sector/GDP	-0.026 (-3.23)***	-0.016 (-4.68)***	-0.029 (-3.42)***	-0.0180 (-4.68)***
Change in crude oil prices (euro)	-0.182 (-3.65)***	-0.129 (-5.83)***	-0.181 (-3.38)***	-0.129 (-5.89)***
<i>Change in real government spending</i>	<i>0.203 (0.42)</i>	<i>0.150 (0.42)</i>	<i>0.531 (1.00)</i>	<i>0.373(1.08)</i>
<i>Change in real government current taxes on income and wealth</i>	<i>0.725 (1.85)*</i>	<i>0.484 (1.87)*</i>		
<i>Change in real VAT</i>			<i>-0.439 (-1.16)</i>	<i>-0.278 (-1.29)</i>
R-squared	0.8909		0.8857	
Nobs	40		40	

Notes: The table reports the estimated partial effects of each variable on the respective dependent variable, i.e., the “pure” marginal effects of the regressor on the dependent variable, having partialled out the linear effect of the rest of controls from both the dependent and the explanatory variable. The R-square refer to the multiple correlation coefficient of the original regression specification. ***, **, * indicate significance at 1%, 5% and 10% level of significance, respectively. Robust t-statistics are reported in parenthesis.

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