

# Fiscal policy under a deleveraging process

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## 1 Introduction

During the Great Recession public and private indebtedness have significantly increased, while expectations of potential growth remain subdued. Thus, we are witnessing an intense on-going debate about the optimal fiscal policy stance between those who believe that fiscal consolidations are bound to be self-defeating when private demand is depressed, and those still arguing in favor of "expansionary" fiscal austerity, despite the poor growth prospects of many advanced economies. Moreover, in many EMU countries, (public and private) deleveraging has to proceed under the restrictions imposed by low nominal growth, lack of independent monetary policy, and strong dependence of external financing, as their net foreign international investment positions are significantly negative.

Despite these restrictions, most theoretical analysis of fiscal policy under deleveraging are cast in a closed economy framework. For instance, Eggertsson and Krugman (2012) present the case for expansionary fiscal policy in a closed economy model in which risk-neutral households are involved in smoothing income fluctuations under a debt constraint. They analyze the consequence of the debt constraint becoming more binding, and, not surprisingly, since monetary policy is constrained by the zero lower bound and borrowers are liquidity constrained, they find large "fiscal multipliers", so that the effects of stabilizing fiscal policy are very powerful.

In this paper we argue that the potential impact of fiscal policy when (public and private) debt is high depends very much on the characteristics of the deleveraging process and its causes. Our intuition for reassessing the effects of fiscal policy under a deleveraging process is as follows: An increase in Government expenditure leads to higher demand and production as long as households are willing to distribute additional income into saving and consumption (and firms are willing to increase investment). This follows easily if, for instance, it is assumed that households are willing to increase its debt and that the debt

financing cost are invariant. However, suppose that there is an excess of accumulated debt that household desire to bring down and/or debt financing costs (for both the public and the private sector) are increasing in the volume of public debt. Then, the usual "Keynesian" transmission mechanism of expansionary fiscal policy may not be operative. On the contrary, suppose that Government expenditure is reduced. In this case, household may feel richer (as future expected taxes are diminished), but they may not respond by increasing their consumption if they still hold an excess of debt, even if financing costs are lower, and/or expectations of future income growth are not bright. Thus, the usual "Ricardian" transmission mechanism of fiscal policy is also impeded. In short, Moreover, in the current situation of some EMU countries that resembles the case of small open economy with high (public and private) debt, real exchange rate misalignments, home bias in tradable goods and assets, the determinants of risk premia and whether the excess of accumulated debt is the result of either overoptimistic expectations or it is the consequence of a sudden permanent drop in potential growth may all be very relevant issues to the analysis of the potential impact of fiscal policy.

The paper has the following structure. First, we briefly describe the current conditions regarding the burden of (public and private) debt in advanced countries, and survey the (theoretical and empirical) literature on the effects of fiscal policy when debt is high. Secondly, we present a simple model of a small open economy with external debt and simulate fiscal policy shocks under an invariant financial constraint and under a simultaneous shock to the household's debt constraint. Finally, we discuss several alternatives scenarios which are also relevant to the analysis of fiscal policy in a debt crisis.

## **2 How much deleveraging?**

### **2.1 Public and private debt**

In part due to the diverse nature and scale of the crisis, in part because of the political responses to it, public debt-GDP ratios have increased during the Great Recession in most OECD countries and are nowadays at maximum levels (around 110% of GDP for the OECD, with only ten countries below 60% - Estonia, Australia, Luxembourg, Korea, Switzerland, Norway, Sweden, Czech Republic, New Zealand, Slovakia, and Slovenia -see Figure 1). When accounting for the likely evolution of social expenditures (pension and health), the fiscal consolidations needed to bring down those ratios to a manageable range seem quite substantial: According to Sutherland et al. (2012), the immediate rise in the underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050 is in most OECD countries 4 pp. or more (Figure 2). And their conclusions seem to be derived under conservative projections of pension and health expenditures.

The financial situation of the household sector in most of these countries does not look better. The financial crisis has also left private households highly

indebted in many of these countries. Figure 3 displays recent data from the Household Finance and Consumption Survey (HFCS)<sup>1</sup>, showing that the proportion of indebted households (with secured or unsecured debt) is close to or above 30% in a significant number of countries, with high debt median values which imply significant debt-income ratios and, despite very low interest rates, non-negligible debt service-income ratios<sup>2</sup>. Moreover, expectations of potential growth remains low, which also constrain consumption and investment.

Finally, EMU countries also differ significantly in the weight of external debt (see Figure 4). While for the whole EMU, external debt is negligible, within EMU there are significant cross-country claims with net international investment positions close to -100% of GDP in a significant number of countries (Greece, Spain, Ireland, and Portugal).

## 2.2 Fiscal revenues

Another important difference among advanced countries regarding the fiscal situation is the uneven incidence of the crisis on fiscal revenues (see Figure 5). After the crisis, there is a significant number of countries with tax revenues-GDP ratios above 40% and where they have not decreased very much since the beginning of the crisis (Austria, Belgium, Norway, Italy, Finland, France, Sweden, Denmark). On the contrary, in countries where the housing bubble was biggest and/or where the euro crisis hit with more intensity (Ireland, Spain, US, Greece, Portugal), the decrease in tax revenues has been quite substantial and now their public sector collects less than 35% of GDP, even though in some of these countries tax rates increased.

Regarding taxes, the differences across countries are also noticeable in terms of their composition (see Figure 5). Income and profit taxation is relatively low in Eastern European countries but also in Greece, France, Spain and Germany. However, countries with relatively low income and profit taxation have relatively high social security contributions and payroll taxes. It is also noticeable the diverse incidence of property taxes and indirect taxation. These differences are of course relevant when thinking about the design of fiscal policy in a debt crisis. For instance, some authors (Farhi et al., 2012) have suggested “fiscal devaluations”, consisting of reducing non-wage labor costs (e.g., social security contributions) and increasing consumption taxes, as way to cheapen the prices of domestically produced goods with respect to goods produced abroad to help to solve the external imbalances of some of the EMU countries mostly hit by the balance of payment crisis that started in 2010.

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<sup>1</sup>This is the first wave of a survey conducted by Eurosystem’s National Central Banks, under the coordination of the European Central Bank, which provides harmonized data on wealth, debt, income and consumption across European countries.

<sup>2</sup>See Bover et al. (2013) for a detailed analysis of household debt in the EMU using HFCS data and some conclusions of the institutional determinants that may explain cross-country differences in these regards.

### 2.3 Fiscal policy in a debt crisis

In this scenario, questions about what fiscal policy can and cannot achieve have a prominent status both in economic research and policy debates. Typically these debates are presented as a "confrontation" between those who believe in "expansionary fiscal austerity" (Alesina and Ardagna, 2012) and those who argue that fiscal consolidations when private demand remains subdued may be self-defeating (De Long and Summers, 2012).

In this regard, the empirical literature has focused in the estimation of "fiscal multipliers" by making use of new data sets and methodological approaches (see, for instance, Kraay, 2012, and Mian and Sufi, 2012). This literature provides now a wide array of estimates, depending upon sample periods, macro co-variates, identification procedures, and characteristics of the fiscal measures (Ilzetki, Mendoza and Vegh, 2011, Baum, Poplawski-Rivero and Weber, 2012). Depending on the values of the fiscal multipliers being used, the thresholds above which fiscal consolidations are "self-defeating" may or may not be binding in the current situation (e.g. Boussard, de Castro and Salto, 2012).

One of the co-variates that come out as significant in the estimation of fiscal multipliers is the level of *public* debt (see, for instance, Baum et al., 2012 and Afonso et al. 2011). How private debt conditions the responses of consumption and investment to fiscal expenditure/revenue shocks has been less studied in VAR estimation of fiscal multipliers. There is, however, some evidence for the US showing that highly leveraged homeowners had larger declines in spending between 2007 and 2009 (Dynan, 2012) and some survey evidence for Italy and the US showing that households with higher debt declare a lower (intended, and, of the US, realized) Marginal Propensity to Consume (Japelli and Pistaferri, 2013, and Graziani et al. 2013).

As for theoretical models, although there is a burgeoning literature on optimal public debt in models with heterogeneous agents (Werning, 2007, Golosov, Tsyvinski and Werning 2007), its conclusions are normative and have little to say about the current policy debate on how to deal with predetermined debt. Hence, most papers focus on the effects of stabilizing fiscal policy are very powerful when monetary policy is at constrained by the zero lower bound and there are agents whose borrowings are also constrained (Eggertsson and Krugman, 2012). To this basic framework other papers add the impact of public debt on financing costs (Corsetti, et al. 2011), and the consequences of high private debt (Andrés et al., 2012). However, the role that fiscal policy could play in the resolution of the crisis in eurozone countries crippled by debt, both public and private, and subject to growth and competitiveness problems has received less attention.

Hence, it seems relevant to bring explicitly to the analysis how households in a deleveraging process caused by a correction of overoptimistic expectations on potential growth, react to fiscal policies in a country with a high external debt facing scarcer and more costly funding. In this situation, the usual transmission mechanisms of fiscal measures need to be reconsidered. First, using expansionary fiscal policy to transfer resources to households so that their bor-

rowing constraints are somehow relaxed, and, hence, increasing consumption, may not work if debt-constrained private agents are involved in a deleveraging process in which consumption is determined, not by current income, but by the new desired level of debt. On the contrary, reducing public expenditures may not have the well-known expansionary Ricardian effects if expectations about future income growth remain subdued. Moreover, at the current debt levels, it is very likely that fluctuations in public debt are associated with changes in financing costs, so that the negative short-run effects on output of reducing public debt may be compensated by lower interest payments, while increasing public debt may raise financing costs and, hence, produce smaller short-run positive output effects. Thus, “fiscal multipliers” seem, more than ever, very dependent on the fiscal measure implemented, on its impact on financing costs, and on expectations on future growth.

These considerations raise two types of asymmetries or non-linear effects of fiscal policy that have also been somehow neglected. One is the dependence of the value of the fiscal multiplier on the state of the economy or on the level of some particular macroeconomic and/or financial variable that, beyond some thresholds, exert strong influence on the effect of fiscal policies. This is a possibility that has been extensively researched in recent empirical work . The other type of asymmetry that has not received so much attention, in neither the empirical nor the theoretical literature, is the possibility that the effects of a positive fiscal shock may not be of the same magnitude, albeit different sign, than those of a negative shock, when those effects depends very much on the response of financing costs, the state of expectations about potential growth, and the ongoing deleveraging process in the private sector.

### 3 A Model of Fiscal Policy and Deleveraging in a Small Open Economy

The model is one of a small open economy, member of a monetary union, with a representative household, which may borrow up to some limit determined by a collateral constraint, with firms under monopolistic competition setting prices ‘a la Calvo’ (1983), a public sector issuing external debt, and nominal interest rates determined abroad and adjusting in response to varying levels of debt<sup>3</sup>.

#### 3.1 Households

Households’ derive utility from consumption,  $c$ , housing services from their housing stock,  $H$ , and, leisure,  $1 - l$ , using resources from labor earnings,  $wl$  -net of (lump-sum) taxes and transfers,  $T$ , and profits from firms,  $D$ -, changes in

<sup>3</sup>The model is inspired in Adam et al. (2011), but sticking to the rational expectations hypothesis instead of using alternative ways of modeling expectations and learning.

private debt ,  $b$ , which pays (gross) nominal interest rate,  $R$ , and capital gains from housing, whose price is denoted by  $q$ . The discount factor is given by  $\delta$ , and there are shocks to the utility values of housing and of leisure,  $\xi_t^H$  and  $\xi_t^l$ , respectively. (Gross) inflation is given by  $\Pi$ , so that the (gross) real interest rate is  $\frac{R}{\Pi}$ . Finally, household borrowing is constrained by the collateral value of housing, being the (maximum) loan to value ratio denoted by  $\theta$ , which follows an AR(1) process,  $\theta_t - \theta = \rho_\theta(\theta_{t-1} - \theta) + u_t$ .

Hence, the representative household solve the following program:

$$\begin{aligned} & \max_{c_t, H_t, l_t^s, b_t} E_0 \sum_{t=0}^{\infty} \delta^t \left( \frac{c_t^{1-\beta}}{1-\beta} + \xi_t^H \log(H_t) + \xi_t^l \frac{(1-l_t)^{1-\eta}}{1-\eta} \right) \\ & s.t. \\ c_t &= w_t l_t - T_t + b_t - \frac{R_{t-1}}{\Pi_t} b_{t-1} - q_t (H_t - H_{t-1}) + D_t \\ b_t R_t &\leq \theta_t H_t E_t \Pi_{t+1} q_{t+1} \end{aligned}$$

Optimal choices of consumption, housing, leisure and private debt are given by the following first-order conditions:

$$\begin{aligned} c_t &: c_t^{-\beta} = \lambda_t \\ H_t &: \frac{\xi_t^H}{H_t} - \lambda_t q_t + \delta E_t (\lambda_{t+1} q_{t+1}) + \gamma_t \theta_t E_t \Pi_{t+1} q_{t+1} = 0 \\ l_t^s &: -\xi_t^l (1-l_t)^{-\eta} + \lambda_t w_t = 0 \\ b_t &: \lambda_t - \delta E_t \left( \frac{\lambda_{t+1} R_t}{\Pi_{t+1}} \right) - \gamma_t R_t = 0 \end{aligned}$$

which imply

$$\begin{aligned} w_t &= \frac{\xi_t^l (1-l_t)^{-\eta}}{c_t^{-\beta}} \\ \frac{\frac{\xi_t^H}{H_t} - c_t^{-\beta} q_t + \delta E_t (c_{t+1}^{-\beta} q_{t+1})}{c_t^{-\beta} - \delta E_t \left( \frac{c_{t+1}^{-\beta} R_t}{\Pi_{t+1}} \right)} &= \frac{\theta_t E_t \Pi_{t+1} q_{t+1}}{R_t} \end{aligned}$$

### 3.2 Firms

Monopolistically competitive firms use only a labor input,  $N(i)$ , to produce a differentiated good,  $Y(i)$ , under constant returns to scale, subject to (aggregate) productivity shocks,  $A$ :

$$Y_t(i) = A_t N_t(i)$$

They set prices *a la* Calvo (1983) with adjustment probability  $\alpha$ , by solving the following program:

$$\begin{aligned} & \max_{P_t^*} \sum_{k=0}^{\infty} (1-\alpha)^k E_t \{ Q_{t,t+k} [P_t^* Y_{t+k|t} - \Psi_{t+k}(Y_{t+k|t})] \} \\ & \text{s.t.} \\ Y_{t+k|t} &= \left( \frac{P_t^*}{P_{t+k}} \right)^{-\epsilon} Y_{t+k} \end{aligned}$$

The corresponding first-order conditions are:

$$\begin{aligned} p_t^* &= \frac{P_t^*}{P_t} = \frac{K_t}{F_t} \\ K_t &= \frac{\epsilon}{\epsilon-1} mc_t c_t^{-\beta} y_t + \delta(1-\alpha) E_t \Pi_{t+1}^\epsilon K_{t+1} \\ F_t &= c_t^{-\beta} y_t + \delta(1-\alpha) E_t \Pi_{t+1}^{\epsilon-1} F_{t+1} \\ \Delta_t &= \alpha (p_t^*)^{-\epsilon} + (1-\alpha) \Pi_t^\epsilon \Delta_{t-1} \\ 1 &= \alpha (p_t^*)^{1-\epsilon} + (1-\alpha) \Pi_t^{\epsilon-1} \\ mc_t &= \frac{w_t}{A_t} = \frac{W_t/P_t}{A_t} \end{aligned}$$

Regarding the assumption on firms' price setting behavior it is important to note that it is crucial for the determination of the long-term real interest rate, and, therefore, it determines the size of the government spending multiplier. Dedola and Nakov (2012) show that, in order to obtain a large fiscal multiplier, not only monetary policy has to be accommodative but also prices have to be sufficiently sticky and that, assuming Calvo's pricing tends to increase its size beyond that obtained under a fixed menu cost model, unless the nominal interest rate is held constant. In the former case the biggest increase in the government spending multiplier relative to a Taylor rule without smoothing, occurs in the fixed menu cost model.

### 3.3 Government

Government expenditures follow an autoregressive process with shocks,  $g$ :

$$G_t - G = \rho_G (G_{t-1} - G) + g_t$$

while taxes are set according to a fiscal rule which takes into account past taxes and public debt,  $B$ :

$$T_t = T_{t-1} + \zeta_Y \left( \frac{B_{t-1}}{Y_{t-1}} / \frac{B}{Y} \right) + \zeta_d (B_{t-1} - B_{t-2})$$

which, obviously, is determined by the Government budget constraint:

$$B_t = \frac{R_{t-1}B_{t-1}}{\Pi_t} + G_t - T_t$$

### 3.4 Financing costs

(Public and private) Debt is held abroad. Foreigners are willing to hold the debt at a interest rate which increases with inflation and the volume of debt:

$$\frac{R_t}{\bar{\Pi}r^w} = \left( \frac{R_{t-1}}{\bar{\Pi}r^w} \right)^{\phi_r} \left[ \left( \frac{\Pi_t}{\bar{\Pi}} \right)^{\phi_\pi} \left( \frac{B_t}{\bar{B}} \right)^{\phi_B} \right]^{1-\phi_r}$$

where  $r^w$  is the exogenously given steady-state world real interest rate. The parameter  $\phi_r$  determines the degree of inertia of nominal interest rates, while  $\phi_B$  gives by how much public debt financing costs vary with the level of debt.

### 3.5 Resource constraint

Finally, net exports are a function of world output,  $y_t^W$ , and the terms of trade,  $TOT$ :

$$NX_t = TOT_t^{-\rho} y_t^W, \quad TOT_t = TOT_{t-1} \frac{\Pi_t}{\Pi_t^W}$$

where  $\Pi_t^W$  is the exogenously given world inflation. Thus, total production must equal the sum of consumption, Government expenditures and net exports.

$$y_t = c_t + G_t + NX_t$$

## 4 Computation, parametrization, and first results

Computation using Dynare. Parameter values are given in Table 1.

As a first step, we compute a standard closed economy version of the previous model in which there is no private debt, and public debt is held by the representative household. Figures 6 and 7 give the resulting impulse-response functions of the main variables to an increase in Government spending of 1% GDP, under the assumptions that i) the nominal interest rate is invariant to the level of public debt ( $\phi_B = 0$ ) and, alternatively, that ii) the nominal interest rate increases with the level of debt ( $\phi_B = 0.125$ ). As seen in the Figures, the inclusion of a debt spread responding to the volume of debt significantly reduces the impact of Government expenditure shocks on GDP and changes the

dynamics of the public debt due to the noticeable increase in the real interest rate.

As for the impact of private debt constraint in the Government expenditure fiscal multiplier, Andres et al. (2012) show that the greater the borrowing capacity of households (as measured by a higher loan-to-value ratio) is, the stronger the impact multiplier of fiscal policy is. This arises from households borrowing to the limit of their constraint, thus increasing their consumption substantially when the loan-to-value ratio is high, contributing to a higher aggregate multiplier. One implication of this result is that fiscal expansions lose strength after a credit crunch. Thus, pre-crisis multipliers might not be a good indicator of the likely impact of fiscal policy after the deterioration in the conditions under which households have access to credit.

We now turn to the open economy version of the model where household borrowing is constrained and debt is held abroad, possibly with financing costs increasing in the volume of debt. We perform two types of simulations with the same set of parameters: i) an expansionary government expenditure shock (of 1% of GDP), with and without the private debt constraint being operative, and ii) a negative collateral shock (also of size 1%), with and without the expansionary government expenditure shock. Thus, from the first simulation we draw some conclusions on the effects of expansionary fiscal policy depending upon households' debt constraints, and, from the second simulation, we focus on the power of expansionary fiscal policy to counteract the consequences of household deleveraging.

(Results forthcoming. Available at the seminar.)

## 5 Other considerations

Previous results show that the effects of fiscal policy depends crucially on the extent to which households are debt-constrained. And in the previous parametrization of the model, the representative household is *always* debt-constrained, since there is no scope for precautionary savings. Alternatively, one might consider a situation in which households do not want the debt constraint to be binding ( $\beta > 1$ ) and, hence, may respond to expansionary government expenditure by increasing savings, and, thus, reducing debt below the level implied by the actual collateral parameter,  $\theta$ . This is likely to happen for instance, under a deleveraging process in which, either because of overoptimistic expectations in the past or due to an unexpected decrease in expected growth, the desired level of private debt could be lower than the implied by the constraint. Handling this alternative case requires to using a solution method that takes into account that the debt constraint may not be always binding. In the context of DSGE this has been done, for example, in several papers analyzing the consequences of the zero lower bound constraint on nominal interest rates (see Adam and Billi, 2007), Nakov, 2008), but this problem arises also in many other economic applications

such as models with limitations on the mobility of factors of production; models with heterogenous agents and constraints on the financial assets available to agents; and models with inventory management. There are now well-established methods to address this type of nonlinearity in dynamic/stochastic settings (see, for instance, Guerrieri and Iacoviello, 2012a).

Another important case to consider is that in which there are asymmetric responses of financing costs to public debt. In the previous parametrization of the model we have abstained from imposing any change in financing costs to the debt level. Alternatively, it may be the case that, at some moment, increasing debt implies increasing financing costs, so that, the expansionary effect of increasing government expenditures is counteracted by higher financing costs for both the private and the public sector, while reducing debt has the added payoff of lower financing costs<sup>4</sup>.

(Forthcoming versions of the paper will include further results trying to shed light in both of these scenarios).

## 6 Final comments

The discussion about the effects of fiscal policy in the Great Recession has sidelined to some extent important issues that are very relevant to the situation of some EMU countries with high (public and private) debt. In this paper we have embedded two of them in a standard dynamic, stochastic model of a small open economy: i) the behavior of indebted household after an excessive increase in debt, and ii) the lack of monetary policy and the dependence of debt financing costs on the level of debt. Preliminary results indicate that taking into consideration these two issues is of first importance for identifying what fiscal policy can and cannot achieve in these countries in the current situation.

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<sup>4</sup>The fact that these asymmetries may be very relevant in this type of models has been seen by Guerrieri and Iacovello (2012b) when considering the response to changes in house prices.

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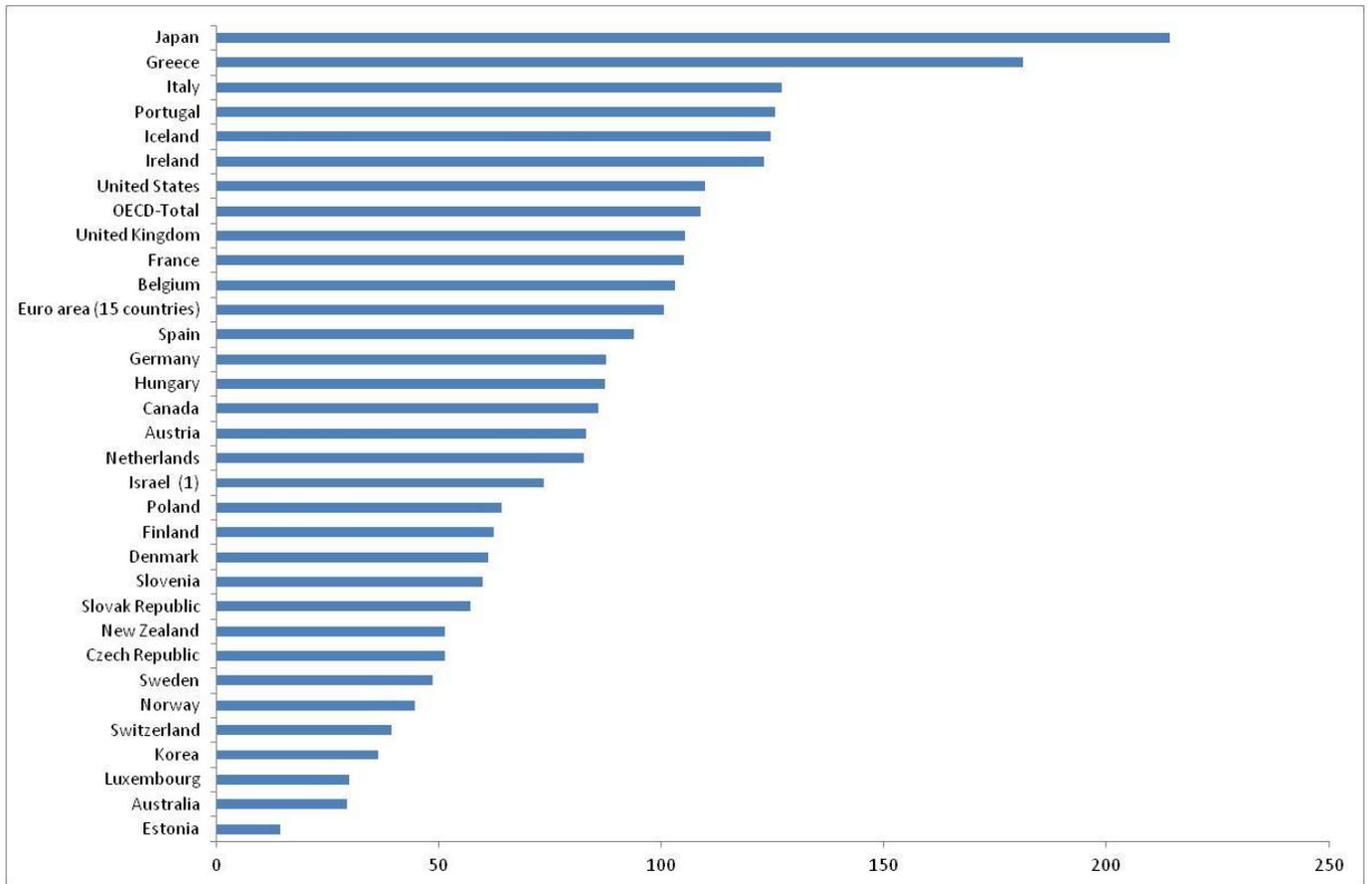
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**Table 1. Parameter values**

Parameter	Value	
$\alpha$	1/3	Probability of price adjustment
$\delta$	0.99	Time preference
$\epsilon$	7	Elasticity of substitution among varieties
$\bar{\Pi}$	1	Steady-state gross inflation
$r^w$	1.01	Steady-state world real interest rate
$\beta$	1	Coefficient of relative risk aversion
$\eta$	1	Labor supply elasticity
$\phi_R$	0.8	Interest rate smoothing coefficient
$\phi_B$	0 – 0.125	Interest reaction to public debt
$\phi_\Pi$	1.5	Interest reaction to inflation
$\bar{H}$	10	Fixed housing stock
$\theta$	0.26	Steady-state loan-to-value ratio
$\xi^H$	0.013	Housing coefficient in utility
$\xi^l$	1	Labor coefficient in utility
$G$	0.2	Steady-state government spending
$\zeta_Y$	0.0001	Reaction of taxes to debt-GDP ratio
$\zeta_B$	0.05	Reaction of taxes to changes in debt
$\rho_\theta$	0.9999	Persistence of LTV shock
$\rho_{\xi^H}$	0.9	Persistence of shock to $\xi^H$
$\rho_{\xi^l}$	0.9	Persistence of shock to $\xi^l$
$\rho_a$	0.9	Persistence of TFP shock
$\rho_G$	0.7	Persistence of shock to $G$
$\rho_T$	0.5	Coefficient on lagged taxes in fiscal rule

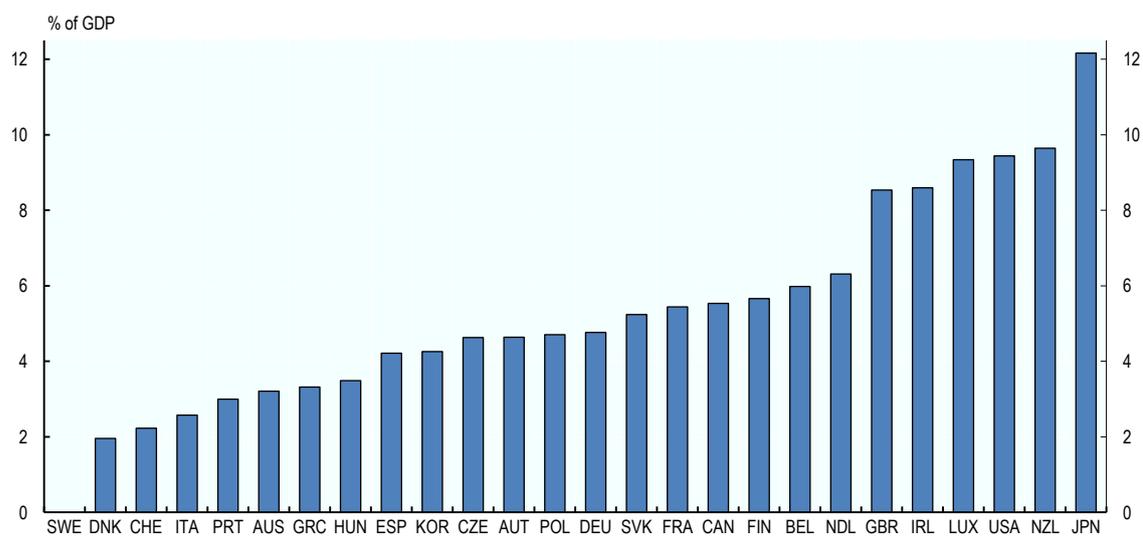
**Figure 1. Public Debt-GDP ratios (%) in advanced economies**



Source: OECD

**Figure 2. Fiscal consolidation needed to bring public debt-GDP ratios down to 50% in 2050**

Immediate rise in the underlying primary balance needed to bring gross financial liabilities to 50% of GDP in 2050



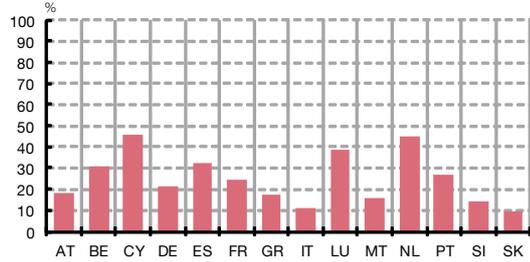
*Note:* Projections include health and long-term care and also pension spending.

*Source:* Merola, R. and D. Sutherland (2012), "Fiscal Consolidation: Part 3. Long-run Projections and Fiscal Gap Calculations", OECD Economics Department Working Paper, No. 934.

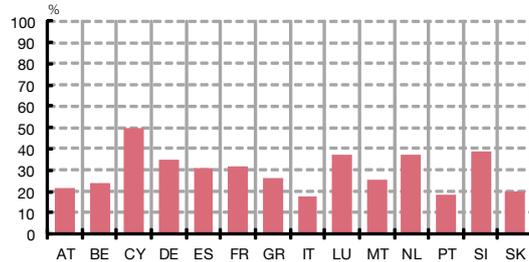
**Figure 3. Household indebtedness in EMU countries**

HOUSEHOLD INDEBTEDNESS IN THE EMU

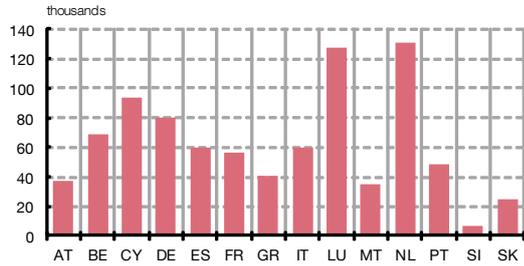
% HOUSEHOLDS WITH SECURED DEBT



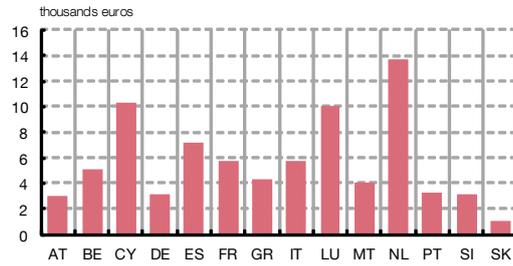
% HOUSEHOLD WITH NO SECURED DEBT



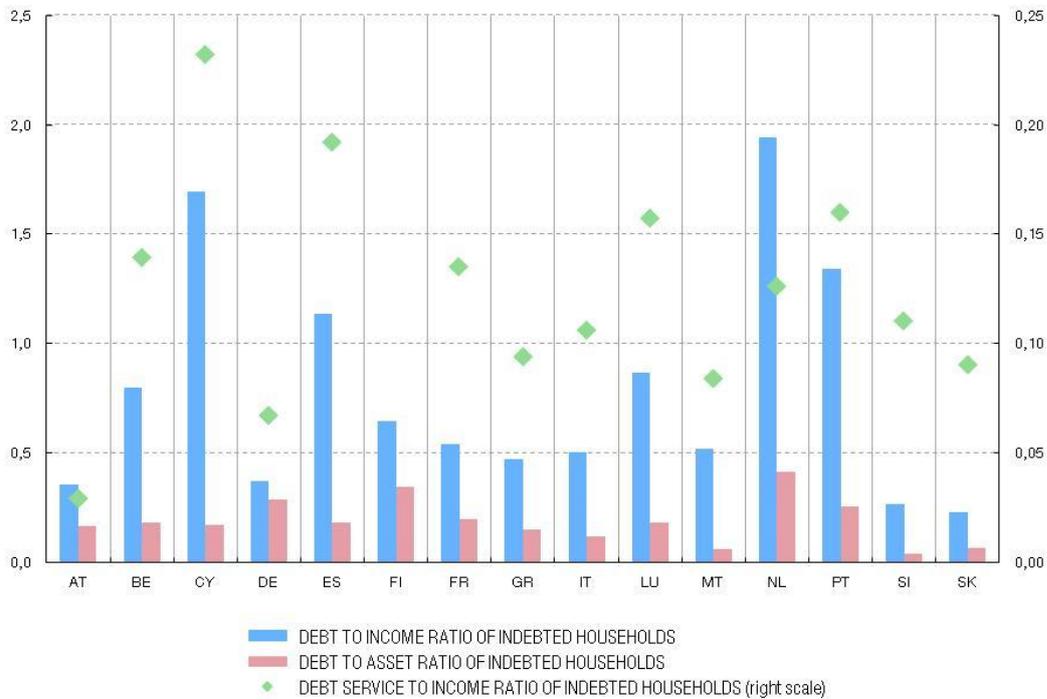
DEBT MEDIAN VALUE (SECURED DEBT)



DEBT MEDIAN VALUE (NO SECURED DEBT)

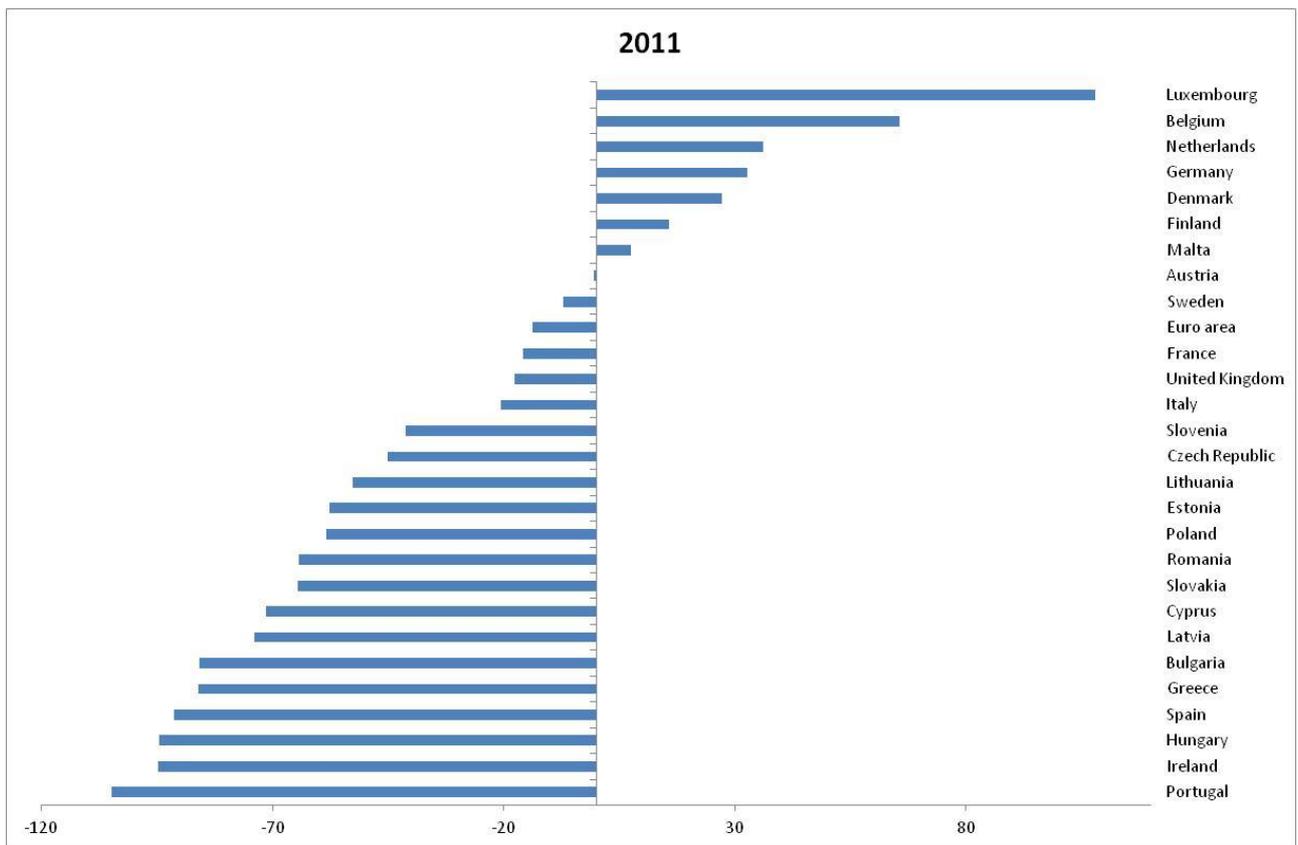


FINANCIAL BURDEN INDICATORS  
MEDIAN RATIOS



Source: HFCS

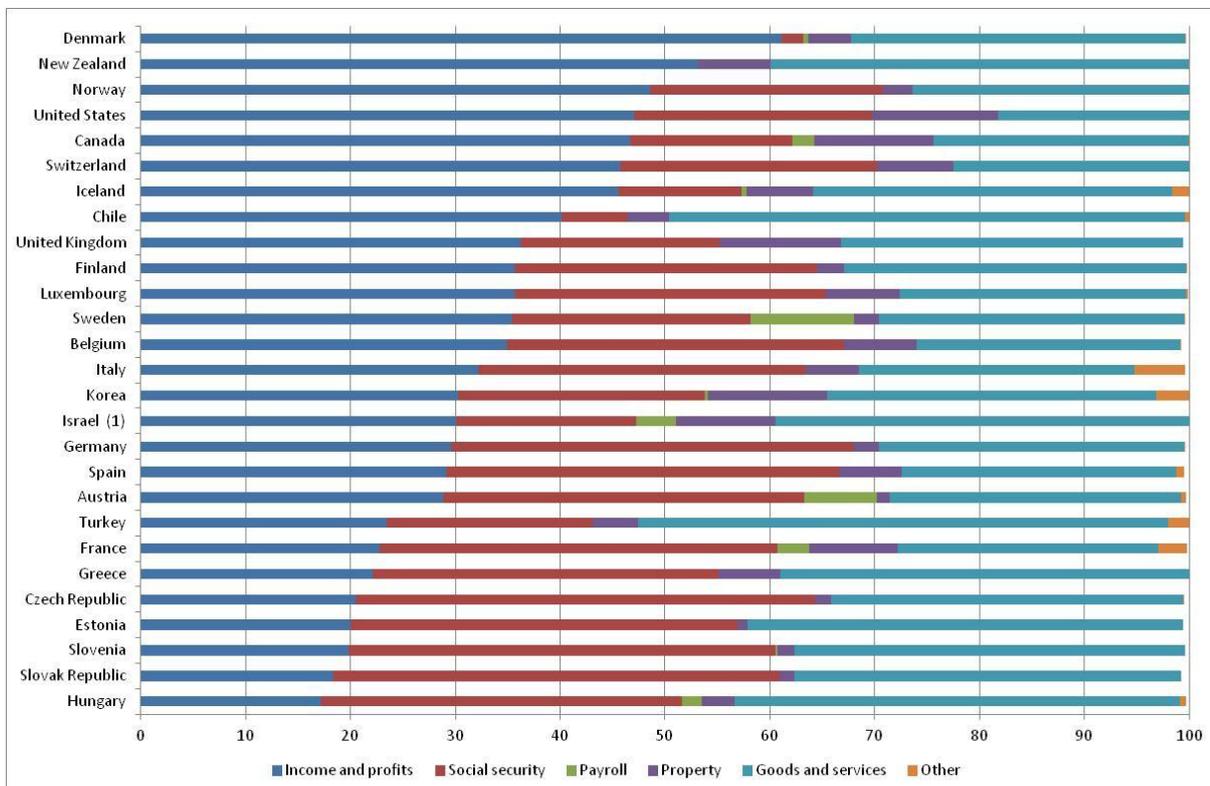
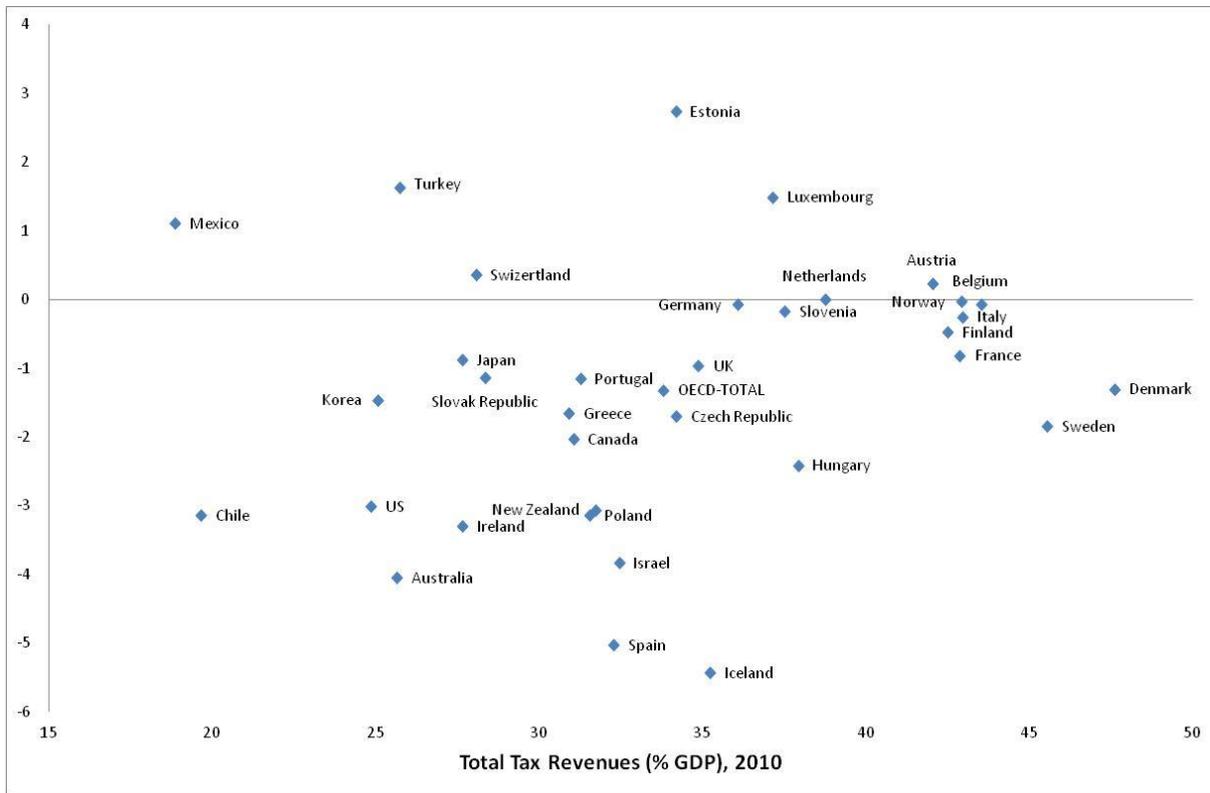
**Figure 4. External debt (%GDP) in advanced countries**



Source: EUROSTAT

**Figure 5. Fiscal revenues and its composition**

(Increase in tax revenues-GDP, 2007-2010)



Source: OECD

Figure 6. Closed economy- No debt spread ( $\Phi_B = 0$ )

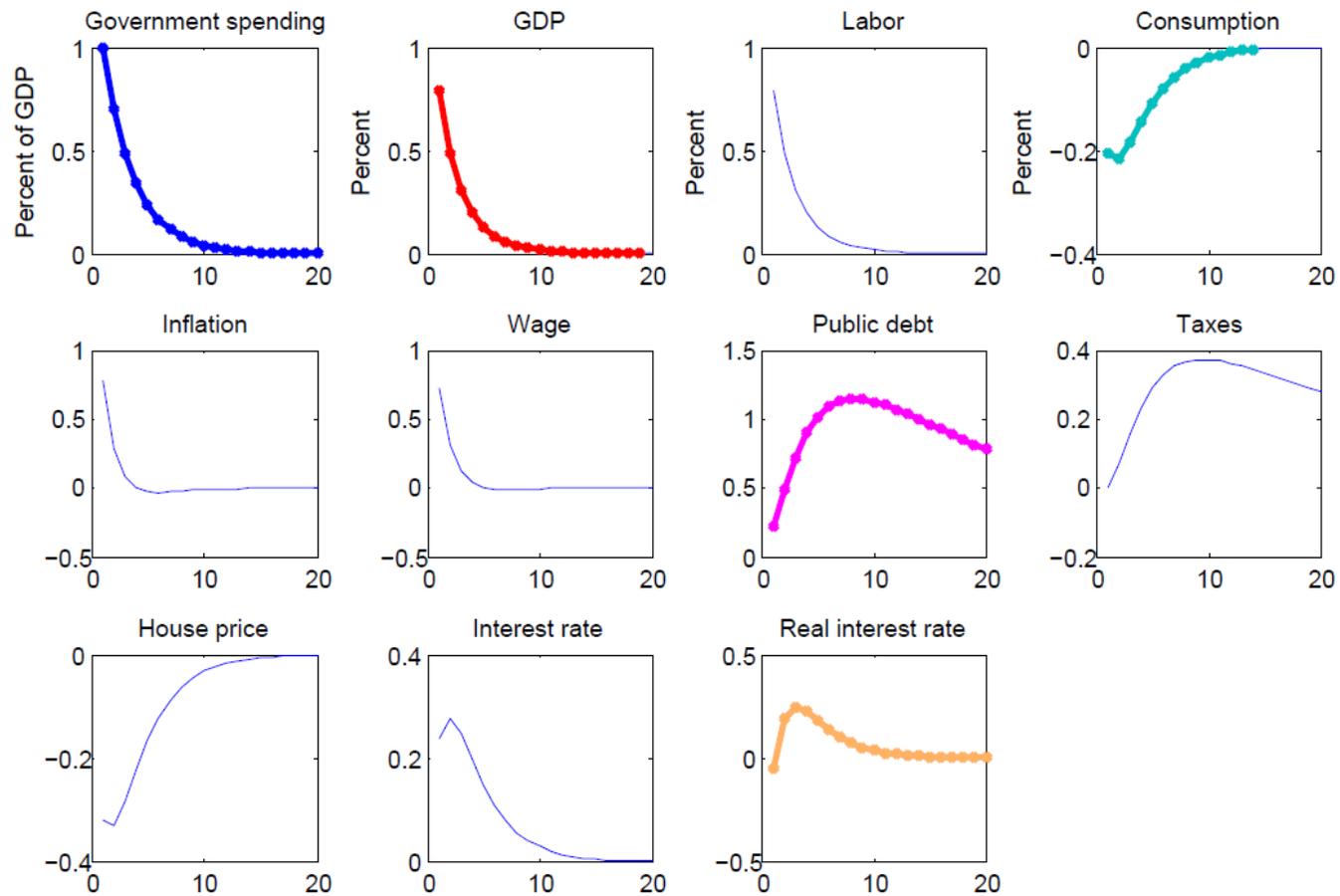


Figure 7. Closed economy-Debt spread ( $\Phi_B=0.125$ )

