Session 4

THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

THE CONSEQUENCES OF BANKING CRISES FOR PUBLIC DEBT

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The aim of this paper is to assess the consequences of banking crises for public debt. Using an unbalanced panel of 154 countries from 1980 to 2006, the paper shows that banking crises are associated with a significant and long-lasting increase in government debt. The effect is a function of the severity of the crisis. In particular, we find that for severe crises, comparable to the most recent one in terms of output losses, banking crises are followed by a medium-term increase of about 37 percentage points in the government gross debt-to-GDP ratio. We also find that the debt ratio increased more in countries with a worse initial fiscal position (in terms of the gross debt-to-GDP ratio) and with a higher share of foreign debt.

1   Introduction

Financial crises are not only typically associated with sharp economic downturns,[1] but also with a substantial deterioration of fiscal positions. Declining revenues due to weaker economic conditions, higher expenditures associated with bailout costs and demand stimuli have historically led to a rapid deterioration of fiscal balances and increase of public debt.[2]

Analysing a panel of developed and developing economies, Reinhart and Rogoff (2009) estimate that in the 3 years after the occurrence of a banking crisis the real value of government debt rose on average by 86 per cent. However, arguably measuring the change in debt this way can be misleading because it depends on the initial level of the debt. Alternatively, if the rise in debt is measured in terms of the change in the ratio of debt to GDP, the figures becomes considerably smaller; using similar episodes to those chosen by Reinhart and Rogoff (2009), but focusing on the percentage point increase of the debt-to-GDP ratio, the historical average cumulative increase in the debt-GDP ratio 3 years after the occurrence of banking crises is about 9 percentage points of GDP (Figure 1). The effect varies considerably across the episodes presented in the figure, ranging from an almost insignificant increase in the case of Thailand in 1997 to an increase of more than 35 percentage points for Finland in 1991. In addition, countries differ not only in terms of the magnitude of the impact in the 3 years following the crisis, but also in terms of the dynamic of the response and in terms of medium-term effects. For example, three years after financial crises in Japan and Finland the effect on debt is very similar, however the medium-term evolution beyond three years is very different (Figure 2).

The current financial crisis is exceptional not only for its severity and its synchronicity across countries, but also for the policy response: monetary policy rates have been slashed, central

[1]   See, for example, Aziz *et al.* (2000); Barro (2001); Hutchinson and Ilan (2005); Boyd *et al.* (2005); Cerra and Saxena (2008); Furceri and Mourougane (2009a, b); and Furceri and Zdzienicka (2010a, b).

[2]   See, for example, Caprio and Klingebiel (1997); Honohan and Klingebiel (2000); Laeven and Valencia (2008a); Reinhart and Rogoff (2008); Furceri and Mourougane (2009a); and OECD (2009).

bank balance sheets expanded, and most governments have taken expansive fiscal measures to counter the economic downturn. For many countries debt levels are projected to increase substantially. For example, in OECD countries (Figure 3) gross government debt-to-GDP ratios are projected to increase by more than 20 percentage points by 2011, and in some cases (Iceland, Ireland, Japan, and the United Kingdom) by more than 30 percentage points (OECD, 2010). Focusing on a longer time horizon (Figure 4), debt levels may increase even more (OECD, 2010). Based on the assumption that government consolidation measures are only gradual but sufficient to stabilise debt-to-GDP ratios over the long term, debt-GDP ratios may still increase by about 30 percentage points by 2025 compared to pre-crisis level, with the largest increase being projected for Ireland (about 100 percentage points) and the United Kingdom (about 80 percentage points).[3]

In the context of the aftermath of the recent financial crisis this paper considers past historical episodes to

Figure 1

Cumulative Increase in the Debt-to-GDP Ratio in the Three Years Following the Banking Crises
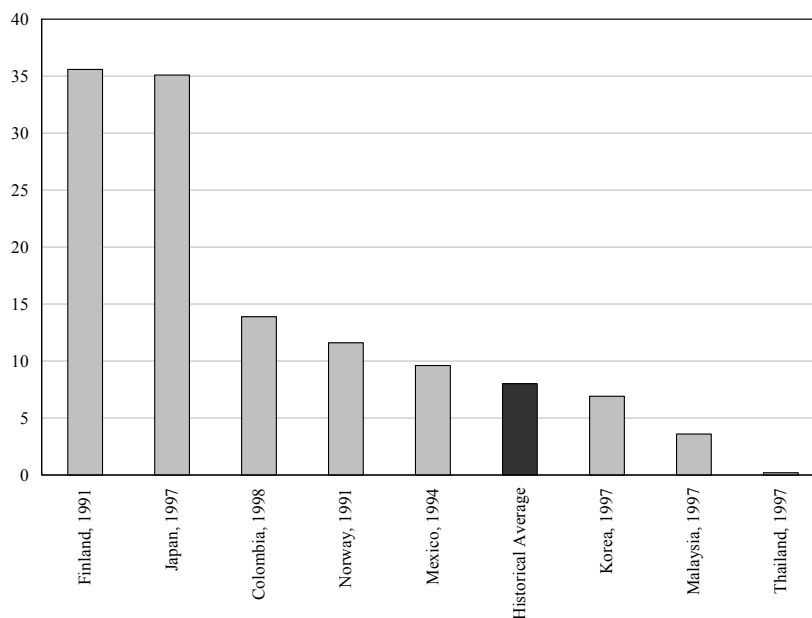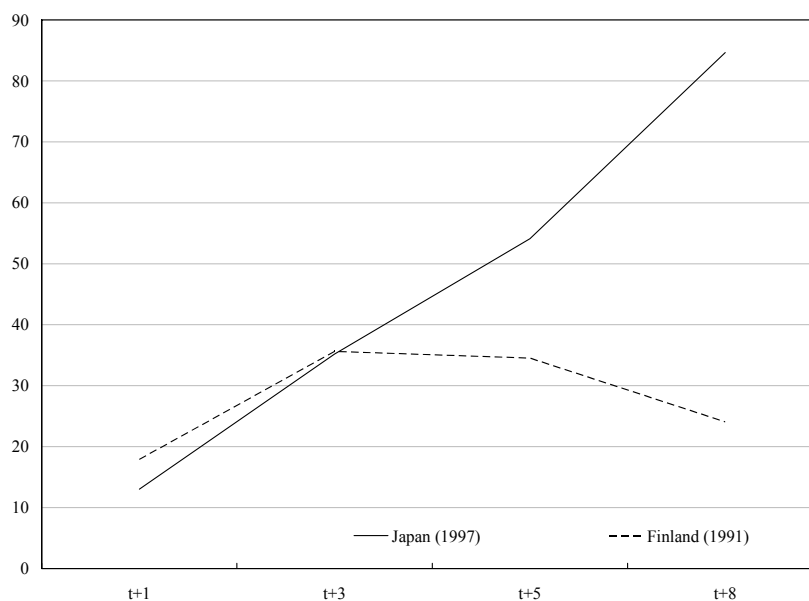*(percent of GDP)*

Figure 2

Evolution of the Debt-to-GDP Ratio Following Banking Crises in Finland and Japan
(percent of GDP)

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[3]   In particular, it is assumed that the underlying primary fiscal balance improves by ½ per cent of GDP until it is sufficient to ensure that the debt-to-GDP ratio is stable. See, Chapter 4 of OECD's *Economic Outlook 87* (2010) for more details.

Figure 3

Projected Increase in the Government Debt-to-GDP ratio, 2007-11
(percent of GDP)
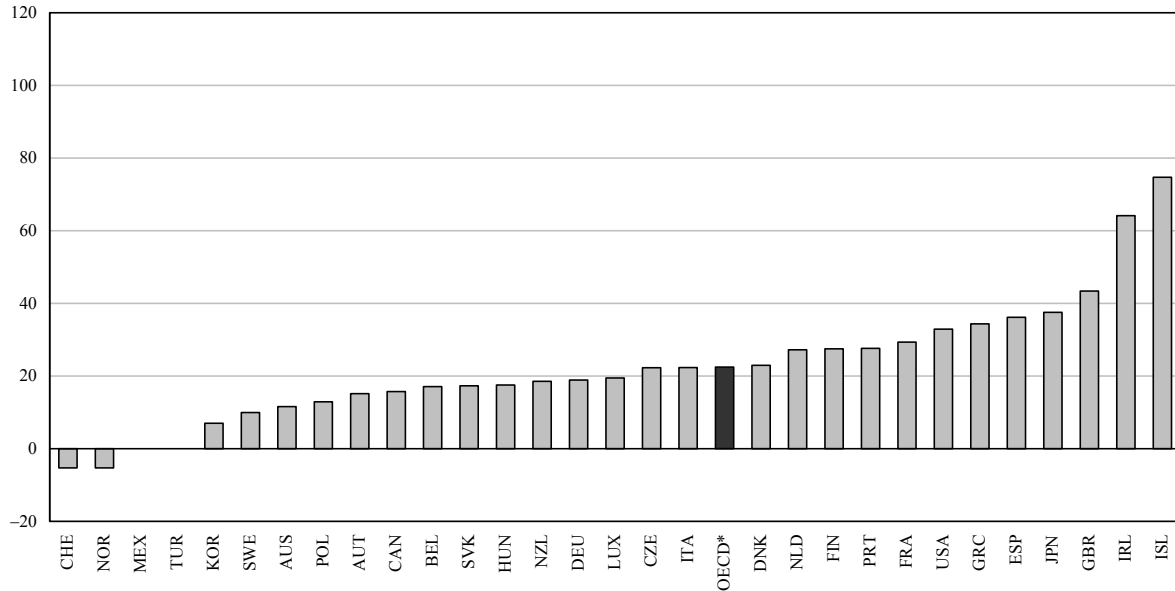
Source: OECD (2010), *Economic Outlook 87 Database.*
Note: * unweighted average of OECD countries excluding Mexico and Turkey.

Figure 4

Projected Increase in the Government Debt-to-GDP Ratio, 2008-25
(percent of GDP)

Source: OECD (2010), *Economic Outlook 87 Database.*
Note: * unweighted average of OECD countries excluding Mexico and Turkey. Projections are based on the assumption that government debt-to-GDP will stabilize by 2025 as a result of gradual consolidation measures. See the OECD's *Economic Outlook 87* (2010) for more details.

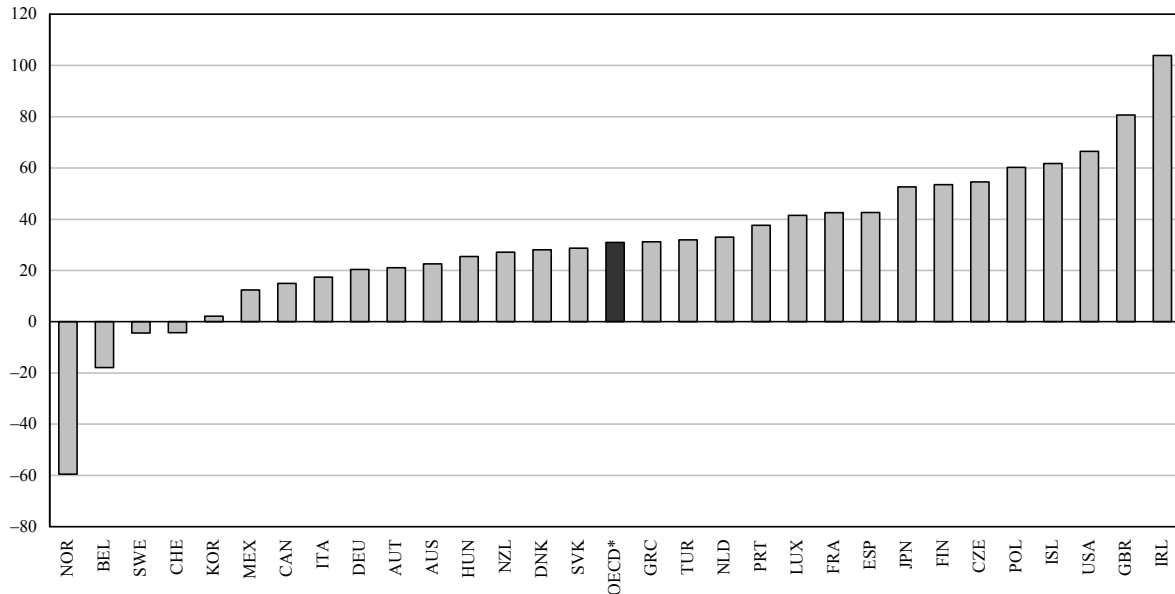examine what has happened to public debt over the medium and long term, The paper provides estimates of the dynamic impact that banking crises episodes have typically had on the gross debt-to-GDP ratio, and of the role that structural and policy variables have had in shaping this response. The analysis complements previous work analysing the fiscal costs associated with banking crises in several respects by:

- focusing on gross public debt as a dependent variable. Several papers in the literature have instead focused on trying to estimate only the bailout costs associated with banking crises.[4] However, there are two main problems with this approach. First, estimates of fiscal bailouts depend markedly on the methodology used. As a result, the difference in the estimates across studies focusing on the same episodes is large (Frydl, 1999 and Vale, 2006). Second, bailout costs are only a part of the fiscal cost associated with banking crises. In fact, the fiscal consequences of banking crises also result from the reduced revenues associated with output losses, the increase in spending due to automatic stabilisers and from discretionary increases in the public deficit;

- the focus is on the debt-to-GDP ratio rather than the percentage change in debt levels. This is important for two reasons. First, the debt-to-GDP ratio is a better measure to assess fiscal sustainability. Second, analysing the percentage increase of debt levels in the aftermath of banking crises could lead to possible mis-interpretations since the percentage increase crucially depends on the initial level of the debt before the occurrence of the crisis. For example, consider two crises episodes: Sweden (1991) and Colombia (1998). Following Reinhart and Rogoff (2009), the increase in the gross public debt in the three years following the banking crisis as in Colombia implies that public debt increased by about 175 per cent, while in Sweden it increased by about 60 per cent. However, when the percentage point increase in the debt-to-GDP ratio is considered, as in Figure 1, the result leads to a spectacular reversal of this ranking: fiscal positions deteriorated significantly more in Sweden (27 percentage points of GDP) than in Colombia (13 percentage points of GDP);

- presenting inferential empirical evidence on the increase of the debt-to-GDP ratio in the aftermath of banking crises. The only work, to our knowledge, that tries to assess the increase in public debt (not as ratio to GDP, as discussed previously) is Reinhart and Rogoff (2009). However, in their paper, the authors present only descriptive evidence of the increase in the gross government debt 3 years after the occurrence of banking crises, without controlling for countries characteristics and other factors that could explain the increase in public debt in the short term and different responses across countries;

- estimating the effect of banking crises on the debt-to-GDP ratio both in the short and in the long-run,[5] in particular to assess whether fiscal costs associated with the crises have been permanent or if they have tended to dissipate in the long term;

- analysing the heterogeneity of responses among different countries and episodes.

Using an unbalanced panel of 154 countries from 1970 to 2006, the main findings of the paper is to show that banking crises are associated with a significant and long-lasting increase in the government debt-to-GDP ratio. The magnitude of effect is a function of the severity of the crisis. In particular, we find that for severe crises, comparable to the most recent one in terms of output loss, banking crises are on average followed by a medium-term increase of about 37 percentage points in the government gross debt-to-GDP ratio. We also find that larger increases in debt tended to occur in those countries with the worse initial fiscal positions (in terms of gross debt-to-GDP ratio) and with the highest share of foreign public debt.

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[4] See, among others, Caprio *et al.* (2005) and Sanhueza (2001).

[5] Previous works generally focus on a time horizon of 3 years.

The rest of the paper is organised as follows: the next section describes the data and the empirical methodology used to examine the effects of a financial crisis on debt; Section 3 describes the results; and finally, Section 4 concludes with the main findings.

2   Data and empirical methodology

2.1   *Data*

Data for real gross debt-to-GDP ratio are taken from the IMF's *World Economic Outlook* (2009). Data for the share of gross foreign public debt over total public debt are taken from Panizza (2008), where public foreign debt is defined as issued in foreign countries and under the jurisdiction of a foreign court. Data for banking crises episodes are taken from Laeven and Valencia (2008a). In the latter paper the authors provide detailed information on the starting date of several banking, currency and debt crises. The dataset is constructed by combining quantitative indicators measuring banking sector distress, such as a sharp increase in non-performing loans and bank runs, with a subjective assessment of the situation. In particular, the database extends and builds on the database of Caprio *et al.* (2005) and covers the universe of systemic banking crises (124 episodes) for the period 1970-2007.[6]

2.2   *Empirical methodology*

In order to estimate the dynamic impact of banking crises episodes on the debt-to-GDP ratio the paper follows the approach proposed by Jorda (2005) and Teulings and Zubanov (2009) which consists of estimating impulse response functions (IRFs) directly from local projections. In detail, for each future period k the following equation has been estimated on annual data:

$$b_{i,t+k} - b_{i,t} = a_i^k + \sum_{j=1}^{l} \gamma_j^k \, \Delta b_{i,t-j} + \beta_k \, D_{i,t} + \varepsilon_{i,t}^k \qquad (1)$$

with $k= 1,..8$. Where b indicates the government gross debt-to-GDP ratio, D is a dummy that takes the value equal to 1 in the occurrence of a banking crisis and zero otherwise, α_i represent country fixed effects, γ_j captures the persistence in changes of the debt ratio, and β_k measures the impact of banking crises on the change of the debt ratio for each future period k. The number of lags (l) has been tested, and the results suggest that inclusion of two lags produce the best specification.[7] Correction for heteroskedasticity, when appropriate, are applied using White robust standard errors, while the problem of autocorrelation in the errors is addressed using two lags of the explanatory variable as regressors.[8] Impulse response functions (IRFs) are then obtained by plotting the estimated coefficients β_k for $k= 1,..8$.

An alternative way of estimating the dynamic impact of banking crises on output is to estimate an ARDL equation of debt-to-GDP ratio and crises dummies and to compute IRFs from the estimated coefficients.[9] However, the IRFs derived using this approach are sensitive to the choice of the number of lags, and the inclusion of interaction terms in the equation often leads to problems of multicollinearity, thus making the IRFs unstable. In addition, the significance of

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[6]   See Tables 1 and 2 for a detailed description of crises episodes.

[7]   The results are extremely robust to the number of lags included in the specification.

[8]   Tests for autocorrelation of the residuals have been carried out and have rejected the hypothesis of serial correlation.

[9]   This approach was initially proposed by Romer and Romer (1989) and then recently applied by Cerra and Saxena (2008); Furceri and Mourougane (2009a, 2009b); and Furceri and Zdzienicka (2010b) to assess the impact of financial crises on economic activity.

long-lasting effects on the debt ratio with ARDL models can be simply driven by the use of one-type shock models (Cai and Den Haan, 2009).

In contrast, the approach used in this paper does not suffer from these problems because the lags of the change in the debt ratio enter only as control variables and are not used to derive the IRFs. Finally, the confidence bands associated with the estimated IRFs are easily computed using the standard deviations of the estimated coefficients β_k, and Monte Carlo simulations are not required.

Figure 5

The Effect of Banking Crises on the Debt-to-GDP Ratio
(percent of GDP)

The central scenario is surrounded by the intervals that reflect the uncertainty in the demography, the labour market, the benefit ratio and the business cycle.
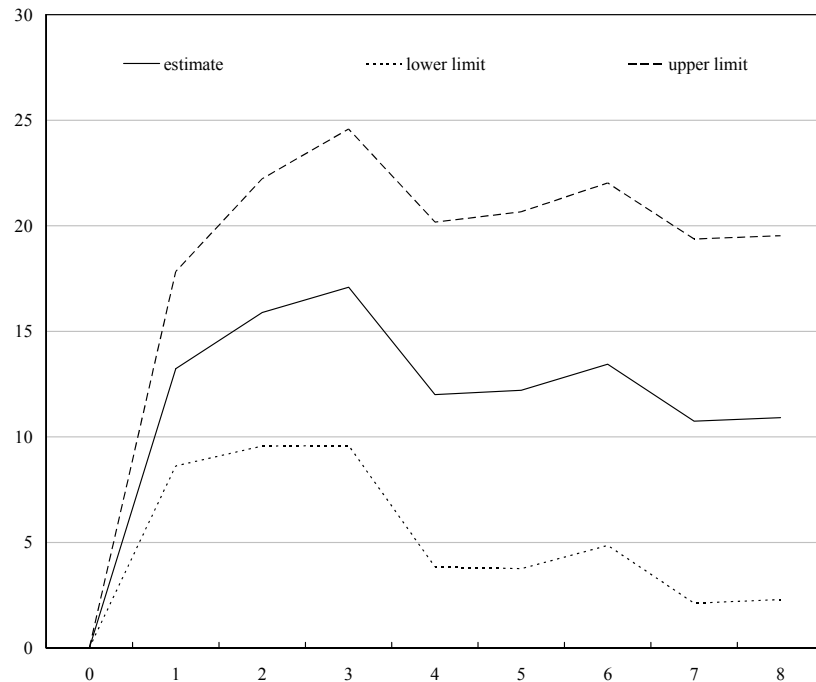Source: INE, Ministerio de Trabajo y Asuntos Sociales and own elaboration.

3 Results

3.1 Baseline

The impact of banking crises on the gross government debt-to-GDP ratio is estimated as described in equation (1). The results for each period *k* are displayed in Figure 5, together with the associated confidence bands.[10] Looking at the figure it is immediately apparent that banking crises are associated with a significant and long-lasting increase in public debt. In particular, banking crises have typically increased the government gross debt-to-GDP ratio by about 12 percentage points in the short term (1 year after the occurrence of the crisis), and by about 10 percentage points in the medium term (8 years after). In addition, we find that the largest increase in the debt ratio (17 percentage points) has typically occurred around 3 years following the occurrence of a banking crisis.

To check for the robustness of the results, equation (1) is re-estimated by alternatively including 1) time fixed effects, 2) a common time trend, 2) a country-specific time trend. Time fixed effects are included to control for specific time shocks, such as those affecting world interest rates. A time trend is used to control for common trends in the developments of debt-to-GDP ratios. Finally, a country-specific time trend is included to allow the trend in debt-to-GDP ratio to differ across countries. The results using these different controls remain statistically significant and broadly unchanged (Figure 6a-6c).

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[10] See Table 3 for more detailed information regarding the estimated parameters in equation (1).

Figure 6

Robustness Tests
(percent of GDP)

a) Time-fixed Effects

b) Common-time Trend

c) Country-specific Time Trend

d) Restricted Balanced Sample
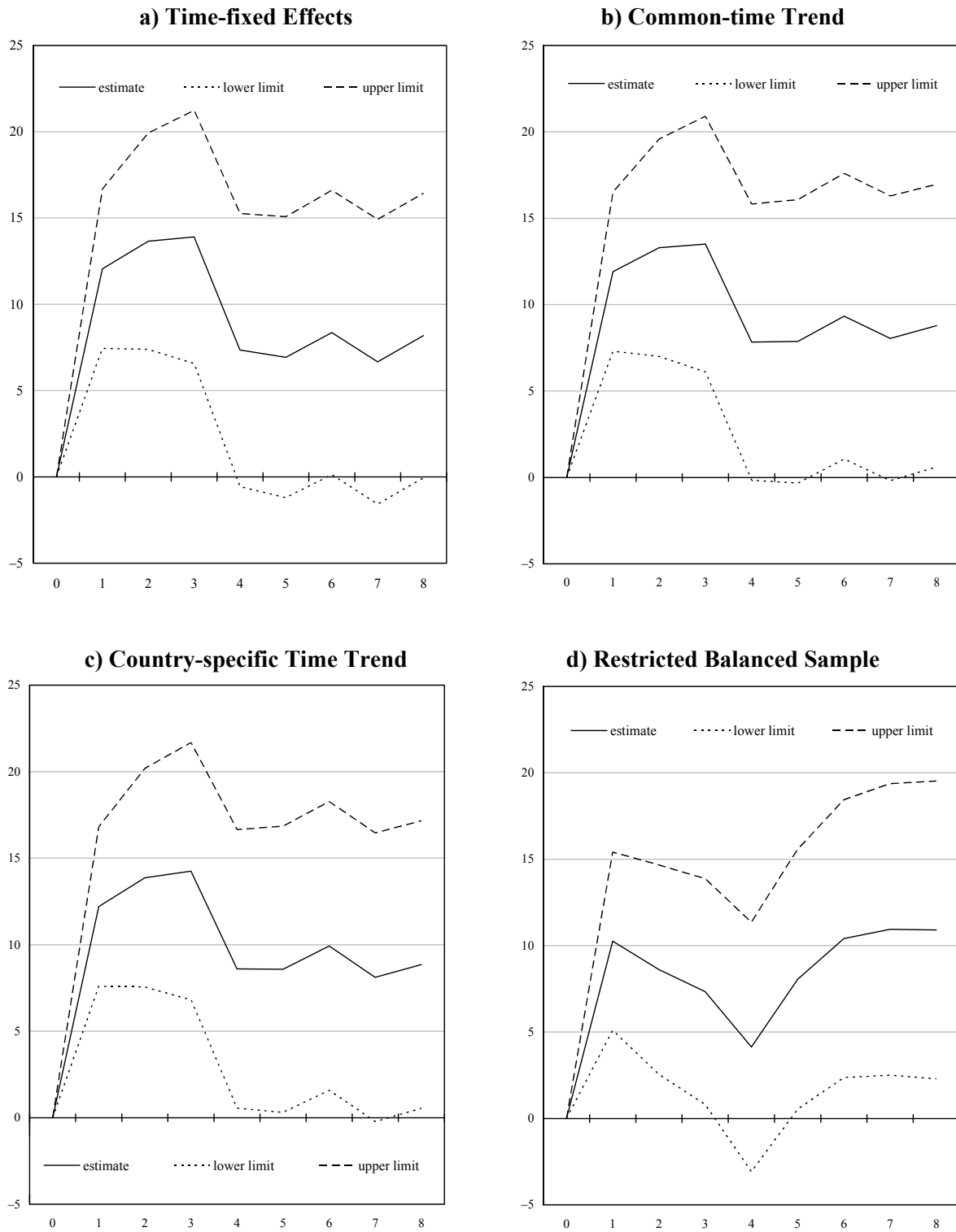
Note: dotted lines represent 90 per cent confidence bands.

As an additional robustness test the estimation sample is restricted to those countries for which data for $b_{i,t+k}$ are available for each period k. The reason for doing so is to control for a possible composition bias deriving from estimating $b_{i,t+k}$ over an unbalanced set of countries. The results for the restricted sample (displayed in Figure 6d) suggest that the short and the medium-term effects are almost identical to those estimated for the unbalanced baseline sample.

Finally, to also test whether the effect is similar between advanced and less developed economies, equation (1) is augmented by including a dummy for OECD countries as a control and as interaction term with the crisis dummy, as follows:

$$b_{i,t+k} - b_{i,t} = a_i^k + \sum_{j=1}^{l} \gamma_j^k \, by_{i,t-j} + \beta_k \, D_{i,t} + \vartheta^k \, OECD_{i,t} + \delta^k \, OECD_{i,t} \, D_{i,t} + \varepsilon_{i,t}^k \qquad (2)$$

The coefficient associated with the interaction term is statistically significant, suggesting that the effect of banking crises on public debt is not statistically difference between the two groups of countries. The unconditional effect is still positive, statistically significant and of the same order of magnitude as the one estimated in the baseline specification (Table 3).

3.2 Severity of the crises

The results presented so far have shown that on *average* banking crises have had significant and persistent effects on the government debt-to-GDP ratio. However, it is reasonable to think that fiscal policy responses, both in terms of size of fiscal stimulus packages to counter the crisis and in terms of the increase in the deficit due to automatic stabilisers, may be a function of the output losses and therefore vary with the severity of the crisis. This would imply that the baseline estimates tend to over-estimate the impact on government debt for "moderate" banking crises and to under-estimate the impact for "severe" crises.

To test for this hypothesis equation (1) is for two groups of crises: i) severe crises, *i.e.* banking crises associated with cumulative output losses (computed as the deviation of the annual growth rate from the average trend) above 4 per cent, which are comparable to the current circumstances;[11] ii) moderate crises, *i.e.* banking crises associated with output losses below 4 per cent. The results of this exercise are reported in Figure 7. Looking at the figure it is possible to observe a different response of the debt-to-GDP ratio between moderate and severe crises, both in the short and in the medium term. In particular, for moderate crises (Panel A) the maximum effect is about 15 percentage points after 4 years and it becomes insignificant in the medium term (after 8 years). For severe crises (Panel B-C), the peak effect is about 50 percentage points (three times bigger than the average effect presented in the baseline scenario) and the medium-term effect (eight years after) is about 37 percentage points.

The results for severe crises are in line with the recent IMF's *World Economic Outlook* (2010) and OECD's *Economic Outlook* (2010) medium-term projections for the debt-to-GDP ratio.

3.3 Initial debt

The rise in public debt in the aftermath of a banking crisis may be more important for countries that had at the time of the crisis a higher initial debt-to-GDP ratio. This hypothesis can be

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[11] Output losses are computed as the deviation of the annual growth rate compared to the trend (approximated by the average of annual growth rates over time). The results are qualitatively unchanged for reasonable changes in the threshold value. This is conceptually similar to the cumulative (negative) output gap following a downturn.

The Effect of Moderate and Severe Banking Crises on the Debt-to-GDP Ratio
(percent of GDP)

a) Moderate Crises
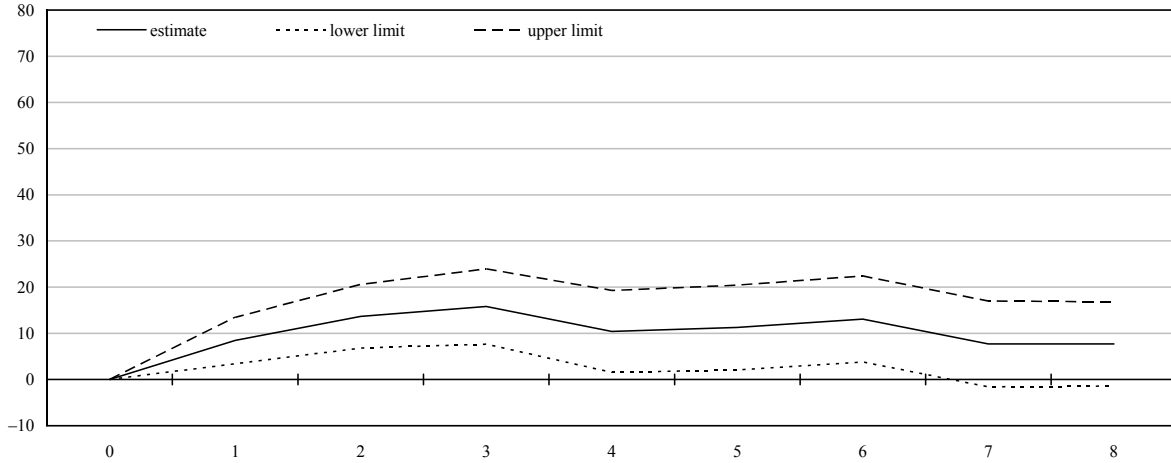
b) Severe Crises – Full Unbalanced Sample
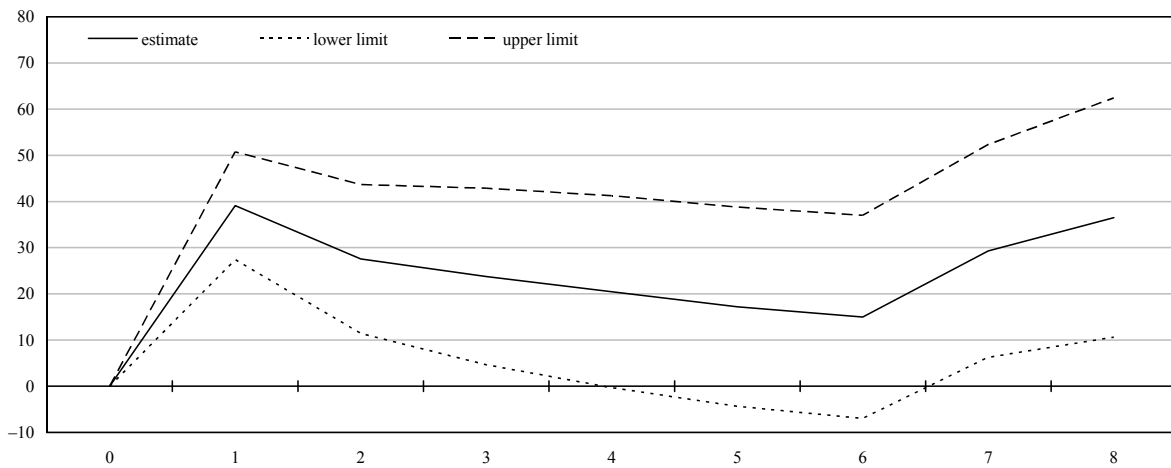
c) Severe Crises – Restricted Unbalanced Sample
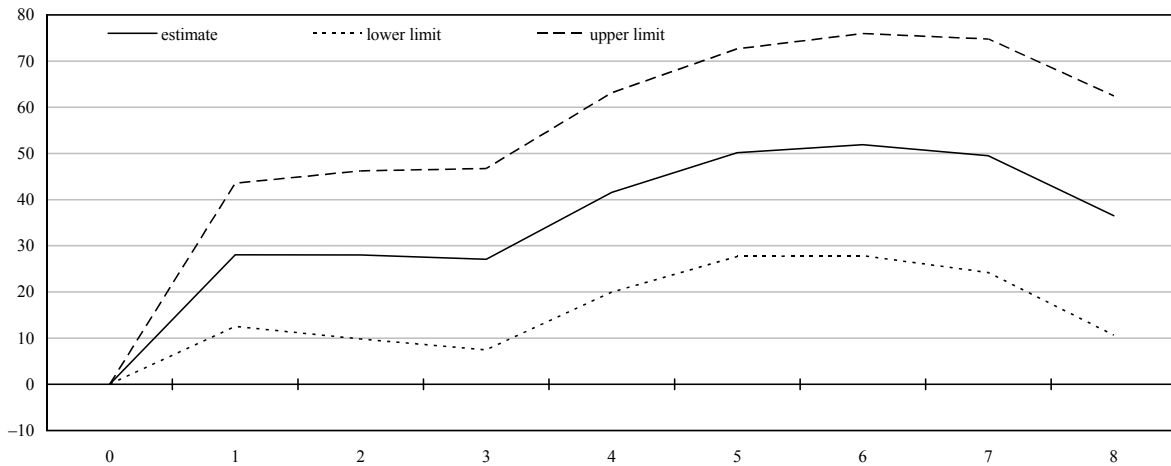
Note: dotted lines represent 90 per cent confidence bands.

explained by the fact that a higher initial level of debt affects the debt accumulation through debt service.[12] In times of crisis, debt service burdens increase due to reduced government revenues and increased risk premia. This last factor tends to be generally more important for countries with a higher initial level of public debt.[13]

To assess the impact of the initial debt-to-GDP ratio on shaping the dynamic response of the government debt-to GDP ratio to banking crises, equation (1) is augmented by including the initial debt-ratio as a control variable and as an interaction term with the crises dummy:

Figure 8

The Effect of Banking Crises on Debt-to-GDP Ratio Controlling for the Initial Debt Ratio
(percent of GDP)
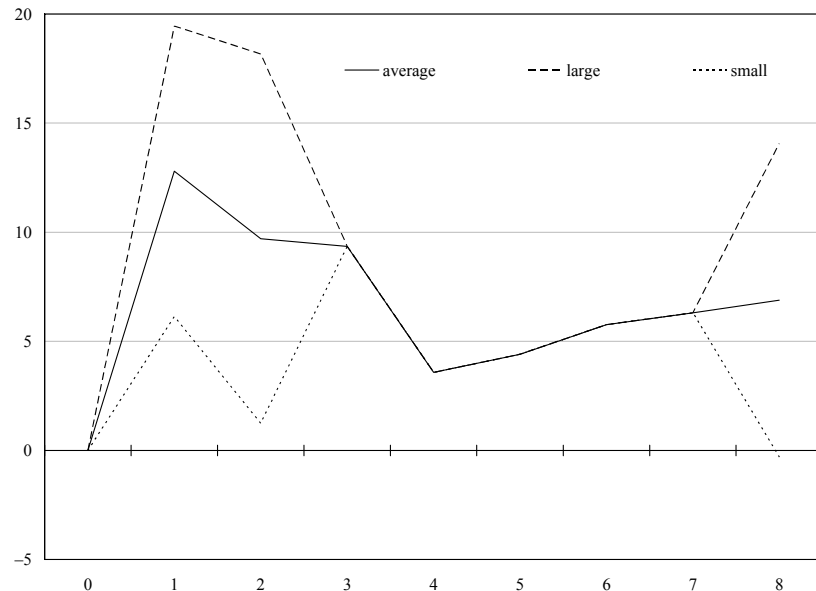

Note: Large and small identify the first and the third quartile of the initial debt-to-GDP ratio distribution. Dotted lines differ from the average response only when the interaction term is statistically significant.

$$b_{i,t+k} - b_{i,t} = a_i^k + \sum_{j=1}^{l} \gamma_j^k \, by_{i,t-j} + \beta_k \, D_{i,t} + \vartheta^k \, X_{i,t} + \delta^k \, (b_{i,t} - \overline{b})D_{i,t} + \varepsilon_{i,t}^k \qquad (2)$$

The interaction term $(b_{i,t} - \overline{b})D_{i,t}$ is centred on the (over-time and cross-country) mean to make the interpretation of unconditional effects easier. Based on equation (2), for each period *k,* the impact of banking crises on the debt-to-GDP ratio is measured by $\beta_k + \delta^k (b_{i,t} - \overline{b})$. This implies that the effect will increase as a function of the initial debt ratio if $\delta^k > 0$.

The results reported in Figure 8 tend to confirm the hypothesis that in countries with larger initial level of debt-to-GDP ratio (corresponding to the 3rd quartile of the distribution, *i.e.* above 76 per cent) the increase in the debt-to-GDP ratio, both in the short (1 and 2 years after) and in the medium term (8 years after), is about 15 percentage points higher than in countries with lower initial debt (the 1st quartile, *i.e.* below 20 per cent).

3.4   *Foreign public debt*

Another factor that may affect the pattern of the public debt-to-GDP ratio in the aftermath of

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[12]   See Figure 10 and 11 for the estimated impact of banking crises on government debt service.

[13]   See, for example, Haugh *et al.* (2009), Schuknecht *et al.* (2009), Codogno *et al.* (2003), Gale and Orzag (2003), Gomez-Puig (2006), Manganelli and Wolswijk (2007).

banking crises is the ratio of public foreign debt to total public debt (public foreign debt ratio). First, countries with an high share of foreign public debt may face higher interest payments on debt coming due as capital markets become unwilling to continue rolling debt over. Second, when foreign exposure is heavy, expectations that debt might not be repaid in the case of depreciation may lead to a self-fulfilling liquidity crunch, and eventually to public debt default. Third, in countries with a high foreign public debt ratio currency depreciation may lead to a substantial increase in the debt burden because of the *original sin* and lead to debt crises (Flandreau, 2003; Bordo, 2006; Bordo and Meisser, 2006). Fourth, a high level of foreign public debt may lead to significant output losses, especially in emerging economies, since sudden stops or reversals in capital inflows are more likely.[14]

An approach to test whether countries with a higher foreign public debt ratio have been characterised by an higher rise in the debt-to-GDP ratio in the aftermath of banking crises is to re-estimate equation (2) using the initial level of the foreign public debt ratio as control and interaction term with the banking crises dummy. However, a problem with this approach in this case is that the probability of banking crises is endogenous to the share of foreign public debt.[15]

A way to mitigate this problem is to estimate our baseline equation for different levels of the foreign public debt ratio. For simplicity, and homogeneity with the rest of the results presented, we estimate equation (1) for three groups of countries (observations): i) those with a foreign debt ratio lower than the first quartile of the distribution, *i.e.* below 34 per cent (*low foreign debt ratio*); ii) those with a foreign debt ratio higher than the third quartile of the distribution, *i.e.* above 83 per cent (*high foreign debt ratio*); iii) those with a foreign debt between the first and the third quartile (*average foreign debt ratio*). The IRFs corresponding to the three groups are displayed in Figure 9. The results suggest that the public debt-to-GDP ratio increased more in those countries with a higher share of foreign debt. In particular, in countries with low foreign debt ratio the increase in the debt ratio is not statically significant different from zero. In countries with average foreign debt ratio, the results point to a long term increase of the debt ratio of about 10 percentage points (which is similar to the baseline effect presented in Figure 5). Finally, in countries with high foreign debt ratio the peak effect is close to 30 percentage points, while the long-term effect is about 20 percentage points.[16]

4   Conclusions

Financial crises are typically associated with sharp economic downturns but also with a substantial deterioration of fiscal positions. Declining revenues due to weaker economic conditions, higher expenditures associated with bailout costs and demand stimuli have historically led to a rapid deterioration of fiscal balances and increase of public debt. Focusing on the debt-to-GDP ratio and several episodes of banking crises from 1980 to 2006 this paper aims to quantify the evolution of the government gross debt-to-GDP ratio in the aftermath of banking crises. In particular, using a sample of 154 countries the paper estimates impulse response functions of public debt to banking crises.

The results of this exercise suggest that banking crises have produced a significant and long-lasting increase in the government debt-to-GDP ratio, with the effect being a function of the

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[14]   See, for example, Calvo *et al.* (2004) and Bordo *et al.* (2008).

[15]   Bordo and Meisser (2006) find that, especially if mismanaged, foreign debt can significantly increase the probability of financial crises.

[16]   The results obtained by estimating equation (2), using the initial level of the foreign debt ratio as control and interaction term with the banking crises dummy, broadly confirm these results.

Figure 9

**The Effect of Banking Crises on the Debt-to-GDP Ratio
for Different Level of Foreign Debt Ratio**
(percent of GDP)

a) Low Ratio
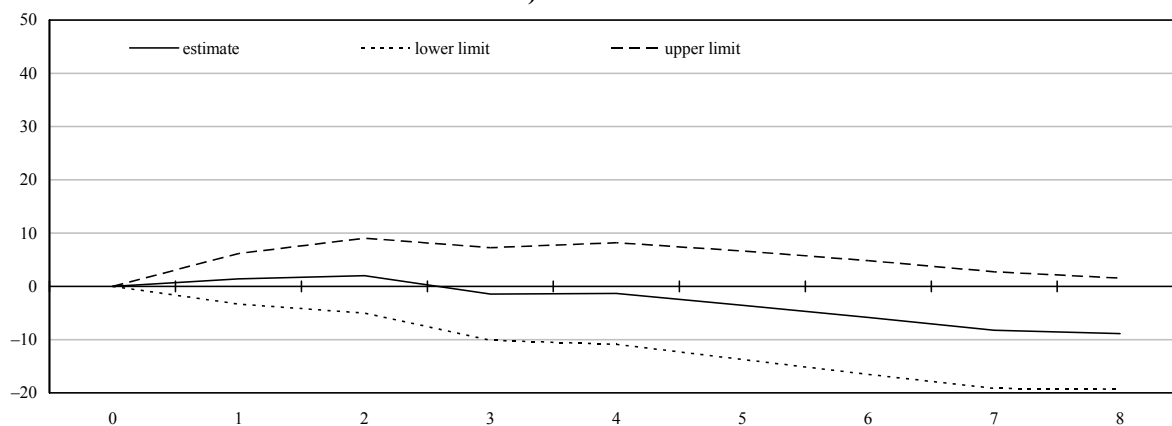
b) Average Ratio
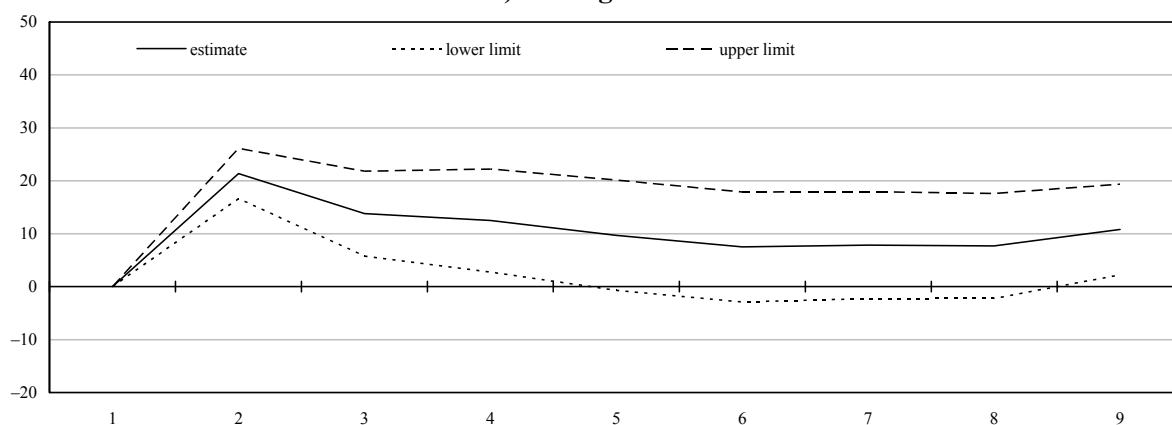
c) High Ratio
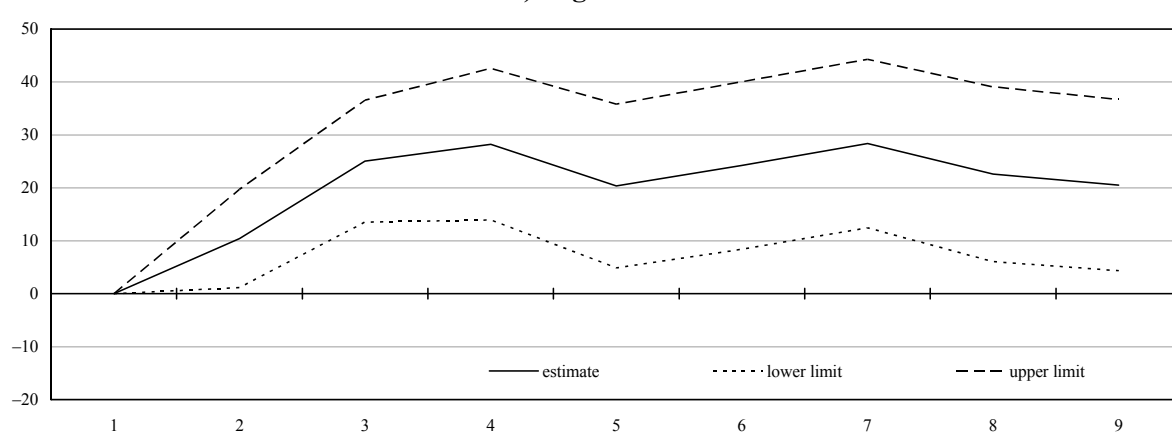
Note: dotted lines represent 90 per cent confidence bands. Low ratio corresponds to a level of the foreign debt ratio lower than 34 percentage points (1st quartile of the distribution); Average ratio corresponds to a level of foreign debt ratio higher than 32 percentage points and lower than 75 percentage points; High ratio corresponds to a level of foreign debt ratio higher than 75 percentage points (3rd quartile of the distribution).

severity of the crisis. In particular, for severe crises, comparable to the current one in terms of output losses, we find that government debt-to-GDP ratios increased up to 50 percentage points at the peak, and by 37 percentage points in the medium term (eight years after the crises onset). The effect is considerably lower for moderate crises.

We also find that the increase in public debt in the aftermath of banking crises depends not only on the severity of the crises but also on countries heterogeneity. In particular, analysing a set of structural and policy variables we find that larger increases in debt occurred in countries with worse initial fiscal positions (in terms of debt-to-GDP ratio) and with a larger share of foreign debt.

Summarising, the results of the paper suggest that financial crisis have a significant and long-lasting impact on public debt. This implies that, given the unprecedented severity of the current financial crisis and the associated fiscal policy response, countries urge to take current and further actions in order to avoid temporary stimuli to increase permanently debt levels, thus putting debt sustainability at risk.

ANNEX

Figure 10

The Effect of Banking Crises on Debt Service
Interest Expenditure Over Total Revenue
(percent)
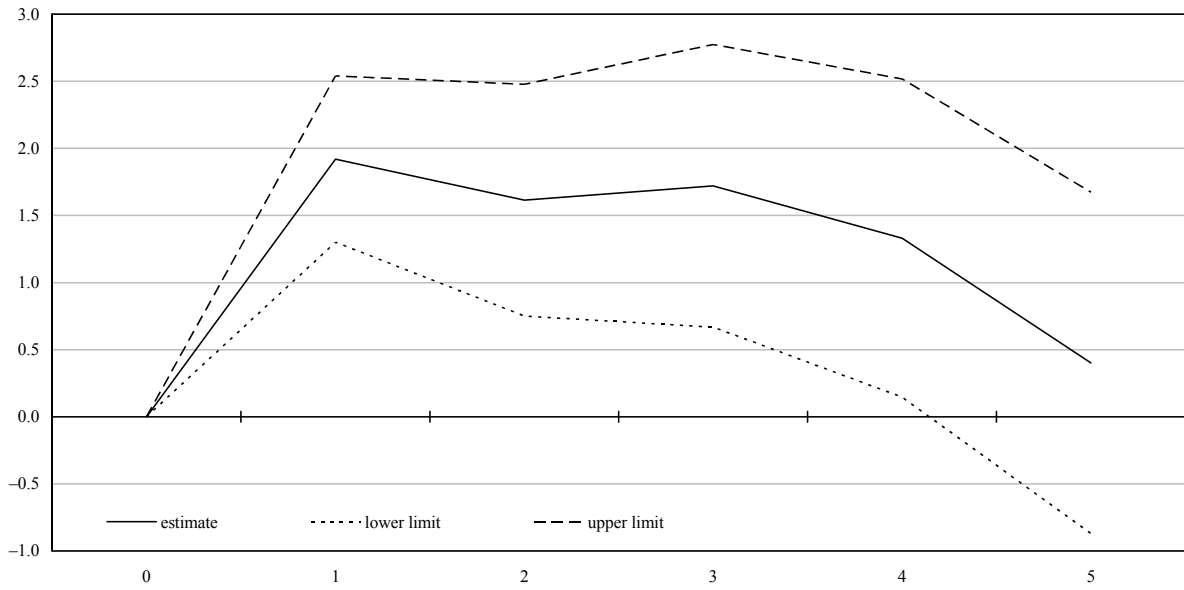
Figure 11

Interest Expenditure Over GDP
(percent)
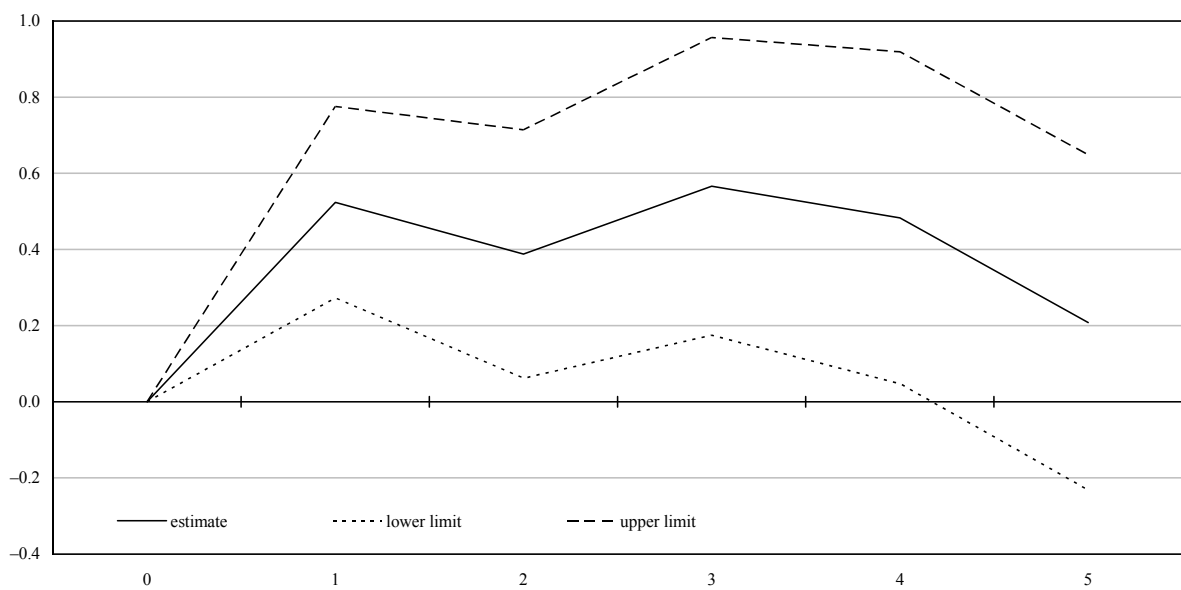
Note: dotted lines represent 90 per cent confidence bands.

Table 1

Banking Crises Episodes

Country	Time	Country	Time	Country	Time
Albania	1994	Ecuador	1982	Nicaragua	1990
Algeria	1990	Ecuador	1998	Nicaragua	2000
Argentina	1980	Ecuador	1998	Niger	1983
Argentina	1989	Egypt	1980	Nigeria	1991
Argentina	1995	El Salvador	1989	Norway	1991
Argentina	2001	Equatorial Guinea	1983	Panama	1988
Armenia	1994	Eritrea	1993	Paraguay	1995
Azerbaijan	1995	Estonia	1992	Peru	1983
Bangladesh	1987	Finland	1991	Philippines	1983
Belarus	1995	Georgia	1991	Philippines	1997
Benin	1988	Ghana	1982	Poland	1992
Bolivia	1986	Guinea	1985	Romania	1990
Bolivia	1994	Guinea	1993	Russian Federation	1998
Bosnia and Herzegovina	1992	Guinea-Bissau	1995	São Tomé and Príncipe	1992
Brazil	1990	Guyana	1993	Senegal	1988
Brazil	1994	Haiti	1994	Sierra Leone	1990
Bulgaria	1996	Hungary	1991	Slovak Rep.	1998
Burkina Faso	1990	India	1993	Slovenia	1992
Burundi	1994	Indonesia	1997	Spain	1977
Cameroon	1987	Israel	1977	Sri Lanka	1989
Cameroon	1995	Jamaica	1996	Swaziland	1995
Cape Verde	1993	Japan	1997	Sweden	1991
Central African Republic	1976	Jordan	1989	Tanzania	1987
Central African Republic	1995	Kenya	1985	Thailand	1983
Chad	1983	Kenya	1992	Thailand	1997
Chad	1992	Korea	1997	Togo	1993
Chile	1976	Kuwait	1982	Tunisia	1991
Chile	1981	Kyrgyz Republic	1995	Turkey	1982
China	1998	Latvia	1995	Turkey	2000
Colombia	1982	Lebanon	1990	Uganda	1994
Colombia	1998	Liberia	1991	Ukraine	1998
Congo, Dem. Republic	1983	Lithuania	1995	United Kingdom	2007
Congo, Dem. Republic	1991	Macedonia, FYR	1993	United States	1988
Congo, Dem. Republic	1994	Madagascar	1988	United States	2007
Congo, Republic	1992	Malaysia	1997	Uruguay	1981
Costa Rica	1987	Mali	1987	Uruguay	2002
Costa Rica	1994	Mauritania	1984	Venezuela	1994
Cote d'Ivoire	1988	Mexico	1981	Vietnam	1997
Croatia	1998	Mexico	1994	Yemen	1996
Czech Republic	1996	Morocco	1980	Zambia	1995
Djibouti	1991	Mozambique	1987	Zimbabwe	1995
Dominican Republic	2003	Nepal	1988		

Source: Laeven and Valencia (2008a).

Table 2

Banking Intervention Policies

Country	Time	Nationalization	Blanket Guarantees	Liquidity Support
Argentina	1980	1	0	1
Argentina	1989	0	0	1
Argentina	1995	0	0	0
Argentina	2001	1	0	1
Bolivia	1994	0	0	1
Brazil	1990	0	0	1
Brazil	1994	0	0	1
Bulgaria	1996	1	0	1
Chile	1981	0	0	1
Colombia	1982	1	0	1
Colombia	1998	1	0	1
Cote d'Ivoire	1988	0	0	1
Croatia	1998	1	0	0
Czech Rep	1996	0	0	0
Dominican Republic	2003	0	0	1
Ecuador	1998	1	1	1
Estonia	1992	1	0	1
Finland	1991	1	1	1
Ghana	1982	0	0	0
Indonesia	1997	1	1	1
Jamaica	1996	1	1	1
Japan	1997	1	1	0
Korea	1997	1	1	1
Latvia	1995	0	0	0
Lithuania	1995	1	0	0
Malaysia	1997	1	1	1
Mexico	1994	1	1	1
Nicaragua	1990	0	1	1
Norway	1991	1	0	1
Paraguay	1995	0	0	1
Philippines	1997	0	0	0
Russian Federation	1998	1	0	1
Sri Lanka	1989	0	0	0
Sweden	1991	1	1	1
Thailand	1997	1	1	1
Turkey	2000	1	1	1
Ukraine	1998	0	0	1
Uruguay	2002	1	1	0
Venezuela,	1994	1	0	1
Vietnam	1997	0	0	0

Note: "1" refers to the adoption of the policy.
Source: Laeven and Valencia (2008b).

Table 3

Estimates

K	Baseline	Time FE	Time Trend	Country Time Trend	Severe	Moderate	OECD
1	13.226	12.065	11.908	12.206	39.078	8.447	15.176
	(4.72)***	(4.30)***	(4.25)***	(4.35)***	(5.51)***	(2.77)***	(4.69)***
2	15.893	13.657	13.291	13.869	27.563	13.694	17.372
	(4.13)***	(3.58)***	(3.48)***	(3.61)***	(2.81)***	(3.27)***	(3.98)***
3	17.084	13.903	13.500	14.246	23.746	15.795	19.808
	(3.75)***	(3.12)***	(3.00)***	(3.15)***	(2.04)**	(3.19)***	(3.76)***
4	12.002	7.351	7.832	8.602	20.470	10.410	13.445
	(2.42)**	(1.53)	(1.61)*	(1.76)*	(1.62)*	(1.93)**	(2.34)**
5	12.206	6.937	7.872	8.581	17.220	11.246	13.706
	(2.37)**	(1.4)	(1.58)*	(1.71)*	(1.31)	(2.02)**	(2.30)**
6	13.441	8.365	9.331	9.928	15.012	13.102	16.109
	(2.57)**	(1.67)*	(1.86)*	(1.96)**	(1.12)	(2.31)**	(2.66)***
7	10.747	6.671	8.050	8.116	29.299	7.684	13.233
	(2.05)**	(1.33)	(1.61)*	(1.60)*	(2.09)**	(1.36)	(2.12)**
8	10.910	8.191	8.783	8.856	36.526	7.681	13.499
	(2.08)**	(1.63)*	(1.77)*	(1.75)*	(2.32)**	(1.38)	(2.14)**

Note: *t*-statistics in parenthesis. ***, **, * denote significance at 1, 5, and 10 per cent, respectively.

Table 3 (continued)

Estimates

K	Severe	Moderate	Small Foreign Debt	Average Foreign Debt	Large Foreign Debt	Debt
1	39.078 (5.51)***	8.447 (2.77)***	1.420 (0.49)	21.358 (7.39)***	10.430 (1.85)*	12.794 (4.84)***
2	27.563 (2.81)***	13.694 (3.27)***	2.000 (0.47)	13.793 (2.83)***	25.029 (3.35)***	9.706 (2.99)***
3	23.746 (2.04)**	15.795 (3.19)***	-1.431 (-0.27)	12.493 (2.11)**	28.246 (3.25)***	9.348 (2.60)***
4	20.470 (1.62)*	10.410 (1.93)**	-1.334 (-0.23)	9.719 (1.54)	20.361 (2.17)**	3.575 (0.96)
5	17.220 (1.31)	11.246 (2.02)**	-3.538 (-0.57)	7.503 (1.19)	24.237 (2.52)**	4.407 (1.18)
6	15.012 (1.12)	13.102 (2.31)**	-5.846 (-0.90)	7.861 (1.28)	28.374 (2.93)***	5.765 (1.53)
7	29.299 (2.09)**	7.684 (1.36)	-8.216 (-1.24)	7.705 (1.28)	22.579 (2.25)**	6.309 (1.65)*
8	36.526 (2.32)**	7.681 (1.38)	-8.872 (-1.40)	10.820 (2.08)**	20.526 (2.09)**	6.883 (1.79)*

Note: *t*-statistics in parenthesis. ***, **, * denote significance at 1, 5, and 10 per cent, respectively.

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IMPLICATIONS OF THE CRISIS FOR PUBLIC FINANCES: THE CASE OF AUSTRIA

Lukas Reiss[*] and Walpurga Köhler-Töglhofer[*]

The economic crisis of 2008-09 has greatly compounded the challenge of economic policymaking both at the EU level and at the national level by causing a permanent loss in potential output – which may reach between 4 per cent and 6 per cent in the case of Austria (Gaggl and Janger, 2009) – and by sharply driving up public deficit and debt ratios.

This study highlights the implications these developments are likely to have for fiscal and structural policymaking in Austria. Section 1 outlines how the economic crisis of 2008-09 and upcoming demographic changes would cause public finances to deteriorate significantly and permanently in the absence of consolidation. Section 2 discusses the timing and composition of consolidation strategies: When should policymakers act, and on which areas should they focus? Section 3 concludes.

1 High consolidation needs due to crisis (and ageing societies)

The global financial and economic crisis has not only caused GDP, and thus real income, to contract in 2009 compared with 2008; it has also caused public finances to deteriorate sharply. The analysis of historical economic crises, especially those associated with a crisis of the banking sector, shows that public deficits – and even more so public debt ratios – may become 'unsustainable' in the medium to long term in the aftermath of such crisis. Recent data on, and forecasts of, deficit and debt levels worldwide have confirmed these patterns for European countries and, with some qualifications, also for Austria.

Figure 1 shows the OeNB June 2010 forecast for the Austrian deficit and debt ratio until 2012 (see Ragacs and Vondra, 2010). In 2009 the Maastricht deficit increased by 3 percentage points and is expected to reach 4.5 per cent of GDP in 2010, with the debt ratio developing correspondingly. For 2011 and 2012, the OeNB forecasts slight reductions in the deficit driven by expenditure containment; the debt ratio is projected to increase further. In the following sections we will argue that a large part of the deterioration since 2008 is of a permanent nature.

Thus, the economic crisis jeopardizes the long-term sustainability of public finances, as economic recovery alone will not suffice to lower debt and deficit levels – it will take considerable consolidation measures to achieve that. In addition to the medium- to long-term impact of the global financial and economic crisis and its budgetary implications, the impact of Europe's ageing societies constitutes a further risk to the long-term sustainability of public finances, also for Austria.

The notion of sustainability is based on the idea of ensuring intergenerational fairness and is aimed at securing fiscal policy leeway in the long run. In this context the ageing-related public expenditures play a key role, as they typically increase the budgetary burden.

Intuitively speaking, fiscal policies will be sustainable as long as governments do not default[1] (Balassone und Franco, 2000). The notions of long-term sustainability of public finances found in the literature fall into three broad families:

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The opinions are strictly those of the authors and do in no way commit the OeNB.

Figure 1

OeNB Forecast for Austrian Public Finances
(percent of GDP)

General Government Budget Balance
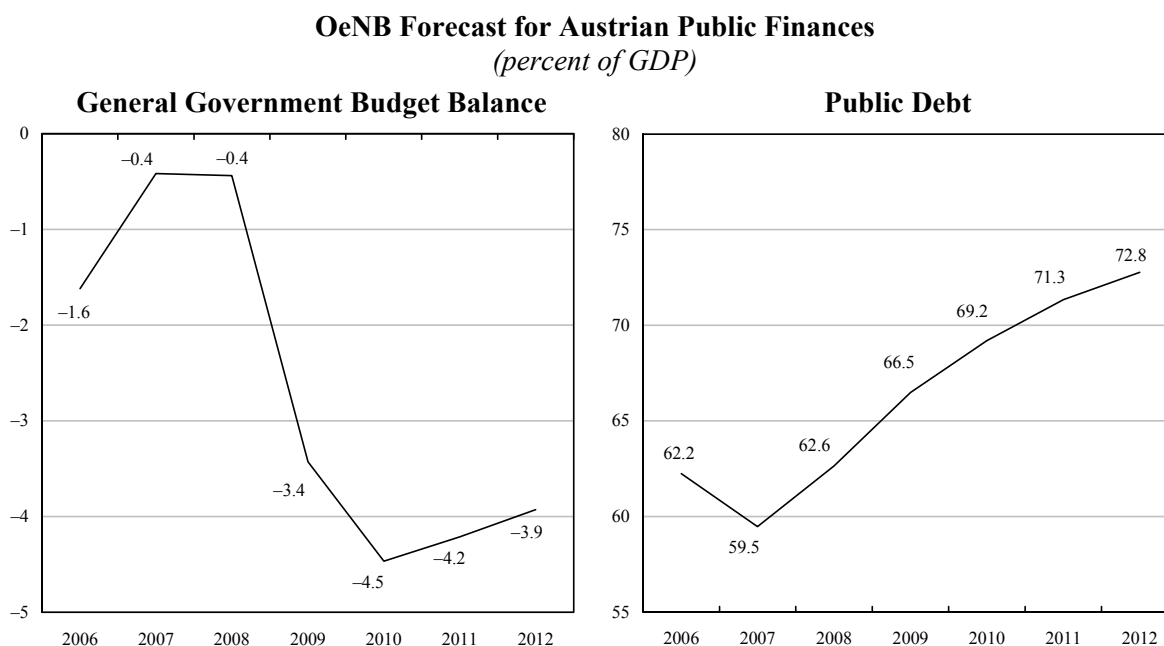
Public Debt

Source: OeNB.

- According to Domar (1944) the public debt ratio should converge to a finite value in order to avoid a continual rise of the tax burden.
- Sustainability as defined in Buiter (1985), Blanchard (1990) and Blanchard *et al.* (1990) requires that the debt ratio converges back to its initial level (in order to prevent the debt ratio from exploding).
- Taking this idea one step further, Blanchard (1990) and Blanchard *et al.* (1990) define a fiscal rule that will ensure the convergence of the debt ratio to its initial level – and thus sustainability. According to this rule, the discounted value of all future primary surpluses equals the current level of public debt.

Even though there is no agreed definition of what constitutes a sustainable position of public finances (Balassone and Franco, 2000), analyses of fiscal sustainability tend to concentrate on the public debt ratio, as a continually growing debt ratio and fiscal sustainability are considered to be a contradiction in terms.

The European Commission assesses the implications of demographic ageing with two sustainability gap indicators named "S1" and "S2" (European Commission, 2005). These two sustainability gap indicators show the size of the budget adjustment that is required to ensure that a given target debt ratio is reached. S1 shows the budget adjustment required to reach a target debt ratio of 60 per cent in 2060, and S2 shows the sustainability gap for an infinite time horizon. In its 2009 Sustainability Report, the European Commission (2009e) finds Austria to have a sustainability gap (S1) of 3.8 per cent of GDP, based on the budgetary position of 2009, the European Commission's spring forecast and the projected increases in age-related expenditure (European Commission, 2009c); in the "lost decade" crisis scenario, which assumes below-average

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[1] A government would be considered to have defaulted on its debt if it is no longer in a position to refinance itself, *i.e.* to place debt securities in the market.

growth until 2020, the sustainability gap would be even 5.3 per cent of GDP. Measured in terms of S2, Austria is found to have a sustainability gap of 4.7 per cent of GDP (or 6.1 per cent of GDP in the "lost decade" crisis scenario).

The following analysis is not based on a specific notion of sustainability, as the prevailing big uncertainty about macroeconomic developments in the future (and thus about estimates for the output gap and/or the structural budget balance of the base year) would not allow for an exact and reliable quantification of adjustment needs. Much rather, the paper shows that it will take fundamental consolidation measures and structural reforms, even under relatively optimistic macroeconomic assumptions, to reach a trend primary surplus that is sufficient to reduce the public debt ratio to a level of or below 60 per cent of GDP and that further measures will be needed to frontload or to reduce the additional fiscal cost of demographic changes.

1.1 *Structural deterioration of public finances caused by a combination of factors*

Part of the crisis-related deterioration in public finances will have long-term implications, thus creating a need for consolidation in the post-crisis period. The burden on public households has been increased by a range of direct (1) and above all indirect factors (2, 3 and 4):

1) fiscal cost of financial market intervention (= direct fiscal cost of financial crises);

2) additional debited interest resulting from the sharp rise in debt ratios;

3) discretionary fiscal policy stabilization measures (especially if permanent);

4) permanent effects of automatic stabilizers following a loss in potential output.

The fiscal effects of financial market interventions include above all the potential cost of guarantees, in case the underlying risks should materialize, and overvalued purchases of problem banks or their toxic assets. These costs loom large in the public mind; yet how big an effect these measures are actually going to have on public finances in Austria, or in other EU Member States or worldwide, is difficult to say at the current juncture. At any rate, these direct costs can be expected to be a mere fraction of the associated indirect costs. According to Cottarelli and Viñals (2009b), even in the current crisis, only a relatively small portion of the expected debt surge is due to official financial support operations. This has been the rule also in past financial crises, as is evidenced by historical analyses provided by Reinhart and Rogoff (2009) or by the European Commission (2009e, Part III).

As Figure 1 exhibits, the public debt ratio is expected to shoot up quickly also in Austria. Currently, we expect the debt ratio to climb by around 10 percentage points from end-2007 to end-2010. The measures taken to stabilize the banking sector actually account for a relatively small share of this increase. The key drivers behind the budget deterioration are the free operation of automatic stabilizers and the discretionary fiscal policy stabilization measures. Even if output were to return to its old path and even if all stabilization measures were to be of a temporary nature, the surge in debt would still have effects into the future through higher interest payments. Given that the average nominal interest rate on public debt currently exceeds average nominal output growth in Austria, as in most other euro area countries, and given that this positive interest rate/growth differential is likely to persist in the next decade, the government will need to achieve a considerable primary surplus to stabilize the debt ratio.

While there has been a case for economic stimulus packages in this global crisis,[2] it is self-evident that such packages create the need for even further adjustments when the crisis is over.

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[2] See Almunia *et al.* (2009) for evidence on the relatively high multipliers of discretionary fiscal policies in times of crisis, as well as IMF (2008) for the merits of using stimulus packages in such exceptional periods.

These adjustment needs may go beyond the afore-mentioned higher interest burden if, as is the case in Austria, the bulk of measures is of a permanent nature (like the income tax reform and the permanent increase in family transfers).[3]

It is too early to say whether and, if so, how deeply the economic crisis of 2008-09 may affect potential growth rates of individual economies in the medium term (Gaggl and Janger, 2009). Yet even if the economies were to return to their pre-crisis poten-tial growth rates when the crisis is over, it appears to be unlikely that all of the output loss incurred in 2009 can be recouped in the foresee

Figure 2

Possible Growth Paths After the Crisis

Source: OeNB.

able future as the crisis will probably have had permanent negative effects on the levels of trend employment, trend TFP and the capital stock (see Figure 2).

Subject to the free operation of automatic stabilizers, this fact constitutes an additional challenge for fiscal policy, as a comparatively lower output will go hand in hand with lower tax revenues, and as a potentially higher trend unemployment rate will push up social transfers. This means – for a given real trend growth rate of acyclical expenditure – that the cyclically adjusted budget balance is going to deteriorate, resulting in an even higher consolidation need.

Figure 3 shows how these effects add up, comparing the European Commission's spring 2008 forecast (which was still based on the assumption of an economic downturn and not of a severe recession) for Austria's cyclically adjusted general government budget balance[4] and its output gap5 with the Commission's spring 2010 forecast. The latter brought a ex post downward revision of the cyclically adjusted balance for 2006 by 0.5 percentage points and for 2007 by 0.6 percentage points. The European Commission considered a comparatively larger part of the tax

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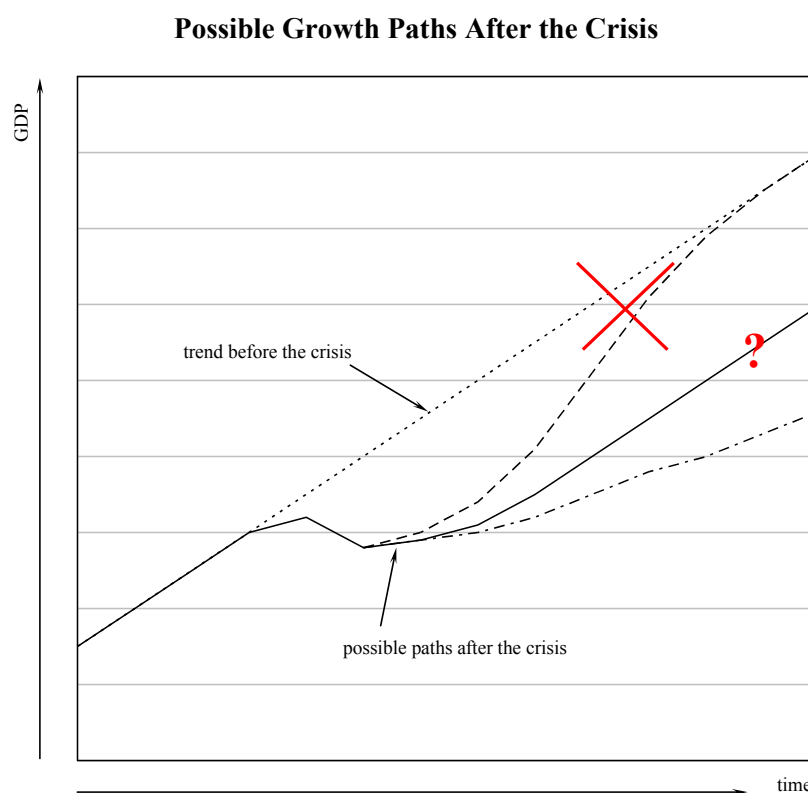
[3]   Subject to a very narrow interpretation of "permanent fiscal measures", the tax reform and increases in some transfers would not qualify as such, as income tax brackets as well as the size of some of the transfers in case (e.g., family allowance) are not indexed. In other words, any additional negative fiscal impact of such measures will be automatically reduced by any bracket creep that may occur in the future, or by any real depreciation of such transfers.

[4]   General government budget balance as adjusted for the estimated effect that the business cycle may have through the play of automatic stabilizers.

[5]   Difference between current output and potential output in percent (for an extensive discussion of the concepts of potential output and output gap, see Gaggl and Janger, 2009).

Figure 3

Commission Forecasts for Austria

Cyclically-adjusted Budget Balance	Output Gap
(percent of GDP)	*(percent of potential GDP)*

– – – Forecast 4/2008   —— Forecast 4/2010
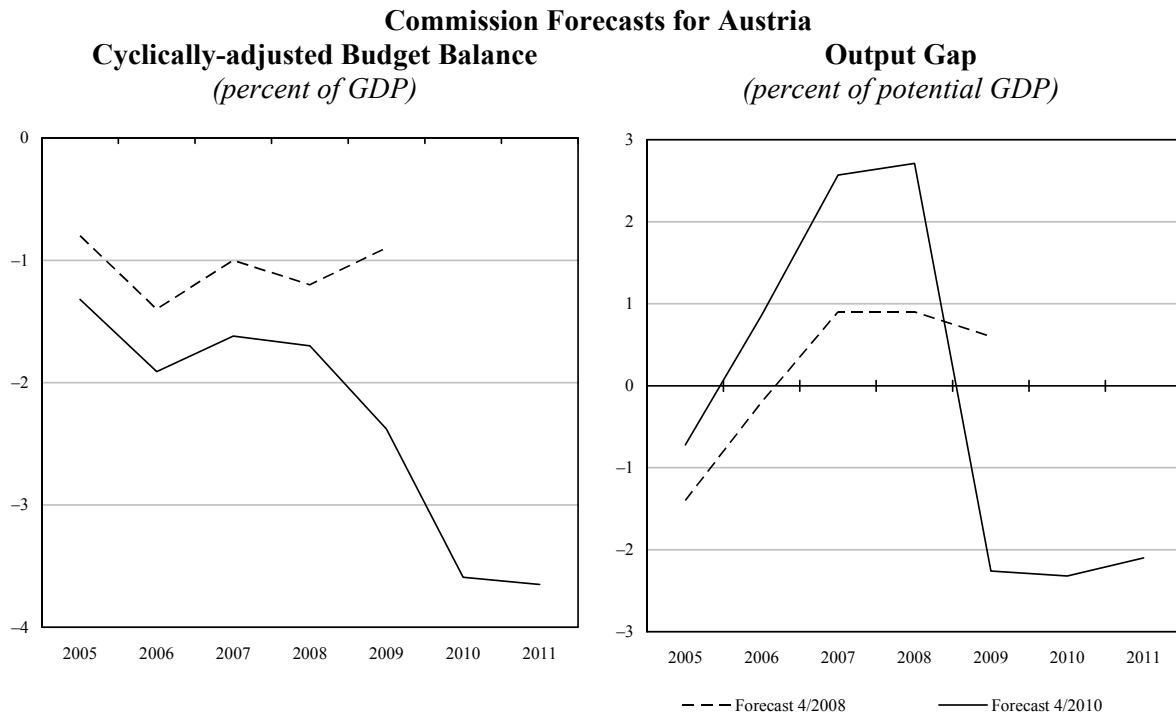
Source: European Commission.

revenues of those years to be of a cyclical nature in its spring 2010 forecast – which means that it has become more pessimistic in its assessment of the underlying structural developments. This change in the assessment of Austria's cyclical position is also evident from the sharp downward revision of the output gaps for those years.

Furthermore, the comparison of the successive forecasts for 2009 highlights the effect of the comprehensive discretionary fiscal measures that were adopted after the spring of 2008. Together with the very low growth of potential output estimated for 2010, those measures are a key driver behind the further deterioration in 2010.[6]

1.2   Without consolidation, public finances would deteriorate further until 2020

1.2.1   Even comparatively optimistic assumptions…

The following scenario is meant to show how Austria's debt ratio and deficit ratio are likely to change, even under optimistic macroeconomic assumptions, should policymakers fail to undertake fiscal consolidation until 2020. This scenario is based on the following assumptions:

• The starting point for our scenario is the OeNB June 2010 forecast for the years 2010 to 2012 (see Figure 1). The output gap in 2012 is expected to be –1.3 per cent of potential output. We assume this gap to close in a linear fashion from 2013 to 2014.

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[6]   The autumn 2008 forecast was completed shortly before the economic crisis broke out *(i.e.,* before the stimulus packages were adopted). At the time, the European Commission expected Austria's cyclically-adjusted budget deficit to reach 1.2 per cent of GDP in 2010. This forecast has since been revised upward by around 2 ½ percentage points.

- We assume that the temporary measures adopted in 2008 and 2009 will indeed be phased out. Moreover, we expect the revenues from profit-related taxes, which declined more sharply in 2009 than historical elasticities would have suggested, to return to the old trend path by 2014 (so that the GDP share of these revenues will rebound to the 2006 level in 2014). This would allow the government to recoup some of the revenue shortfall that occurred in 2009.

- The trend growth of real GDP and the rise in age-related expenditure for education, long-term care, health care and pensions as a share of real GDP from 2012 onward are based on the latest Ageing Report of the European Commission (2009c).[7] Following comprehensive (parametric) pension reforms in the first half of the last decade, the GDP share of age-related expenditure is projected to rise by roughly ½ percentage point from 2012 to 2020.

- All revenues and other categories of primary expenditure are assumed to grow at a trend rate of 2 per cent (in real terms), which corresponds to the projected average rate of real GDP growth (2013 to 2020) and implies constant structural ratios.[8] Like the European Commission (2007) we also assume the primary balance to have a semi-elasticity of 0.47 with regard to real GDP.

- For 2020, we expect the average real interest rate on public debt to be 2.5 per cent per annum, with interest rates gradually rising to this level from 2013 to 2020. A level of 2.5 per cent roughly matches the average since 1999 and is below the 3 per cent level assumed by the European Commission in its Ageing Report (2009c).

- We have not specifically taken into consideration the government's banking package, as the amounts budgeted so far have negligible effects on the debt ratio (about 2 per cent of GDP in 2009) and on the deficit ratio (roughly neutral).

Our scenario runs until 2020, as this is roughly the point when the effects of ageing on the Austrian economy in general and on public finances in particular are going to increase sharply (see below).

1.2.1 ... imply a further rise of the debt ratio in the absence of fiscal consolidation

Even under this fairly optimistic macroeconomic scenario would the public debt ratio rise to about 80 per cent of GDP until 2020 (see Figures 4 and 5 for an overview). While the budget balance improves until 2014 as the negative output gap is closed, the fact that the debt ratio will have breached the 75 per cent mark by then means that the primary balance would still be more than 1 percentage point below the level that would be necessary (when having a trend real growth rate of 2 per cent and an average real interest rate of 2.5 per cent) to stabilize the debt ratio at this very high level.

Given the growing share in GDP of interest payments on government debt (as indicated by the negative contribution of the orange bars in the figure decomposing the change in the deficit ratio from year to year) from 2.5 per cent of GDP in 2008 to 3.5 per cent of GDP in 2020,[9] we will see even in this period, both the budget deficit and the debt ratio stand to deteriorate further in spite of the until then only slight rise in age-related costs. As noted in Section 1.1, the higher interest rate burden exacerbates the need for consolidation.

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[7] We wish to thank Caroline Haberfellner for having made the underlying data available to us. While these data are based on a different macroeconomic scenario (the assumptions were made before the fall of 2008; see below), the dampening effect of comparatively weaker employment growth and of lower real wages on pension benefits (reflecting lower pensionable earnings and shorter contribution periods of newly retiring workers) will remain limited on pensions in Austria until the medium term, because unlike in other countries, pension benefits are indexed to consumer prices in Austria.

[8] In other words, in this scenario we assume that quantity taxes (such as the petroleum tax), fees, nominally fixed transfers and wage and income tax brackets will be adjusted regularly, or that these factors will offset each other.

[9] In calculating the budget deficit, we furthermore assumed that the GDP deflator would grow by 2 per cent (thus implicitly using the change in the GDP deflator to calculate real interest rates). The results for the debt ratio and for the primary balance would be the same even if we used different assumptions for the inflation rate (see, e.g., Blanchard and Illing, 2009, chapter 27).

Figure 4

Scenario: Development of Public Finances Without Further Consolidation
(percent of GDP)

Debt Ratio   **Primary Balance and GDP Growth**
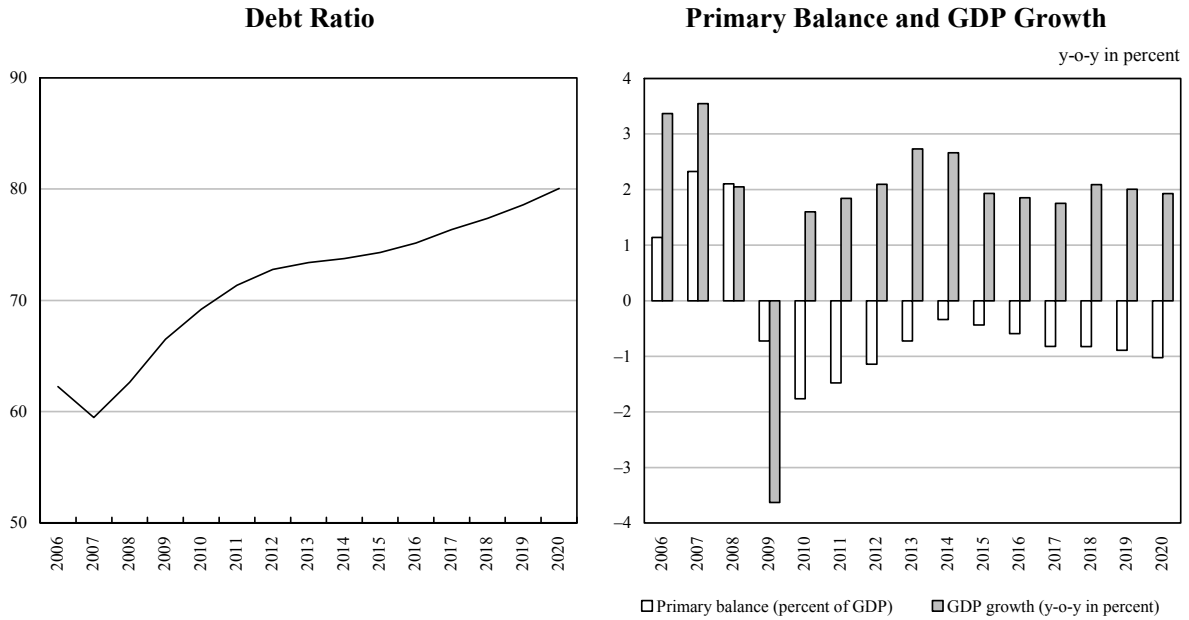
Source: OeNB.

Figure 5

Scenario: Development of Public Finances Without Further Consolidation
(percent of GDP)

General Government Budget Balance   **Decomposition of Change in Balance**
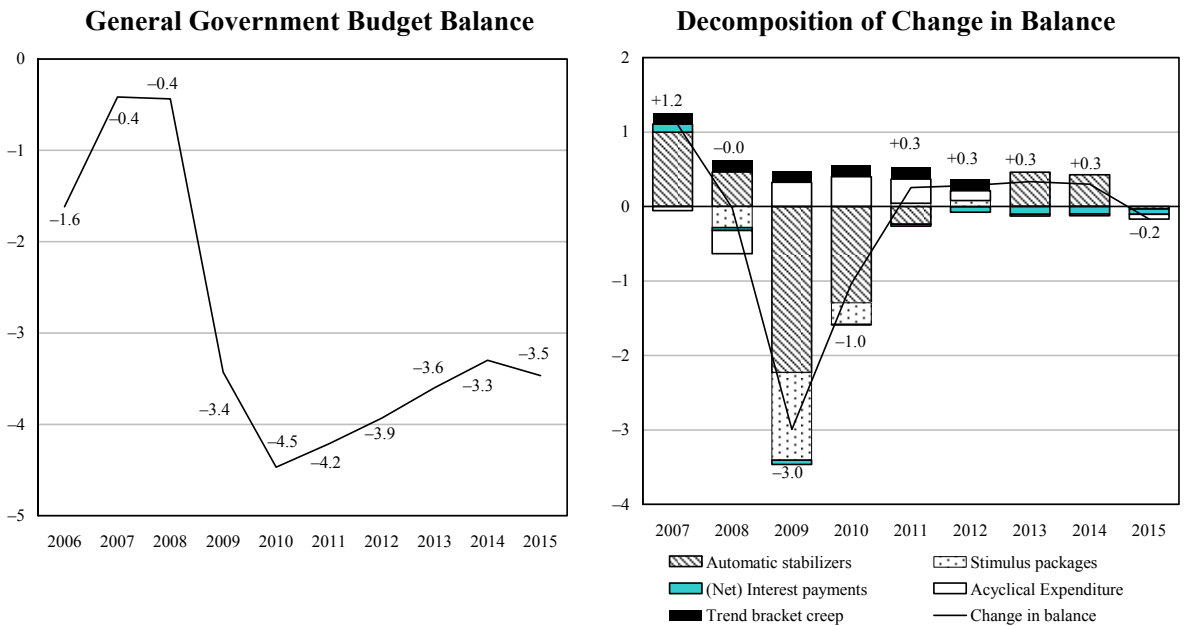
Source: OeNB.

Figure 5 illustrates the effects of the slow-down in growth on public finances – the light blue bars in the graph for "automatic stabilizers" do not sum to zero between 2006[10] and 2015. When computing the effect of automatic stabilizers on the (change in) budget balance, an average trend growth rate of real expenditure of 2 per cent was assumed. The average rate of real GDP growth in the scenario over this time horizon will, however, be much lower (the loss in potential output until 2014 implied by our scenario is around 5½ per cent compared with the growth rates of GDP in the EC's (2009c and 2009d) Ageing Report.

The contribution of stimulus packages to the change in the budget balance is strongly negative from 2008 to 2010 (when different measures came into effect) and slightly positive in 2011 and in 2012 (when some parts are expected to expire). From 2009 to 2012 there is a positive effect on the balance of the development of acyclical primary expenditure,[11] a trend which cannot be sustained without structural reforms. The already observed expenditure containment in 2009 can be mainly attributed to the newly implemented budget framework for the federal government (see also Box 1 in Section 2.2.1). This containment is expected to continue over the next few years, which is partly due to a lowering of expenditure ceilings for the period 2011-13. However, a permanent dampening of the expenditure path is rather unlikely without structural reforms, and such reforms have not been announced yet.

A positive contribution over the projection horizon comes from the trend bracket creep in the income tax which vanishes after 2011 due to our assumption of indexation from 2012 on; in Section 2.2.3 we will discuss what would happen if there were no regular adjustments of nominally fixed categories in the Austrian income tax and transfer system.

The scenario outlined here is somewhat more optimistic about the development of the debt ratio until 2020 than the baseline scenario that the European Commission used in its latest Sustainability Report (2009f).

The diverging underlying assumptions make the projections of the individual scenarios hard to compare, though. For instance, the scenarios of the European Commission are implicitly based on a spending elasticity of close to 1 relative to real GDP (with the exception of pension payments). A spending elasticity of close to 1 means that the shares of spending aggregates in GDP will remain broadly constant as long as the demographic composition remains constant. If we assume GDP to have dropped by a cumulative 10 per cent over x years, this would mean that, say, health care expenditure will likewise have gone down by a cumulative 10 per cent over the same period.[12]

In our scenario, we have expressly refrained from making such an assumption, even though real spending growth will have to go down by necessity during an economic setback in order to avoid an explosion of spending. Yet such measures are in fact already consolidation measures. Moreover, this assumption would imply that, in a short- to medium-term perspective, automatic stabilization would be limited to cyclically sensitive spending categories (typically passive labor market policies).[13]

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[10]   As of now, the output gap for 2006 is estimated to be slightly positive (see also Figure 3). So the sum of the bars in Figure 5 slightly overestimates the negative impact of automatic stabilizers.

[11]   When computing the effect of acyclical primary expenditure on the balance, we controlled for cyclical price developments and the direct effects of pension and/or public wage increases on public revenue. Furthermore, we excluded expenditure increases related to stimulus measures.

[12]   This assumption is controversial. It does, however, explain why, in the lost-decade scenarios of the European Commission's Ageing and Sustainability Reports, the additional cost of ageing in percent of GDP is shown to be largely driven by pensions for Austria but also for the EU average, whereas the share of health-care expenditure in GDP remains basically unchanged when compared with the baseline scenario.

[13]   In reality, though, the public sector automatically creates stabilization effects for the real economy by continuing to pay public pensions, retaining public employees, etc.

The minimum structural adjustment need highlighted by our scenario exceeds the 1 per cent of GDP that would be necessary in the short run to stabilize the debt ratio (as outlined above) at the level of 2014. After all, the demographic changes start to affect public households already in the second half of the 2010s, by raising costs for pensions, health care and long-term care, and above all by reducing trend growth. Lower output growth, in turn, increases the primary balance required to stabilize debt, while at the same time causing the actual primary balance to shrink through the effect of the automatic stabilizers. However, the automatic stabilizers affect the primary balance only through weaker tax revenue growth as the slowdown in output growth reflects a smaller supply of labor rather than a rise in the unemployment rate.

1.3 Developments from 2020 shaped by demographic change

From roughly 2020 onward, the budgetary pressures of demographic change will increasingly add to the repercussions of the economic crisis. This shift in the weight of the driving factors makes 2020 an ideal end point for our scenario.

The Ageing Report of the European Commission (2009c) projects the working-age population in Austria to keep increasing until 2020, but to decline thereafter (see Table 1 for an overview of key demographic metrics and projected age-related costs for Austria for the period from 2007 to 2060).[14] While the overall population will keep growing beyond 2020, partly through migration, the share of the population aged 65+ will increase by a disproportionately large extent.[15] The reduction in the working-age population will cause potential output growth to drop relatively sharply,[16] which will in turn hurt growth of tax revenues and social security contributions.

At the same time, these projected dynamics – growth of total population, reduction of working-age population – imply that in the absence of offsetting measures the growth rate of public spending will exceed that of revenues or GDP. This is especially true for spending on health care and on long-term care. The pension reforms that Austria adopted between 2001 and 2005[17] actually keep the rise in pension expenditure relatively low compared with other EU countries. Due to these measures, Austria boasts the fourth-lowest real increase in average pensions in the period from 2007 to 2060 within the EU; and within the euro area, Austria is outperformed only by Italy (European Commission, 2009d, Table A66).[18] This is also an important reason why the overall increase in ageing-related fiscal costs is estimated to be under the EU average.

Until roughly 2020, the projected rise in the spending ratios for health care, pensions and long-term care is broadly offset by a considerable decline in the share of spending on education in GDP. The number of students is expected to bottom out in absolute terms around 2020 (European Commission, 2009d, Table A111). From 2020 onward, the share of age-related expenditure in GDP is projected to rise by 3 percentage points until 2050, and to shrink somewhat until 2060.

In the baseline scenario of the Ageing Report the rise in spending is driven not only by purely demographic factors, but also by rising demand (especially for public health care). Some of

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[14] The macroeconomic assumptions for the baseline scenario were taken before the summer of 2008, *i.e.* before the economic crisis hit Europe with full force. This is why the results in Table 1 on employment and potential output growth in 2010 and the figures on age-related expenditure as a percentage of GDP are not directly comparable with the scenario until 2020 in Section 1.2.

[15] This causes the dependency ratio to rise sharply.

[16] The baseline scenario projection reflects the assumption that the labor market participation of the working age population (15-64) will rise, that the unemployment rate will drop slightly, and that productivity growth will remain broadly constant in Austria over the period from 2007 to 2060.

[17] Among other things, the reforms provided for longer averaging periods and lower accrual rates. However, some reforms were subsequently diluted somewhat, e.g., through the extension of the early retirement scheme for workers with long employment histories.

[18] However this may raise the issue of "social sustainability".

<div align="right">**Table 1**</div>

Key Results of the Ageing Report for Austria

	2007	2010	2020	2030	2040	2050	2060
(millions)							
Total population	8.3	8.4	8.7	9.0	9.1	9.1	9.0
(share of total population, percent)							
65 years and above	16.9	17.6	19.4	23.7	27.2	28.2	29.0
below 15 years	15.6	14.9	14.3	14.1	13.6	13.5	13.8
(annual change, percent)							
Working-age population (from 15 to 64 years)	+0.2	+0.4	+0.1	–0.6	–0.1	–0.2	–0.3
Employment	+0.7	+0.6	+0.2	–0.2	-0.2	–0.2	–0.2
Potential GDP	+2.2	+2.2	+1.9	+1.5	+1.5	+1.5	+1.5
(percent of GDP)							
Age-related expenditure	26.0	25.7	26.2	27.7	28.6	29.3	29.0
of which: Pensions	*12.8*	*12.7*	*13.0*	*13.8*	*13.9*	*14.0*	*13.6*
Health care	*6.5*	*6.6*	*7.0*	*7.4*	*7.8*	*8.1*	*8.0*
Long-term care	*1.3*	*1.3*	*1.4*	*1.7*	*2.0*	*2.4*	*2.5*
Unemployment	*0.7*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
Education	*4.8*	*4.5*	*4.1*	*4.2*	*4.2*	*4.2*	*4.3*

Source: European Commission (2009c, 2009d).

the assumptions underlying the Ageing Report for the long-term projections for Austria are controversial, like the assumed strong decline in early retirements.

Looking ahead, based on current knowledge, the additional costs arising from ageing would appear to be higher than the additional costs created by the global economic crisis.

1.4 *Summing up: Large consolidation effort of about 4 per cent of GDP will be necessary in the medium term*

Summing up the results from the scenario in Section 1.2 and the projected effects of ageing in Section 1.3, one could approximate the overall necessary consolidation (and structural reform) effort as follows:

After the output gap has closed and crisis-related temporary effects have run out (expiration of temporary stimulus measures, unwinding of revenue shortfalls) the primary balance will be around –1/3 per cent of GDP in our scenario (in 2014). As said before, assuming a trend growth rate of 2 per cent and an average real interest rate of 2.5 per cent, the primary balance of 2014 (the year with the best primary balance in our scenario) has to be improved by about ¾ percentage points to reach the 0.4 per cent of GDP which would be necessary to bring down the debt ratio again.

Frontloading the increase in age-related expenditure would roughly take another 3 per cent of GDP. So the overall effort required for consolidation and structural reform is close to 4 per cent

of GDP, which is in line with the most recent sustainability gaps calculated by the European Commission of 3.8 per cent of GDP (S1) and 4.7 per cent of GDP (S2), respectively.

As said before, a lower rate of trend GDP growth implies further consolidation efforts: To give an example: When trend GDP growth shrinks from around 2 per cent to around 1.5 per cent (given an unchanged real interest rate of 2.5 per cent), the primary balance needed to stabilize the debt ratio becomes twice as high. Furthermore a lower trend growth also means that the yearly increases of public expenditure in other areas need to be contained. While the growth of subsidies may be reduced by itself (as lower activity could mean a lower demand for subsidies), that may not be the case in other areas. Given that labour productivity growth is projected to remain constant (see EC, 2009d), growth of average wages can be expected to remain constant as well. And as the overall population of Austria will presumably continue to grow (see Table 1), it might be difficult to contain spending growth in areas like general public services and public order and safety without implementing any reforms.

2   When and how to consolidate?

The following section essentially deals with the action required to offset the rise in the deficit and debt ratios in the aftermath of the economic crisis of 2008-09. Economic policy measures that may be taken to counter the problem of demographic change are also touched upon in this section.

2.1   Fundamental considerations

Given the sharp global contraction, the expansionary fiscal measures that policymakers adopted by concerted international action to dampen the setback and stabilize the real economy have driven up public deficits. If the consolidation drive of the coming years is to be a success, it will have to go beyond a mere stabilization of the debt ratio once the crisis is over. There are three reasons for this:

- First, the government will have to create scope for the operation of the automatic stabilizers and for discretionary measures that may have to be taken in future crises[19] – in other words, the government will have to strengthen Austria's resilience to shocks. As evidenced by Nowotny (2009), the stabilizing function of fiscal policy had been limited since the 1980s because of insufficient action to reduce structural deficits.

- Second, the challenges that result from ageing populations, as outlined in Section 1.3, will have to be tackled. These challenges alone imply that the medium-term need for fiscal adjustment and structural reforms will go far beyond the short-term requirements under the corrective arm of the Stability and Growth Pact (reducing the deficit ratio to below 3 per cent).

- Third, Austria will have to meet the requirements of the European fiscal framework (see below).

2.1.1   Coordinated action within the european fiscal framework is required ...

While the principle necessity of post-crisis consolidation is undisputed, there is a lack of agreement about when the crisis would be considered to be over, and about when to actually launch consolidation measures. Making the start of consolidation contingent on a self-sustained economic revival is equally problematic. The contraction bottomed out. However, unwinding expansionary

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[19]   According to an IMF analysis of the packages adopted by India, China and the G-7 countries, countries with originally lower debt ratios have tended to put together bigger packages (Horton and Ivanova, 2009).

fiscal measures too soon could jeopardize the as yet fragile recovery[20] and would thus prolong the recession and increase unemployment (and hence undo previous improvements of the fiscal situation to a certain extent); there is no unambiguous empirical evidence for the existence of non-Keynesian effects in this context.[21]

Given the high degree of international economic integration, national consolidation measures have dampening effects on trading partners' economies. These spillover effects and the prevention of free-riding behavior essentially call for consolidation strategies to be coordinated internationally similar to the way support measures have been coordinated.

For the EU Member States, the Stability and Growth Pact constitutes an operational framework for coordinating the timing and extent of consolidation. Under the provisions of the excessive deficit procedures under Article 104 (7) of the Treaty, the earliest possible start of consolidation as well as the year until which the deficit must have been brought back below 3 per cent of GDP have been laid down for the countries concerned. Moreover, the minimum structural consolidation that is to be achieved per year during the respective period has been specified. The recommendations and requirements of the European Commission or of the European Council are guided by the principle of taking adequate account of national conditions and particularities, such as the size of the economic or fiscal contraction, or the size of the debt.

Based on the recommendations of the European Council (2009) made at the end of November 2009, Austria should continue implementing the fiscal measures under the stimulus package in the first half of 2010. At the same time, Austria is expected to develop a detailed consolidation strategy until June 2010, which it should start implementing in 2011, so as to remove the excessive deficit by 2013 (this is the deadline for most euro area countries in EDP). Consolidation should moreover be designed to reverse the trend in the government debt ratio, so as to ensure a gradual reduction to the reference value of 60 per cent of GDP in the foreseeable future.

2.1.2 *... and a credible long-term strategy that is communicated as soon as possible*

According to the OECD (2009f), it would be important to target a smooth transition between phasing out temporary support measures stimulating the economy and strengthening financial market stability, and phasing in structural measures with a medium- to long-term horizon. When unwinding temporary stimulus and stabilization measures too late, policymakers run the risk of destabilizing expectations, thus undermining the effect of the implemented measures and raising the actual need for consolidation (through rising interest payments on public debt).

As argued by Giavazzi (2009) structural reform measures promising medium-term savings – such as the introduction of fiscal rules or medium-term finance plans; raising the regular retirement age – should have priority, in order to convince investors that policymakers really mean to resume sound fiscal policies and in order to prevent investors from demanding risk yields on sovereign bonds. While such measures do dampen spending in the medium term, they do not imply any short-term setback in demand.

In principle, there can also be negative effects on economic activity from the sole announcement of consolidation measures, for example when finite-lived forward looking agents take future decreases in monetary transfers into account and decrease consumption immediately.

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[20]   The situation might be different in some other EU countries where – regardless of possible negative effects on the recovery – consolidation had to start immediately due to strongly elevated spreads on government bond yields which signal doubts on the solvency of these countries.

[21]   See Prammer (2004) for an overview of non-Keynesian effects, a description of the conceptual frameworks and an assessment of their empirical relevance.

However, such negative effects of announcements should be very limited: Government consumption and government investment use up resources and so changes in these aggregates affect GDP when they take place, and empirical studies on quasi-experiments with tax rebates indicate that even the timing of monetary transfers matter (which might be due to liquidity constraints and/or myopia; see for example Blinder, 2004).

2.2 Where to start with consolidation?

The potentially most controversial issue is the question of which taxes to increase, and which spending items to cut. Public interventions in time of crisis and exit policies may have highly divergent effects on macroeconomic developments, depending on the design of the measures and the starting conditions (see also the example of Japan versus Sweden and Finland in Gaggl and Janger, 2009).

2.2.1 Spending cuts and, if need be, higher "growth-friendly" taxes...

A (sustainable) consolidation strategy hinges above all on an adjustment of the primary balance, which may a priori be achieved through spending cuts or revenue increases. Empirical evidence suggests that consolidation measures tend to be more successful (i.e. more sustainable) when they are based on spending cuts (e.g., Ardagna, 2004; European Commission, 2007, part IV).

Spending cuts should, as much as possible, be supported through an increased output orientation and measures that raise efficiency. In this respect, the new federal budget law (see box 1) may create a positive momentum, as may efforts to improve the quality of the public finances in general (e.g., Haberfellner and Part, 2009). As already indicated in Section 1.2.2, first effects of the new budgetary framework could already be observed in 2009 where growth in federal expenditure was extraordinarily low. Low growth of public wages and intermediate consumption implied by low growth of expenditure ceilings in 2011 and 2012 are the only fiscal adjustment effort included in the OeNB's June 2010 forecast presented in Section 1.

Measures to improve the incentive structures of the fiscal sharing scheme (Schratzenstaller, 2006)[22] as well as measures to enhance the efficiency of public administration at all levels of government and in the area of health care and education have typically been cited as ways to achieve this goal (e.g., during the latest IMF article IV consultations with Austria, see IMF, 2009 and 2010b). Furthermore the Austrian Institute for Economic Research suggests reducing the level of capital transfers and subsidies to private sector companies, which are very high in Austria by international standards (see Aiginger *et al.*, 2010).

On the revenue side, policymakers would be well advised to consider redistribution effects as well as the "growth friendliness" or the allocative effect of different options. Based on an empirical study by Johansson *et al.* (2008), the OECD (2009e) has formulated the general recommendation of raising taxes on immovable property and consumption (above all the consumption of goods with negative externalities such as alcohol, tobacco and fuel).

Likewise, the IMF (2009) advised Austria against increasing the tax burden on labor, recommending petroleum tax and tax increases on immovable property instead,[23] thus mirroring the recommendations identified by the Austrian Institute of Economic Research (Aiginger *et al.*, 2010).

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[22] For instance, it has often been criticized that compulsory school teachers are regional civil servants but paid by the central government (see also Government Debt Committee, 2009).

[23] The IMF estimates that those measures might contribute up to ¾ per cent of GDP to consolidating the budget.

Box 1
New (Federal) Budget Framework in Austria[24]

The Austrian Parliament adopted the Austrian Federal Budget Reform in December 2007. As this reform is quite large in scale, it is implemented in two stages.

The first stage was implemented in 2009 with the introduction of a legally binding 4-year medium-term expenditure framework (MTEF) including an explanatory strategy report. The binding ceilings are enacted into law. The ceilings for about 80 per cent of total expenditure are fixed in nominal terms. Nevertheless, some expenditures which either heavily depend on the business cycle or on total tax revenues have variable ceilings based on certain indicators (e.g., unemployment benefits).

The five headings of the Medium Term Expenditure Framework (1. General Government Affairs, Court and Security; 2. Employment, Social Services, Health and Family; 3. Education, Research, Art & Culture; 4. Economic Affairs, Infrastructure and Environment; and 5. Financial Management and Interest) represent the main policy fields. Expenditure ceilings are set on the heading level as well as for the underlying budget chapter level representing the different ministries' portfolios. These ceilings are binding – at the heading level for four years, at the chapter level for the following year. The chapter level limits for the other three years will be of a merely indicative character. At the same time, incentives for line ministries to use resources more efficiently have been created by granting them more flexibility in building reserves and allowing them to carry forward appropriations from one year to another.

The spending ceilings are adopted, and may be changed, by Parliament. The MTEF is expected to tighten spending discipline. By offering a stable framework, the MTEF should contribute to sustainable public finances.

The second stage of the budget reform consists of a new budget structure (global budgeting instead of line item budgeting), result-oriented management of state bodies, accrual accounting and budgeting and performance budgeting and will take effect in 2013. The current budget law primarily focuses on inputs; the second step of the reform aims at interweaving input-, output- and outcome information in the budget documentation in a consistent and transparent manner. Outputs and outcomes will be formulated for all policy fields on all budgetary levels – with a focus on priorities to prevent an administrative overkill. As the objective of the reform is to create better instruments for management decisions, for budget steering activities as well as improved information for politics, administration and the public about the financial status of the ministries and the federal sector, there is also the need to reform the accounting and budget system.

Moreover, there is the potential to raise additional revenue by correcting the relative discrimination of owning fixed-income financial assets (interest and dividend income are subject to taxation while capital gains are only taxed under very specific circumstances).

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[24] For further information see Meszarits *et al.* (2008).

Payroll and wage taxes as well as relatively high social security contributions push the average and marginal tax burden of Austrian workers with low or medium wages far beyond the corresponding OECD and EU-15 averages (OECD, 2009d). This is why policymakers would be well advised not to increase taxes on labor any further (Haberfellner and Part, 2009). We also wish to point out that – from an incentive perspective – the tax burden on labor needs to be assessed together with the transfer system, as upper income limits or progressive adjustments of transfers raise effective marginal tax rates.

2.2.2 ... supported by structural reforms which raise potential output

Sustainable consolidation strategies go beyond improving budgetary conditions by effectively contributing to raising the growth path in the medium run. A comparatively higher growth path will, in turn, create leeway for fiscal policy. This section discusses shortly which measures could raise the path of potential output and support fiscal consolidation.[25]

Due to demographic change increasing the labor supply will be a crucial task for economic policy to dampen the decrease in trend growth. In Austria there is potential to increase the participation rates of specific groups, such as older workers, women, migrants and low-skilled workers.

In spite of increasing life expectancy, the average retirement age has declined by about three years since 1970 for both men and women (Sozialversicherung, 2009).[26] In 2008, the employment rate of older workers was far below the EU-15 average (41 versus 47.5 per cent). The OECD (2007) suggests limiting invalidity pensions and other possibilities for early retirement (such as the early retirement scheme for workers with long employment histories) to raise the *de facto* retirement age. Such a measure would have to be accompanied by measures to increase the employability of older workers (such as flattening the seniority wage curve and enhancing lifelong learning and the acquisition of transferable skills). Obviously, reforms in this area would also have direct fiscal implications by decreasing the growth rate of pension expenditure.

At 65 per cent, the employment rate of women in Austria was about 5 percentage points above the EU-15 average in 2008, but below the average of Switzerland and the Nordic countries. Furthermore, the share of part-time employment is very high; especially for women above 30 (see Grossmann *et al.*, 2009). This can be attributed to the system of half-day schooling and the limited supply and quality of formal childcare. The OECD (2009b) has, among other things, identified the training of kindergarten teachers as well as the sharing of competences between federal and regional government as possible areas for improvement in the latter area. Changing to a system of full-day schooling and following the OECD's recommendations on child-care could not only raise female labor supply, but also enhance the quality of labor in the future. Thereby it would also ease the integration of migrants (and their descendants) into the labor market.

Despite relatively high (and above EU-average) spending on research and development, there is some potential in Austria to increase potential output by raising aggregate productivity. Possible measures include improving the supply of risk capital, a reform of the financing of universities, fostering competition in the service sector (more resources for regulators, measures to increase price transparency …) and so on.[27]

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[25] More details can be found in Grossmann *et al.* (2009) and Janger and Reinstaller (2009).

[26] In 2008, the effective retirement age for old age pensions was 62.7 years for men and 59.5 years for women, compared with 53.7 years or 50.3 years for invalidity pensions. Invalidity pensions have been sharply on the rise compared with old-age pensions since 2003, accounting for roughly one-third of the annual number of new pensions (Sozialversicherung, 2009).

[27] For more recommendations in this area see Grossmann *et al.* (2009); Janger and Reinstaller (2009); Aiginger *et al.* (2006); and the OECD's economic survey on Austria (2007).

2.2.3 Temporarily higher inflation is no viable option

In the literature, allowing for higher inflation rates is also discussed as a possible solution, for example by Rogoff (2008) (in the context of public and private debt).

One channel is seigniorage: The amount of cash in circulation in the euro area is about 9 per cent of GDP, so a 1 per cent increase in the price level leads to non-recurring seigniorage revenue in the range of 0.1 per cent of GDP, which also corresponds to the G7-average estimated in Cottarelli and Viñals (2009a).

Furthermore, an unexpected rise in inflation would lead to a real devaluation of the non-indexed medium-to-long-term part of outstanding public debt which is denominated in domestic currency. The IMF (2010a) estimates that an annual inflation rate of 6 per cent from 2009 to 2014 in highly developed major economies would depress the debt ratio by an average of 8 to 9 percentage points by 2014 (compared to the 2014 debt ratio in a baseline scenario with an average growth of the GDP deflator of about 2 per cent). For euro area countries, the estimates are close to 7 percentage points for Germany and 10 percentage points for France, the latter having a much higher non-indexed medium-to-long-term debt compared to GDP. Austria has a lower share of short-term debt than most other OECD countries (see Cecchetti *et al.*, 2010); when accounting for SWAPs, the foreign currency share in overall debt is around 3 per cent (as of January 2010) and the debt ratio is slightly below the ones of France and Germany. So the effect of the IMF scenario in Austria should be in the range of 10 percentage points.

However, higher inflation would also devalue claims held by the government, like holdings of participation capital in Austrian banks under the support measures for the financial sector.[28]

A crucial factor for the "success" of inflating away part of the debt is the disinflation period. If the disinflation is not credible and inflation premia and nominal interest rates remain high, governments would have to pay high real *ex post* interest rates. So the financing needs of governments during this period are an important determinant for the long-run effects of temporarily higher inflation.[29]

However, one has to be aware that the current situation differs from past episodes of high public debt ratios, which have typically been the result of warfare. While wars may sharply drive up national debt levels, the primary balance will, as a rule, improve automatically once the war is over (as military expenditure goes down again; see also Reinhart and Rogoff, 2010). This is indicated in Figure 6, which shows the development of public finances before, during and after warfare in the UK and the US. For both countries we see a huge increase in the debt-to-GDP ratio during wartime and a substantial improvement in fiscal balances (a proxy of the primary balance in the case of the US and the change in debt for the UK) which is driven by a large drop in defense spending.

At the current juncture, however, deficits are likely to remain high without substantial consolidation. A real devaluation of outstanding public debt would indeed reduce the effect of additional interest payments by (at least temporarily) lowering the debt ratio, yet it would have no direct impact on the primary balance, which has deteriorated permanently given a loss in output and lasting economic stimulus measures.

Furthermore, average debt maturities have shortened during the crisis in many countries (including Austria), which further increases financing needs in the short-to-medium term.
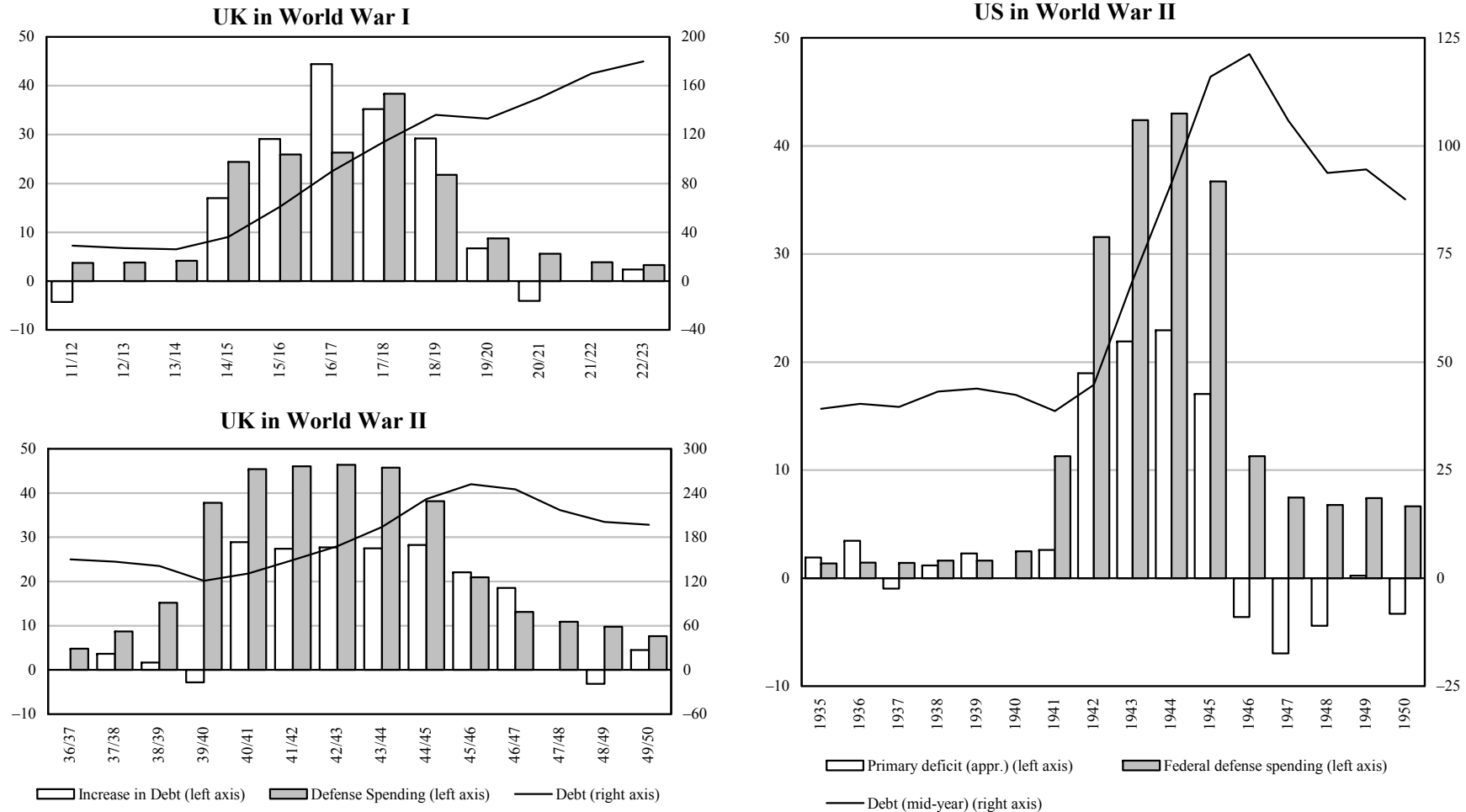
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[28]   In 2008 actual interest payments by the government were 2.5 per cent of GDP while received interest income was 0.6 per cent of GDP.

[29]   One possible way to circumvent these adverse effects on public finances in the disinflation phase would be to issue inflation-indexed bonds (which would also prevent a rise in real interest rates via higher inflation uncertainty premia).

Figure 6

Wars, Deficits and Debt: Experience of US and UK
(percent of GDP)

UK in World War I

US in World War II

UK in World War II

Increase in Debt (left axis) Defense Spending (left axis) Debt (right axis)

Primary deficit (appr.) (left axis) Federal defense spending (left axis)

Debt (mid-year) (right axis)

Source: ukpublicspending.co.uk, US Bureau of Economic Analysis, US Treasury.

The probably most important argument against using high inflation for easing the interest burden on public debt is that such a policy would have substantial negative effects on the real economy like distortions in resource allocation (see IMF, 2010a) and a loss in confidence in (monetary) policy institutions. It could also substantially hurt households in the middle class, as their portfolios usually have a much higher share of fixed-income products than the richest households (see Fessler and Schürz, 2008, for Austria).

Higher inflation rates could, however, substantially affect the primary balance indirectly via the non-neutrality of inflation in the tax system and a real devaluation of nominally fixed transfers.[30] Immense distortions could arise in the context of taxation of nominal profits and interest payments. For example, households' income from interest payments is taxed at 25 per cent in Austria. So a 3 per cent interest rate with 2 per cent inflation would mean a net real return of 0.25 per cent (and tax payments of 0.75 per cent) while a 7 per cent interest rate with 6 per cent inflation would mean the same before-tax real return of 1 per cent while the net real return would be –0.75 per cent (with tax payments of 1.75 per cent).[31]

2.3.4 A very attractive no-go: consolidating via bracket creep

The non-neutrality of tax systems to inflation (and nominal GDP growth) is also an important issue when making long-run projections of public finances. While in a balanced-growth path proportional taxes like VAT or corporate income tax should in principle grow at the same rate as GDP without any policy change,[32] this is not true for excise duties, nominally fixed transfers and the personal income tax.

In the current OeNB forecast, the elasticity of the income tax paid by employees on the average wage rate is 1.8 and the elasticity for pensioners is even 2.[33] So not adjusting the brackets for growth of average wages and pensions (or not even for inflation) would increase revenue substantially. As Table 2 shows, we expect the income tax of employees to make up about 5.8 per cent of GDP in 2010 and income tax receipts of pensioners 1.7 per cent. Assuming no change in brackets until 2020, nominal GDP growth of 4 per cent per year (in line with the macroeconomic scenario from above), a development of pension payments and employment as in the Ageing report, and nominal growth of average wages of 3 per cent, these numbers would increase to 6.5 and 2.4 per cent, respectively. This would imply a rise in the ratio of income tax over GDP by 1.4 percentage points, despite an assumed decrease in the wage share in GDP. Furthermore, while gross public pension payments would increase stronger than GDP over this horizon (see Table 1), the ratio of net pension payments over GDP would actually decrease.

In our simulation we assume that there are no behavioral changes; however, negative effects on labor supply are very likely to be a by-product of such a policy. The tax burden on labor significantly increased over the last decades. Thus, given the already very high burden on this production factor (see Section 2.2.1), raising taxes should be considered a NO-GO. However, a

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[30] In their recommendation of raising inflation targets, Blanchard *et al.* (2010) also say that tax systems are often not designed for high inflation.

[31] Additional indirect effects of higher inflation could arise via a lagged response of (parts of) the expenditure side. However, they should be negligible as wages are likely to show a lagged response too and they are by far the most important tax base in Austria.

[32] To a very small extent, nominally fixed categories are also relevant for VAT (the revenue threshold above which companies are subject to VAT is nominally fixed) and corporate income tax (there is a nominally fixed minimum tax payment which has to made every year regardless of profits); but the effects of non-indexation of theses brackets is negligible.

[33] The OECD (2008) analyzes the extent of bracket creep in overall wage taxation in different OECD economies. Comparing these numbers with updated figures for Austria (the 2005 tax reform strongly increased the degree of progressivity in the Austrian income tax system; see Breuss *et al.*, 2004) indicates that the potential for consolidation via bracket creep in wage taxation is similar to the OECD average.

Mediu-term Effects of Bracket Creep
(percent of GDP)

	2010	**2020**	**Difference**
Income tax of employees	5.8	6.5	**0.8**
Memo: Compensation of employees	*49.9*	*46.0*	
Income tax of pensioners	1.7	2.4	**0.7**
Memo: Gross pensions (Ageing Report 2009)	*12.7*	*13.0*	
Overall	**7.5**	**9.0**	**1.4**

Source: OeNB.

decrease in income tax brackets in the next few years is very unlikely and the most recent tax reforms (2000, 2005, 2009) compensated only for part of the previously incurred bracket creep.

On the expenditure side, part of the transfer payments is also nominally fixed. Among monetary transfers, family related transfers play a special role in fiscal projections for the next decade(s): In 2010, they are projected to make up around 2 per cent of GDP. Looking at the demographic assumptions in EPC, the number of eligible people[34] will decrease by about 10 per cent until 2020. So even if these transfer payments are indexed to prices (but not to real growth), their share in GDP would decrease to around 1.5 per cent in 2020. The fiscal space created by these demographic changes could be used to increase transfers in kind to families (see Section 2.2.1).

3   Conclusions

A permanent loss in potential output following the crisis and the permanent nature of many discretionary stimulus measures have created a need for adjustment that goes significantly beyond the need to finance the economic stimulus packages *ex post*. The repercussions of the crisis on public finances are going to be exacerbated in the medium term also by the implications of demographic change.

In view of the anticipated negative effects on the real economy and in order to prevent free-riding behavior, policymakers should coordinate their measures internationally (and are, indeed, obliged to do so within the EU by the Stability and Growth Pact). While determined action is required to implement the necessary considerable fiscal adjustment, policymakers must at the same time proceed with sufficient caution so as not to jeopardize the as yet fragile recovery. Nevertheless governments would be well advised to develop credible consolidation programs rather soon, in order to ensure rapid implementation during the next recovery stage and in order to secure public confidence in the sustainability of public finances. Consolidation should focus on spending cuts, while avoiding conflicts with other economic policy goals (e.g., in the research and education areas). Any revenue-side measures should dampen growth as little as possible, which would speak for an increase in specific excise taxes and in taxes on immovable property.

These measures should be supported by structural reforms raising potential output (and thereby increasing tax revenue) like measures to increase the average retirement age.

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[34]   Most of these transfers are for children who are underaged and/or in professional education (including tertiary education).

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THE FIRST TIME YOU NEVER FORGET: THE SUCCESS OF BRAZIL IN THE 2009 CRISIS AND THE NEED FOR THIRD-GENERATION REFORMS

Joaquim Vieira Levy[*]

Understanding how Brazil successfully faced the 2009 global crisis is interesting because the country is currently the 10th largest economy in the world and should climb new positions in that ranking in the years ahead. The recession lasted only two quarters in Brazil, followed by the creation of a million new jobs in 2009 and the expectation of 7 per cent GDP growth in 2010. For the first time in many years, instead of getting pneumonia when the rest of the world got a cold, Brazil fared better than most countries. This paper argues that this was the result of many years of accumulating strength through fiscal discipline and structural reforms, together with special features of the present crisis. The text, written from a practitioner stand point, summarizes the response of the Brazilian government to the crisis, highlighting factors that may help explain its success and the risks ahead. It also reviews options to leverage structural factors favoring growth in the coming years and the much yearned reduction in interest rates. It argues that priority should be given to keep fiscal responsibility and promote third-generation reforms to, inter alia, better use the excellent financial infrastructure that already exists in Brazil to fund much needed investments.

1 Introduction

Figure 1

The impact of the 2008 financial crisis was short-lived in Brazil. As several developing economies continued to grow well after the US economy started to cool down in 2007. That apparent decoupling with the US and Europe resumed after a quick contraction following the failure of Lehman Brothers. GDP dropped 1.9 per cent in each quarter in early 2009, but seasonally-adjusted activity had overcome the peak of 2008 by the end of 2009, resulting in –0.2 per cent change in average GDP that year and expected growth in 2010 above 7 per cent (Figure 1). The

Real GDP
(chained index 1995=100)

two-quarter recession in 2009 followed 21 quarters of uninterrupted growth and was the shortest cycle in the last 30 years, although also the deepest.
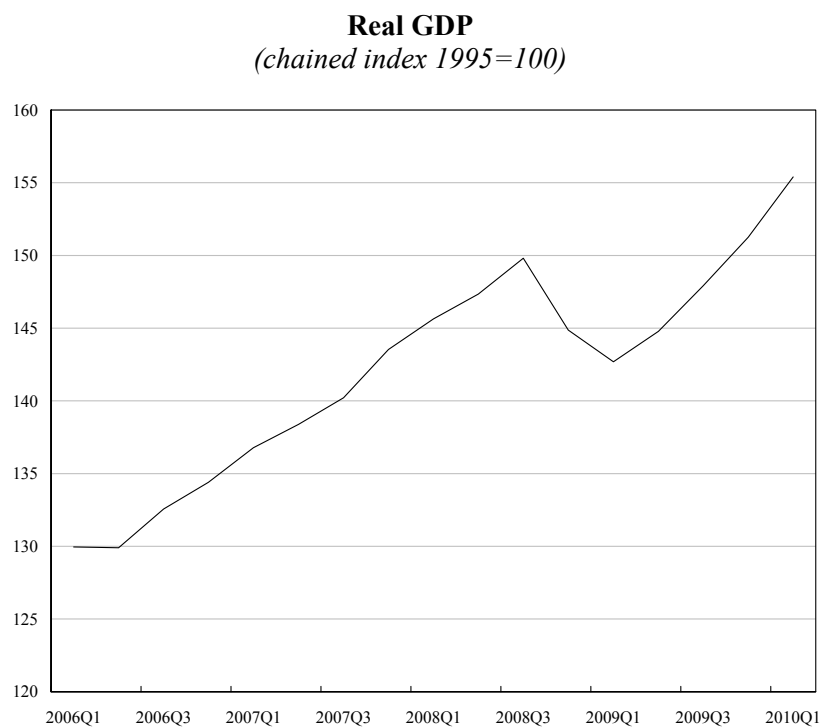
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Labor Turnover at the Formal Market in 2009

Branch	Admissions	Dismissions	Net	Percent of Change
Farming	1,270,867	1,286,236	−15,369	−0.99
Mining	42,915	40,879	2,036	1.18
Industry	3,147,085	3,136,220	10,865	0.15
Utilities	77,608	72,624	4,984	1.41
Construction	1,950,078	1,772,893	177,185	9.17
Commerce	3,783,528	3,486,371	297,157	4.20
Services	5,802,755	5,302,578	500,177	3.93
Public sector	112,804	94,729	18,075	2.33
Total	16,187,640	15,192,530	995,110	3.11

Source: CAGED – Ministry of Labor.

Almost one million new formal jobs were created in the twelve months to December 2009. Job creation was positive in all sectors except for farming. Also the informal sector accompanied the formal market, further brightening the labor market (Table 1). Job creation in 2010 is likely to exceed 2 million positions.

Understanding how Brazil overcame the crisis so quickly is interesting because Brazil is already the 10th largest economy and may become the 5th largest in the next few years. The economy was much more resilient this time than in any previous occasion in the last 25 years, and the government had instruments to react to the crisis. Therefore, as soon as it became evident that the world economic meltdown had been averted by vigorous government intervention in developed countries, the Brazilian economy reacted, also helped by confidence from foreign investors. This was translated into an economic boom, with the acceleration of infrastructure investment, and evidence that emerging markets could make a contribution to the world economic recovery.

The response of the government, made possible by the strengthening of the economy in recent years, provides a useful background to the discussion of priorities for the upcoming period. Government response, although timely and effective, implied an increased exposure of the public sector to the balance sheet of companies and was accompanied by a deterioration of the external current account balance. The impact of these risks is still limited and mitigated by several factors, such as the new oil province announced in 2008 that will provide long-term support to Brazilian exports. These favorable factors do not overshadow, however, the need for further structural reforms, especially to attain the goal of reducing distortions that still keep interest rates at high levels, and to allow the private sector to grow with less support from government. The following sections of this text review the reforms undertaken in the last 15 years and the economic standing of the Brazilian economy before the crisis, as well as the response of the government to the crisis, to sketch a balance of risks ahead and policy options to help attain the objectives above.

2 Initial conditions

2.1 The 1990s

Brazil has experienced important changes in the last twenty years. These changes were spearheaded by the opening of the economy in 1990, in the wake of the fall of the Berlin Wall. Because inflation of more than 1000 per cent made impossible for Brazil to be competitive in a global economy, that opening forced the government to face the problem of chronic inflation, which had worsened in the 1980s. For this purpose, a clever mechanism was implemented in 1994 to stop inflation protecting the economic value of existing contracts. The underlying conditions to this transformation were a fiscal contraction in 1993-94 and increased access to external savings in 1995-97. The end of inflation also forced the consolidation of the financial sector and spurred a modern and comprehensive financial regulation, higher bank capitalization, and enhanced supervision.

Globalization helped anchor the new currency during the mid 1990s and finance long overdue investments, notably in infrastructure. In this environment, profound changes in the business sector, now facing full fledged foreign competition, fostered an increase in overall productivity. Tight monetary police, on the other hand, stimulated the maintenance of low leverage ratios, helping insulate companies from international crises.

Low inflation, however, posed a fiscal challenge. The loss of the inflation tax, combined with wage increases granted in the last months of high inflation proved a heavy burden to state governments and the federal government, and herald a few years of fiscal relaxation. The persistence of high interest rates, reflecting a lingering distrust about fiscal sustainability and the overall macroeconomic balance, further punished public accounts. As a consequence, the public sector was vulnerable to the Asian crisis, and particularly to the events following the failure of LTCM and events related to the Russian debt in 1998. Increased risk aversion by international investors rendered difficult to keep the pegging of the *real*. The strategy of trying to stem capital outflows through higher domestic interest rates quickly showed its limitations, stressed the fiscal outlook and ultimately led to the breakdown of the exchange rate system in early 1999.

The response of Brazil to the 1998 crisis was a new macroeconomic framework based on a flexible exchange rate, inflation targeting, and fiscal responsibility. Of these, the most difficult to achieve, as well as the most important, was a long overdue commitment to fiscal discipline. The new framework was introduced amid an unfavorable international environment, and against the initial skepticism of the International Monetary Fund, but has been long-lived and successful.

2.2 The 2000s

Fiscal discipline was quickly translated into the Fiscal Responsibility Law voted in 2000. The law provided an encompassing framework, applicable to the federal, state and local government. The Fiscal Responsibility Law-LRF, in addition to introduce sharp constraints on the financing of the public sector, including state-controlled financial institutions, provided for budgetary planning and disclosure rules. A hallmark of the LRF is the bi-monthly review of fiscal targets and budget execution, which drastically reduces the chance of large slippages. The law also rendered unlawful the bailing out of states by the federal government. It provided for limits to public debt, which reinforced those set in refinancing programs signed by the federal government and states in the late 1990s. A comprehensive and swiping electronic system was built to check the compliance of government to obligations, halting voluntary transfers when rules are not observed. Importantly, fiscal dominance was reduced by the focus on primary fiscal targets, rather than on nominal fiscal

Federal External Debt in 2008
(million US$ equivalent)

| Maturity	Dollar	Euro	Real	Other	Total	Share
in 12 months	4,025.76	855.67	552.27	133.08	5,566.77	5.78%
in 24 months	9,262.84	1,882.36	1,104.53	221.79	12,471.52	12.95%
in 36 months	14,997.21	2,762.82	1,944.26	286.04	19,990.32	20.75%
in 48 months	19,749.91	3,492.55	2,640.23	339.28	26,221.97	27.22%
in 60 months	24,732.04	4,257.52	3,369.80	395.10	32,754.45	34.01%
beyond 5 years	48,480.20	7,443.70	7,099.29	543.14	63,566.33	65.99%
Total	73,212.24	11,701.21	10,469.09	938.24	96,320.78	100.00%

targets. This choice helped improve overall fiscal planning and relieved the pressure on monetary policy, strengthening its ability to deliver the inflation targets.

Fiscal targets were met every year to 2009. Moreover, in the wake of the election of President Lula, the target for the consolidated public primary surplus was raised to 4.5 per cent of GDP, a value observed in the following years. Unfortunately, the brunt of the fiscal adjustment fell on tax increases, owing to the rigidity of pensions and health care, as well as of public wages. As a consequence, the tax-to-GDP ratio for the consolidated public sector rose from around 25 per cent in the early 1990s, to around 35 per cent by the mid of the 2000s.

Improvements in the fiscal stance helped change the profile of public foreign debt after 2003. Old, expensive Brady bonds issued in the 1990s were replaced by cheaper and longer-term global issues; for the first time ever *real*-denominated bonds were issued abroad, as a way to familiarize a new class of investor to the local currency and eventually to local bonds. In 2005, all IMF loans were repaid in advance, the same happening to Paris Club loans, some of which dating back from the 1980s. The stock of foreign public debt was lengthened, with 2/3 of maturities beyond five years, and had dropped to US$ 96 billion by 2008 (Table 2). These improvements were translated into a much belated upgrade of the foreign federal debt to "investment grade" in 2008.

The floating exchange rate, together with the worldwide dynamism of international trade, spurred Brazilian exports. Since 2000, the diversification of products as well as of destinations of Brazilian exports has been remarkable, with manufactures reaching an increasing large array of partner countries. Brazilian companies also expanded abroad, with acquisitions and contract awards in all continents. As a result, Brazilian exports jumped from about US$ 50 billion in 2000 to close to US$ 200 billion in 2008. Between 2004 and 2007, Brazil also ran a small current account surplus, allowing the Central Bank to accumulate reserves on a more solid fashion than in the 1990s.

Improvement in the fiscal and external balances promoted confidence and GDP growth. After a major turbulence ahead of President Lula election in 2002, a long period of growth took hold, further buttressed by the President's steadfast support of the Central Bank. After almost two decades, average growth was back in excess of 4 per cent, notwithstanding the forceful response of the Central Bank anytime high growth (e.g., 5.7 per cent in 2004) started to build inflation

Figure 2

Credit
(percent of GDP)
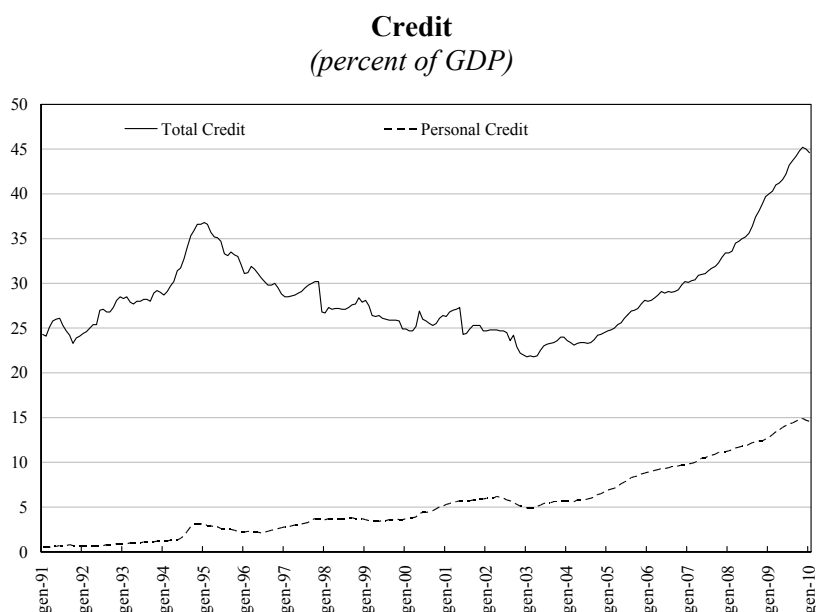
pressures. The improvement in the denominator of the debt/GDP ratio reinforced the contribution of the real appreciation and of interest rates, to reduce this ratio by almost 10 percentage points in 2003-08.

Growth was accompanied by more domestic credit. While the domestic credit/GDP ratio had dropped from 35 in 1995 to 22 per cent in 2002, it showed a steady increase in the following years, rising from 23.5 in 2004 to 37 per cent by late 2008 (Figure 2). That growth was due mostly to private

banks, in the wake of lower spreads and reforms that yielded stronger guarantees and liens over paychecks, cars and residences.

Credit and jobs helped create a new middle class. Poverty reduction, which improved significantly after the stabilization of the currency in 1994, was accelerated after 2005. Although the Gini coefficient remains high at 0.57, strong job creation, as well as transfer programs such as the Bolsa Família that benefits 12 million households, have contributed to reduce the number of very poor households (income below R$ 804) by 40 per cent since 2002 (Figure 3). Meanwhile, the share of the middle class, *i.e.*, households earning between R$ 1,150 and R$ 4,800 a month (US$ 8,500-32,500 a year), in the population has risen by more than 10 percentage points. Together with the upper classes, it accounts now for 70 per cent of households, from 53 per cent in 2003.[1] The impact of income growth on consumption has been further fueled by more personal credit, especially paycheck loans, with strong reflex on the consumption of services and durable goods.

In sum, in mid 2008 Brazil enjoyed a growing economy, with a comfortable external balance, a much improved fiscal situation, and a watchful Central Bank. The country also experienced a surge in investment, reflected in a record number of IPOs. Fortunately, all these indicators, including credit, were still in a beginning-of-a-cycle position when the crisis hit.

3   The crisis and the government response

The credit crunch and drop in commodity prices that are typically caused by financial crises was very brief in the aftermath of the failure of Lehman Brothers. The crisis initiated in 2008 was different from the ordinary global shock, because of the response of authorities in developed countries and China. This time around, there was a massive injection of liquidity by the central banks of developed countries and China helped keep world demand afloat by embarking in a

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[1]   Ranking established by the Center for Social Policies at Fundação Getúlio Vargas.

Figure 3

Income Distribution
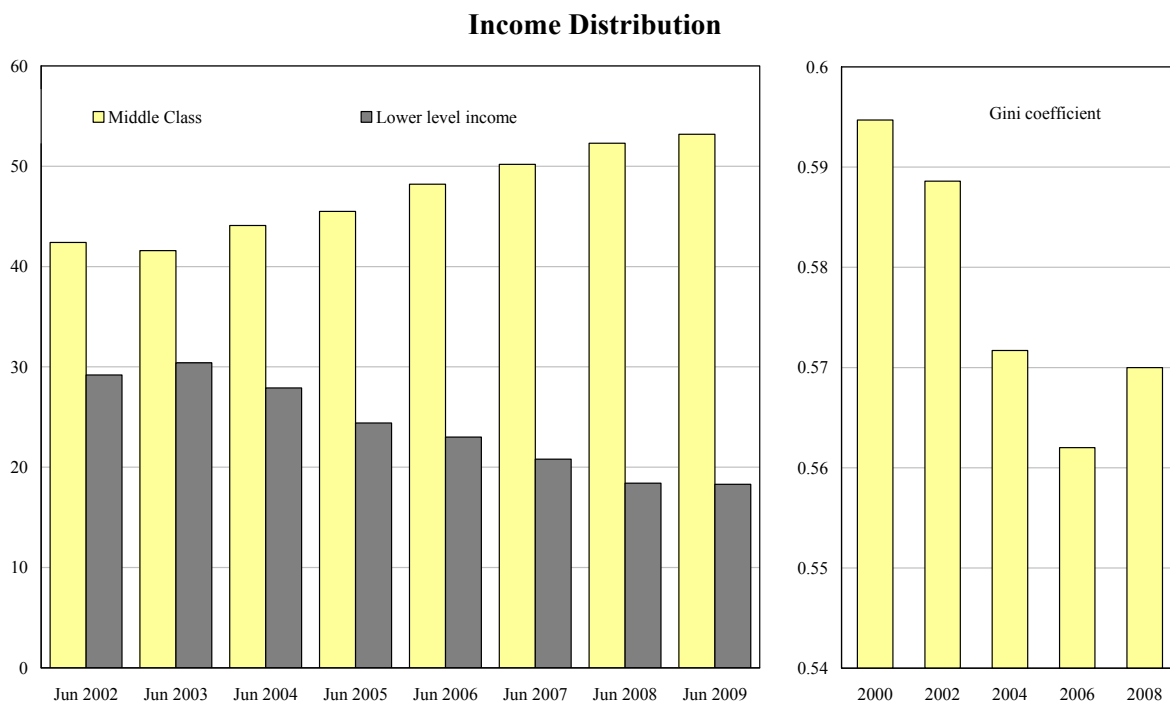
massive public works program. Both features created a favorable environment to Brazil. Together with the soundness of the Brazilian financial market and the Central Bank ability to respond to circumstances without wavering in its commitment to the floating exchange rate, this environment helped business people to quickly recover confidence and the government to use the fiscal room it had build, without jolting financial markets. In the occasion, the Central Bank also reinforced its vast international reserves with contingent lines with the US FED (US$ 30 billion) and the IMF. None of these lines were however used.

The government response to the global slowdown can be grouped into protection of financial markets and support to credit; full use of automatic stabilizers; and outright fiscal stimulus. The Central Bank played a paramount role in implementing the first group, while policies already in place responded for most of the second, and a mix of tax brakes, public-sector wage increases, and a pro-active stance of public banks accounted for the third. The ability of the country in successfully deploying theses tools, rather than their originality, was perhaps the big news about them.

### 3.1   Protection of financial markets

The Central Bank ensured the smooth operation of currency markets. This was based on more than US$ 200 billion in international reserves, and the judicious swap of part of them with domestic players. Central Bank interventions included US$ 24 billion in credit to exporters, outright sales of US$ 14.5 billion and swaps adding to US$ 33 billion (Table 3). This strategy was predicated on the view that the external sector was fundamentally sound, and those who had borrowed from the Central Bank would be able to repay it in a few months. The provision of liquidity ensured that exports continued to flow, and that futures markets would not face undue turbulence; also the Central Bank could earn some income by selling dollars when the *real* was

Table 3

**Interventions of the Central Bank in Late 2008
and Accumulation of Reserves to July 30, 2009**
(US$ billion)

Item	Sales	Repayments	Balance
Spot	14.5	8.2	6.3
Export financing + repos	24.5	20.0	4.5
Total	39.5	28.2	10.8

Figure 4

International Reserves
(US$ billion)
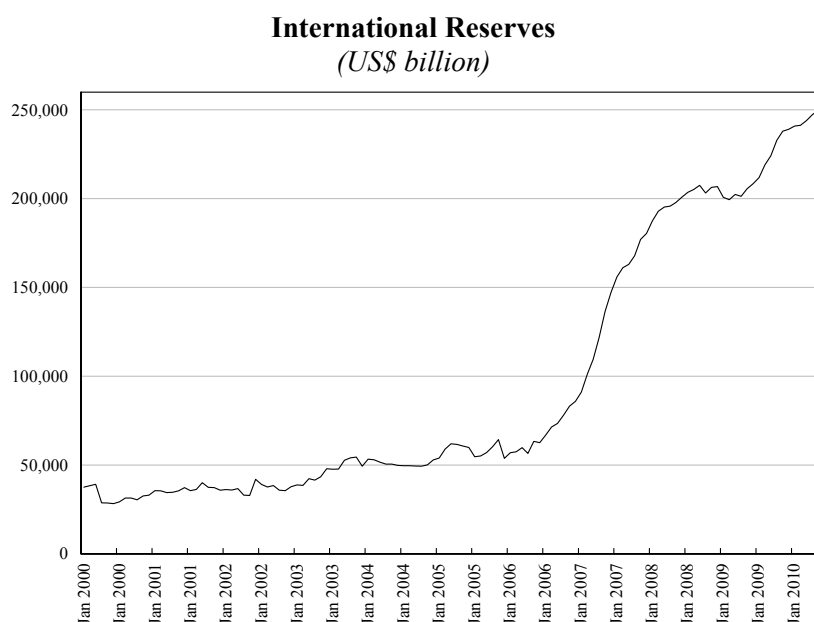
depreciated, buying them back when the currency recovered. The bet proved right. The *real* recovered quickly from the 40 per cent fall experienced in late 2008, and stabilized around R$1.8/US$ (*i.e.*, around the exchange rate in 2000). In a few months, international reserves were higher than at the outset of the crisis (Figure 4). By mid 2009, US$ 20 billion of the export credit lines and US$ 8.2 billion of the outright sales, as well as US$ 11 of the currency swaps had been repaid. Almost all the resources had been paid back by 2010.

Ensuring liquidity in the immediate aftermath of Lehman's collapse was essential to avert an unnecessary crisis. In 2005-08, Brazilian companies had lengthened their debt through international bond issues. Nonetheless, in addition to the need of rolling over that debt, external bank credit still accounted for about US$ 97 billion in September 2008, and US$ 47 billion in domestic bank credit were supported by foreign lines. These funds amounted to 20 per cent of the total bank credit market, and the contraction of foreign credit made domestic lending based on foreign funds drop by US$ 38 billion between September 2008 and January 2009. Also, as international capital markets froze, Brazilian companies turned to domestic banks. The most striking case of this dislocation was the R$ 2 billion emergency loan granted by the federal savings bank to Petrobras. A result of this short run financial drying out was a sharp contraction of output in late 2008, as companies cut inventory and put workers on vacation.

The Central Bank channeled liquidity to small banks. In Brazil, small banks depend on funds from large banks, rather than the other way around, as traditionally in the US. As a consequence, they were squeezed when large corporations started to compete for funds from large banks. That had an immediate effect on medium-size companies, which are big employers and depended on smaller banks. In response, the Central Bank reduced reserve requirements by 40 per cent in October 2008, freeing R$ 100 million (3 per cent of GDP, since requirements amounted to 1/3 of

total credit). About half of that was earmarked to re-lending by large banks to small banks or other ways to disperse credit. This re-lending could be insured at government subsidized rates. Most of the remaining freed resources were, however, mopped up by the Central Bank, since private banks did not expand their overall credit in the following months. With the recovery of the economy, requirements were jacked up in early 2010 in the wake of a brisk increase in credit.

Helping smaller banks also supported personal credit. In late 2008, President Lula made a carefully balanced speech on TV prompting workers to continue to spend, except if they already carried large debts. His message was that, as long as a worker did not face a debt overhang, he or she would be better off spending, because this would ultimately help preserve his or her job. Smaller banks were specialized in personal credit, and the intervention of the Central Bank protected this market, which was further stimulated by the entrance of public banks in that segment in the following months.

Although the Central Bank does not make much publicity about

Figure 5

Domestic Demand, GDP Growth and the SELIC Interest Rate
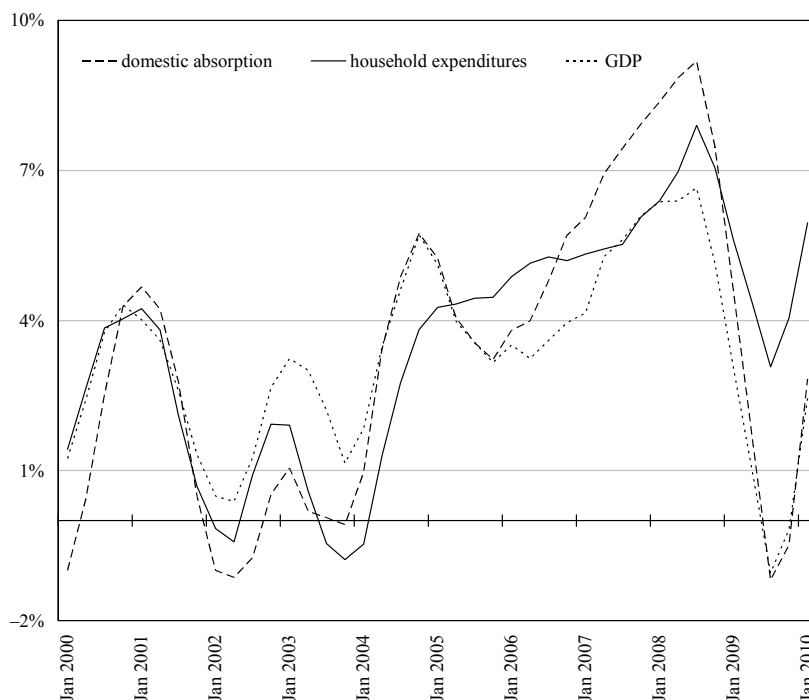
Central Bank SELIC Target Rate
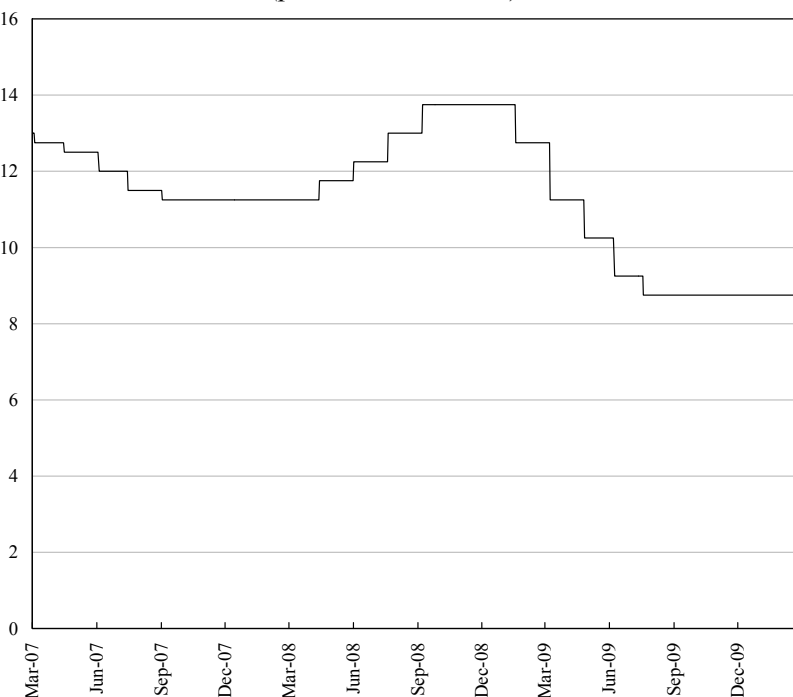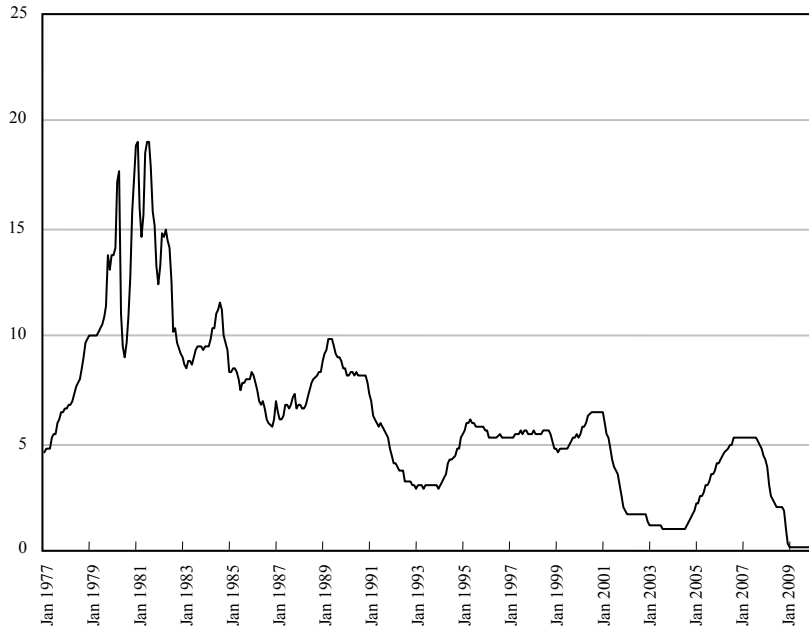*(percent annual rate)*

Figure 6

Federal Funds
(percent year)

its role in supporting aggregate demand, interest rates fell to their lowest levels in 15 years. Rates had actually been tightened in 2008, to respond to the impact of record levels of international commodity prices and the over-heating of the economy, which was growing at 6 per cent y-o-y, fueled by domestic demand growth of 9 per cent y-o-y (Figure 5). Between April and September 2008 the Central Bank SELIC rate rose from 11.25 to 13.75 per cent. Rates started to decline only in January 2009, after GDP had contracted close to 2 per cent and inflation expectations were tamed. The SELIC had dropped to 8.75 per cent by July 2009, when the relaxation cycle was complete. It was the first time in recent years that Brazil was able to respond to a slowdown in the world economy by relaxing rather than tightening monetary policy.

The Central Bank was comfortable to reduce rates because of the equilibrium in the domestic economy and the policy response of developed countries to the crisis. The very accommodative monetary policy in the United Stated created unusual liquidity in world markets, stimulating capital flows to Brazil and helping support the exchange rate and reduce inflationary pressure. This is, of course, a scenario radically different from those faced by Brazil in the 1980s, in 1995 (the so-called "Tequila crisis") or in 1998-2001, when capital outflows were the norm, often in the wake of a tightening in the US (Figure 6). It allowed the public sector to adopt a much more ambitious response than in previous crises.

A proactive role for the public sector was illustrated early on by the response to the problems of a handful of exporters caught off guard. As mentioned above, financial markets performed well during the crisis. Nonetheless, there were a few companies that faced very dangerous situations. In particular, two large exporters that had been unhappy with the appreciation trend of the *real* and high domestic interest rates, bought complex derivatives, betting on borrowing at lower interest rates against the risk of a large loss in the case of a major depreciation of the *real*. As the currency swung beyond any expected threshold, the contracts called for extremely punitive payments that exceeded by far the companies' export streams and caused severe cash flow problems. The government response, after checking that this was an idiosyncratic problem, was to induce each of the firms to merge with stronger competitors, with the financial help of the National Bank for Social and Economic Development (BNDES). The strategy chastised controlling shareholders, while striving to preserve ongoing concerns. It was perceived as a portent of opportunities opened by the crisis, for allowing the creation of global powerhouses in the export markets of poultry and cellulose.

The episode of derivatives also highlights strengths of Brazilian financial markets. Authorities could intervene firmly and timely because they had access to information, which included the individual name of final risk bearers of each contract. By inquiring in the clearing system (CETIP) where it is mandatory to register every over the counter contract, the Securities Exchange Commission (CVM) and the Central Bank were able to quickly map the exposure of all domestic derivatives. This stands in striking contrast with, for instance, the US, where authorities would know only the aggregate positions of banks. The review showed Brazilian authorities that large risks were concentrated on exposures of one type of contract offered by foreign banks offshore, facilitating the tailoring of the response. Also, because most companies knew that the Central Bank would not try to defend the currency, they were adequately hedged, requiring minimum liquidity provision to the futures market by the Central Bank.

3.2   Automatic stabilizers

In contrast with most developing countries, Brazil has strong demand stabilizers, anchored on sizeable social transfers. Pay-as-you-go pension payments amount to 9.2 per cent of GDP. About 40 million workers, in a 92 million working force contribute to the general pension system, while 6.5 million are enrolled in schemes for public employees, and 19 million are self employed in and out of the formal market and the roll of social security contributors. The general scheme pays about 23.5 million benefits a month, of which 1/3 referring to rural pensions with tenuous contributory factor. In addition, the social security pays 3.5 million old-age and disability minimum-revenue benefits (LOAS-RMV) amounting to R$ 20 billion. Unemployment insurance, although limited by high rotation and job informality, typically benefits more than 6 million people a year. Also, since the early 2000s, and especially since 2003, the Bolsa Família program has become an important vector for social transfers (before 2003 the program had a different name). By 2008, it reached more than 11 million households (close to 20 per cent of the Brazilian population) with benefits averaging R$ 1000 a year (US$ 50 a month).

All mechanisms of social transfers expanded their payments in 2009, translating into a stimulus of 0.45 per cent of GDP. Social security outlays rose from R$ 199 billion in 2008, to R$ 225 billion (US$ 125 billion) in 2009. This 13 per cent increase was well above inflation or the growth of nominal GDP, reflecting the upward trend in the number of beneficiaries and real increase in benefits linked to the minimum wage. LOAS/RMV outlays increased by 18 per cent (0.07 per cent of GDP), while unemployment insurance payments rose from R$ 21 billion (0.70 per cent of GDP) to R$ 27 billion (0.88 per cent of GDP), with the roll of beneficiaries rising to 7.5 million. On September 2009, the scale of Bolsa Família benefits was increased by 10 per cent, compounding the effect of the expansion of the coverage of the system to 12.4 households. Total expenditure with the program reached R$ 12 billion in 2009, or 0.3 per cent of GDP.

A recent minimum wage setting mechanism helped support demand. The rule agreed in 2007 established that real wage increases should reflect per capita real GDP growth two years before. Confirmed by the decree n. 456/2009, it meant more than 5 per cent real growth for the minimum wage in 2009. The impact of this growth went well beyond formal employees earning the minimum wage for two reasons: pay levels in the informal market are linked to the minimum wage, because the duality of labor markets is related more to the payment of taxes than to wage levels; the floor of pensions and other benefits, comprised in the "broad labor compensation" monitored by the Central Bank, are also linked to it.[2]

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[2]   For the Central Bank, "wage" income accounts for 76 per cent of broad labor compensation, while pensions represent 21 per cent and minimum income programs 3 per cent.

3.3 Fiscal measures

Fiscal measures by the central government included reductions in taxes and increases in public servant wages and investment. Tax breaks ranged from the reduction in the federal VAT on industrial goods (IPI), to the introduction of new income tax brackets aimed at reducing the tax burden on the middle class. Also, the tax on the financial transaction IOF on loans and the corporate income tax due by companies involved with a new low-income housing program were cut down. Altogether, the direct fiscal stimulus amounted to about 0.5 per cent of GDP, with the following breakdown: R$ 5 billion (0.2 per cent of GDP) due to the change in income tax brackets; R$ 6 billion out of total IPI revenues of R$ 39 billion in 2008; R$ 2.5 billion related to IOF; R$ 0.2 billion related to the tax break for the real estate sector. The stimulus was effective in some sectors, such as the auto industry and home appliances: car production recovered to a record level of 3.1 million vehicles in 2009, making Brazil the fifth largest auto producer in the world that year.

The increase in public wages outpaced by far the expansion in public investment. Wages in the Executive branch rose by 16 per cent in the Executive branch. Together with an increase in positions, it led the payroll to rise from 4.35 per cent of GDP in 2008 to 4.84 per cent of GDP in 2009. This 0.5 per cent of GDP increase was larger than the combined effect of automatic stabilizers, although it benefited a much smaller group of people. It was also larger than the R$ 11 billion expansion in Central Government investments, notwithstanding the prominence given to projects in the PAC-Growth Accelerating investment program, especially those benefiting from the PPI allowance that excluded certain Central Government investments from the primary target (PPI outlays increased from R$ 7.8 billion to R$ 16 billion).[3] Indeed, despite great managerial effort and absence of fiscal constraints in the case of the PPI, investments by the Central Government amounted to just a bit more than 1.5 per cent of GDP in 2009.

Significant part of the fiscal stimulus was done through public enterprises. Public investments by Eletrobras, the federal electricity holding company, reached R$ 3.6 billion, while the company, often as a minority partner, participates in PAC projects to the top of R$ 41 billion. Petrobras invested R$ 50 billion in the first three quarters of 2009 (1.6 per cent of annual GDP), as part of its US$ 174 billion investment plan for 2009-13. Investment by the federal government and Petrobras accounts for more than 15 per cent of total investment, according with the Ministry of Finance. However, despite its role in the PAC and in the government public agenda, Petrobras has recently been excluded from the fiscal figures of the consolidated public sector, because Brazil adopted the practice used in most developed countries with regard to public enterprises producing market goods. Traditionally, Petrobras contribution to the consolidated public sector primary balance had been in the range of 0.4-0.5 per cent of GDP.

Additional stimulus came from public banks through vigorous credit expansion (Figure 7). Banco do Brasil moved aggressively in retail, in addition to keep its traditional role in farming. It acquired two medium-size banks, one in a rescue operation and the other put for sale by a state government. Banco do Brasil took full advantage of lower interest rates and the acquisitions to increase its consolidated lending by 33 per cent in 2009. The savings bank Caixa Econômica Federal (CEF) expanded its credit by more than 50 per cent, increasing its market share by 2.3 percentage points to 8.8 per cent, in a expanding market. The balance sheet of BNDES more than doubled *vis-à-vis* 2007, with large exposures to private and public companies, in support of outright investments as well as several mergers and acquisitions. Disbursements totaled R$136

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[3] The PPI was introduced in 2005 as a pilot project in which investments with ascertained rates of return would be excluded from the fiscal targets under the argument that the country was not facing a liquidity constraint anymore and therefore fiscal targets should focus on solvency. As such, if an investment could bring more in the long run than the cost of financing it, it was worth doing as long as this financing were available. At the beginning the PPI allowance amounted to R$ 3 billion a year, with the possibility of replacing projects that did not perform adequately with new ones.

billion in 2009 (≈US$ 75 billion), against R$91 billion in 2008 and R$65 billion in 2007 (*i.e.*, +2 per cent of GDP). With credit expansion by private banks modest for most of 2009, the share of public banks in total credit rose from 34.8 per cent in late 2008 to 42 per cent by the end of 2009.

Abundant credit also propped up a new housing program and helped buffer states against the decline in federal transfers. The "minha casa-minha vida" low-income housing program was set up to provide R$ 6 billion in subsidized loans to developers and households.

Figure 7

Stock of Credit by Type of Institution
(R$ billion)

Although disbursements were negligible in 2009, projects for 275 thousand houses were approved, creating great expectations in the construction sector, which had not benefited from significant public funds since the 1980s, when macroeconomic instability led to the bankruptcy of the existing financing system (BNH).[4] The federal government also offered about R$ 2 billion in loans from public banks to states facing shortfalls in VAT receipts and lower federal transfers, and lifted their borrowing ceilings by R$ 10 billion, facilitating loans from multilateral financial institutions.

On balance, the crisis strengthened the presence of public companies, which was already significant, especially in energy and banking. Petrobras is dominant in domestic oil and gas production, virtually a monopolist in refining and an important player in fuel distribution. Its sales reached R$ 232 billion in 2008, for a market cap of US$ 97 billion (Total's and Eni's market caps were of US$ 128 billion and U$ 93 billion respectively, in December 2008). Sales of Eletrobras summed R$ 32 billion in 2008. The company controls 38 per cent of electricity generation and 56 per cent of transmission, with more than 40 thousand miles of transmission lines. Banco do Brasil was the largest bank prior to the merger of Itau and Unibanco and its profits reached a record level of R$ 10.1 billion in 2009 – the largest ever for any Brazilian bank. CEF is also among the largest five or six banks, but its profits fell by 22 per cent in 2009, while those of private banks rose on average by 24 per cent that year. BNDES annual lending nowadays exceeds by far that of the World Bank.

4   Remaining risks and structural issues

The success in responding to the crisis highlights the importance of fiscal issues in Brazil and

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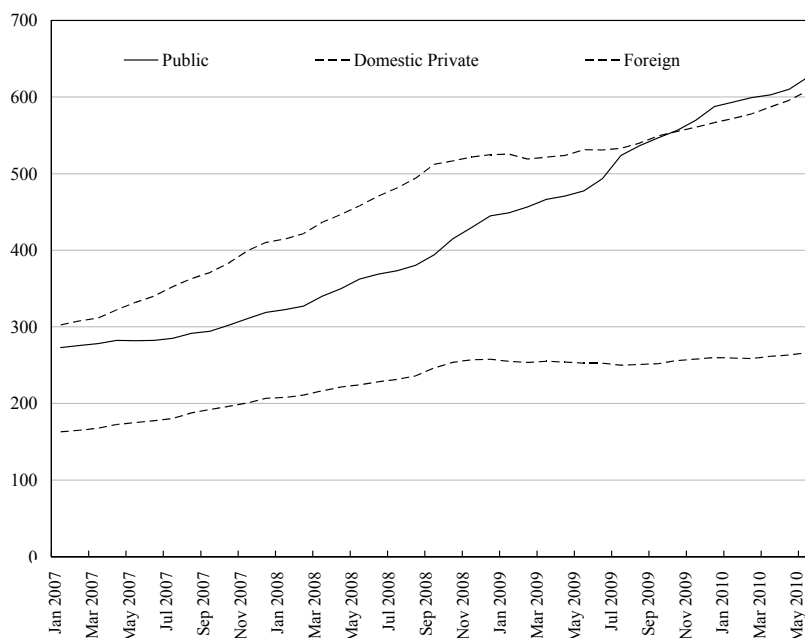
[4]   The resulting bad loans remained in the financial sector until 2001, when they were moved to the resolution company EMGEA.

of further reforms to consolidate the gains obtained in the last 15 years. The response brought fiscal risks that go beyond the decline in the primary surplus of the central government in 2009. These risks may be more related to the belief that the success of the fiscal stimulus and credit relaxation during the crisis vindicates a larger permanent role for the public sector, rather than being an evidence that years of effort allowed the country to successfully deploy countercyclical measures, which were supported by the exceptional combination of lax monetary policy in developed countries and sustained demand in China. Diverse perceptions of the meaning of the quick recovery can thus lead to different policy choices in coming years. These could favor demand stimulus and increased reliance on public companies as the way to long-term growth, or could keep the emphasis on promoting additional structural changes through institutions and the fostering of competition in a free-market economy. They will also be instrumental to reach the long yearned goal of lower interest rates. The decline in interst rates, if correctly done, could unleash a new wave of investments. If forced inappropriately, it could lead to capital flight and stagnation. The following paragraphs review the economic outlook and risks in Brazil, and suggest a direction for a new generation of reforms that may help achieve those goals safely.

### 4.1   Economic outlook and risks

The recovery was unmistakable by the end of 2009, and output is likely to be well beyond potential by end 2010. Retail sales were 8.8 per cent higher at end 2009 *vis-à-vis* one year before; a few months later, industrial production had also regained the lost ground, pulled mostly by domestic demand. Industrial capacity utilization reached record level in 2010, while unemployment was 5 percentage points below its level at the beginning of the growth cycle in 2004, at around 7 per cent. Investment also started to pick up, reaching 19 per cent of GDP in early 2010. By the beginning of the year, the Central Bank started underscoring signs of inflationary pressures, leading to a 1.5 per cent increase in rates by mid 2010, with further tightening likely to be pursued, given the 9 per cent y-o-y GDP growth in the first quarter of the year, an average of up to 250,000 new jobs a month, and inflation in the service sector close to 10 per cent.

Improvement in fiscal accounts in 2010 will be due mostly to the buoyancy of the economy, as in 2008. The deterioration of the primary surplus in 2009 suggests an important break with early Lula years, even considering cyclical factors. Indeed, fiscal discipline begun to weaken before the crisis, although that was masked by the upswing of the economy. The phasing out of the CPMF contribution on bank transactions in December 2007 implied a permanent loss of R$ 40 billion in revenues (1.5 per cent of GDP), which was temporally offset by the extraordinary buoyancy of the income tax in 2008, pushed by profits from banks and the general acceleration of GDP (the income tax rose 19 per cent from 2007 to 2008, accounting for R$ 30 billion in additional revenue). With the economic slowdown, those weaknesses became apparent, and were compounded by a change in the command of the Revenue Service in August 2008 that brought ill-timed and ineffective innovations, which eventually led to the replacement of the team a year later. With the recovery, tax receipts have increased (sometimes with the help of once-off measures), improving fiscal outcomes. Nonetheless, primary results remain erratic, and expenditure remains the real problem. Central Government outlays, excluding transfers to sub-national governments, rose by 15 per cent in nominal terms in 2009 (+10 per cent real, or 2 percentage points of GDP), and Government and Congress have brought new decisions on pensions and public-sector wage increases in 2010 that only exacerbate the problem.

It is important to continue to watch primary results and debt levels. The primary surplus of the central government halved in 2009, dropping to 1.25 per cent of GDP (Figure 8). It may improve in 2010, but targets for 2011 include so many allowances for special items, that they are losing their meaning. Also, beyond Central Government primary spending, the expansion of the BNDES balance

Figure 8

Primary Balance of the General Government
*(percent of GDP)*
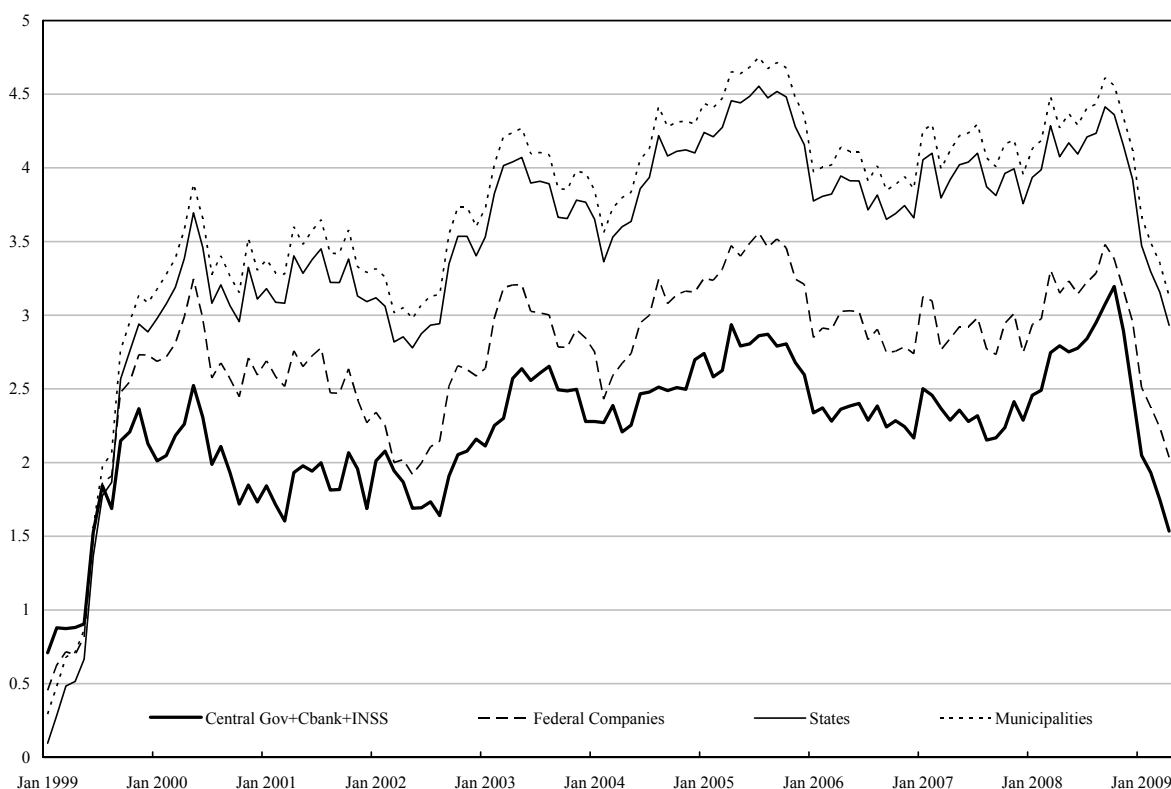
sheet raises flags: most constraints on lending to public companies imposed in the 1990s and early 2000s were lifted, while large exposures to private companies over a broad range of sectors were built. Abstracting from legitimate views on industrial policy, these actions have a clear fiscal bias, because they required extensive support from the National Treasury and brought back a practice of money-creation that had been stopped in the 1980s. Although the increase in the Treasury exposure did not affect the non-financial public sector net debt figures, because it was effected trough the purchase of BNDES subordinated debt rather than outright capital injections, it impacted gross debt. Of the R$ 233 billion increase in the National Treasury gross debt in 2009 (+15 per cent, or 5 per cent of GDP), R$ 102 billion (3 per cent of GDP) arose from the financing of public banks.

Public spending will keep the pressure on the external accounts. The strong pace of household consumption, fueled by fiscal and credit policies, as well as a sharp increase in profit and dividend remittances, has created a current account deficit. This increase appears to be related to financial needs of international companies rather than to any weakness in the Brazilian economy, as it has been contemporary to higher foreign direct investment inflows and reserves levels (the BOP showed a US$ 46 billion surplus in 2009, with a financial account surplus of US$ 70 billion). Nonetheless, risks may be accumulating, considering that imports have doubled in quantum since 2006, while the quantum of exports has remained stable. More than half of the increase in exports receipts in the last five years is owed to price increases, while import prices have been very tame. A change in the terms of trade, often contemporary with a global increase in interest rates, could require an important adjustment in the economy. Past experience and the dynamics of imports

Figure 9

**Energy Independence and the "Pré-sal"
Oil Province Off-shore Rio de Janeiro**
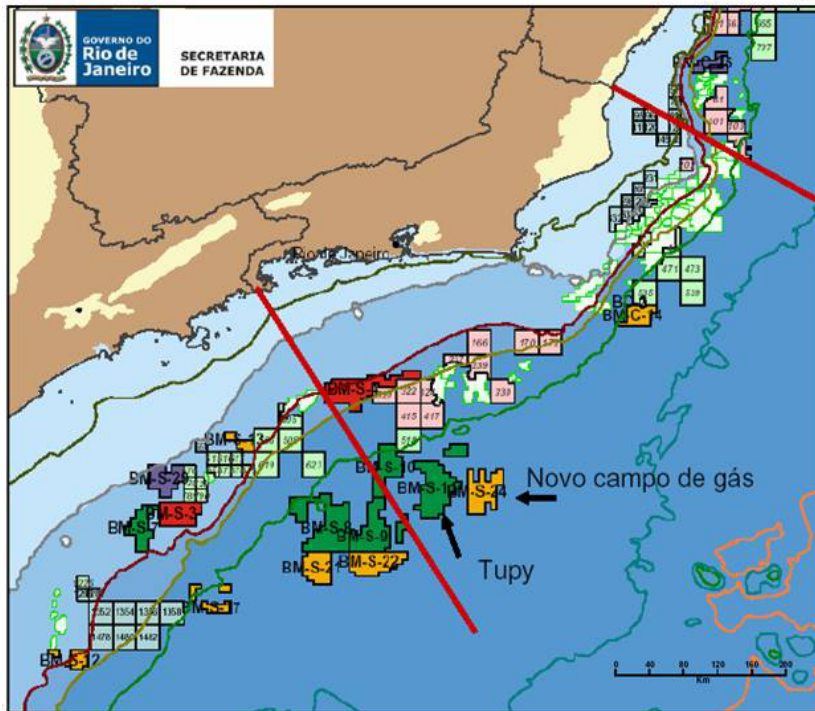
Oil Consumption/Production

1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008
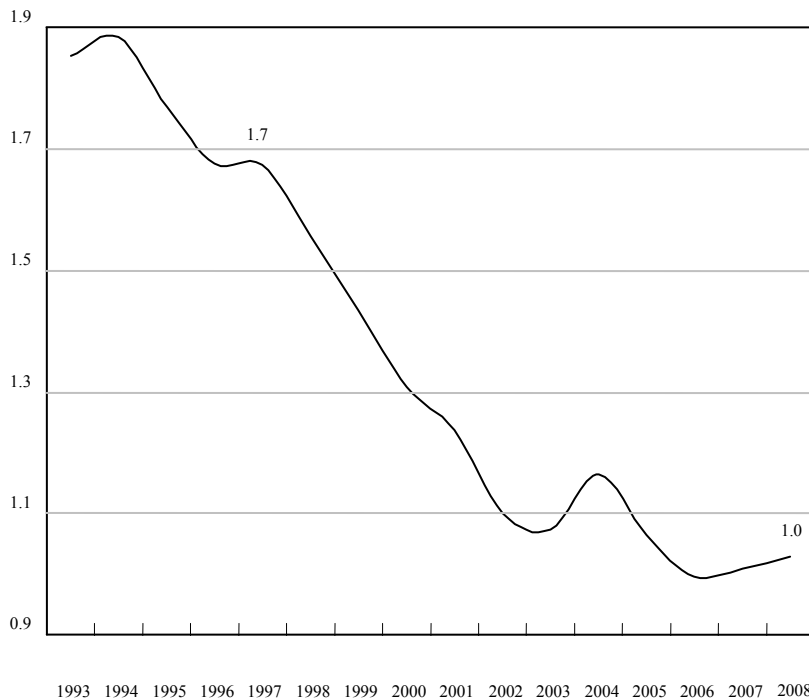
Source: ANP.

during the crisis suggest that this adjustment is feasible, if not painless. A large part of imports refers to intermediate goods, and their weight floats with the exchange rate and other relative prices, owing to the ability of the diversified domestic industrial basis to supply these items when prices are attractive. The increase in the import content of local manufacturing, as well as in the share of commodities in total exports, has not necessarily implied a hollowing of the Brazilian industry.

On the bright side, Brazil can count on new oil discoveries and a steady demand from China. Brazil can be a reliable long-term supplier of minerals, food, construction materials and basic industrial goods to China. With regard to oil, the reserves in the "pré-sal" province are in the 50-80 billion barrels range (Figure 9). Production there could reach 2 million barrels a day by 2017. Most of this oil would be available for exports, generating up to US$ 50 billion a year in income (1-2 per cent of GDP). In addition, minimum domestic content requirements on equipments and services supplied to oil companies in the pré-sal will have a multiplier effect,

remembering that a third of the annual R$ 80 billion investment program of Petrobras is linked to the drilling and production of oil. The expertise and scale local suppliers will obtain by servicing the pré-sal will likely help create new streams of exports. The challenge will be to walk the fine line between industrial promotion and inefficiency.

4.2   The scope for further structural reforms

Reforms adopted since 2003 have proved effective, as demonstrated by the expansion in real estate investment since 2005. First-generation reforms from the 1990s (e.g., in oil drilling, telecomm, banking) yielded benefits throughout the 2000s. These, have increasingly been accompanied by those from a second generation of reforms implemented after 2003 (Table 4). One of the most effective reforms in the latter group was the one dealing with real estate. This project-finance inspired reform segregated real estate projects against developers' corporate bankruptcy and other risks, providing much more security to buyers and financers.[5] Coupled with the relaxation of monetary policy and earlier changes in lending rules (e.g., strengthening of repossession of financed houses), it unlocked a huge market, reviving the construction sector even before the "minha casa-minha vida". New house financing rose from 30,000 in the 1990s and early 2000s, to 300,000 more recently, supporting several IPOs of developers. The market is still small, with annual disbursements of just R$ 30 billion, and the stock of mortgages amounting to just around R$ 105 billion (*i.e.*, 3 per cent of GDP), but its potential is large (Figure 10).[6]

Medium-term fiscal spending targets, together with third-generation reforms can reduce aggregate risks, stimulating idiosyncratic risks and investments. Such spending targets would help agents to assess the impact of fiscal impulses to the aggregate demand and the amount of distortion caused by future taxes. It would thus be a natural improvement over the existing commitment to the primary surplus target. Third-generation reforms could focus on the refinement of existing check-and-balance systems, strengthening

Figure 10

Real Estate Lending – Stock of Residential Loans
(percent of GDP)

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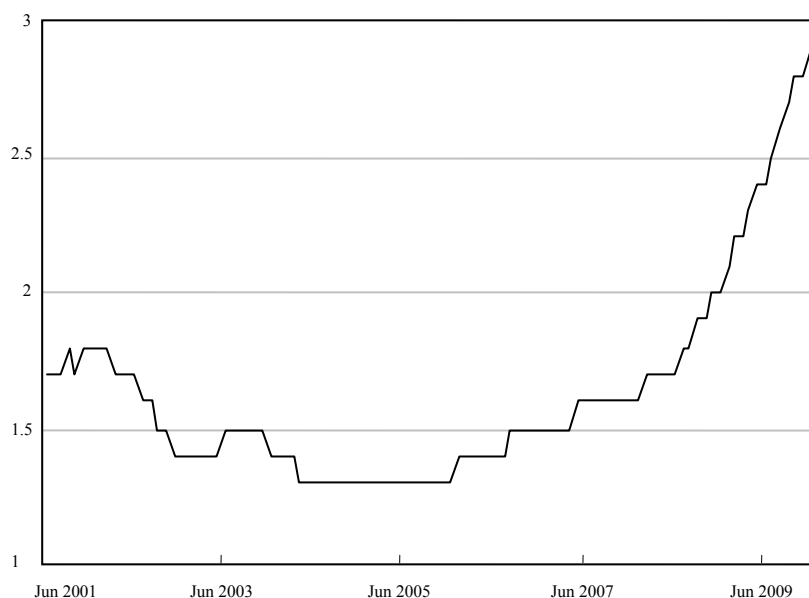
[5]   In the 1990s many individual investors lost money because constructors would mix resources from several projects in a common account. Because tax and labor liabilities would have precedence in any bankruptcy situation, problems in one project would quickly affect all projects.

[6]   The stock is so small also because the residual, unfunded mortgages from the 1970-90 have been transferred to the resolution fund EMGEA.

<div align="right">**Table 4**</div>

The Reform Agenda Accomplished in the Early Years of the Lula Administration

Law	Topic	Effect
No. 10820/2003	Loans guaranteed by payroll	Lowers cost of personal loans
No. 10833/2003	Makes pis-cofins non cumulative	Reduces distortion of this federal tax
No. 10931/2004	Reforms real estate sector, segregating projects for tax and bankruptcy purposes	Reduces risks for builders and buyers
No. 11079/2004	Introduces PPP	
No. 11101/2004	Bankruptcy law	Changes payment priorities, promotes resale of assets and preservation of concern
No. 11196/2005	Incentives to R&D	Provides tax brakes and stimulus for diffusion of innovations
LC 123/2006	Small enterprises	Consolidates their tax liabilities, reducing overall tax burden to foster formalization
LC 126/2006	Opens re-insurance market	Ends monopoly and opens market to domestic and foreign companies
No. 11445/2006	Sanitation Framework Law	Regulates concessions in the sector
No. 11638/2007	Corporations Law	Subjects accounting rules to control of independent bodies, aligning them with international practice

regulatory agencies and external control of government decisions. This would respond to the want of better coordination among agencies representing stakeholders that often unduly increase the risk surrounding private and public investment and help improve the effectiveness of public spending. It would, for instance, address the incentives for agencies responsible for licenses to procrastinate, rather than give positive or negative responses; or the problem that obtaining a stay from a court (mandado de segurança) is rather easy, while deciding on the merit can drag for decades. Improving the governance of macro-processes in the public sector needs not hamper freedom or growth, but rather make rules more clear and objective. Absent that, the tendency would be a sliding towards bullying agencies and the return to discretionary and unaccountable polices from the Executive branch and close-door decisions by public companies.

That two-pronged approach could pave the way to lower interest rates. Although rates are below the peaks of the 1990s or early 2000s, they remain surprisingly high, distorting investment and labor decisions and creating incentives for rent seeking, such as below-market rate loans from BNDES. A frontloaded effort in the fiscal would thus reduce the implicit subsidy in BNDES loans, which, at R$ 10 billion, adds up to almost the cost of the Bolsa Família.[7] It would also help shave government interest payments, which are in excess of 5 per cent of GDP, freeing resources ahead. It is intuitive that the current policy mix of tight monetary policy and expanding fiscal policy is inefficient in an environment where growth quickly translates into price increases because fiscal uncertainty weakens the supply response to shocks in aggregate demand, and large companies borrowing from BNDES are insulated from Central Bank rates. Hence, the good financial

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[7] This amount is estimating considering a 5 per cent subsidy on a R$ 200 billion balance sheet.

indicators currently surrounding the public debt should not be mistaken for a license to spend, even if credit default swaps on Brazilian debts are priced below those on Italy and Spain (e.g., CDS premium of 131 bps for Brazil, versus around 180-240 for those countries). A balanced and sound decline in rates would strengthen Brazilian companies on the whole and probably reduce the need for the government to promote "national champions" through official channels, as well as the incentive for firms to share risks with the government through loans from public banks.

Sub-national governments provide interesting experiences regarding better quality in public spending. An often overlooked consequence of the institutional changes triggered by price stability was the pressure on subnational governments to focus on better service delivery. Without the smoke of inflation, subject to the Fiscal Responsibility Law, and with little room to issue debt, state governments changed their way to do business, focusing on core areas such as health, education and public security, which are essential to long-term growth. Increased commitment to transparency, stronger compliance rules, and better internal controls were promoted, together with more effective rapports with controlling agencies.[8] New, ambitious programs for automating and integrating taxes, spending and their accounting using corporate systems (e.g., SAP/Oracle ERPs) are also under way.

Given the excellent financial infrastructure of Brazil, further confidence on fiscal and macroeconomic balances could facilitate the tapping of local capital markets. Clearing, custody, as well as trading and underwriting technology and systems are state of the art in Brazil. The Brazilian Exchange BOVESPA is one of the four most valuable exchanges in the world, and the overall market capitalization of listed companies is at par with that of Spain and Germany. Over the counter clearing institutions are also nimble and secure. Pension funds, investment funds, and insurance companies have thrived since the reforms of the early 2000s, creating a robust and increasingly well regulated sector of institutional investors eager to find new outlets for their savings. Thus, the share of capital market debt in the balance sheet of industries doubled in 2006-07 and amounted to 8 per cent of GDP in 2008, while bank loans excluding those using earmarked/public funds have stagnated. With less aggregate risk and the ensuing lower interest rates, the BOVESPA plan to list up to 200 new companies in the coming years could become reality and dramatically facilitate the financing of corporations and infrastructure, sustaining growth.

5   Concluding remarks

The success of the response to the crisis validates the policy choices of the last 15 years. The success in deploying anti-cyclical instruments should not be confused with a license to weaken the fiscal stance in the medium term and expand public companies in a thoughtless way, but rather be seen as a sign of the potential of third-generation reforms. Sedimentation is one of the strengths of Brazil, which helped consolidate the reforms of the 1990s and promote a new round of changes in 2003-06, all along boosting the confidence in the policy formulation and implementation process. This cycle should be extended in the aftermath of the 2008 crisis, through the elimination of any doubts about the country's solvency. This would be especially favorable to growth, considering the new opportunities opened up by the pré-sal oil discoveries, long-term trends in international trade and capital flows, as well as the large market driven by a burgeoning middle class. Discipline on pubic financing of banks should not be weakened, in light of past experiences

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[8]   In Rio de Janeiro, oil revenues, for instance, are channeled to the public servants pension fund, insulating the rest of the government from the fluctuations in oil prices, and guaranteeing great transparency in the use of these receipts. Better governance has also helped the nature conservancy fund FECAM financed with a small share of those oil revenues to deliver consistent results, with lower agency costs. Also, on-line disclosure of every payment and other measures to improve transparency and predictability have allowed the government to expand partnerships with the private sector and lower acquisition costs significantly.

and of the vitality of domestic capital markets. Instead, the focus should be on improving the quality of public spending and regulatory agencies, and on developing a new framework to reinforce instances of social control, to foster accountability without unduly slowing down investment projects. Confidence in the fiscal outlook, together with yet more clarity on the functioning of institutions, would help avoid overlapping demands from licensing bodies and stimulate greater use of capital markets, fostering investment and growth.

APPENDIX

<div align="right">**Table 5**</div>

Gross and Net Debt of the General Government of Brazil

Item	R$ million				2009/08 percent change	percent of GDP			
	2006	**2007**	**2008**	**2009**		**2006**	**2007**	**2008**	**2009**
Net debt of General Government (C+F+I+J)	**1,091,255**	**1,181,418**	**1,175,203**	**1,378,129**	**17.3%**	**46.0**	**44.4**	**39.1**	**44.0**
Gross Debt of General Government (C=D+E)	**1,336,645**	**1,542,852**	**1,740,888**	**1,973,424**	**13.4%**	**56.4**	**58.0**	**57.9**	**62.9**
Domestic Debt (D)	**1,186,058**	**1,426,087**	**1,595,878**	**1,861,984**	**16.7%**	**50.0**	**53.6**	**53.1**	**59.4**
Treasury Bonds and Notes	1,073,652	1,204,314	1,236,732	1,369,262	10.7%	45.3	45.3	41.2	43.7
Open Market BCB Operations	77,367	187,416	325,155	454,710	39.8%	3.3	7.0	10.8	14.5
Federal Government Loans	2,090	2,216	2,103	2,262	7.6%	0.1	0.1	0.1	0.1
Liabilities to CEF – Law 8,727/1993	23,585	22,194	20,358	17,630	–13.4%	1.0	0.8	0.7	0.6
State Loans	6,339	6,425	7,276	12,546	72.4%	0.3	0.2	0.2	0.4
Municipal Loans	2,890	3,371	4,253	5,574	31.1%	0.1	0.1	0.1	0.2
External Debt (E)	**150,587**	**116,764**	**145,010**	**111,440**	**–23.2%**	**6.4**	**4.4**	**4.8**	**3.6**
Federal Government	136,108	104,433	126,456	94,993	–24.9%	5.7	3.9	4.2	3.0
State Governments	12,545	10,641	16,054	14,440	–10.1%	0.5	0.4	0.5	0.5
Municipal Governments	1,934	1,691	2,500	2,007	–19.7%	0.1	0.1	0.1	0.1
Claims of the General Government (F=G+H)	**–465,221**	**–533,018**	**–563,425**	**–830,612**	**47.4%**	**–19.6**	**–20.0**	**–18.8**	**–26.5**
Domestic Credits (G)	**–465,221**	**–533,018**	**–563,425**	**–830,612**	**47.4%**	**–19.6**	**–20.0**	**–18.8**	**–26.5**
Short Term Assets of the General Government	–247,406	–305,568	–292,507	–445,177	52.2%	–10.4	–11.5	–9.7	–14.2
Cash	–5,528	–7,072	–8,351	–7,746	–7.2%	–0.2	–0.3	–0.3	–0.2
Claims against the BCB	–226,047	–275,843	–255,217	–406,354	59.2%	–9.5	–10.4	–8.5	–13.0
State claims against banks	–14,396	–21,358	–25,993	–29,252	12.5%	–0.6	–0.8	–0.9	–0.9
Loans to official institutions	–12,343	–14,150	–43,087	–144,787	236.0%	–0.5	–0.5	–1.4	–4.6
Subordinated debt	–2,389	–7,504	–7,633	–15,550	103.7%	–0.1	–0.3	–0.3	–0.5
Claims against BNDES	–9,953	–6,645	–35,454	–129,237	264.5%	–0.4	–0.2	–1.2	–4.1
Assets of funds and programs	–50,294	–54,790	–61,700	–73,851	19.7%	–2.1	–2.1	–2.1	–2.4
Claims against SOEs	–20,041	–18,805	–18,977	–16,518	–13.0%	–0.8	–0.7	–0.6	–0.5
Other claims	–12,487	–11,289	–10,974	–10,249	–6.6%	–0.5	–0,4	–0.4	–0.3
Claims of FAT against banks (mostly BNDES)	–122,650	–128,417	–136,181	–140,030	2.8%	–5.2	–4,8	–4.5	–4.5
External Assets (H)	**0**	**0**	**0**	**0**	**-**	**0.0**	**0.0**	**0.0**	**0.0**
Federal bonds owned by BCB (I)	**219,831**	**171,585**	**169,156**	**183,105**	**8.2%**	**9.3**	**6.4**	**5.6**	**5.8**
Revenues from currency derivatives (J)	**0**	**0**	**–171,416**	**52,212**	**–130.5%**	**0.0**	**0.0**	**–5.7**	**1.7**
Memo Items									
BCB Net Debt	**8,481**	**8,585**	**–31,922**	**–39,189**	**22.8%**	**0.4**	**0.3**	**–1.1**	**–1.3**
Net Debt of SOEs (excludes Petrobras)	**12,965**	**10,795**	**10,351**	**6,385**	**–38.3%**	**0.5**	**0.4**	**0.3**	**0.2**
GDP 12month, deflated by the IGP-DI	2,369,797	2,661,344	3,004,881	3,135,010	4.3%				

Table 6

Balance of Payments
(US$ million)

Item	2004	2005	2006	2007	2008	2008 Jan-Oct	2009 Jan-Oct
Trade Balance	33,641	44,703	46,458	40,032	24,836	20,920	22,641
Current Account	11,679	13,985	13,621	1,550	−28,192	−24,122	−14,788
Capital Account	372	663	869	756	1,055	906	888
Financial Account	−7,895	−10,127	15,113	88,330	28,297	44,126	51,317
Foreign Direct Investment	8,339	12,550	−9,420	27,518	24,601	19,121	24,311
Outward	−9,807	−2,517	−28,202	−7,067	−20,457	−15,647	5,058
Inward	18,146	15,066	18,782	34,585	45,058	34,768	19,254
Portfolio Investment	−4,750	4,885	9,573	48,390	1,133	9,598	39,331
Stock	−3,875	7486	9,966	49,517	−1,024	9,008	40,040
Fixed Income	2,714	7391	6,278	24,518	−9,208	−5,324	31,970
Other Investments	−10,806	−27,521	14,577	13,132	2,875	15,751	−12,494
Errors and Omissions	−1,912	−201	965	−3,152	1,809	−5,560	881
BALANCE OF PAYMENTS	2,244	4,319	30,569	87,484	2,969	15,350	38,298
Memo:							
Current Account/GDP	1.76	1.58	1.25	0.12	−1.79	−1.83	−1.26

STRUCTURAL ASPECTS OF THE JAPANESE BUDGET

Michio Saito[*]

1   Introduction

Japanese fiscal position has been deteriorating over a long time. After the collapse of bubble economy, the Japanese government continues to try to improve the situation and has set targets for fiscal consolidation repeatedly, but it couldn't achieve them. On the contrary, the situation has worsened under the world economic and financial crisis in the last few years.

In this paper, the developments of the Japanese budget structure will be explained first. In both expenditures and tax revenues, there have been factors which have had effects on the enlargement of fiscal deficits. Considering the size of government expenditure to GDP, the most essential problem in Japanese fiscal situation is the lack of tax system which can gain enough revenues as fiscal resources. But such situation means on the other hand there is room to increase the tax burdens to cover the fiscal gap.

As a conclusion it will be pointed out that Japanese fiscal policy faces challenging situation to achieve fiscal consolidation in moderate economic growth under population aging.

The Japanese government has decided its new fiscal consolidation plan on June 22, 2010. The recovery of the fiscal soundness will be pursued along the plan.

2   Trends in the Japanese budget structure after the bubble era

Even in the bubble era around 1990, when the fiscal balance of Japan's general government was in surplus, the fiscal balance of central government was slightly in deficit. After that, Japan's fiscal balance has been deteriorating and the deterioration was mainly in the central government, especially in these 10 years (Figure 1). So the focus of this paper is mainly on the central government.

But it doesn't mean that local governments are more conscious about fiscal soundness. The central government has increased fund transfer to the local governments so that they can cope with the problems under economic downturn. This fund transfer worsened the fiscal balance of the central government on one side, prevented the deterioration of local fiscal situation on the other side. The difference of fiscal situation between the central government and the local governments can be seen caused rather by political power balance.

To the mid-1990s, debt services cost was about half of the central government's fiscal deficit, reflecting a relatively high interest rates at the time of bubble boom. Since late 1990s the greater part of fiscal deficit has been structural (Figure 2).

Despite the huge amount of debt, the portion of interest payment has become rather small as a result of lowering level of interest rates in the sluggish economy. But it contains future risk, as interest rates could go higher when the economic growth become stronger and private investments increase.

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The article is based on the author's personal views and should not be regarded as reflecting official stance of the Japanese Government or the Ministry.

Fiscal Balance Developments of Japanese General Government
(percent)

Legend: Social Security Funds | Local Governments | Central Government | General Government
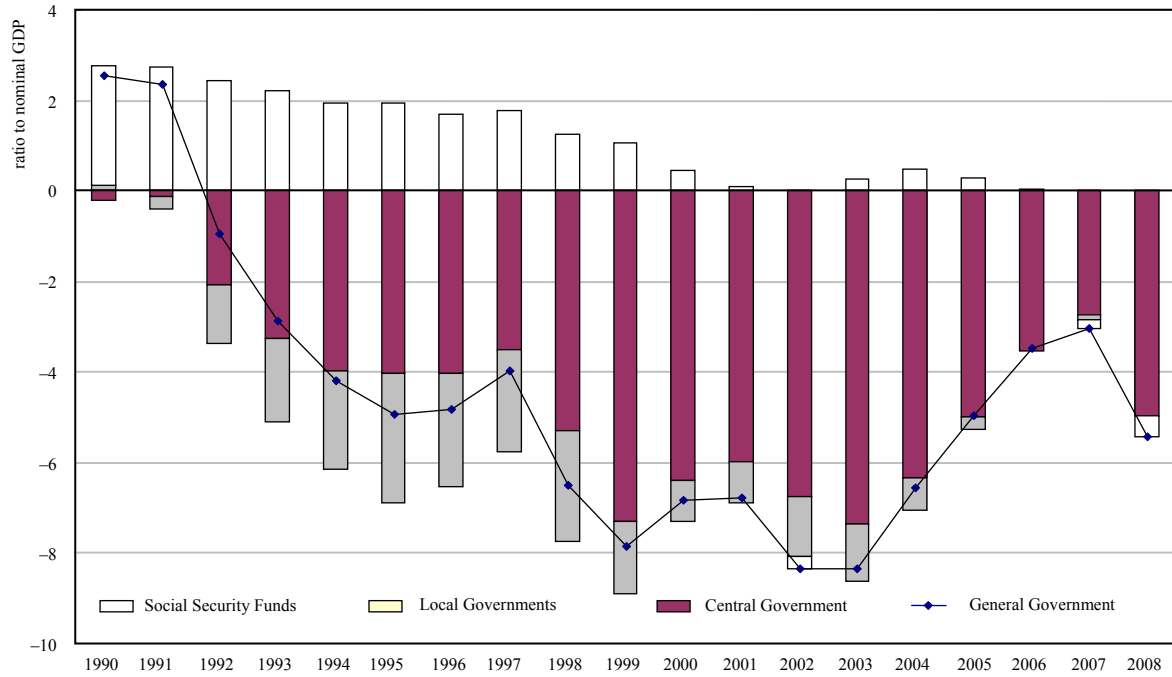
Estimated Structural and Cyclical Fiscal Balance of Central Government
(percent)

Legend: Structural Primary Balance | Net Interest Payment | Cyclical Fiscal Balance | Fiscal Balance
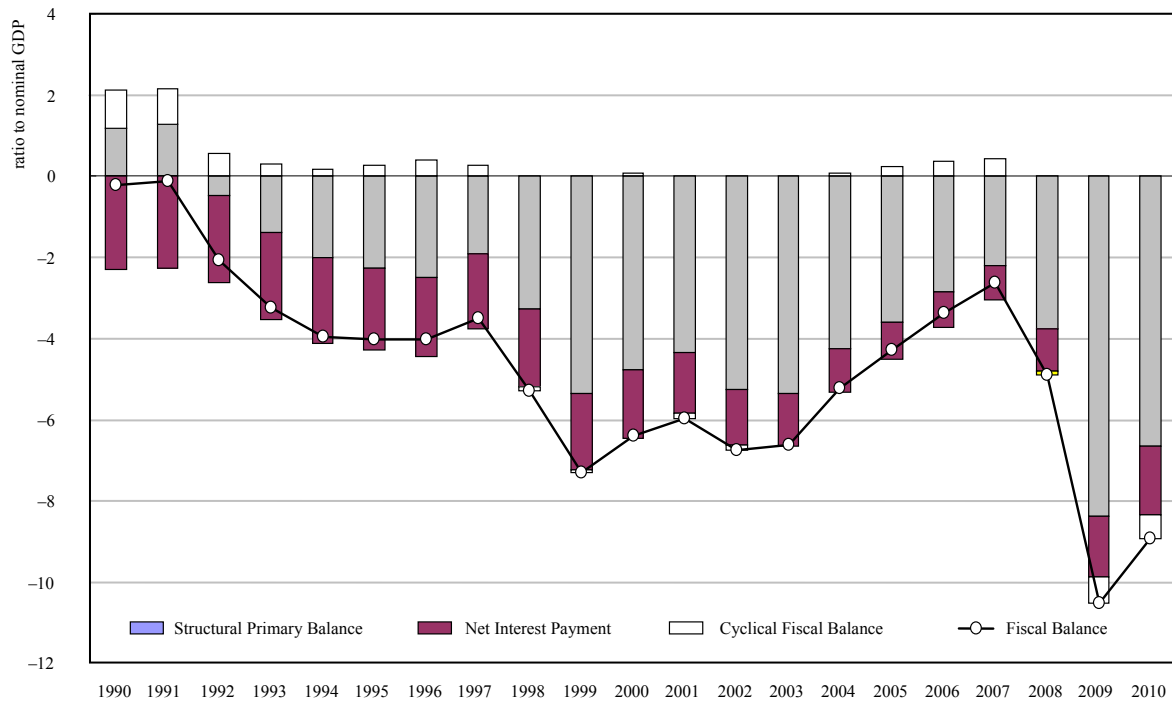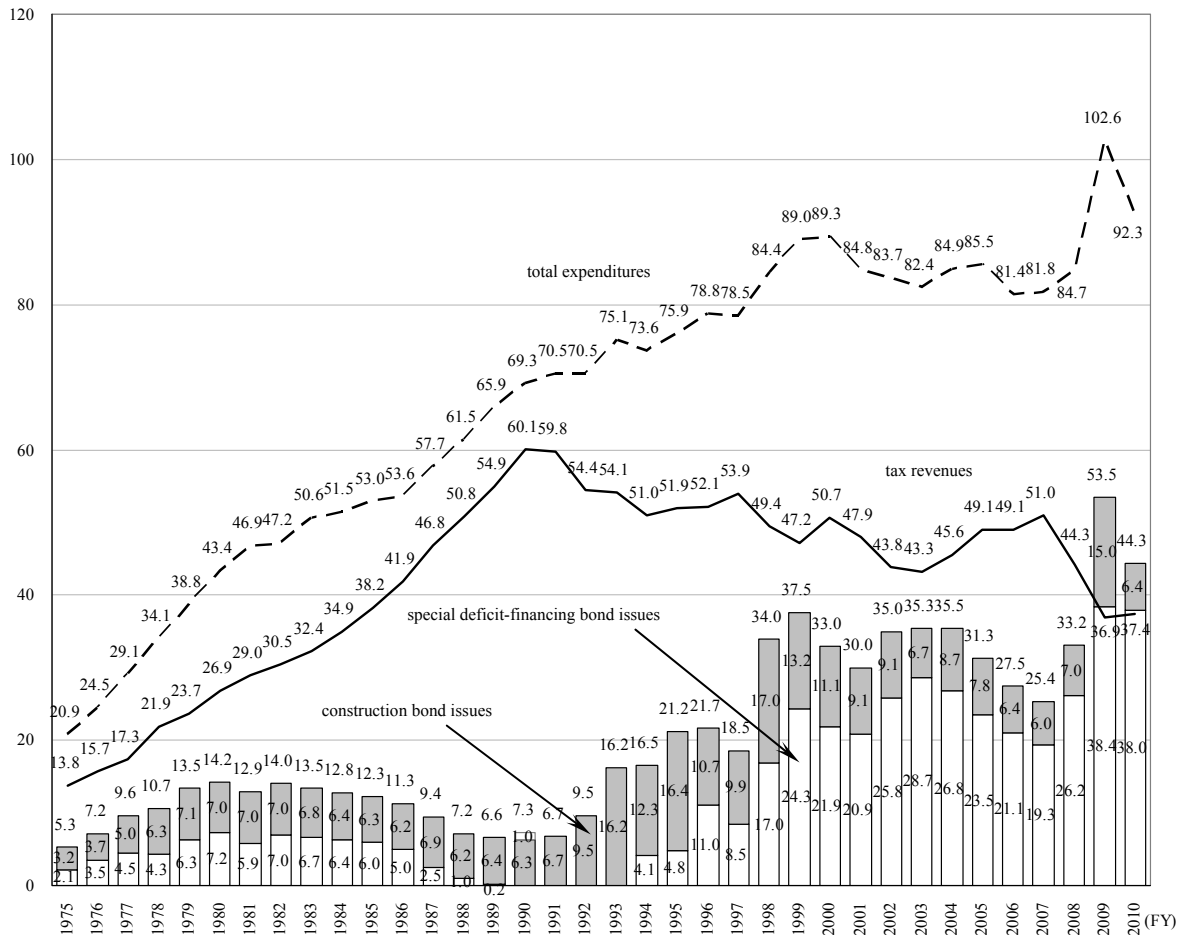
Figure 3

Trends in General Account Tax Revenues, Total Expenditures and Government Bond Issue
(trillion yen)

Notes: FY1975-2008: Settlement, FY2009:Second revised budget, FY2010: Initial budget.
Ad hoc deficit-financing bonds (approx. 1 trillion yen) were issued in FY1990 as a source of funds to support peace and reconstruction efforts in the Persian Gulf Region.

Estimated portions of cyclical fiscal balance in 2009 and 2010 seem rather small despite that in the global economic and financial crisis Japan's tax revenues decline drastically (2008: 44 trillion yen → 2009 and 2010: 37 trillion yen). The biggest lost revenue was the corporate tax revenue, which decreased in 2009 to the level of half of the previous year (2008: 10 trillion yen → 2009: 5 trillion yen). The gap between the estimated cyclical portion and the actual tax revenue decrease suggests that calculation of cyclical components using the output gap and the tax elasticities causes underestimation of cyclical effects on Japanese fiscal balance.[1]

For the deterioration of Japanese fiscal balance, both of the expenditure side and the revenue side have been affected. Trends in total expenditures and tax revenues of general account show that total expenditure continues to increase since late 1970s on the one hand, tax revenues are in

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[1] On the calculation of cyclical and structural factor, please see "Cyclical and Structural Components of Corporate Tax Revenues in Japan" by my colleague Mr. Ueda.

Figure 4

Factor Analysis of the Japanese Budget Balance
(percent of GDP)

	1990 (peak year of the Tax Revenues)		**2000**		**2007** (before the economic crisis)		**2010**
Fiscal Balance	−0.9%		−4.3%		−2.6%		−7%
Total Expenditures (excluding Debt Redemption Expenses)	14.6%		15.5%		13.6%		17.1%
Social Security	2.5%	Increase of Social Security Expenditures	3.5%	Increase of Social Security Expenditures	4.1%	Increase of Social Security Expenditures	5.7%
Public Works	1.5%	Increase of Public Works	2.4%	Decrease of Public Works	1.4%	Decrease of Public Works	1.2%
Tax Revenues	13.3%	Tax Reduction etc. / decrease of Tax Revenue	10.1%	Tax Reduction etc. decrease of Tax Revenue	9.9%	Tax Reduction etc. / decrease of Tax Revenue	7.9%
Nominal GDP	451.7 tri.yen	Average growth rate 1.1%	504.1 tri.yen	Average growth rate 0.2%	515.7 tri.yen	Average growth rate −0.8%	475.2 tri.yen
Ratio of people aged 65 and over	12.1%		17.4%		21.5%		23.1%

Figures represent the general account-based data.

downward trend after 1990 on the other hand. As a result bonds issuance has been increasing and accelerates recently as consequences of global crisis. In these two fiscal years, the borrowing becomes bigger than the tax revenues, which is an extraordinary situation never seen since immediately after the World War 2 (Figure 3).

In the increasing trend of expenditures, public works were first increased in order to add public demands in the aftermath of bubble burst, then declined in these ten years. Caused by the population ageing, continuous increase in social expenditures is observed. On the revenue side, tax revenues continue to decrease. Very low growth rate or the decrease of nominal GDP caused by deflation worsens the situation through lowering tax revenues and making fiscal adjustments more difficult (e.g., to decrease the ratio of expenditure to GDP, to restrict the increase of expenditure in growing economy is easier than to cut expenditure actually in non-growing economy) (Figure 4).

3 Structural problems in expenditures

3.1 Social expenditures

Social security benefits, especially in the area of medical insurance and care insurance, are estimated to expand faster than the economic growth (Figure 5). Behind the increase of social security benefits there is a demographic factor. In Japan, not only the increase of elder people but also the decrease of people at working-age makes the situation more difficult (Figure 6).

Figure 5

Estimation of Future Social Security Benefits
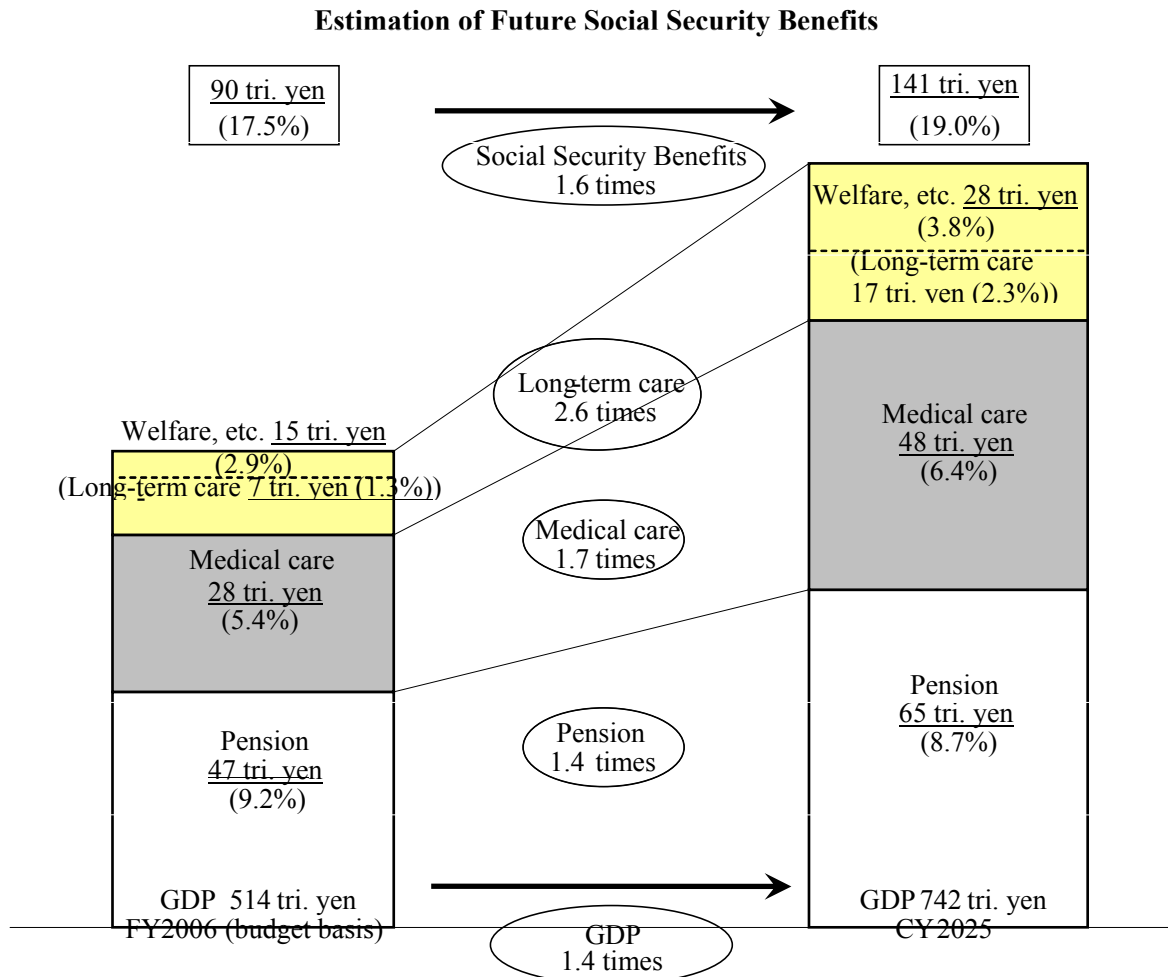
Note: Figures in parentheses represent the percentage of GDP.
Source: Estimation by the Ministry of health, Labour and Welfare (May 2006).

3.2 Public works

The level of Japan's governmental investment was once much higher than another advanced countries. The level is declining in these ten years but is still relatively high (Figure 7).

The high level of public works expenditures implies room for reduction, but increase of old infrastructure facilities over 50 years might limit room for expenditure cut as higher cost for repairs and maintenances would be required (Figure 8).

3.3 Debt service cost

In these 25 years, size of debt outstanding becomes four times but interest payments have been leveling off under the situation of continuous decrease of interest rate. Now the movement of interest rate seems like hitting the bottom (Figure 9).

Figure 6

Demographic Change as an Important Factor for Social Security Benefits Increase
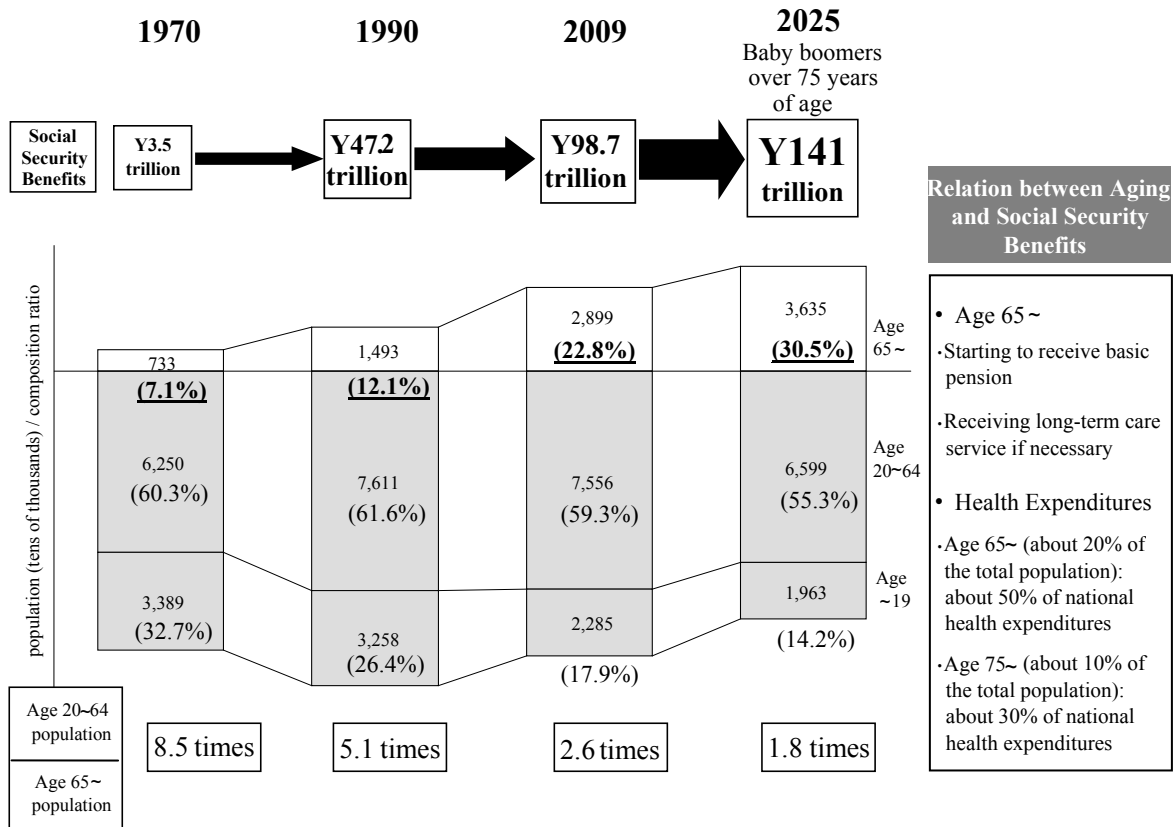
Note: Baby boomers: born in 1947-49.

4   Structural problems in revenues

After 1990, almost all Japan's major tax reforms were tax reductions except the consumption tax rate increase in 1997 (Figure 10). The motivations of tax cuts were both economic stimulus in recessions and rather structural ones like corporate income tax reduction in order to improve the competitiveness of Japanese companies.

Japan's tax system has not succeeded to produce sufficient revenues, not only because of economic downturn but also as a result of repeated tax reductions.

5   Narrow path to exit

International comparison in OECD countries of the size of general government expenditures (excluding social security benefits) shows that Japan's government is one of the smallest (Figure 11). Even when including social security benefits, Japan's rank is a bit higher but the difference is not so big.

Figure 7

Trend of the Governmental Gross Fixed Capital Formation
(percent of GDP)
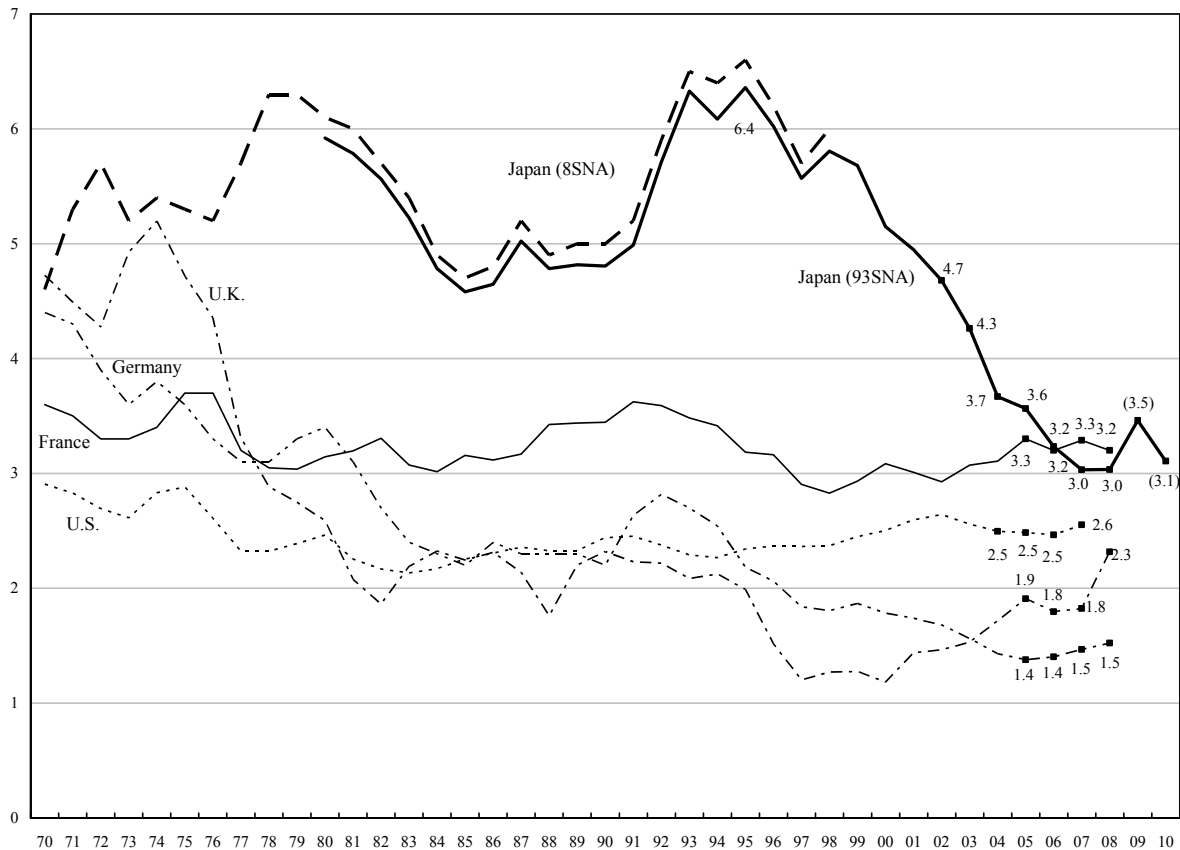
Sources: Data on Japan from Cabinet Office, *National Accounts* (fiscal year basis). For other nations: OECD, *National Accounts 2009 Vol. 2*, (calendar year basis).

Comparison of national burden ratio shows same tendencies. Japan's national burden ratio is very low and tax burden is one of the smallest in OECD (Figure 12).
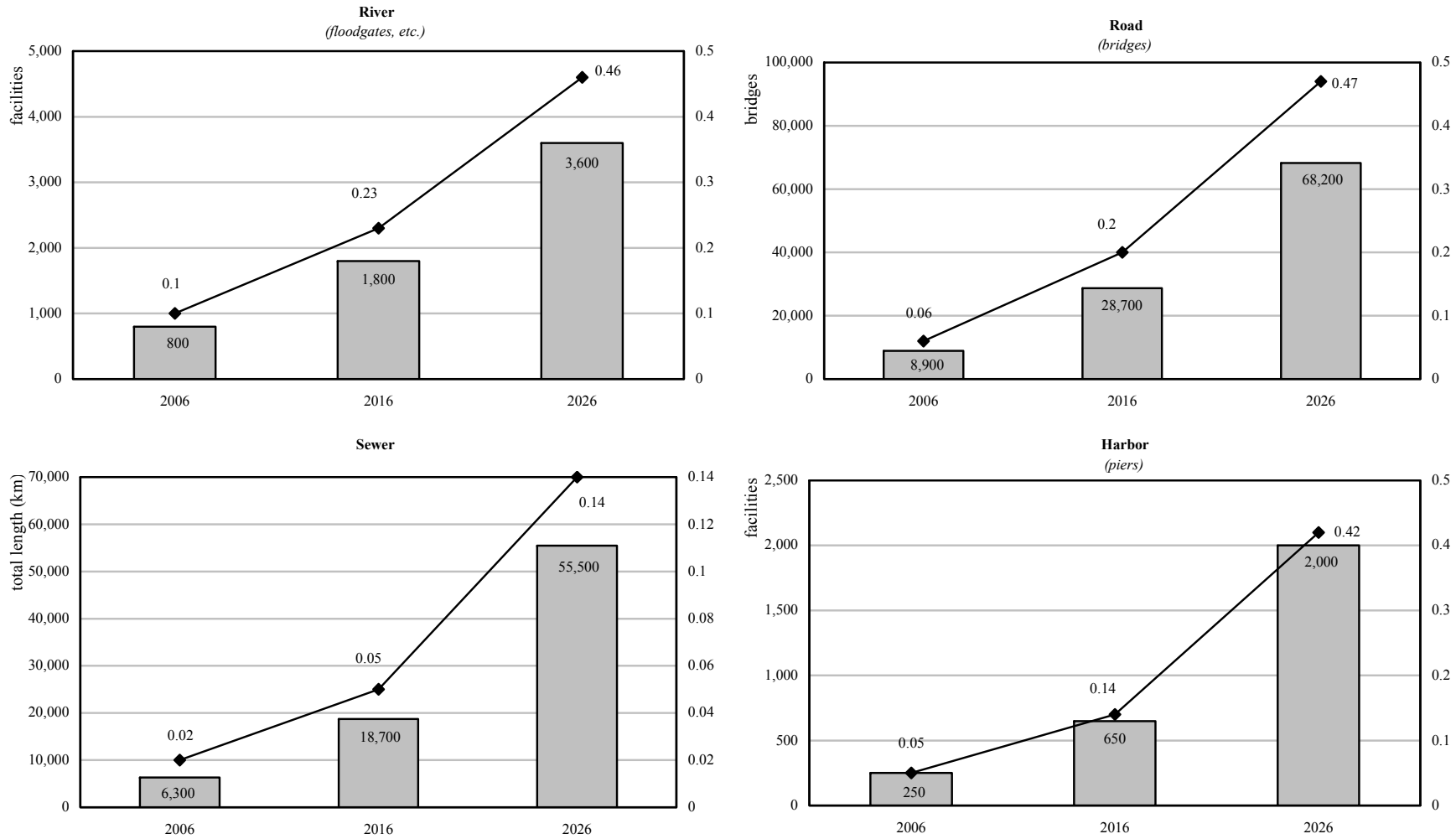
Taking into consideration the observations presented in this paper, some implications for coming Japanese fiscal consolidation can be drawn.

- Relatively low level of tax burden implies the possibility of revenue reform.
- Room for expenditure cut seems rather limited. But reduction of so-called "wasteful expenditures" is still necessary to gain people's wider support for tax increase.[2]
- Exit from deflation is indispensable precondition for successful fiscal consolidation.
- Because of rapid population ageing, expected Japan's economic growth in future would remain moderate. Adequate speed for Japan's fiscal consolidation might be slower than in other advanced economies. Hasty implementation of fiscal tightening could be harmful.

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[2] There are many literatures suggesting that fiscal consolidation would be more successful through expenditure cut, but Japan's situation should be seen as rather unique because of its small government size.

Figure 8

Ratio of Old Infrastructures

River
(floodgates, etc.)

facilities

5,000 — 0.5

4,000 — 0.4

3,000 — 0.3

2,000 — 0.2

1,000 — 0.1

0 — 0

0.46

0.23

0.1

3,600

1,800

800

2006   2016   2026

Road
(bridges)

bridges

100,000 — 0.5

80,000 — 0.4

60,000 — 0.3

40,000 — 0.2

20,000 — 0.1

0 — 0

0.47

0.2

0.06

68,200

28,700

8,900

2006   2016   2026

Sewer

total length (km)

70,000 — 0.14

60,000 — 0.12

50,000 — 0.1

40,000 — 0.08

30,000 — 0.06

20,000 — 0.04

10,000 — 0.02

0 — 0

0.14

0.05

0.02

55,500

18,700

6,300

2006   2016   2026

Harbor
(piers)

facilities

2,500 — 0.5

2,000 — 0.4

1,500 — 0.3

1,000 — 0.2

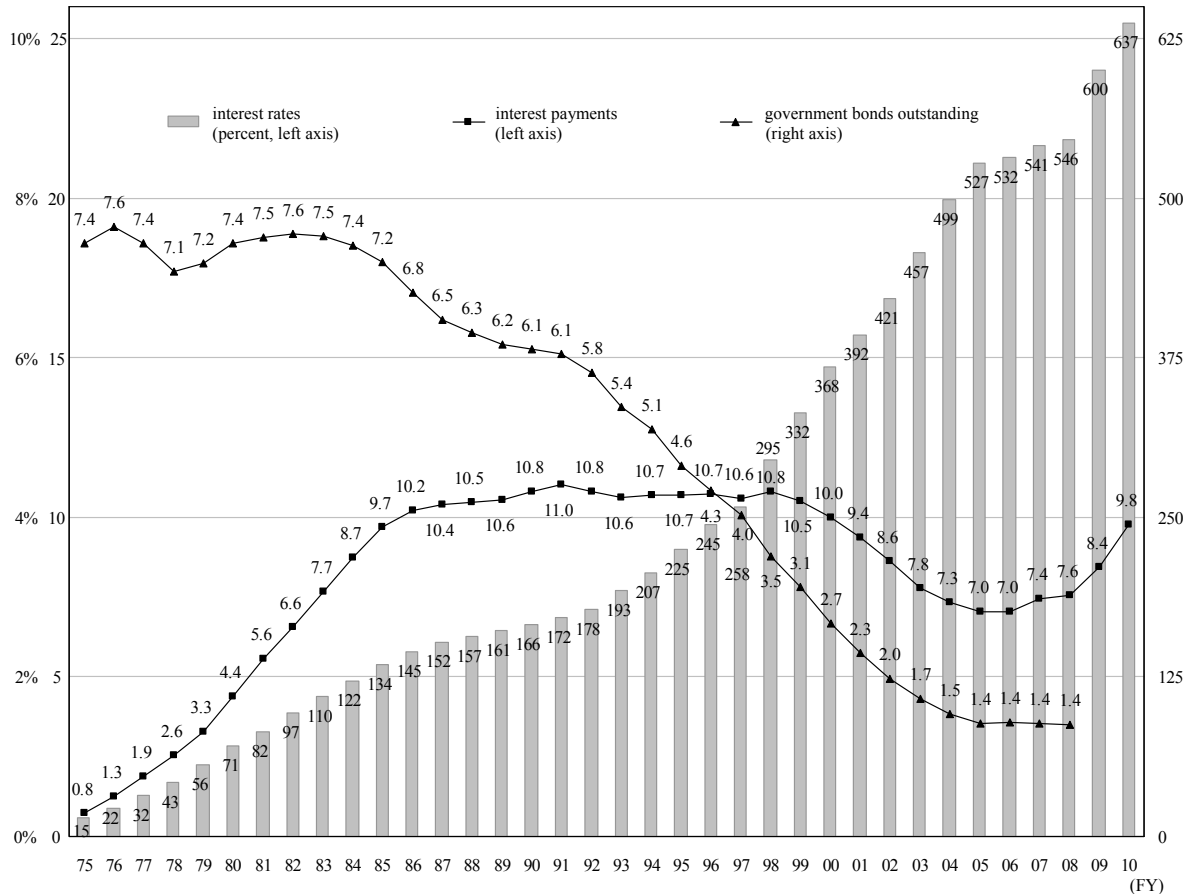500 — 0.1

0 — 0

0.42

0.14

0.05

2,000

650

250

2006   2016   2026

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Bar graph: number of the facilities constructed over 50 years ago (Left scale). Line graph: ratio of the facilities constructed over 50 years ago (Right scale).

Figure 9

Trends in Interest Payments and Average Interest Rate
(trillion yen)

Notes: Interest Payments for FY1975-2008: *Settlement*; FY2009: *Second Revised Budget*; FY2010: *Initial Budget*.
Government bonds outstanding for FY1975-2008: Actual; FY2009: *Second Revised Budget*; FY2010: *Initial Budget*.

On 22 June, Japanese Government took a Cabinet Decision on a Fiscal Management Strategy. The Strategy reflects the ideas described above and sets new fiscal consolidation targets in both aspects of flow and stock.[3]

Flow targets:

- By FY2015 at latest, halve primary balance deficit relative to GDP from the level in FY2010.
- By FY2020 at latest, achieve primary balance surplus.
- Continue fiscal consolidation efforts in and after FY2021.

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[3] The pace of fiscal consolidation set in these targets is a bit slower than in other advanced countries. The G-20 Toronto Summit Declaration describes that "advanced economies have committed to fiscal plans that will at least halve deficits by 2013 and stabilize or reduce government debt-to-GDP ratios by 2016. Recognizing the circumstances of Japan, we welcome the Japanese government's fiscal consolidation plan announced recently with their growth strategy".

Figure 10

Major Tax Reforms

	Drastic tax reform (1988, 1989)	Tax reform (1994)	Permanent tax reduction, etc. (1998, 1999)	2003 ~
Taxation on consumption	·Introducing consumption tax **(+5.4 tri. yen)** 1989 ~ ·Streamlining the individual indirect taxes **(–3.4 tri. yen)** 1989 ~	·Raising the consumption tax rate ·Introducing local consumption tax **(+5.1 tri. yen)** 1997 ~		·Reducing the tax exempt threshold for small- and medium-size corporations, etc. **(+0.6 tri. yen)** 2004 ~
Taxation on individual incomes	·Institutional reduction (Mitigation of progressive tax rate structure, increase in the personal exemption, application of the special exemption for dependents, etc.) **(–5.5 tri. yen)** 1987, 1988 ~	·Institutional reduction (Mitigation of progressive tax rate structure, Increase in the personal exemption, Broadening the income bracket for employment income deduction, etc.) **(–3.5 tri. yen)** 1995 ~ ·Special tax reduction 1994 **(–5.5 tri. yen)** / 1995 **(–2.0 tri. yen)** / 1996 **(–2.0 tri. yen)**	·Reduction in the highest marginal tax rate **(–0.5 tri. yen)** 1999 ~ ·Permanent tax reduction **(–3.5 tri. yen)** 1999 ~ 2006 ·Special tax reduction 1998 (twice) **(–4.0 tri. yen)**	·Review of various deductions (Special deduction for spouses, Public pension deduction, etc.) **(+1.1 tri. yen)** 2004, 2005 ~ ·Transfer of tax revenue sources 2004 ~ [central → local: 3.1 tri. yen]
Taxation on corporation	·Lowering the basic tax rate, etc. **(–0.6 tri. yen)** 1987 ~ **(–1.8 tri. yen)** 1989, 1990 ~		· Lowering the basic tax, rates, broadening the tax base **(–0.4 tri. yen)** 1998 ~ · Lowering the basic tax rates **(–2.5 tri. yen)** 1999 ~	·Tax reduction for R&D and investment in plant and equipment, etc. **(–1.7 tri. yen)** 2003 ~ 2006: Abolition of the IT investment tax incentives +0.8 tri. yen) ·Review of Depreciation system **(–0.7 tri. yen)** 2007 ~
Taxation on others	·Reducing inheritance tax (Mitigation of progressive tax rate structure, Increase in the basic exemptions, etc.) **(–0.7 tri. yen)** 1988 ~ ·Taxation, in principle, at capital gains from stock transfers, etc. **(+1.2 tri. yen)** 1989 ~	· Reducing inheritance tax (Mitigation of progressive tax rate structure, Increase in basic exemptions, etc.) **(–0.3 tri. yen)** 1994 ~		·Reduction of inheritance tax reduction in the highest marginal tax rate etc. **(–0.2 tri. yen)** 2003 ~

Note: Figures in parentheses represent the sum of the estimation of increase and decrease of national taxes and local taxes (fiscal year).

Stock target: Achieve stable reduction in the amount of public debt relative to GDP from FY 2021.

The Strategy also describes the following points:

- The government should make every effort, in cooperation with the Bank of Japan, to bring deflation to an end. By implementing the New Growth Strategy in conjunction with the Fiscal Management Strategy, the government aims at achieving over 3 per cent of nominal growth rate and over 2 per cent of real growth rate on average until FY2020.
- Basic rules on fiscal management as "Pay-as-you-go" rule.
- As measures on the revenue side; the government will soon determine the details of the comprehensive reform of taxes including personal income tax, corporate tax, consumption tax and tax on assets, so that necessary revenue will be secured towards achievement of fiscal consolidation targets.
- As the Medium-term Fiscal Framework; "Overall Expenditure Limit" for General Account is set during FY2011 ~ 2013.

The Japanese Government will pursue to restore fiscal soundness along the Strategy.

Figure 11

General Government Expenditures excluding Social Security Benefits
(percent of GDP)
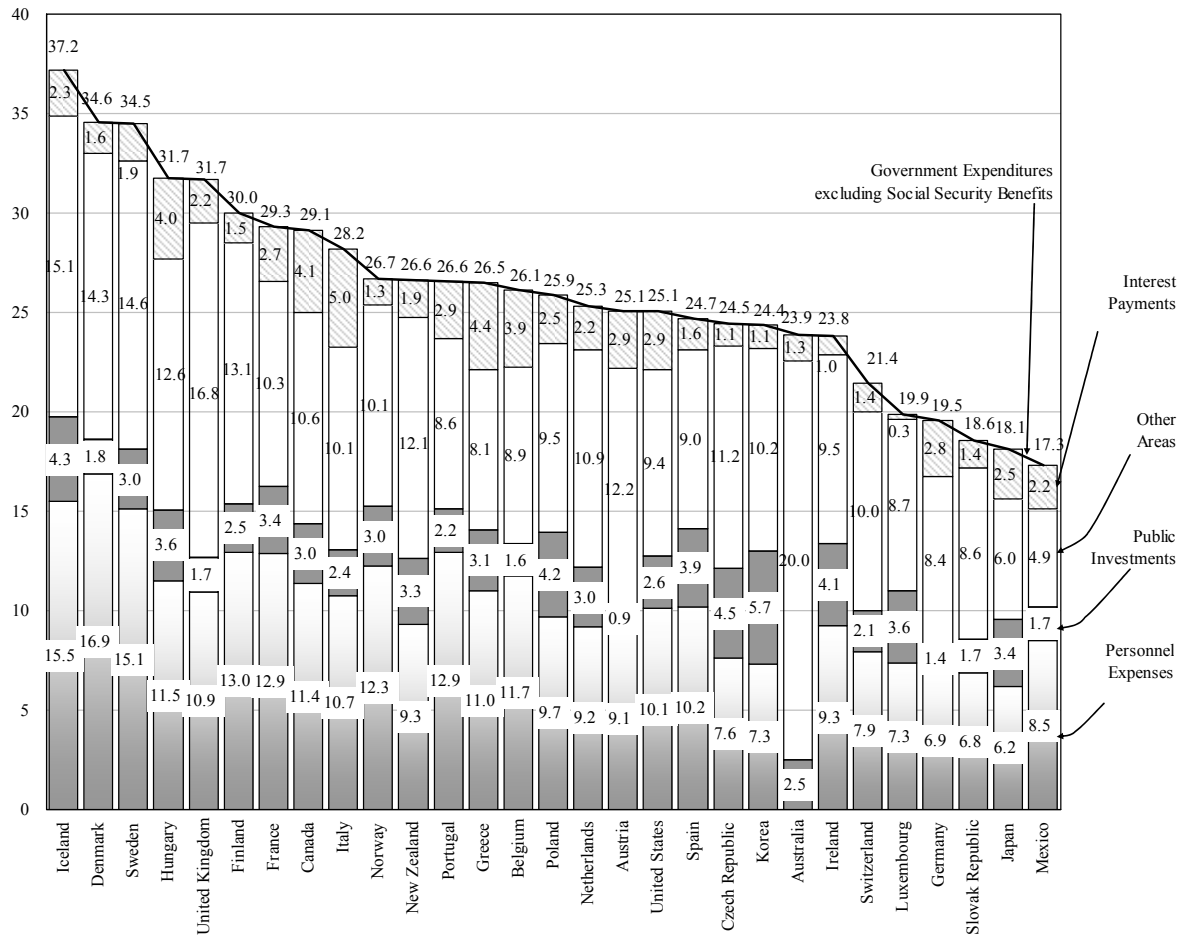
Notes: Australia doesn't include Personnel Expenses because of lack of data.

Japan: FY2007, Other countries: CY2007 (Korea, Switzerland: CY2006, New Zealand: CY2005, Mexico: CY2004).

Source: OECD.

Michio Saito

Figure 12

International Comparison of National Burden Ratio
(percent of GDP)
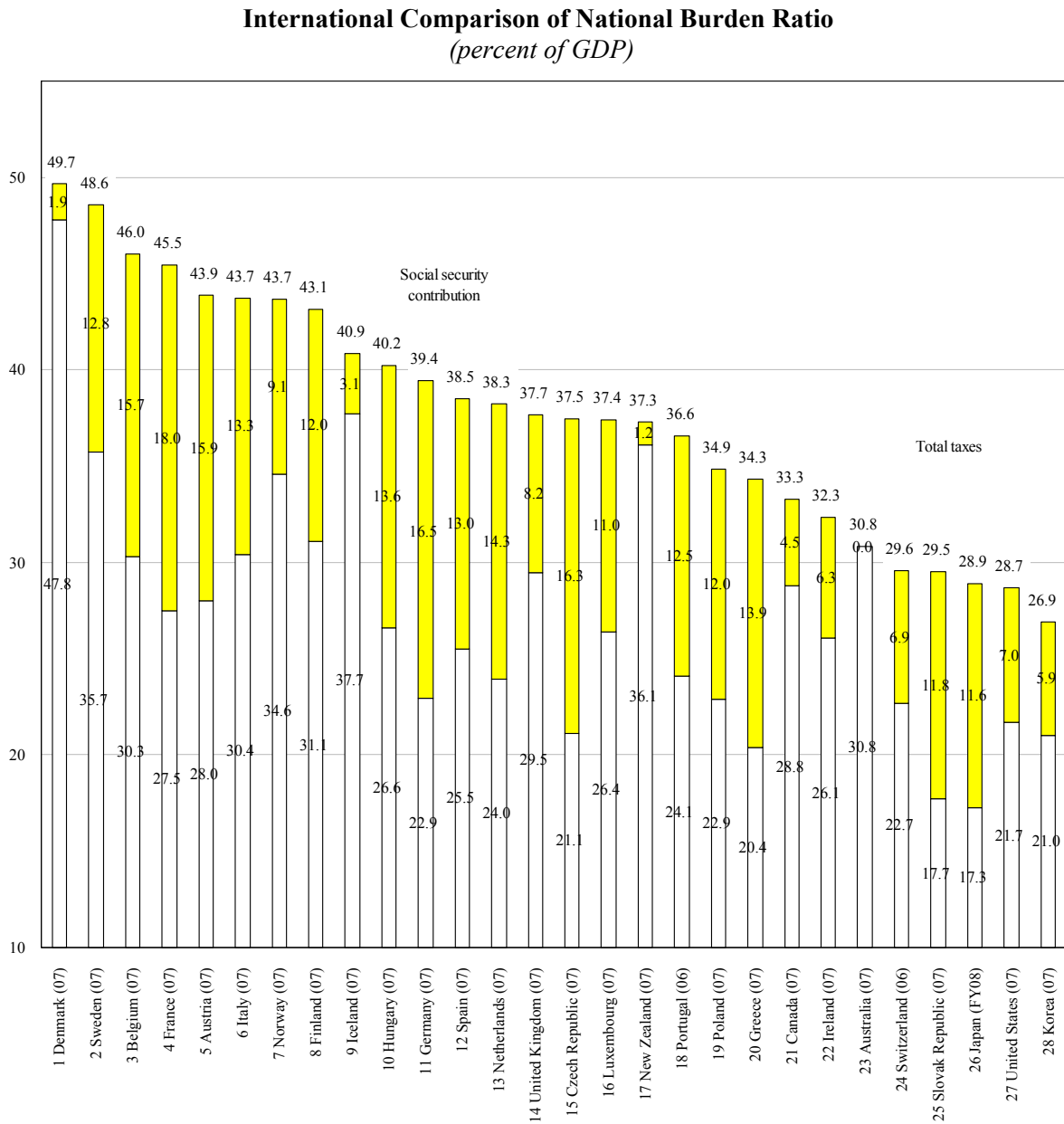
Notes: 28 countries of 30 OECD members' actual figures. The other 2 countries (Turkey and Mexico) do not appear above because of lack of data.
Source: For Japan: Cabinet Office's *National Accounts*, etc. For other countries: OECD, *National Accounts 2009* and OECD, *Revenue Statistics*.

CYCLICAL AND STRUCTURAL COMPONENTS OF
CORPORATE TAX REVENUES IN JAPAN

Junji Ueda,* Daisuke Ishikawa** and Tadashi Tsutsui***

1   Introduction

In considering fiscal sustainability, it is very important to have an accurate forecast about the size of future tax revenues that can be obtained under the current tax system and economic structure. As is evident from the movement in tax revenues in recent years, the actual size of the tax revenue fluctuates wildly in Japan. When we verify long-term fiscal sustainability, we need to foresee precisely how much tax we can obtain removing effects of temporary economic fluctuation.

As a measure of changes in tax revenue, the size of the elasticity of tax revenue to changes of GDP has been regarded as important numbers. The amount of cyclical tax revenues caused by short-term economic fluctuation can be estimated by multiplying the size of GDP gap by the estimated number of constant tax elasticity, and the amount of structural tax revenues can be gained by subtracting this amount from the actual tax revenue, according to traditional methods shown in OECD.

It used to be natural to use such method before 1990 in Japan. However, recent movements in tax revenues are considerably unstable, and the actual value of the elasticity of tax revenue calculated has fluctuated sharply as a result. Therefore, calculating the size of structural tax revenues by using the certain number of elasticity is not always appropriate as a basis for discussion to consider medium-term fiscal sustainability.[1]

In this paper we will focus on the fluctuation of Japan's corporate tax revenue and its elasticity since 1980, quantitatively specify the factors which affected the fluctuation, and then discuss appropriate method for the estimation of structural corporate tax revenue. This paper is organized as follows: in Section 2 we will considers the actual corporate tax revenue and elasticity data, as well as the relation between actual tax revenue and Corporation Sample Survey data. In Section 3 and 4 we will carefully look at historical fluctuation of corporate tax revenue in Japan and specify several factors which largely affected it. In Section 5, we estimate the level of structural corporate tax revenues based on regression analysis. In Section 6, we mention some conclusions and needs for future research.

2   Corporate tax revenue and elasticity of tax revenue

2.1   *Changes of corporate tax revenue to nominal GDP*

Japan's corporate tax revenue data since FY 1980 (general account revenue of central government) (Figure 1) shows that it rose significantly during the economic expansion from 1986

[1]   As is not discussed in this paper, there proposed various methodology for measuring the size of the GDP gap. And it has been pointed out that a result of estimate based on the latest data available have large errors compared to estimate based on the data available in the future.

Figure 1
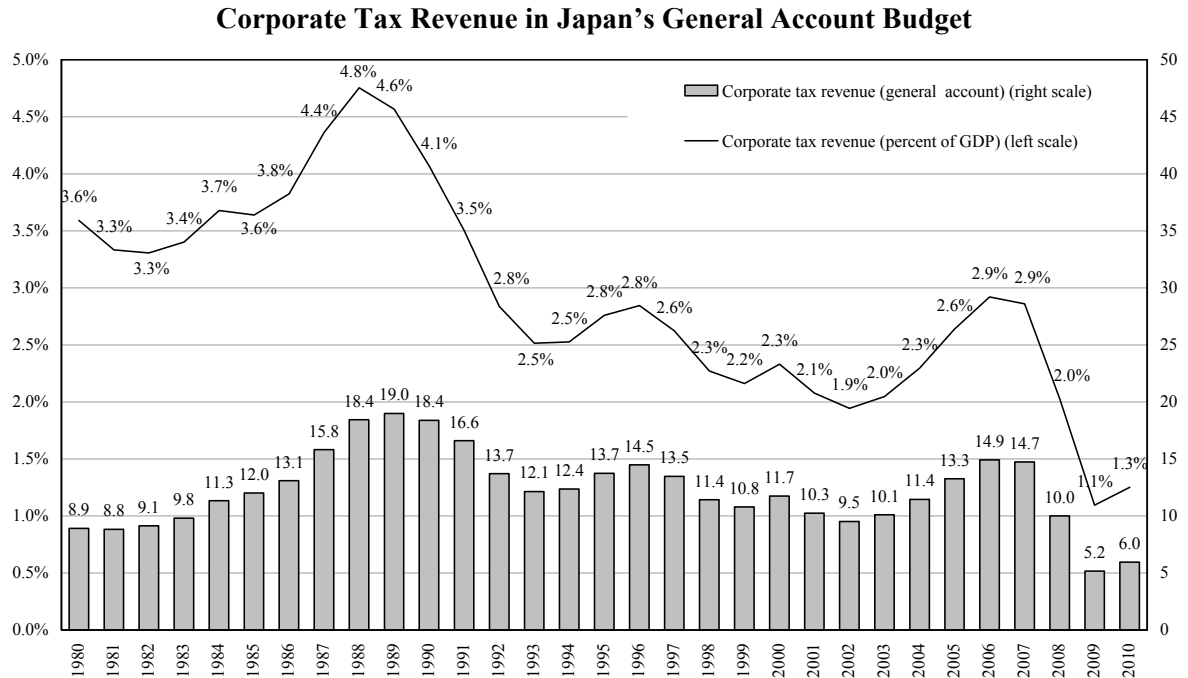
Corporate Tax Revenue in Japan's General Account Budget

Notes: Final budget until FY2008, revised budget in FY2009 and initial budget in FY2010.
Source: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report*.

through 1988 reaching a peak of 4.8 per cent to GDP in 1988, and fell sharply from 1989 with the subsequent collapse of the bubble economy. Since 1993 the sizes of tax revenue had been within a range of 2-3 per cent of GDP. In 2009 and 2010, with rapid economic downturn caused by the financial crisis, the revenue is expected to drop to a level of about 1 per cent of GDP.

In order to decompose and analyze corporate tax revenue, we use the data of Corporation Sample Survey data published by National Tax Administration Agency. Corporation Sample Survey is the extracted sample data with size 51,942 in 2007 (average extraction rate is 2.0 per cent and the companies with capitalization of more than 10 billion yen are exhaustive extraction). The comparison of tax revenue data in Figure 2 shows that the survey data have been below the actual tax revenue due to sampling errors. Therefore, it is necessary to consider the differences. In the following analysis we will use the average tax rate, the size of tax deduction and the distribution of taxable income based on Corporation Sample Survey data.

2.2   Elasticity of corporate tax revenue

Figure 3 shows the elasticity of total tax revenue (central and local government, SNA data) and its decomposition. It is obvious that after the 1990's the total elasticity numbers have been larger and more fluctuating than during the 1980's. We have to note that this variation includes the impact of tax reform, but, even without tax reform factors the relationship between growth rate of tax revenue and nominal GDP in recent years is unstable, especially in corporate tax revenue, as well as income tax.

Figure 4, actual elasticity numbers of corporation tax revenue to GDP, shows some negative numbers and extremely large numbers after the 1990's.

Figure 2

Comparison of Corporate Tax Revenue
(trillion yen)
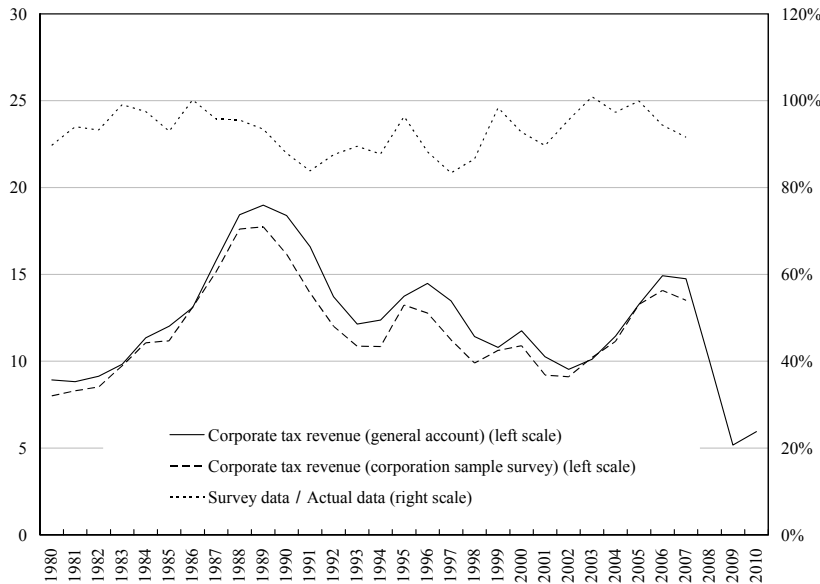
Source: Ministry of Finance, *Fiscal Financial Monthly Report*; National Tax Agency, *Corporation Sample Survey.*

In Japan, since corporate tax rate is almost flat, the cause of the time-varying elasticity is the fluctuation of taxable income to the variation of GDP. The relatively volatile fluctuation of taxable income has been mainly explained by the slower adjustment of compensation of employees than GDP, which causes the short-run large fluctuations of shares of labor income and capital income. Van den Noord (2000) calculates corporate tax base by subtracting wage from GDP, considering the slowly adjustment of labor share (Kitaura, 2009

Figure 3

The Elasticity of Total Tax Revenue and Its Decomposition
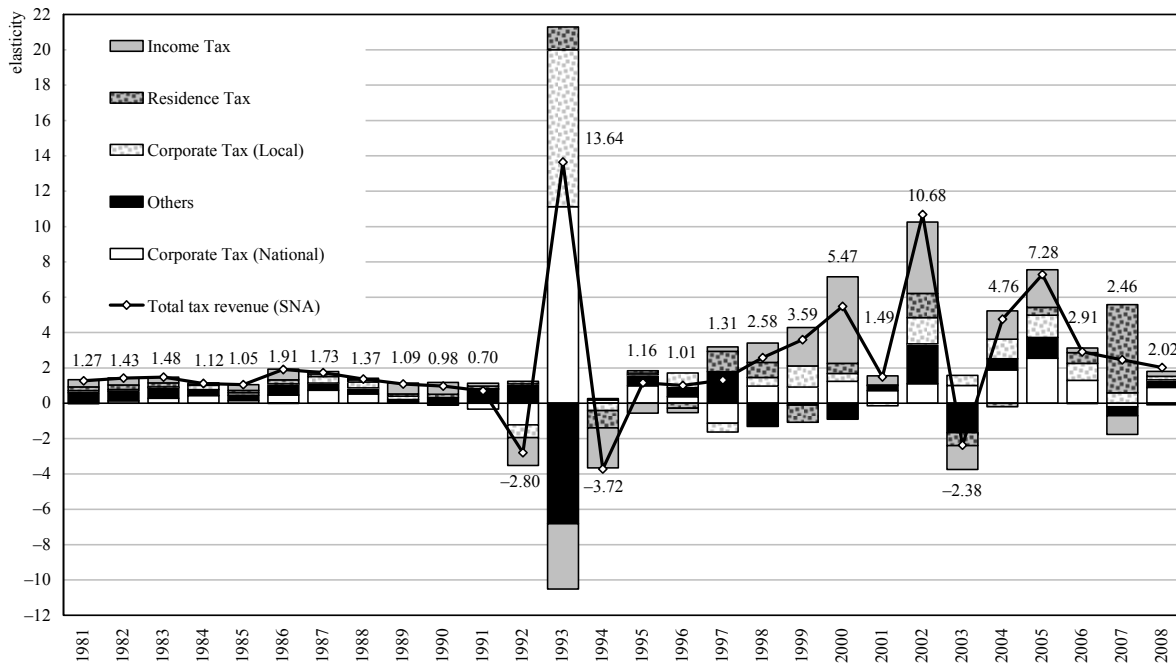
Sources: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report.*

as well). This paper tries to capture the other factors which affect the volatility and elasticity of corporate tax base, such as borrowing interest rate, extra profit and loss and distribution of corporate income[2] and try to estimate the size of structural corporate tax revenues.[3]

As for the size of the elasticity of corporate tax revenue, many attempts to estimate the constant number have been done in previous studies, such as "Annual Economic and Fiscal Report" by Cabinet Administration Office in

Actual Elasticity of the Corporate Tax Revenue
(growth rate of corporate tax revenue/growth rate of nominal GDP)

Sources: Cabinet Office, *SNA*; Ministry of Finance, *Fiscal Financial Monthly Report*.

2005 (CAO, 2005) which estimated 1.30. Cyclical corporate tax revenue is generally calculated by multiplying GDP gap and tax elasticity, and then structural corporate tax revenue is calculated by subtracting cyclical corporate tax revenue from the actual revenue. The example of structural revenue estimation by CAO (2009) using the number (1.30) shows that it can explain only a small fraction of the tax changes (Figure 5). However, if the elasticity of tax revenue is time varying, the estimated level of structural corporate tax revenue assuming single number elasticity will be biased.

3   Average corporate tax rate and tax deduction

In Section 3 and 4, we will analyze the past fluctuation of corporate tax revenue relative to GDP since 1980.This section focuses on the impact of past tax reforms (change of tax rate and deduction system) based on the figures of Corporation Sample Survey data.

The ratio of corporate tax revenue to nominal GDP can be divided into the ratio of "tax calculated" (taxable income multiplied by effective tax rate) to GDP and the ratio of tax deduction to GDP. Figure 6 shows the effective tax rate before deduction (ratio of tax calculated to pretax income of corporation in profit), and statutory corporate tax rate for large companies. The movement of effective tax rate is linked to the statutory rate, although there is a difference of level between the two, due to the reduced tax rate for small companies.[4] After 1999 when the current tax

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[2]   Hayashi (1996) pointed out that fluctuation of dividends and interest payments of private corporations is larger than that of GDP, and Suzuki (2006) pointed out that the factor of changes in corporate tax revenue in recent years is largely affected by the change in the extra profit and loss.

[3]   Nishizaki and Nakagawa (2000) acknowledge that the elasticity of entrepreneurial income to GDP can change over time, and tries to estimate the time-varying elasticity of tax revenue. The estimated elasticity is smaller in the boom and larger during recession, with negative correlation to GDP gap numbers.

[4]   22 per cent tax rate applies to the amount of less than 800 million yen of the income of the general corporation whose capital is less than 100 million yen and incorporated association and the total amount of income of public corporations (Law of corporate tax, Article 66).

Figure 5

**Cyclical and Structural Corporate Tax Revenue
with Elasticity Fixed (=1.30)**
(percent of GDP)
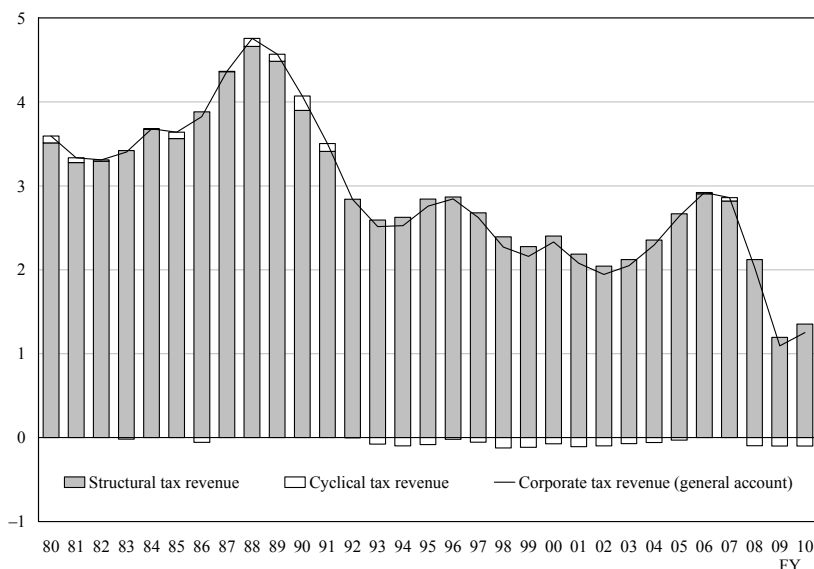
Notes: Final Budget until FY2008, Revised Budget in FY2009 and Initial Budget in FY2010.
Source: Ministry of Finance, *Fiscal Financial Monthly Report*, etc.

Figure 6

**Ratio of Actual Tax Revenue to Income
and the Actual Corporate Tax Rate**
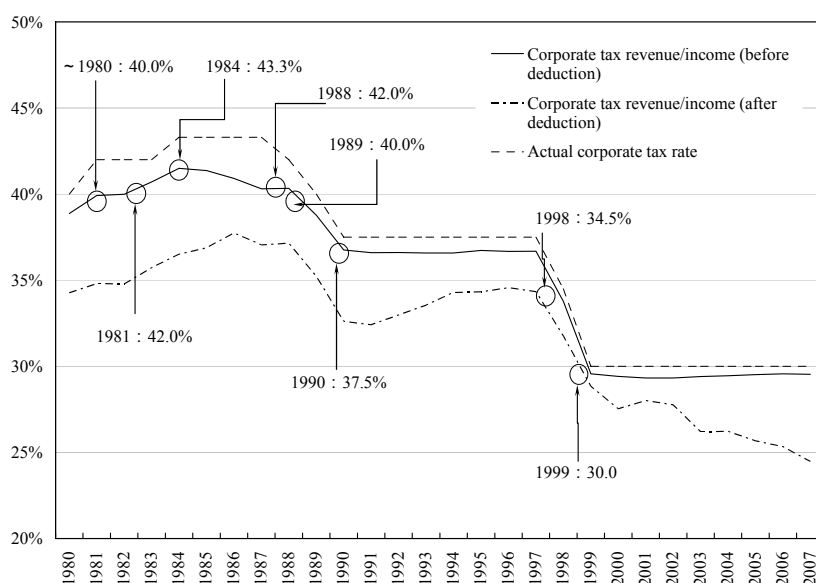
Source: National Tax Agency, *Corporation Sample Survey*, etc.

rate was adopted, the ratio tax of calculated to pretax income of corporation in profit on a macro view remained almost 29.5 per cent and the reduced tax rate is understood to have no significant impact on the movement of the average tax rate.

Difference between the effective tax rate before deduction and the ratio of actual tax revenue after deduction in Figure 6 indicates the amount of tax deduction, and its size has not been stable over time. The change of tax deduction size is shown in Figure 7. "Income tax deduction", which indicates the amount of withholding income tax paid by the corporate enterprises receiving interest and dividend income, has the greatest impact. Although this amount is not recorded as corporate tax, it is appropriate to consider it tax on corporate taxable income. The size of the deduction of income tax in fiscal 2007 counts 0.36 per cent of GDP. In recent years, "foreign tax deduction", "other deductions" (those pertaining to R&D expenses) has increased in size. The latter was introduced by the tax reform of 2003, and in FY2007 the size of tax deduction except income tax credit is 0.36 per cent of nominal GDP.

Figure 7

The Size of Tax Deductions
(percent of GDP)
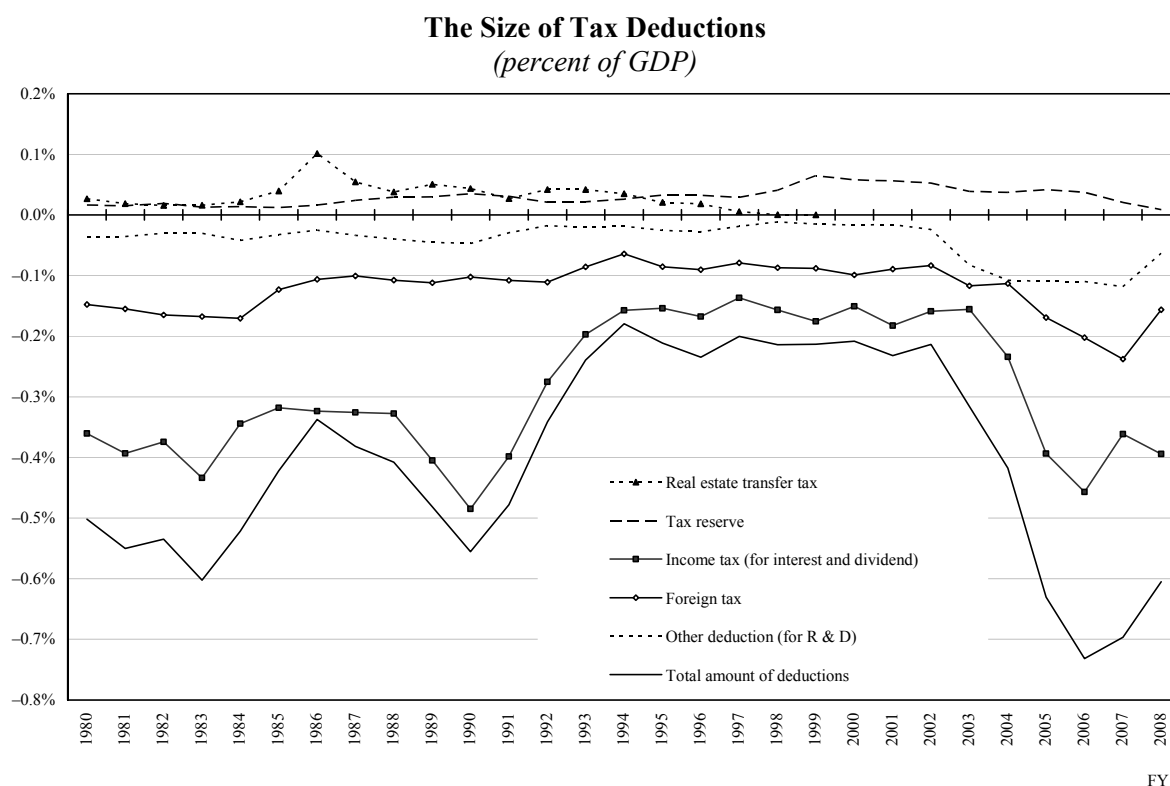
Source: National Tax Agency, *Corporation Sample Survey*, etc.

4   Fluctuation of tax base

Then, we analyze the historical relationship between tax base (pretax income of corporations in profit) and GDP in detail for non-financial corporations, based on National Accounts (SNA) data and Corporation Sample Survey data. The relation can be shown in Figure 8 and following decomposed ratios are used in the following analysis:

$$\frac{\text{Tax base}}{\text{GDP}} = \frac{\text{Operating surplus}}{\text{GDP}} \times \frac{\text{Entrepreneurial income}}{\text{Operating surplus}} \times \frac{\text{Tax base}}{\text{Entrepreneurial income}} \quad (1)$$

"Operating surplus" is SNA data, net of consumption of fixed capital, which corresponds to aggregate operating income of corporations. For "entrepreneurial income", we use SNA entrepreneurial income before dividend payment with adjustment of inventory valuation and interest expense.[5] For operating surplus and entrepreneurial income, the positive value of corporation in profit and the negative value of corporate in loss are offset either. "Tax base" is aggregate pretax income of corporation in profit and calculated from actual tax revenue (adding tax deduction and dividing by effective tax rate). The ratio of tax base to GDP and its decomposition from 1980 to 2008 is shown in Figure 9.

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[5]   Entrepreneurial income of SNA adds up interest payment based on accrual basis, but regarding calculations of ordinary income, it should be based on actual interest payments. Therefore, we created a series of interest payments applying the interest rate calculated from Financial Statements of Corporation Industry data (interest payment divided by debt outstanding) replaced by interest rate SNA applies (interest payment divided by debt outstanding).

Figure 8

Relationship Between GDP and Taxable Income of Corporation, FY2008

Gross Domestic Product   494.2

Operating surplus of public corporations
1.1 (0.2%)

Imputed operating surplus for dwellings
28.1 (5.7%)

Compensation of employees
262.2
(53.1%)

Consumption
of fixed capital
107.9 (21.8%)

**Operating surplus
Non-financial Corporations
35.4 (7.2%)**

Earnings on foreign
direct investment

Extra profit - Extra loss

Mixed income
16.8 (3.3%)

Taxes on production and
imports less subsidies
44.8 (9.1%)

Interest
payment

**Entrepreneurial
income
(net, adjusted)**

**Income of
corporations in deficits**

**Taxable income
(Corporations in profit)**

Figure 9

**Decomposition of Taxable Income
of Private and Non-financial Corporations**
(percent of GDP)

— Taxable income of corporation in positive profit/GDP [left scale]
···· Operational surplus/ GDP [left scale]
-·-· Entrepreneurial income/operational surplus [right scale]
--- Taxable income of corporation in positive profit/ entrepreneurial income [right scale]

Source: Ministry of Finance, *Fiscal Financial Monthly Report*; National Tax Agency, *Corporation Sample Survey*; Cabinet Office, *SNA*.

4.1 Relationship between operating surplus and nominal GDP – changes in the distribution of GDP
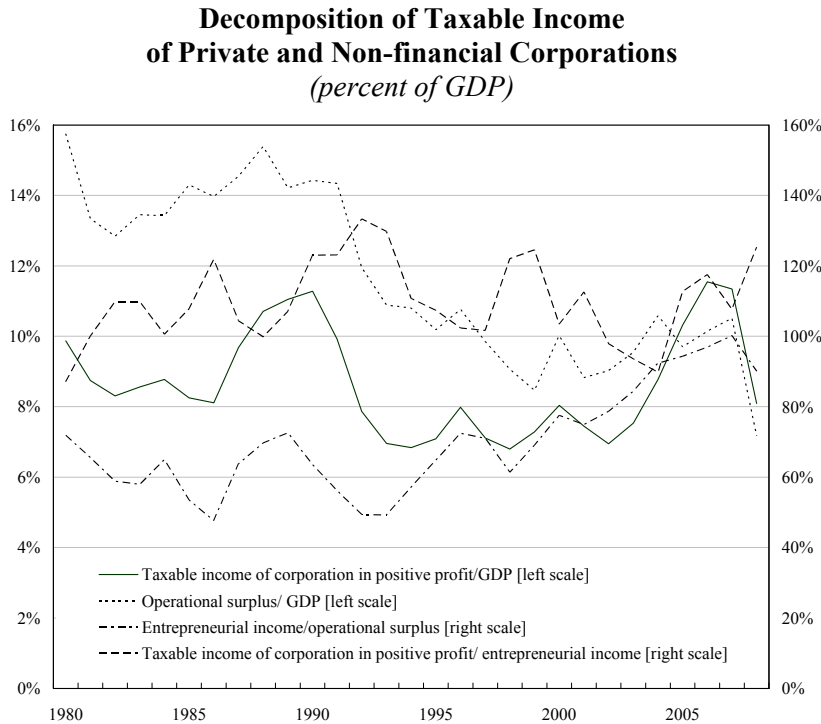
The first factor, the ratio of operating surplus to GDP reflects the cyclical and structural changes in the distribution of GDP. The elasticity of operating surplus to GDP had been within the range of 0-2 in the 1980s, but after 1990s its volatility increased. It can be said that the unstable movement of operating surplus relative to GDP in recent years is a major factor to destabilize the elasticity of corporate tax revenue. When we look

Figure 10

The Breakdown of the Change in GDP
(relative to the previous year)
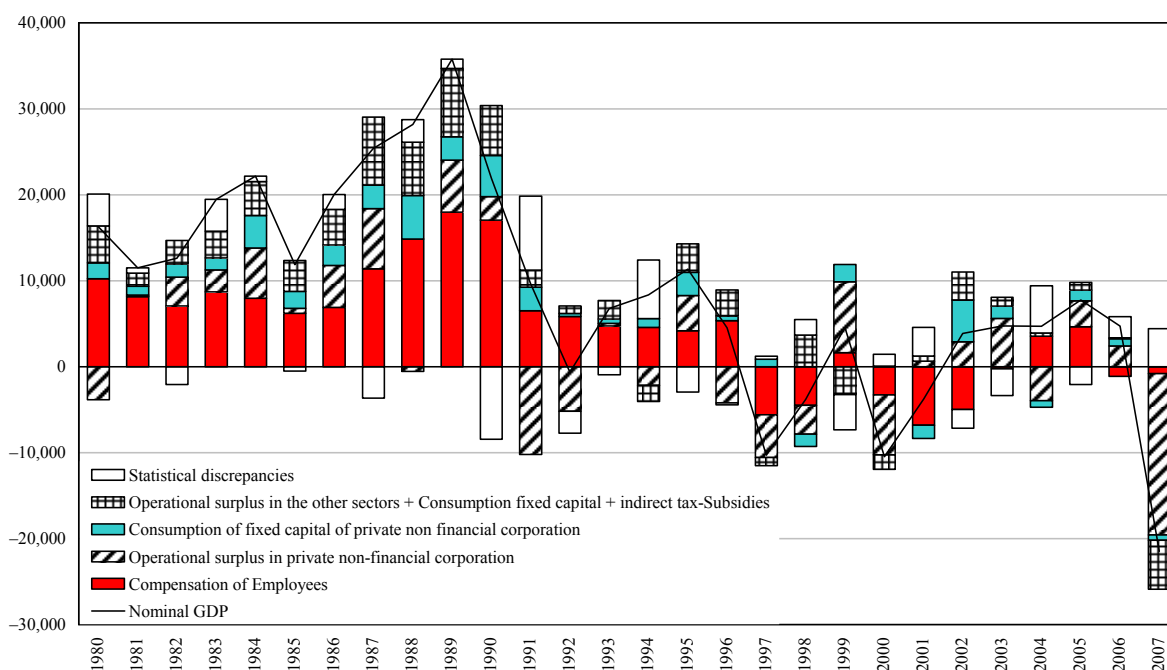
Source: Cabinet Office, *SNA*.

at the decomposition of marginal change of GDP every year in Figure 10, during 1980s the share of compensation of employees, operating surplus and consumption of fixed capital had been generally stable, but in the early 1990s it becomes unstable. The ratio of operating surplus sometimes rapidly decreased with the delay of the adjustment of employee compensation in downturn, and sometimes rapidly increased in economic expansion.

On the other hand, looking at Figure 8 again, there seems to be structural decline of the ratio of operating surplus to GDP from the late 1980s through the late 1990s apart from cyclical fluctuations. This change is due to increase of the ratio of consumption of fixed capital and increase of the ratio of operating surplus of owner-occupied dwellings. The share of consumption of fixed capital to GDP has increased by about 5 per cent from 1980 to 2008 (Figure 11), reflecting the accumulation of capital stock and abundance of the amount of capital.

If we assume one good model and a Cobb-Douglas production function with constant capital share, the ratio of gross operating surplus to GDP is expected to be constant over time in a steady state.[6] However, looking at historical data, it can not be ignored that the share of the corporate tax base to GDP, the past 30 years, has structurally declined. When we view the size of the corporate tax base for the future, it is important to consider the trend in labor share, return on capital and proportion of private corporations in total economy.

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[6]   Assuming CES type for the production function, capital share is not constant and varies depending on *Y/K*. Concretely, the elasticity of substitution of labor and capital as *σ*, if 0<*σ*<1, capital share is an increasing function of *Y/K*, if *σ*>1, capital share is a decreasing function of *Y/K*. If *σ*=1, it returns to the Cobb-Douglas production function and capital share is constant.

4.2 Relationship between entrepreneurial income and operating surplus – impact of interest expense of corporations

The second factor, r e l a t i o n b e t w e e n entrepreneurial income and operating surplus is equivalent to the relation between operating profit and ordinary profit in corporate accounting, which affected the movement of non-operating income and loss. As most of their changes are attributed to the amount of interest expense that is not included in tax base of the corporate income tax, we will consider the changes of the size of interest payments from private non-financial firms to other sectors.

Figure 11

Consumption of Fixed Capital and Operational Surplus
(percent of GDP)

Source: Cabinet Office, *SNA*.
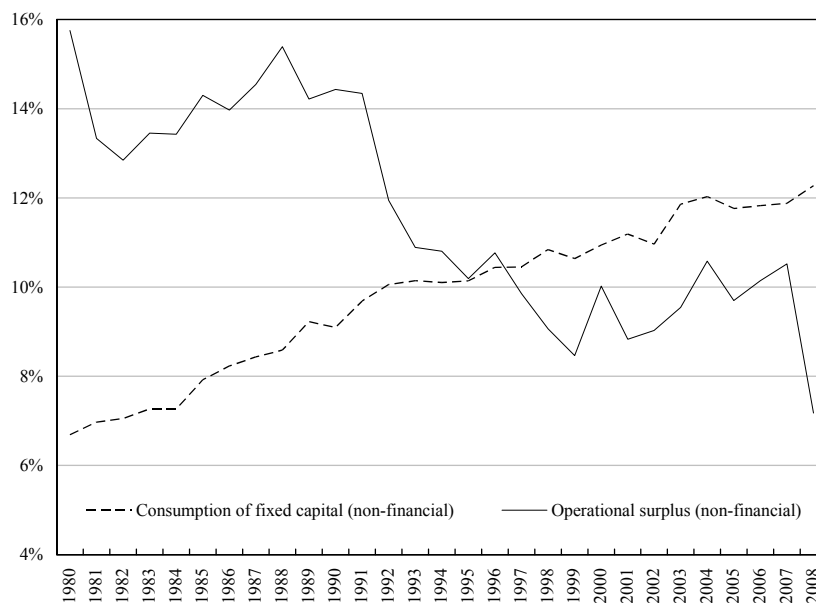
If the secondary distributional shares of operating surplus to interest, dividends and internal reserves are stable, the ratio of entrepreneurial income to operating surplus becomes constant, but Figure 8 shows the level of the ratio has changed dramatically. This reflects the decline of interest payments to other sectors (households and financial institutions) under low interest rate policy since late 1990s. We will verify the magnitude of the factors, such as rate of return, borrowing rate and capital ratio by using Financial Statements of Corporation Industry data.

Operating surplus and entrepreneurial income can be theoretically decomposed to the following:

$$\text{Operating Surplus} = rK + iF = r\alpha A + i(1 \text{-} \alpha)A$$
$$= [\alpha r + (1-\alpha)i]A$$
$$= [\alpha(r \text{-} i) + i] \quad A \tag{2}$$
$$\text{Entrepreneurial Income} = rK + iF \text{ - } ieA$$
$$= r\alpha A + i(1-\alpha)i - ieA$$
$$= [\alpha r + (1-\alpha)i - ie]A$$
$$= [\alpha(r \text{ - } i) + (1 \text{ - } e)i]A \tag{3}$$

where *A* is asset of private non-financial corporate, *K* is real assets, *F* is financial asset, *α* is ratio of real assets to total assets, e is debt ratio, *r* is return on capital rate of real asset, and *i* is borrowing

Figure 12

Factor Decomposition of the Ratio of Operational Surplus to Entrepreneurial Income
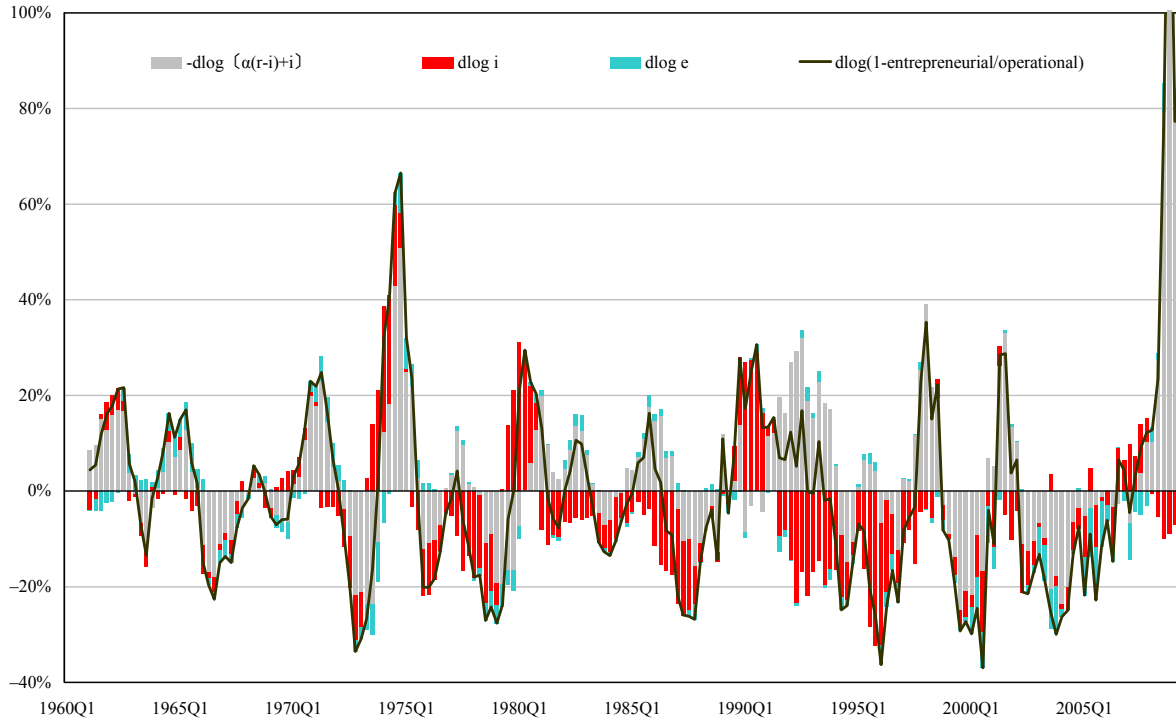
Source: Ministry of Finance, *Financial Statements of Corporation Industry.*

rate for debt. The ratio between the two (entrepreneurial income ratio) is affected by the borrowing rate *i*, debt ratio *e*, and difference between *r* and *i*:

$$\frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}} = \frac{\alpha(r-i)+(1-e)i}{\alpha(r-i)+i}$$

$$= 1 - \frac{ie}{\alpha(r-i)+i}$$

To see the size of the contribution of each factor, we expand the following:

$$1 - \frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}} = \frac{ie}{\alpha(r-i)+i}$$

$$d\log\left(1 - \frac{\text{Entrepreneurial Income}}{\text{Operating Surplus}}\right) = d\log i + d\log e - d\log[\alpha(r-i)+i] \qquad (4)$$

Figure 12 shows the impact of the contribution of three terms to its left-hand side. The first term represents the effect of loan rate (rising interest rates reduced the entrepreneurial income ratio), the second term the debt ratio (rising debt ratio reduced entrepreneurial income ratio), and the third term difference between borrowing rate and return on capital (rising return on capital rate higher than the borrowing interest rate increased entrepreneurial income ratio). Until 1980s, no major changes in the level of debt ratio, and only the large economic fluctuations such as oil shock

Figure 13

Average Interest Rate and Return on Capital
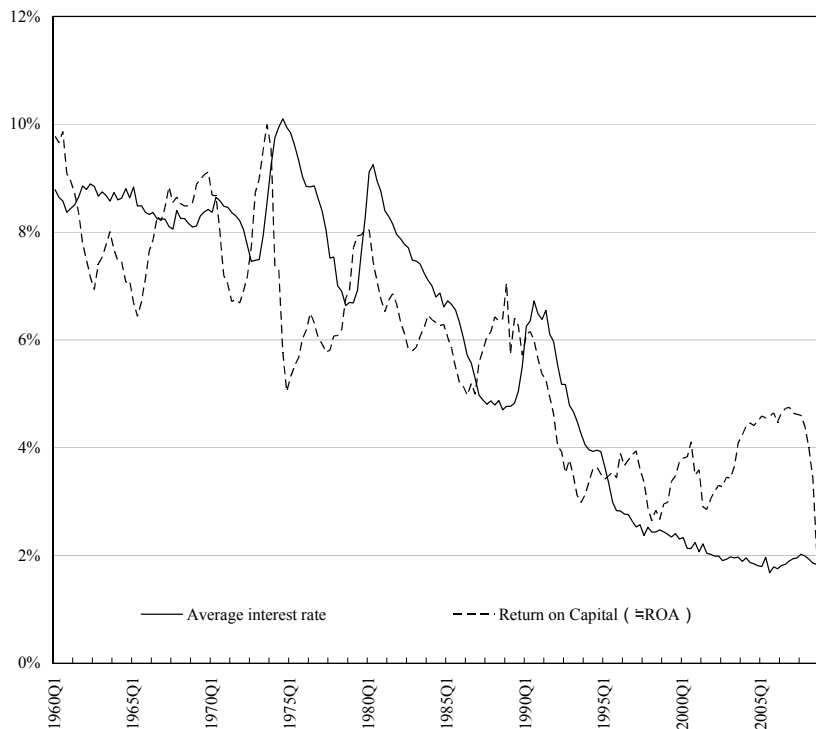
Source: Ministry of Finance, *Financial Statements of Corporation Industry.*

had made the difference between borrowing rate and return on capital fluctuate. But economic cycles had canceled out such fluctuation in the long-run and there has not been significant change in entrepreneurial income ratio. In the 1990s the stable relationship between rates of return and borrowing rates has changed. After the surge of the borrowing rates in 1990 and rapid decline, low interest rates continued since 1995. As a result, after the mid-1990s the variations in real rate of return directly lead to the changes in entrepreneurial income ratio.

While the level of interest rates is theoretically expected to be parallel to the real rate of return, actual level of interest rate is strongly influenced by monetary policy. Since 2000,continuing monetary easing has kept borrowing rates much less than real rate of return (Figure 13). In the background, corporate sector has taken the action retaining internal reserves to recover their equity damaged by falling asset prices since the 1990s. Under such circumstances, the recent level of entrepreneurial income ratio has been historically high. This is another factor which has affected recent volatile corporate tax base in Japan.

Considering the analyses in (1) and (2), we conducted a regression analysis which explains the trend of entrepreneurial income by GDP gap and borrowing rates. The result is shown as follows:

$$\log\left(\frac{SNA\_INCOME\_ADJ}{NDPV}\right) = \underset{(-22.96)}{-1.49} + \underset{(8.29)}{10.93 \times GAP} - \underset{(-7.32)}{11.08 \times LOAN\_RATE} \qquad [\text{reg.1}]$$

[R^2_adj=0.805, sample period: 1990-2008, *t*-value in parentheses]

where *SNA_INCOME_ADJ* is entrepreneurial incomes before dividend payments in the SNA, in which inventory valuation and interest payments are adjusted, *NDPV* is GDP (in the SNA) excluding capital depreciation, operating surplus and mixed incomes in the household and public corporation sectors, *GAP* is GDP gap calculated from the Cobb-Douglass production function and *LOAN-RATE* is the loan interest rate calculated as the ratio of interest payment to loan outstanding in the Financial Statements of Corporation Industry.

4.3   Relation between tax base and entrepreneurial income

Then, we discuss the relation between tax base (incomes of corporations in profit) and entrepreneurial income. Looking at Figure 8, the ratio of the taxable incomes to the corporate incomes fluctuates in the range of 80 to 130 per cent, and the elasticity does not seem stable. The discrepancy is mainly attributed to three factors. The first is the difference in the concept between the taxable incomes and the corporate incomes. While the taxable incomes include value-added produced abroad and the capital gains or losses stemming from asset prices fluctuations, the corporate incomes in SNA data is based on the aggregate of the flows of value-added created in the domestic corporate sector. The second is the influence of the amount of losses of the corporations in deficit (incomes of corporations in deficit). The taxable incomes can be obtained by adding the incomes of corporations in deficit (which is now defined to be positive) to the net aggregate incomes of all corporations. If the distribution of income depends on business cycles and incomes of corporations in deficit show irregular movements, the relationship between the two becomes unstable. The third is the effects of the deductions of operating losses carried forward.

Figure 14

Extraordinary Profits and Losses and Incomes Accrued in Foreign Sources
(percent of GDP)

Source: Ministry of Finance, *Fiscal Financial Monthly Report*, National Tax Agency, *Corporation Sample Survey*.

4.3.1 The effects of the difference in the concept

First, as a source of discrepancies between the taxable incomes and the corporate incomes, we can consider the factor of asset prices fluctuations. Specifically, we will analyze them by using the data of extraordinary profits and losses in Financial Statements of Corporation Industry. The transition of the extraordinary profits and losses is shown in Figure 14.

Value-added produced abroad (incomes generated by overseas branches) are not included in entrepreneurial income, but in the taxable incomes.[7] It is of course difficult to identify the amount
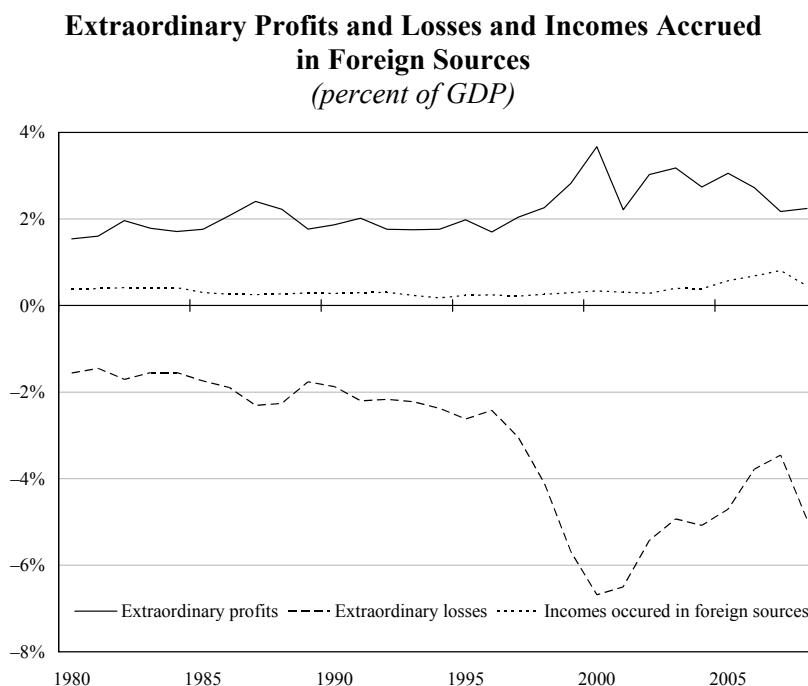
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[7]   The taxable incomes here are the values before tax deductions. The incomes of residents and domestic corporations are taxed worldwide, and the amounts of taxes payable are calculated. After that, deductions of foreign-levied taxes are applied.

Figure 15

Incomes of Corporations in Deficit
(percent of nominal GDP)
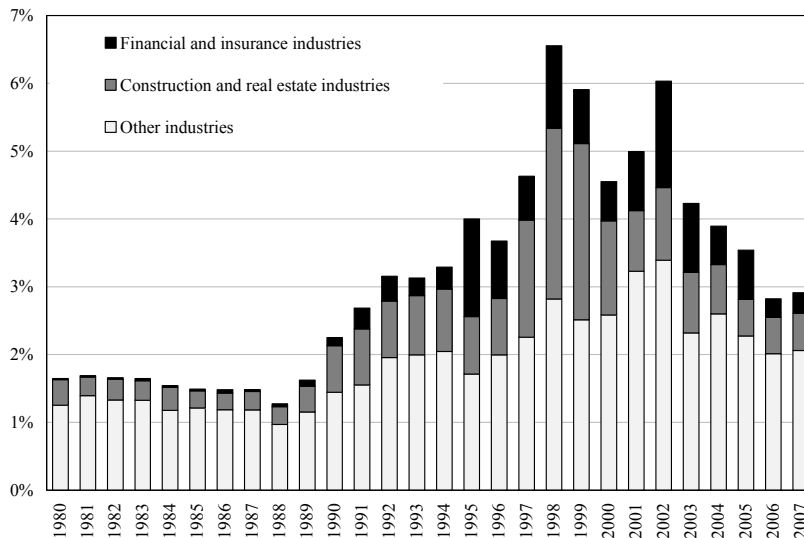
Source: National Tax Agency, *Corporation Sample Survey.*

of incomes generated overseas, however, we try to calculate the amount of incomes accrued in foreign sources by dividing deductions of taxes levied overseas by a certain tax rate, which is also shown in Figure 14. The calculated incomes accrued in foreign sources begin to increase gradually since the early 2000s.

4.3.2 Effects of incomes of corporations in deficit

If the competition among companies can replace the old firms with the new ones or can make differences in their performance, it seems that a constant fraction of the companies will be in deficit even when the GDP gap is zero. If the ratio of incomes of corporations in deficit to overall corporate incomes is stable over time, we can expect that the overall corporate incomes and the incomes of corporations in positive profit (taxable incomes) may move together. However, in reality, decrease of overall corporate incomes will lead to increase of incomes of corporations in deficit (the mean effect in the distribution), and if shocks of macro economy or of business cycles given to each company are not uniform, it will lead to increase of incomes of corporations in deficit (the variance effect in the distribution). In both cases, the ratio of incomes of corporations in deficit to overall corporate incomes may not be stable.[8]

Looking at the movements of the ratio of incomes of corporations in deficit to nominal GDP (except finance and insurance industry) (Figure 15), incomes of corporations in deficit and entrepreneurial income does not necessarily move in parallel. Since 1990s, incomes of corporations in deficit increased sharply, which can be attributed to three industries; finance and insurance, construction and real estate industries.

4.3.3 Effects of deductions of operating losses carried forward

Under Japan's corporation tax system, tax deduction of operating losses carried forward is

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[8]   Explicitly considering the effects of incomes of corporations in deficit, Hori, Suzuki and Kayasono (1998) estimated corporate tax revenues in Japan. In their paper, the relation between the ratio of corporate incomes to nominal GDP (ycv/gdpv) and the ratio of incomes of corporations in deficit to taxable incomes (prl/prb) is modeled as the following exponential function (*a*: constant), in which a decrease in corporate incomes leads to an increase in incomes of corporations in deficit.

$$\frac{prl}{prb} = a^{-\frac{ycv}{gdpv}}$$

Figure 16

Amount of Deductions and Expired Amount of Carried-over Losses
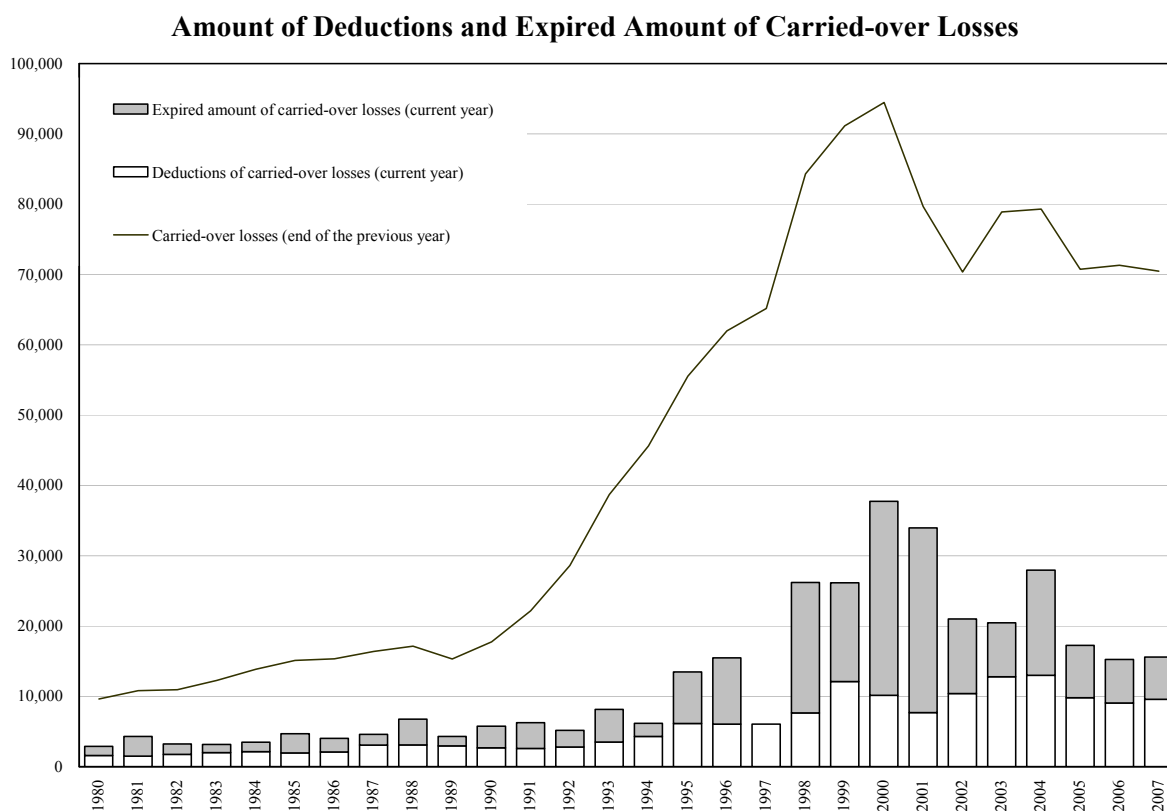
Source: *Corporation Sample Survey* (National Tax Agency)

allowed as an exception of the single-year principle in accounting. It enables companies in deficit to carry forward their losses to the periods of 7 years from the subsequent year, in order not to curb capital accumulations.[9]

Figure 16 shows the carried-over losses outstanding and the amount of deductions in every year (except finance and insurance industry). Increase of incomes of corporations in deficit since 1990s has led to the expansion of the carried-over losses outstanding and the amount of deductions afterward. On the other hand, in the recent years, the carried-over losses outstanding and the amount of deductions begin to decrease because incomes of corporations in deficit tend to decrease and the carried-over losses begin to expire.[10]

Since the size of deduction of each year depends on the past deficits and level and distribution of the positive profits made in subsequent years, it is difficult to make accurate predictions on the future deductions of operating losses carried over. We conducted a regression analysis that explains how the deficit in a certain year can be deducted in 7 years from the subsequent year by using past actual data.

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[9] It is stipulated in the Corporation Tax Law, Article 57. The periods in which deductions of carried-over losses are allowed have been extended from 5 years to 7 years in the tax reform in 2004. The 7-year rule applies to the losses after 1st April, 2001 (Corporate Tax Reform Act in 2004, Additional Rule 13.)

[10] Carried-over losses can not be deducted unless the firms earn positive profits that can be offset in the specified periods. Therefore, not all the cumulative amount of losses in the past are offset in future.

Figure 17

Taxable Incomes of Corporations in Profit and Entrepreneurial Incomes
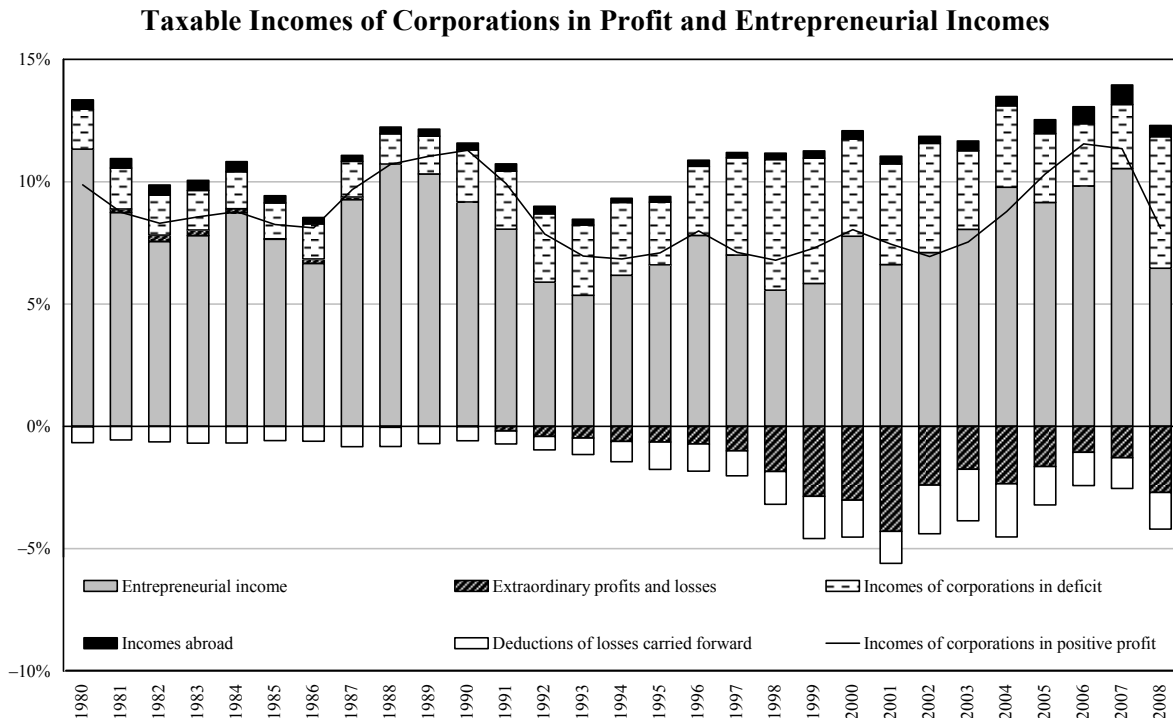
Source: Ministry of Finance, *Financial Statements of Corporation Industry*; National Tax Agency, *Corporation Sample Survey*; Cabinet Office: *SNA*.

$$DCO\_EXF = \underset{(-4.79)}{-0.230} \times INRED\_ADJ(-1)$$
$$\underset{(-3.80)}{-0.037} \left[\sum_{j=2}^{5} INRED\_ADJ(-j) + D01 \times \sum_{j=6}^{7} INRED\_ADJ(-j) \right] \quad \text{[reg.2]}$$

[R^2_adj=0.580, sample period: 1987-2008, *t*-value in parentheses]

where *DCO_EXF* is deductions of operating losses carried forward in the Corporation Sample Survey (except for finance and insurance industries), *INRED_ADJ* is a proxy variable of incomes of corporations in deficit, which can be inferred from the difference between incomes of corporations in positive profit (which is calculated from general account revenues) and the sum of entrepreneurial incomes, extraordinary profits (losses) and incomes abroad and *D01* is a dummy variable that is on after 2001. The number of observations is 30 years, and the result implies that on average 20 per cent of the carried-over losses are deducted in the next year, and roughly half of the losses are deducted for 7 years from the subsequent year, and the remaining losses are expired.[11]

Graphical representation of each factor (a)–(c) is given in Figure 17. The gap between incomes of corporations in positive profit (taxable incomes) and overall corporate incomes can be largely explained by these three factors. It is expressed as follows:

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[11]   Using the data of Corporation Sample Survey from 1990 to 2007, we calculate the cumulative amount of the expired losses carried forward (carried-over losses in the previous period – deductions in current period + deficit in current period – carried-over losses in the current period). It is roughly the half of the accumulative amount of the deficit in the same period.

Incomes of corporations in positive profit (taxable incomes)
= entrepreneurial income
± extraordinary profits and losses, incomes abroad
+ incomes of corporations in deficit
− deductions of losses carried forward

Looking at Figure 17, it can be seen that a fall in asset prices in the Japan's economy in 1990s led to the expansion of extraordinary losses, which reduced taxable incomes. However, as those effects hit intensively on specific industries (such as real estate industry), not only the expansion of extraordinary losses but also increase in deficit have occurred at the same time. As a result, taxable incomes as a whole did not shrink too much. Since the impact of the decrease of incomes (including the negative effects of asset price) in a macroeconomic level has occurred in the specific sectors, it can be said that the variance of corporate incomes became larger and incomes of corporations in deficit increased.

The regression result of incomes of corporations in deficit is as follows:

$$\frac{INRED\_ADJ}{GDPV} = \underset{(1.73)}{0.012} + \underset{(2.10)}{0.246} \times |\Delta GAP| - \underset{(-0.98)}{0.073} \times \left(\frac{SNA\_INCOME\_ADJ}{GDPV} \right)$$
$$+ \underset{(9.19)}{1.017} \times \left(\frac{EXTRA\_LOSS - EXTRA\_PROF}{GDPV} \right) + \underset{(2.50)}{0.0073} \times D1990C \qquad \text{[reg.3]}$$

[R^2_adj=0.894, sample period: 1981-2008, *t*-value in parentheses]

where *EXTRA_LOSS* and *EXTRA_PROF* are extraordinary losses and profits in the Financial Statements of Corporation Industry, *D1990C* is a dummy variable that is on after 1990 and other variables are defined in the previous regression results. In order to quantify the movements of incomes of corporations in deficit, we adopt the mean effects (if entrepreneurial income decreases, incomes of corporations in deficit increase), the variance effects (if the GDP gap widens in both directions, incomes of corporations in deficit increase) and factor of extraordinary profits and losses as explanatory variables. As the level of dependent variable (incomes of corporations in deficit) is significantly different before and after 1990, we added the dummy variable that is on after 1990. The regression result implies that extraordinary losses generated in the estimation period increased incomes of corporations in deficit by raising variance of the distribution of corporate incomes, which in fact did not lower the taxable incomes in the current period. If the GDP gap was zero, the ratio of incomes of corporations in deficit to GDP on average after 1990 would be 1.31 and 1.45 per cent with the ratio of corporate incomes to GDP 9 and 7 per cent respectively.

4.4.4 Summary of the discussions in this section

As discussed in this section, there are mainly five factors that can explain the movement of taxable incomes of private non-financial corporations; (1) structural and cyclical changes of the distribution of value-added in the Japanese economy, (2) the relationship between interest rates and return on capital, (3) asset price movements and return on foreign investment, (4) the divergence of economic fluctuations among sectors, and (5) deductions of carried-over losses. In particular, since 1990, due to the changes in these factors, tax revenues and its elasticity to GDP largely fluctuated every year. It should be noted that these factors did not necessarily affect the taxable incomes in only one way.

As for factor (1), in the long run, the declining trend of return on capital resulted in the fall in the ratio of the taxable incomes to GDP. However, in the short run, taxable incomes were largely

Figure 18

Estimation of the Structural Revenue of Corporate Tax
(baseline scenario, percent of GDP)
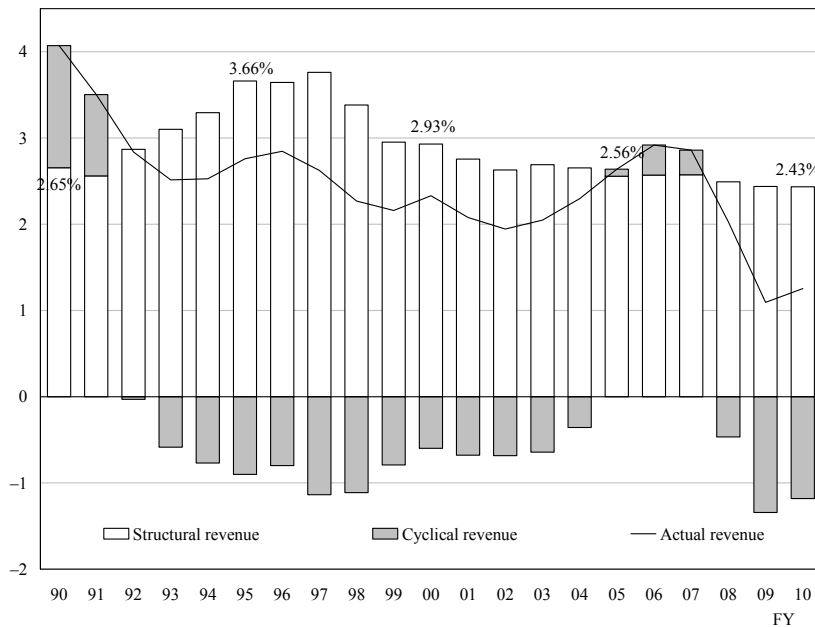
affected by business cycles. In particular, taxable incomes were temporarily enlarged by economic recoveries.

As for factor (2), under the low interest rate policy regime, the level of taxable incomes in recent years has been historically high. Because a nexus between return on capital and interest rates has not worked well since the mid-1990s, we need to pay attention to the fact that the changes in return on capital have the direct impact on the corporate tax base.

As for factors (3)-(5), as massive shocks of the bubble burst in the 1990s hit specific sectors, such as construction, retail and real estate industries, the influences of the negative shocks on the corporate tax base was rather limited although the size of the shocks was unprecedentedly large.

It is expected that the global economic downturn triggered by the global financial crisis since 2008 will drive down corporate tax revenues. The primary factor in the short run is a sharp decline of the capital share with the economic downturn; as the negative shocks hit whole of the economy uniformly, sectors with large positive incomes are most affected. Since interest rate is already at very low level, there would be no buffer of abating the burden of interest payments.

5   Structural components of the corporate tax revenues

In this section, based on the regression results, we will estimate the level of structural corporate tax revenues in relation to the size of the economy under the current tax system. Estimation results are shown in Figure 18. Concrete estimation procedures are as follows:

1) Using [reg.1], the potential series of entrepreneurial income when GDP gap is zero is calculated in each year, with the adjustment of extraordinary profits and losses and incomes accrued in foreign sources.[12]

2) Using [reg.3], the potential series of the incomes of corporations in deficit when the GDP gap was zero is calculated.

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[12]   Extraordinary profits and losses, until 2008, are taken from the actual values in the Financial Statements of Corporation Industry (we assume that the values after 2009 are equal to those in 2008). Incomes accrued in foreign sources, until 2007, are assumed to be equal to the amount of the tax deductions (taken from the Corporations Sample Survey) divided by the average tax rate. Incomes accrued in foreign sources, after 2008, are extended by using the average ratio to tax revenues in 2003-07 (5 years).

3) Using [reg.2] and the estimated series of the incomes of corporations in deficit (obtained in (2)), the potential series of the tax deductions for the carried-over losses is calculated.

4) Adding the incomes of corporations in deficit in (2) to the adjusted entrepreneurial income in (1), and subtracting the tax deductions for the carried-over losses in (3), we can obtain the potential series of the incomes of corporations in positive profit (taxable incomes).

5) The taxable incomes in (4) are multiplied by the actual average rate of corporate tax.

Figure 19

Estimation of the Structural Revenue of Corporate Tax
(alternative scenario in which the interest rate of debt had been kept constant after 1995, percent of GDP)

Subsequently, the tax deductions (including the deductions for income taxes, etc.) and corporate tax revenues from financial institutions are adjusted.[13]

The result implies that the potential size of the structural corporate tax revenue in FY 2010 is estimated to be 2.43 per cent of GDP. When we assume the interest rate was constant after 1995 level (without extraordinary low interest rate policy), the structural corporation tax revenue is estimated to be 2.08 per cent of GDP (Figure 19).

Figure 20 shows the virtual series of the structural corporate tax revenues when huge extraordinary losses were zero in the 1990s[14]. Under the current tax system and the level of interest rates at FY1995, the structural corporate tax revenue in FY 2010 is estimated to be 2.39 per cent of GDP, in which we do not consider the effects of tax deductions for carried-over losses generated by the huge extraordinary losses.

Compared with the potential series of the structural corporate tax revenues calculated above, it seems that the actual level of corporate tax revenue in 2006-07, 2.9 per cent of GDP, may exceed the structural level, reflecting a temporal high capital share in the phase of economic recovery. On the other hand, the actual (expected) level of corporate tax revenue in 2010, 1.1-1.3 per cent of GDP, is considerably lower than the level of the structural corporate tax revenue.

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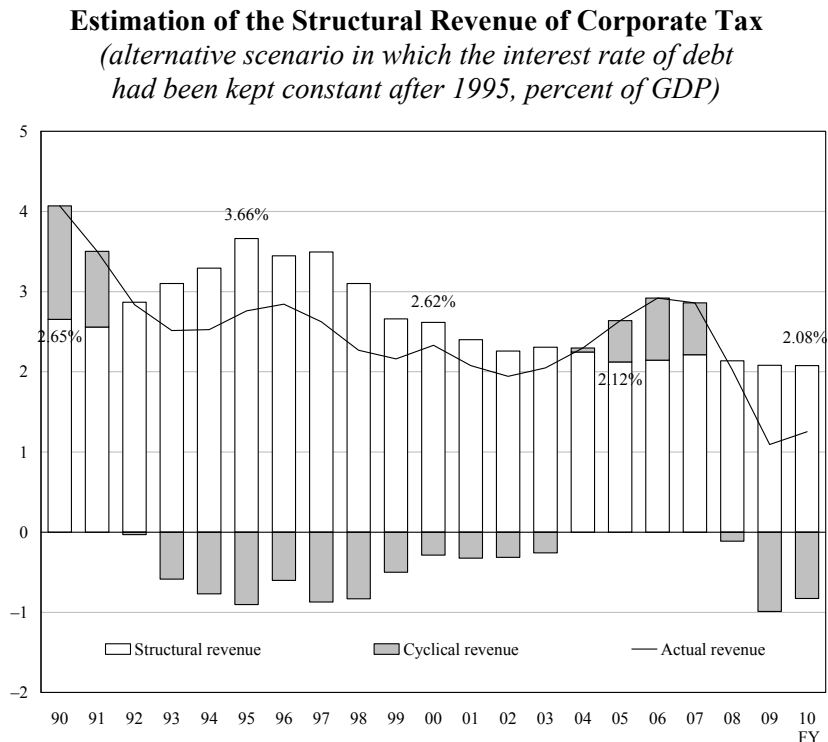
[13]   The average tax rate, the amount of tax deductions etc. and the corporate tax revenues from the financial institutions, until 2007, are taken from Corporation Sample Survey data. The average tax rate, the corporate tax revenues from the financial institutions, and the income tax deductions, after 2008, are assumed to be equal to those in 2007. The tax deductions excluding the income tax deductions, after 2008, are extended by using the ratio to tax revenues in 2007.

[14]   Extraordinary profits and losses (extraordinary profit – extraordinary losses) is virtually assumed to be zero.

6   Conclusions

In recent years, the elasticity and the level of corporate tax revenue have fluctuated widely every year because of the sticky movements of compensation of employees, adhesive movements of interest rates compared with the return on capital, economic shocks stemming from asset price fluctuations and macroeconomic shocks given to sectors unevenly. As we have seen in the previous sections, because the magnitude of the impact of each factor greatly varies over time, it is unreasonable to adopt a methodology of estimating the structural corporate tax revenue under the assumption that the elasticity is fixed at a certain level.

Figure 20

Estimation of the Structural Revenue of Corporate Tax
(alternative scenario in which the huge amount
of extraordinary losses had been zero in the 1990s)
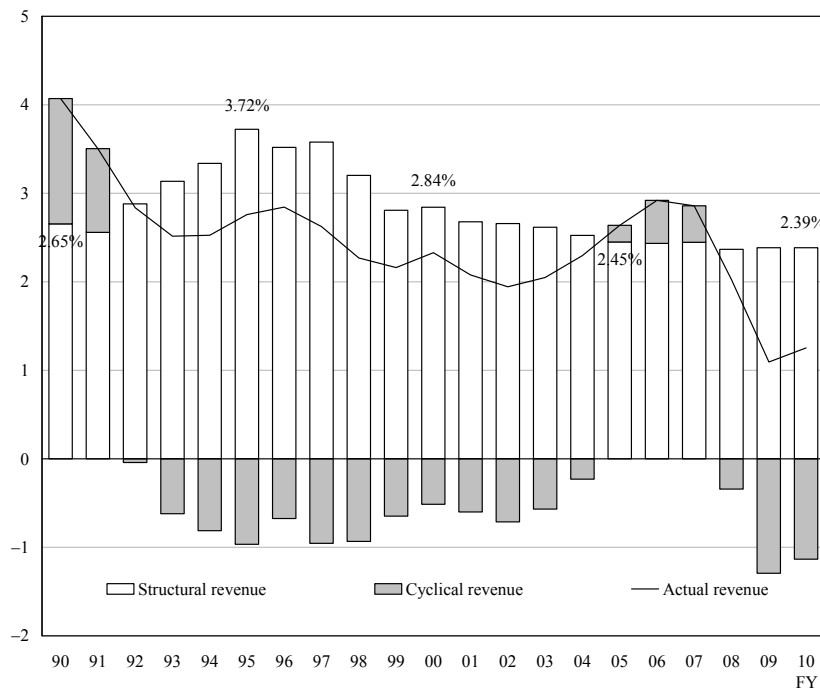
In considering fiscal sustainability, it is essential to have a good knowledge on the structural revenue under the current tax system. Structural corporate tax revenue in the long run is largely determined by the trends in labor and capital share, the trends in the return on capital and interest rates, and the trends in incomes of corporations in deficit. Therefore, it is necessary to assume specific scenarios in the future, to calculate correctly the structural tax revenues obtained under those scenarios, and in the long run to implement appropriate and flexible fiscal management in anticipating the structural tax revenues.

In this paper, under the current tax system and the current structure of economy in Japan, if we assume that interest rates got on normal paths and the effects of the tax deductions for carried-over losses due to large-scale extraordinary losses vanished, potential level of the structural corporate tax revenue is estimated to be 2.4 per cent of GDP. In addition, if we assume that interest rates continued to be extremely low and the effects large-scale extraordinary losses in the past were counted, potential level of the structural corporate tax revenue is calculated to be almost the same level as the previous case.

However, it is also necessary for us to be aware that, with fluctuations of the economy, the actual tax revenues can temporarily swing up as in 2006-07, can swing down as in 2009-10, or could continue to be below the calculated level of the structural tax revenue if large tax deductions of carried-over losses were realized due to huge extraordinary losses.

This paper has not discussed how tax revenues can fluctuate in the short run. Although there is a limitation to make accurate estimates, it is possible to run a simulation in which we can estimate the structural level of tax revenue in a macro econometric model where GDP gaps and interest rates are endogenously determined and we can also control the speed of convergence to the potential level of tax revenues by adjusting the factors of extraordinary profits and losses. Based on alternative scenarios with a variety of concepts reflecting the Japan's current economic situation and evolution, we can also make a long-term outlook of the structural tax revenues and the economic structures of production and distribution. These are interesting subjects in the future research.

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OPTIMAL FISCAL POLICY IN THE POST-CRISIS WORLD

Francesco Caprioli,[*] Pietro Rizza[*] and Pietro Tommasino[*]

To contrast the severe global recession of 2009, governments in most advanced countries implemented expansionary fiscal policies leading to a steep increase in public debt. As economies recover, a critical choice is whether to stabilize debt at post-crisis levels, or to bring it down to pre-crisis levels. On this issue, advices of international institutions and those coming from mainstream economic theory are at odds. While international institutions have called for a substantial and fast debt reduction, optimal fiscal policy literature calls for debt stabilization. The aim of this paper is to provide a formal theoretical rationale to the policy advices of international institutions in a DSGE model (the workhorse of mainstream optimal fiscal policy theory). In particular, we consider a model in which a benevolent government has to choose taxes and debt in order to finance an exogenous stream of public expenditure. We compare the optimal fiscal plan in two contexts. In the first one households are fully confident about government solvency. In the second, households believe that there is a positive default probability which is positively related to the level of debt. While in the first framework a temporary bad shock translates into a permanent increase in the debt level, in the second one the increase in government debt is only temporary.

"Only thing we have to fear is fear itself." F.D. Roosevelt

1   Introduction

To contrast the severe global recession of 2009, governments in most advanced countries implemented expansionary fiscal policies. These interventions have led to a steep increase in debt levels. According to the IMF, in the advanced economies of the G20 the debt-to-GDP ratio is projected to rise from 78 in 2007 to 118 per cent in 2014. While it is clear that ever-increasing debt-to-GDP ratios are inconsistent with government solvency and have to be avoided, a critical policy choice confronting policy-makers is whether to stabilize debt ratios at current levels, or bringing them down to pre-crisis levels. On this issue, advices of international institutions and those coming from mainstream economic theory are at odds.

On one side, international institutions have called for a substantial and fast debt reduction. For example, the December 2009 issue of ECB's *Monthly Bulletin* calls for adjustment measures which "succeed in putting debt ratios on a declining trajectory", to be implemented in 2011 at the latest; the ECOFIN Council (October 2009) agrees that "beyond the withdrawal of the stimulus measures, substantial fiscal consolidation is required in order to halt and eventually reverse the increase in debt"; the European Commission's *Communication from the Commission to the European Parliament and the Council: "Long-term Sustainability of Public Finances for a Recovering Economy"*, 2009, while recognizing that "a one-off increase in the stock of government debt need not put sustainability at risk", stresses that "while, prior to the crisis, the three prongs of the (Stockholm) strategy [*i.e.*, deficit and debt reduction, increases in employment rates and reforms of social protection systems] were options from which countries could choose, each of

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these pillars is now indispensable for most EU countries"; the IMF's *Strategies for Fiscal Consolidation in the Post-crisis World*, 2010, argues that "stabilizing debt ratios at post-crisis level would be insufficient".

On the other side, a surprisingly robust result in optimal fiscal policy theory is that public debt should on average be constant.[1] This has been demonstrated to be true both in a complete market framework (*i.e.*, in a framework in which the government has access to a full array of bonds for each maturity and for each contingency[2]) and in a more realistic incomplete market framework. In this latter setup, Ayagary, Marcet, Sargent and Seppälä (2002), "Optimal Fiscal Policy without State Contingent Debt", *Journal of Political Economy*, rigorously confirm the intuition of Barro (1979), "On the Determination of Public Debt", *Journal of Political Economy*, that negative shocks should have a permanent effect on public debt.[3] More precisely, the authors demonstrate that the optimal fiscal policy requires the debt to follow a random walk process, *i.e.*, its level tomorrow and in any future period is equal in expected terms to today's level. These results are also robust to the introduction of capital (see, e.g., Chari, Christiano and Kehoe (1994), "Optimal Fiscal Policy in a Business Cycles Model", *Journal of Political Economy*; Chari and Kehoe (1999), "Optimal Fiscal and Monetary Policy", in *Handbook of Macroeconomics*; and Scott (1999), "Does Tax Smoothing Imply Smooth Taxes", CEPR, Discussion Paper, No. 2172.

In summarizing this wide body of literature, Scott (2009), "Government Debt After the Crisis" concludes that economic theory suggests that "in the wake of large adverse shocks... the optimal response is to use debt as a buffer stock. Debt should show large and long term shifts and there is no presumption that governments need to reduce debt to pre-crisis levels". And that, in any case, "... fluctuations in government debt after such adverse shocks are long lasting... Debt stabilization occurs over decades not within a decade".

Is it possible to make sense of the policy advices of international institutions and practitioners in a model which shares features of the neoclassical dynamic general equilibrium models, which are the workhorse of standard optimal fiscal policy theory? The aim of this paper is to answer this question.

As in Ayagary *et al.* (2002), we consider a closed production economy with no capital and infinitely lived agents. Public spending follows an exogenous stochastic process. The problem of the representative household is to maximize its lifetime expected utility subject to the flow budget constraint. The government is benevolent: it chooses the level of debt and distortionary taxes on labor income to maximize households' expected utility subject to the feasibility constraint, households' beliefs and optimality conditions and debt sustainability. Moreover, the government acts under full commitment, *i.e.*, it always fulfils its promises. We believe that these two

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[1]   The optimal taxation literature is immense and offering a comprehensive survey goes beyond the scope of this paper. See Barro, R.J. (1979), "On the Determination of Public Debt", *Journal of Political Economy*; Barro, R.J. (1989), "The Neoclassical Approach to Fiscal Policy", published in *Modern Business Cycle Theory*, Harvard University Press; Barro, R.J. (1995), "Optimal Debt Management", NBER, Working Paper, No. 5327; Barro, R.J. (1997), "Optimal Management of Indexed and Nominal Debt", NBER, Working Paper, No. 6197; Bohn, H. (1990), "Tax Smoothing with Financial Instruments", *American Economic Review*, No. 80; Kydland, F. and E.C. Prescott (1980), "Dynamic Optimal Taxation, Rational Expectations and Optimal Control", *Journal of Economic Dynamics and Control*; Lucas, R.E. Jr. and N.L. Stokey (1983), "Optimal Fiscal and Monetary Economy in an Economy Without Capital", *Journal of Monetary Economics*; Chari, V.V., L.J. Christiano and P.J. Kehoe (1994), "Optimal Fiscal Policy in a Business Cycles Model", *Journal of Political Economy*; Chari, V.V. and P.J. Kehoe (1999), "Optimal Fiscal and Monetary Policy", in *Handbook of Macroeconomics*; Ayagary, R., A. Marcet, T.J. Sargent and J. Seppälä (2002), "Optimal Fiscal Policy Without State Contingent Debt", *Journal of Political Economy*; Zhu, X. (1992), "Optimal Fiscal Policy in a Stochastic Growth Model", JET, among many others.

[2]   Lucas, R.E. Jr. and N.L. Stokey (1983), "Optimal Fiscal and Monetary Economy in an Economy Without Capital", *Journal of Monetary Economics*.

[3]   See also Marcet, A. and A. Scott (2010), "Debt and Deficit Fluctuations and the Structure of Bonds Markets", JET.

Figure 1

Debt Level and Yield Spread
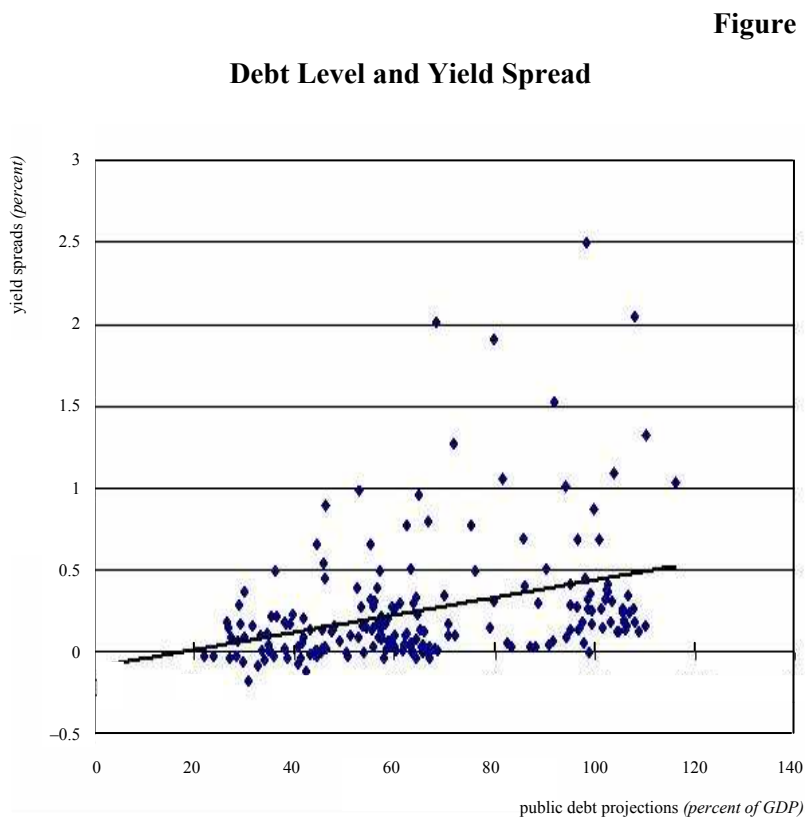
assumptions are quite plausible if referred to advanced economies, in which the political cost of a default is likely to be prohibitive. Nevertheless, we also assume that households believe that with a positive probability the government could default on its own debt. This assumption captures the current situation, in which we observe financial markets assigning significant default probabilities even to the sovereign debt of advanced countries. For example, Figure 1 points to a positive relation between the amount of government debt and yield spread, a proxy for the sovereign risk premium, for 10 euro area countries in the period 2000-09. So we assume that households believe that there is a positive relation between the probability of default and the amount of outstanding debt. Over time they update their estimates of this relation as new data on government behavior become available.

We study the impact of expectations about government default on the optimal fiscal policy in two different set-ups. In the first one, when in the initial period the fiscal authority sets its plans agents are already sceptical about the government capability/willingness to honor its debt obligations. In the second one, agents are instead fully confident about debt repayment, but they may start fearing default if the government uses debt to absorb an adverse shock. These two cases are meant to capture two different situations. The first one refers to the post crisis situation, characterized by high debt levels and significant sovereign risk premia: here the government's problem is to design an optimal "exit strategy". The second one instead is meant to capture both the pre-crisis and the post-crisis period (crisis is modelled here as a very high decrease in productivity and output). The main problem here is to understand whether a "fiscal stimulus" in times of crisis, implying higher deficits and debts, is consistent with an optimal fiscal plan.

Our main findings are the following. First, when agents fear government default, a post-crisis fiscal consolidation becomes optimal. The intuition is that the interest rate on government debt is too high due to distorted expectations about government default. Therefore the marginal cost of higher distortionary taxes today is more than compensated by the expected future marginal benefits of lower distortionary taxes tomorrow. The incentive to reduce debt is stronger i) the more pessimistic agents are about government solvency and ii) for a given degree of pessimism, the higher the post-crisis debt level. Second, the state of agents' initial beliefs has an effect on the long-run mean value of the tax rate and debt. Third, while optimality still requires to increase debt

to absorb the negative shock (as in Ayagary *et al.*, 2002), the possibility of a negative shock leads the government to run much higher primary surpluses before it materializes. *i.e.*, to create "fiscal room" in advance.

The paper proceeds as follows. Section 2 characterizes the optimal fiscal policy, and in Section 3 we solve it numerically. In Section 4 we characterize the fiscal plan in the case of an unexpected adverse shock. In Section 5 we compare the fiscal variables dynamics in two countries which differ for their initial debt level. Section 6 concludes.

2   The model

We consider an infinite horizon economy with an infinitely lived representative consumer and a benevolent fiscal authority. The government finances an exogenous stream of public consumption levying a proportional tax on labor income and issuing a one-period non state-contingent bond, which is the only financial asset in the economy. The government has a full commitment technology and always repays its debt. There are two sources of aggregate uncertainty, represented by a government expenditure shock and a technology shock. In Subsection 1 we briefly review optimal fiscal policy under the assumption that households are at any moment fully confident about government solvency, as in Ayagary *et al.* (2002). In Subsection 2 we modify this benchmark model assuming that households assign a positive probability to the event of government default. We show how the way in which households form their expectations change the constraints faced by the fiscal authority and consequently the optimal fiscal policy.

2.1   *The rational expectations benchmark*

Time is discrete and indexed by t=0,1,2.... At the beginning of each period there is a realization of a stochastic state $s = (g_t, \vartheta_t) \in S = G \times \Theta$. Let us define the history of events up to time t as $s^t = (g^t, \vartheta^t)$, where $g^t = (g_0, g_1, ..., g_t), \vartheta^t = (\vartheta_0, \vartheta_1, ..., \vartheta_t)$, and the conditional probability of s^r given s^t as $\pi(s^r | s^t)$; s_0 is non-stochastic.

2.1.1 *The private sector*

A representative household is endowed with one unit of time which can be used for leisure, l_t, or labor, n_t.

$$n_t(s^t) + l_t(s^t) = 1 \qquad\qquad \forall t \geq 0, \quad \forall s^t \in S^t \qquad (1)$$

He chooses consumption $c_t(s^t)$, leisure and bond holdings $b_t(s^t)$ to maximize his lifetime discounted expected utility:

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) = \sum_{t=0}^{\infty} \sum_{s^t}^{\infty} \beta^t u(c_t(s^t), l_t(s^t)) \pi(s^t | s_0) \qquad (2)[4]$$

subject to the period-by-period budget constraint:

$$b_{t-1}(s^{t-1}) + (1 - \tau_t(s^t)) w_t(s^t)(1 - l_t(s^t)) = c_t(s^t) + p_t(s^t) b_t(s^t) \qquad (3)$$

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[4]   The utility function satisfies the usual standard assumptions, *i.e.*, $u_{c,t} > 0$, $u_{l,t} > 0$, $u_{cc,t} < 0$, $u_{ll,t} < 0$.

where β is the discount factor, $\tau_t(s^t)$ is the state-contingent labor tax rate, $w_t(s^t)$ is the wage rate and $p_t(s^t)$ is the price of the one period bond.

The household's optimality conditions are:

$$\frac{u_{l,t}(s^t)}{u_{c,t}(s^t)} = w_t(s^t)(1 - \tau_t(s^t)) \tag{4}$$

$$p_t(s^t) = \beta E_t \frac{u_{c,t+1}(s^{t+1})}{u_{c,t}(s^t)} \tag{5}$$

where, for notational simplicity, we denote from now on $u_{c,t}(s^t)$ and $u_{l,t}(s^t)$ as the marginal utility of labor and consumption in state s^t.

There is only one non-storable good, produced by a representative price-taker firm with a linear production technology given by:

$$y_t(s^t) = \vartheta_t(s^t)n_t(s^t)$$

Output, y_t, can be used either for private consumption or public consumption (g_t). Equilibrium in the good market and in the labor market requires:

$$y_t(s^t) = c_t(s^t) + g_t(s^t) \tag{6}$$

$$\vartheta_t(s^t) = w_t(s^t) \tag{7}$$

2.1.2 The government

The government finances the exogenous sequence of government expenditures levying taxes and issuing debt. Its policy $\tau_t(s^t), b_t(s^t)$ $\forall t \geq 0$ satisfies the period by period budget constraint:

$$b_{t-1}(s^{t-1}) + g_t(s^t) = \tau_t(s^t)w_t(s^t)(1 - l_t(s^t)) + p_t(s^t)b_t(s^t)$$

The initial level of debt b_{-1} is exogenously given. Ayagary *et al.* (2002) show that the dynamic optimal taxation problem of the government is equivalent to the problem of maximizing:

$$E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) \tag{8}$$

under the following constraints:

$$E_0 \sum_{t=0}^{\infty} \beta^t (u_{c,t}c_t - u_{l,t}(1 - l_t)) = u_{c,0}b_{-1} \tag{9}$$

$$E_t \sum_{j=0}^{\infty} \beta^j (u_{c,t+j}c_{t+j} - u_{l,t+j}(1 - l_{t+j})) = u_{c,t}b_{t-1}(s^{t-1}) \quad \forall t \geq 0, \quad \forall s^t \tag{10}$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^t (u_{c,t+j}c_{t+j} - u_{l,t+j}(1 - l_{t+j}))}{u_{c,t}(s^t)} < \overline{M} \qquad \forall t \geq 0, \quad \forall s^t \tag{11}$$

$$\vartheta_t(1 - l_t(s^t)) = c_t(s^t) + g_t(s^t) \tag{12}$$

Constraints (9) and (10) require that for any period and any state, the inherited level of debt is equal to the stream of expected future primary surpluses. They are equivalent to the intertemporal consumer budget constraint with both prices and taxes replaced using the households' optimality conditions, (4) and (5). If financial markets were complete, constraints (10) would be satisfied by choosing appropriately the vector of state-contingent bond, so they would not constrain the optimal choice of taxes. However, under incomplete markets, the government cannot adjust the inherited stock of debt in response to the current realization of the shock. Therefore, constraints (10) captures the idea that in any period the future path of taxes depends on the current state. Constraints (11) requires that debt limits be respected.

It can be shown that the solution to the government problem satisfies:

$$\tau_t = T(s_t, \psi_{t-1}, b_{t-1}) \qquad\qquad \forall t > 0 \qquad\qquad (13)$$

$$b_t = D(s_t, \psi_{t-1}, b_{t-1}) \qquad\qquad \forall t > 0 \qquad\qquad (14)$$

Equations (13) and (14) are the optimal policy rules for the labor tax rate and for bond holdings respectively. Both of them are time invariant functions of the current state s_t, the inherited bond holding b_{t-1} and the auxiliary state variable ψ_{t-1} which is equal to the sum of past lagrange multipliers, from period 0 till $t-1$, associated to the intertemporal budget constraints (10).[5]

Two observations are worth noting. First, by including the costate variable ψ_{t-1} in the vector of state variables the problem becomes recursive and standard solution techniques can be applied. Second, the presence of ψ_{t-1} and b_{t-1} makes the allocation and the cost of distortionary taxation state and history-dependent.

2.2 *Modeling fear of government default*

In the benchmark model of Subsection 2.1 households fully understand the government problem and therefore attach zero probability to the event of a government default, whatever the observed evolution of government debt. In particular, as households understand the risk-free nature of government bonds, they do not require to be compensated for any default risk. In this section we study what happens if agents abruptly – and wrongly – start to fear that the government might not fulfil the promise of always paying back its own obligations.

In particular, at time t the household believes that at time $t+1$ debt will be honoured with probability $\hat{\pi}_t$ and will be instead repudiated with probability $(1 - \hat{\pi}_t)$.

In this case, the optimality condition of the household is given by:

$$p_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t) = \beta \sum_{s_{t+1}} u_{c,t+1}(s^{t+1}, \delta_{t+1} = 1, \delta^t) \tilde{\pi}(s^{t+1}, \delta_{t+1} = 1, \delta^t \mid s^t, \delta^t) =$$
$$= \beta \sum_{s_{t+1}} u_{c,t+1}(s^{t+1}, \delta_{t+1} = 1, \delta^t) \hat{\pi}(s^{t+1} \mid s^t, \delta^t) \hat{\pi}_t \qquad\qquad (15)$$

where $\delta_t \in \{0,1\}$ is equal to 1 if the government does not default on debt in period t and equal to 0 otherwise, and $\hat{\pi}_t$ is the probability that $\delta_{t+1} = 1$ conditional on s^t and δ^t. The relevant expectations ($\tilde{\pi}$) are now with respect to s^t *and* the event of government default.

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[5]   This approach has been pioneered by Marcet and Marimon (2002).

We make two assumptions about how default expectations evolve. First, the higher the level of outstanding debt, the stronger the fear of government default, and in particular fear of default start to arise when the debt goes above some "psychological" threshold $\overline{b}$:[6]

$$\hat{\pi}_t = \frac{1}{1 + \alpha_t \max(b_t - \overline{b})} \tag{16}$$

Second, we assume that agents revise their beliefs about the probability of a public default as new evidence about government behaviour becomes available. In the literature various ways have been proposed to model agents' learning.[7] We adopt the approach pioneered by Marcet and Sargent (1989). They study agents which are similar to an econometrician, *i.e.*, in each period they estimate recursively those parameters which are relevant for their decision, and whose values they ignore. In our model the only parameter that has to be estimated is α. Let α_t be the agents' estimate of α at time t. If agents use a constant gain algorithm with gain parameter equal to k, a special case of the algorithm studied by Marcet and Sargent (1989),[8] it can be shown that α_t is given by the following expression:

$$\alpha_t = \alpha_{t-1}(1 - kb_{t-1}^2) \tag{17}$$ [9]

Several observations are worth-noting. First, equation (16) nests the rational expectation case in which households understand that default cannot happen. In fact, when $\alpha_t = 0$, $\hat{\pi}_t = 1$. Second, under the condition that $|1 - kb_{t-1}^2| < 1$ equation (17) is such that α_t converges to its true value, 0.

It is important to stress the fact that the perceived default probability has no impact on the actual default probability, which is always equal to 0. We believe that these features of the model capture the challenges that advanced countries are facing in the aftermath of the huge fiscal stimulus packages put in place to contrast the recent crisis. More generally we aim to derive optimal strategies for policymakers which do not see default as a viable policy option but have to take into account the link between the design of fiscal policy, default expectations and macroeconomic variables.

Definition 1

Given b_{-1} and a stochastic process for the government expenditure g_t and the technology shock ϑ_t, a competitive equilibrium is an allocation $\{c_t, l_t, g_t\}_{t=0}^{\infty}$, state-contingent beliefs about government default probabilities $\{\hat{\pi}_t\}_{t=0}^{\infty}$, a price system $\{p_t, w_t\}_{t=0}^{\infty}$ and a government policy $\{\tau_t, b_t\}_{t=0}^{\infty}$ such that (a) given the price system, the beliefs and the government policy the

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[6]   In the remaining of the paper, we set $\overline{b} = 0$, without loss of generality.

[7]   For a comprehensive survey of learning models, see Evans and Honkapohja, (2001). Several papers have already used these models to explain real world phenomena. For example, Adam *et al.* (2006), Carceles and Giannitsarou (2007), and Cogley and Sargent (2008) introduce boundedly rational agents in a standard consumption based asset pricing model to fit some features of asset prices. Marcet and Nicolini (1998) and Adam *et al.* (2005) show how learning can be an explanation of hyperinflationary episodes. Kurz *et al.* (2005), Beaudry and Portier (2004, 2007), and Eusepi and Preston (2008) stress the importance of shifting expectations for business cycle fluctuations.

[8]   In any case, the economic intuition behind the result is robust to alternative learning scheme.

[9]   This formula is derived in the following way. Assume $b_t > 0$. Taking log of equation equation 17 we get $0 \approx -\alpha_t b_t$ where we use the fact that because of the assumption that government always honours its debt $\hat{\pi}_t$ tends to 1 and that $\log(1 + x) \approx x$ for small x.

households' optimality conditions are satisfied; (b) given the allocation and the price system the government policy satisfies the sequence of government budget constraint (3); and (c) the goods and the bond markets clear.

Define:

$$A_t \equiv \prod_{k=0}^{t} \hat{\pi}_{k-1} \qquad (18)$$

In the full credibility case A_t is constant and always equal to 1, while under learning it is not, unless the initial beliefs coincide with the rational expectations ones, *i.e.*, unless $\alpha_{-1} = 0$. Using households' optimality conditions to substitute out prices and taxes from the government budget constraint, Ayagary *et al.* (2002) show the constraints that a competitive equilibrium imposes on allocations. Using a similar argument, we show that under incomplete markets and bounded rationality the following result holds.

Proposition 1

Assume that for any competitive equilibrium $\beta^t A_t u_{c,t} \to 0$ almost surely. Given b_{-1} and α_{-1}, a feasible allocation $\{c_t, l_t, g_t\}_{t=0}^{\infty}$ is a competitive equilibrium if and only if the following constraints are satisfied:

$$E_0 \sum_{t=0}^{\infty} \beta^t A_t (u_{c,t} c_t - u_{l,t}(1 - l_t)) = A_0 u_{c,0} b_{-1} \qquad (19)$$

$$E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j}(1 - l_{+jt})) = A_t u_{c,t} b_{t-1} \qquad (20)$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^t A_{t+j} (u_{c,t+j} c_{t+j} - u_{l,t+j}(1 - l_{t+j}))}{A_t u_{c,t}(s^t)} < \overline{M} \qquad (21)$$

with initial condition $A_{-1} = 1$.

Proof

We relegate the proof to the Appendix.

Equation (20) is the bounded rationality version of the intertemporal constraint on the allocation derived by Ayiagary *et al.* (2002) in a rational expectations framework, given in equation (20). The difference between equations (20) and (10) arises through the effect that government default expectations exert on bond prices. As expectations are not model-consistent, the primary surplus at time t, expressed in terms of marginal utility of consumption, is weighted by the product of one minus the expected default probabilities from period 0 till period t.

2.3   The government problem

Using the so-called primal approach to taxation, we can recast the problem of choosing taxes and bond holdings as a problem of directly choosing allocations of consumption and labor, under the constraint that they satisfy the conditions for a competitive equilibrium.

At this point a clarification is needed. When the households and the benevolent government share the same information, they maximize the same objective function. But when the way in which they form their expectations differ, as in this setup, their objective functions differ as well. In what follows we assume that the fiscal authority maximizes the representative consumer's welfare *as if* the latter were rational. Said differently, the government understands how agents behave and form their beliefs, and it understands that these beliefs are distorted.[10]

Definition 2

The government problem under learning is:

$$\max_{\{c_t, l_t, \alpha_t, A_{t+1}, b_t\}_{t=0}^{\infty}} E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t)$$

subject to:

$$E_t \sum_{j=0}^{\infty} \beta^j A_{t+j}(u_{c,t+j} c_{t+j} - u_{l,t+j}(1 - l_{t+j})) = A_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t) b_{t-1}(s^{t-1}, \delta^{t-1}) \qquad (22)$$

$$\underline{M} < \frac{E_t \sum_{j=0}^{\infty} \beta^j A_{t+j}(u_{c,t+j} c_{t+j} - u_{l,t+j}(1 - l_{t+j}))}{A_t(s^t, \delta^t) u_{c,t}(s^t, \delta^t)} < \overline{M} \qquad (23)$$

$$A_{t+1} = A_t \hat{\pi}_t(s^t, \delta^t) \qquad (24)$$

$$\alpha_t(s^t, \delta^t) = \alpha_t(s^{t-1}, \delta^{t-1})(1 - k b_{t-1}^2(s^{t-1}, \delta^{t-1})) \qquad (25)$$

$$c_t(s^t, \delta^t) + g_t = \vartheta_t(1 - l_t(s^t, \delta^t)) \qquad (26)$$

for given b_{-1} and α_{-1}. Equations (22) and (21) constrain the allocation to be chosen among competitive equilibria. Equation (24) is the recursive formulation for A_t obtained directly from equation (18). Equation (25) gives the law of motion of beliefs. Equation (26) is the resource constraint. As in equations (22) and (21) appear expectations of future control variables, the problem is not recursive and standard solution techniques cannot be used.

The Lagrangian for the Ramsey problem can be represented as:

$$L = E_0 \sum_{t=0}^{\infty} \beta^t u(c_t, l_t) + \psi_t A_t(u_{c,t} c_t - u_{l,t}(1 - l_t)) - \lambda_t b_{t-1} A_{t-1} u_{c,t} + \gamma_t(A_{t+1} - A_t \hat{\pi}_t) + \\ + \rho_t(\alpha_t - \alpha_{t-1}(1 - k b_{t-1}^2) + \nu_t(\vartheta_t(1 - l_t) - c_t - g_t)$$

where $\psi_t = \psi_{t-1} + \lambda_t - \varepsilon_{1,t} + \varepsilon_{2,t}$, where $\beta^t \varepsilon_{1,t}$ and $\beta^t \varepsilon_{2,t}$ are the Lagrange multipliers attached to the upper and lower debt constraints respectively. Since A_t and α_t have a recursive structure, the problem becomes recursive adding A_t and α_{t-1} as endogenous state variables to the ones in the Ayagary *et al.* (2002) model, which are ψ_{t-1} and b_{t-1}.

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[10] The same assumption is made in Karantouniais *et al.* (2010) and Caprioli (2009).

First order necessary conditions $\forall t > 0$ are:[11]

∂c_t :

$$u_{c,t} + \psi_t A_t (u_{cc,t} c_t + u_{c,t}) - \lambda_{1,t} b_{t-1} u_{cc,t} A_t = \nu_t \tag{27}$$

∂l_t :

$$u_{l,t} + \psi_t A_t (u_{l,t} - u_{ll,t}(1 - l_t)) = \vartheta_t \nu_t \tag{28}$$

$\partial \alpha_{t+1}$:

$$\rho_t - \beta E_t \rho_{t+1}(1 - k b_t^2) + \gamma_t A_t \frac{b_t}{(1 + \alpha_t b_t)^2} = 0 \tag{29}$$

∂b_t :

$$-\beta E_t \lambda_{1,t+1} u_{c,t+1} A_{t+1} + \gamma_t A_t \frac{\alpha_t}{(1 + \alpha_t b_t)^2} + 2\beta E_t \rho_{t+1} \alpha_t k b_t = 0 \tag{30}$$

∂A_{t+1} :

$$\gamma_t - \beta E_t \gamma_{t+1} \frac{1}{(1 + \alpha_{t+1} b_{t+1})} - \beta E_t \lambda_{1,t+1} b_t u_{c,t+1} + E_t \psi_{t+1}(u_{c,t+1} c_{t+1} - u_{l,t+1}(1 - l_{t+1})) = 0 \tag{31}$$

3   Numerical solution

Together, the first order conditions and the constraints of the government program imply a stochastic non linear system of difference equations in the variables $c_t, l_t, \tau_t, b_t, \psi_t, A_{t+1}$ and α_t. We solve the system using standard collocation methods both in the case in which there are no doubts about debt repayment and in the case in which agents start to fear a government default. In both cases we consider a truncated AR(1) process for government expenditure and labor productivity:

$$g_t = \begin{cases} \underline{g} & \text{if} & (1 - \rho_g)g^{ss} + \rho g_{t-1} + \varepsilon^g_t < \underline{g} \\ (1 - \rho_g)g^{ss} + \rho g_{t-1} + \varepsilon^g_t & \text{if} & \underline{g} < (1 - \rho_g)g^{ss} + \rho g_{t-1} + \varepsilon^g_t < \overline{g} \\ \overline{g} & \text{if} & \overline{g} < (1 - \rho_g)g^{ss} + \rho g_{t-1} + \varepsilon^g_t \end{cases} \tag{32}$$

where ε^g_t is assumed to be normally distributed with zero mean and σ^g standard deviation. Labor productivity has an analogous structure.

Figure 2 shows the path of consumption, primary surplus and government debt over GDP in two economies which are identical except for the fact that in the second one α starts at a value different from 0 (0.01). In both cases g_t and ϑ_t are constant and equal to their unconditional mean. Both economies start with the same positive level of debt (set

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[11]   As standard in the optimal fiscal policy literature, it is not easy to establish that the feasible set of the Ramsey problem is convex. To overcome this problem in our numerical calculations we check that the solution to the first-order necessary conditions of the Lagrangian is unique.

Figure 2

Rational Expectations Versus Fear of Default
Consumption

Primary Surplus
(percent of GDP)

Rational Expectations
Fear of Government Default

Government Debt / GDP
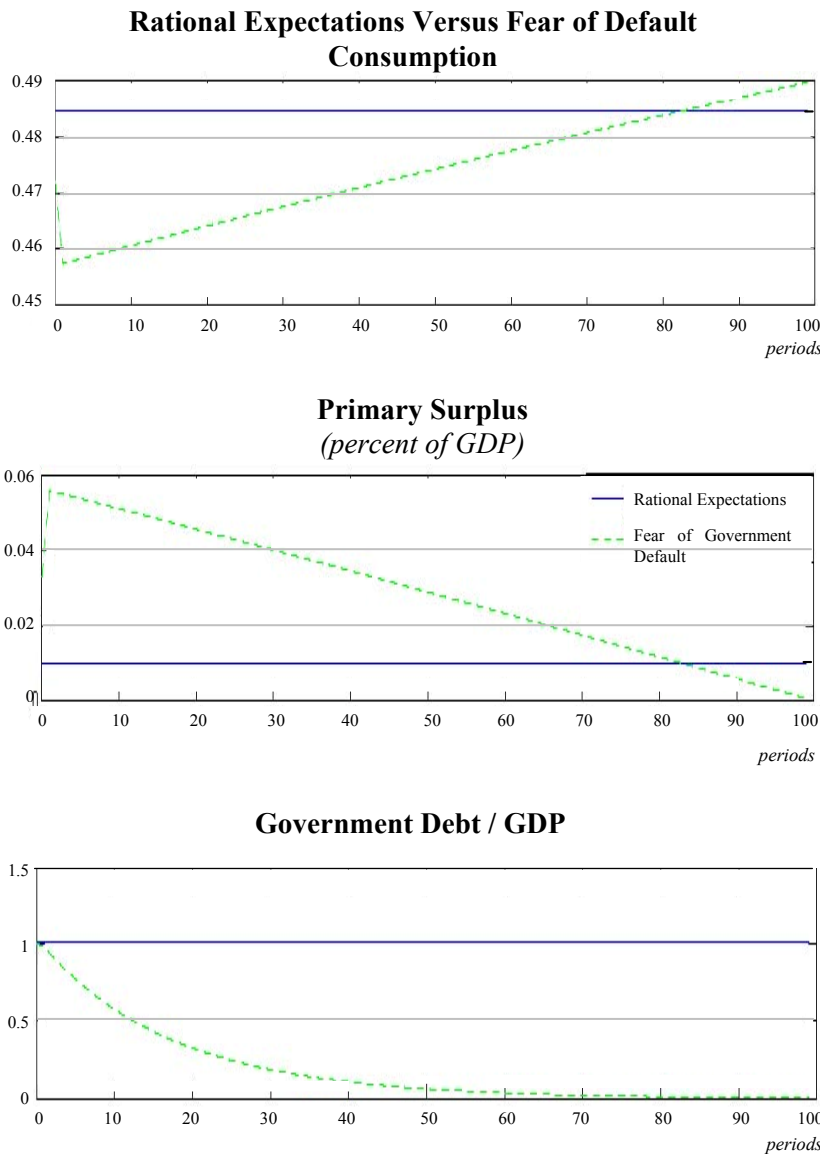
equal to 100 per cent of GDP).[12] Given this parametrization, the initial default probability is equal to 5 per cent.

In the baseline case, government debt stays roughly constant at its initial value. This result is consistent with the main policy message coming out from the optimal fiscal policy literature. The intuition is that, as lump-sum taxes are not available, the only way to reduce debt is by increasing the distortionary tax rate today, which in turn would allow to reduce tax rates tomorrow. Under this path of taxes, households would initially enjoy less consumption and more leisure, whereas the contrary would be true later on (when the tax rate would be allowed to be lower, thanks to the reduction attained in the burden of debt). However, under standard assumptions on the utility function,

households prefer to smooth consumption and leisure over time and states. Therefore a benevolent government keeps distortionary taxes as smooth as possible, and allows debt to fluctuate around the initial value. In other words, a policy of debt reduction is sub-optimal. This policy implication does not hold anymore in a context in which households fear government default. Instead, taxes are increased at the beginning and debt is correspondingly reduced. To get an intuition of this result, it is important to understand the trade-off now faced by the government. On one side, as in the baseline framework, taxes are distortionary and therefore the government would like to keep them as constant as possible. On the other side, the government is aware that the perceived probability of default is higher the higher the debt level. These expectations translate into

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[12]   Of course, changing the initial value does not affect the qualitative features of the result, as long as b_{-1} is above the threshold $\bar{b}$.

higher interest rates on government bonds and higher interest payments. Since agents are learning, the only way to manipulate distorted believes is by reducing debt. Fiscal consolidation becomes optimal because it is a way to correct distorted expectations.

Moving from a single realization to a fully-fledged simulation, Table 1 shows the average values for consumption and leisure and for fiscal variables (tax rate, government debt and primary

<div align="right">**Table 1**</div>

<div align="center">**Average Allocation**</div>

	Full Credibility Model	Partial Credibility Model
Consumption	.31	.3
Leisure	.38	.39
Labor Tax Rate	.49	.51
Bond Holding	.2	.14
Primary Surplus	.0004	.01

surplus) in our two economies (averages are computed over 1000 simulated realizations of the shocks, for 20 time periods each). The qualitative results are confirmed. While in the rational expectation benchmark the mean value of bond holdings is equal to the initial one, in the economy with fear of default it is equal to 0.14, which means that fiscal consolidation is indeed optimal.

Correspondingly, in the second economy taxes and primary surpluses are on average higher (0.51 instead of 0.49 for taxes, 0.01 instead of 0.004 for the primary surplus). After 20 periods debt over GDP is equal to about 100 per cent in the case of a fully credible government, while it is equal to 35 per cent in the other scenario.

4   A step backward: are stimulus packages justified?

In Section 3 we studied a post-crisis situation, in which the debt has already reached the threshold above which scepticism about government commitment to debt repayment kicks in. In such a context, we showed that doubts about the capability/willingness of the government to pay back debt require a substantial, and possibly quite painful, fiscal consolidation. It is therefore natural to ask whether implementing a fiscal expansion in the event of a crisis can be justified, given that the stimulus might triggers fears of a government default.

To answer this question, in this section we do not focus on the post-crisis period only, but we aim at characterizing the optimal fiscal policy both before and after the crisis.

In particular, we assume that productivity ϑ_t is uncertain only at time $t = T$, when it can take two values, either ϑ_L or ϑ_H, with $\Pr ob(\vartheta = \vartheta_H) = \pi$ and $\Pr ob(\vartheta = \vartheta_L) = 1 - \pi$, but it is constant in all other periods: $\vartheta_0 = \vartheta_1 = ... = \vartheta_{T-1} = \vartheta_{T+j} = \vartheta_L(1 - \pi) + \vartheta_H \pi \ \forall j \geq 1$.

Figure 3 shows the optimal way to react to a large decrease in the productivity under the rational expectation benchmark. Before period T the government sets a constant tax rate in all periods and runs a balanced budget in all periods. At T, conditional on the bad shock realization, the government runs a primary deficit and issues debt, which from that period onwards is rolled

Figure 3

Optimal Response to a Bad Shock Under Rational Expectations
(percent of GDP)

Government Deficit
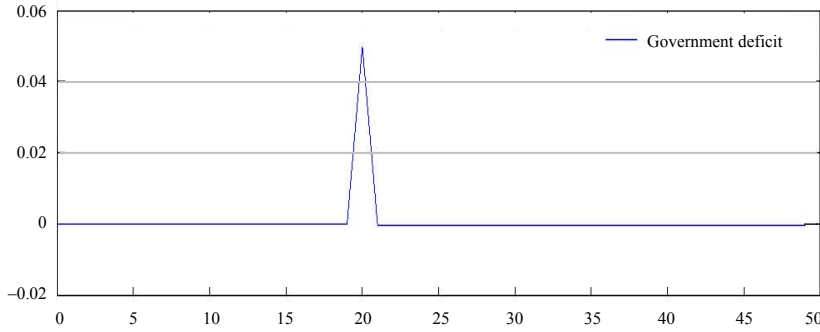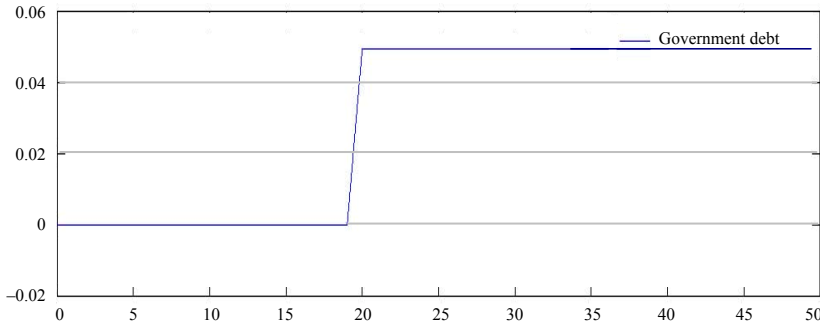
Government Debt

Figure 4

Optimal Response to a Bad Shock Under Fear of Default
(percent of GDP)

Government Deficit
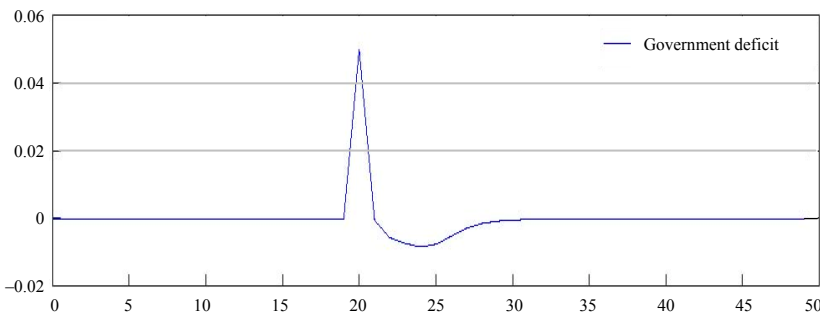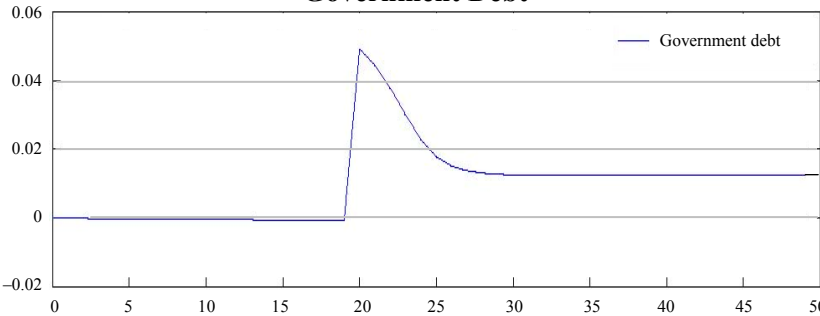
Government Debt

over for ever. After the bad shock the tax rate is higher than before to pay for the higher debt services than before the crisis. But it is not optimal to bring debt to a lower levels.

Things are different when agents fear government default. In particular consider an economy in which debt has been below the "psychological" threshold above which concerns for debt repayment start to appear. The government faces a trade-off concerning the way to cope with the crisis. If the government decides to react to the bad shock by issuing bonds, effects on consumption will be smoothed, but agents will start to fear default, which has costs because it suboptimally increases interest rates and interest payments.

What is the optimal way to respond to the shock in this case? Figure 4 offers a graphical answer to the question, for the case of $\pi = 0.5$, $\vartheta_H = 1.1$ and $\vartheta_L = 0.9$. As in the rational expectations benchmark, the optimal fiscal policy implies running a budget deficit in the event of a realization of a bad shock in T. So one could conclude that in adverse circumstances a fiscal stimulus is justified even if it

induces fears concerning government debt.

However, this conclusion comes with several caveats. First, as we saw in the previous section, after the shock the government starts a fiscal consolidation aimed at reducing debt and increasing its credibility. Second, the jump in debt in T is lower with respect to the benchmark case. Third, the fact that agents may start fearing default at T influences the optimal fiscal policy even before period T.

Figure 5

Optimal Front-Loading:
Rational Expectations Versus Fear of Default
Government Debt Before Period T

(percent of GDP)

Figure 5 shows the dynamics of government debt before the realization of the shock both in the case of a fully credible government and in the case of a non fully credible government. It is apparent that, while starting from the same initial debt levels, the latter reduces debt much more than the former.[13] This provides a theoretical rationale to the policy prescription of building "fiscal space" in good times in order to be able to use fiscal policy as a counter-cyclical tool in bad times.
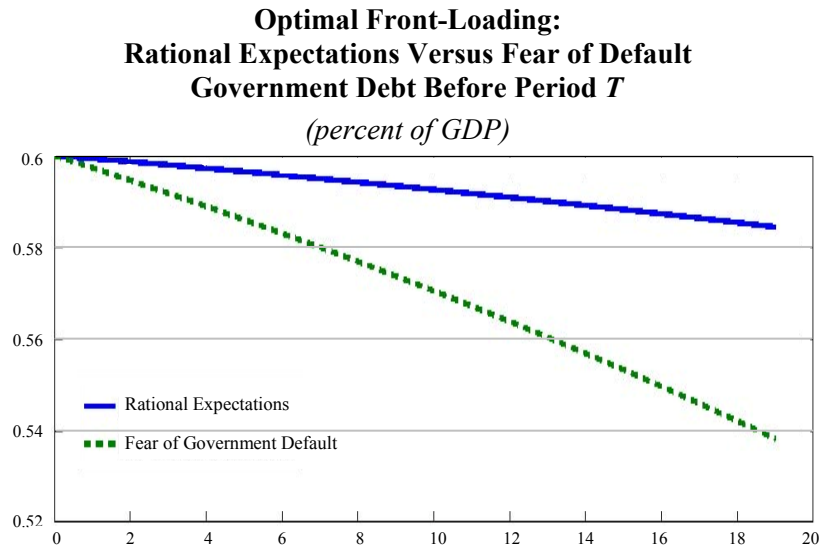
5   Policy Implications for exit strategies: A tale of two countries

In the light of the model described above, how policy suggestions differ across different countries? First, the more investors are sceptical about the government willingness and/or ability to honor its debt, the more the fiscal authorities should pursue fiscal consolidation. Second, countries which are more indebted should act with more strength to reduce the debt burden. In both cases the consequences of distorted expectations are stronger, so more restrictive fiscal policies are required to restore trust in sovereign solvency.

We illustrate these insights using the German and the Italian cases. Both countries have been hardly hit by the economic crisis (in both GDP fell by about 5 per cent in 2009), but they have very different public finances (the debt-to-GDP ratio is at about 115 per cent in Italy and about 80 per cent in Germany). Moreover, perceived default risk as reflected in ratings, bond spreads and differences in the cost of credit default swap contracts, is significantly higher in the Italian case.

We calibrate the initial value for α to match the sovereign default expectations implicit in the prices of CDS contracts. We set the initial debt at the 2009 (post-crisis) level in the two countries. Figures 6 and 7 respectively show how primary deficit and debt/GDP should evolve in the two countries. The solid line refers to Germany, whereas the dashed line refers to Italy. The country facing a higher debt level and higher default premia runs higher primary surplus and reduces debt quicker than the other one.

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[13]   The numerical example shown in Figure 5 has $\pi = 0$. In this scenario, debt is reduced between 0 and T–1 by about 3 per cent by a fully credible government and by about 11 per cent by a non fully credible government (in both economies the initial debt level has been set equal to 75 per cent of GDP).

Figure 6

Primary Surplus
(percent of GDP)

Figure 7

Debt / GDP
(percent of GDP)

6 Conclusions and future research
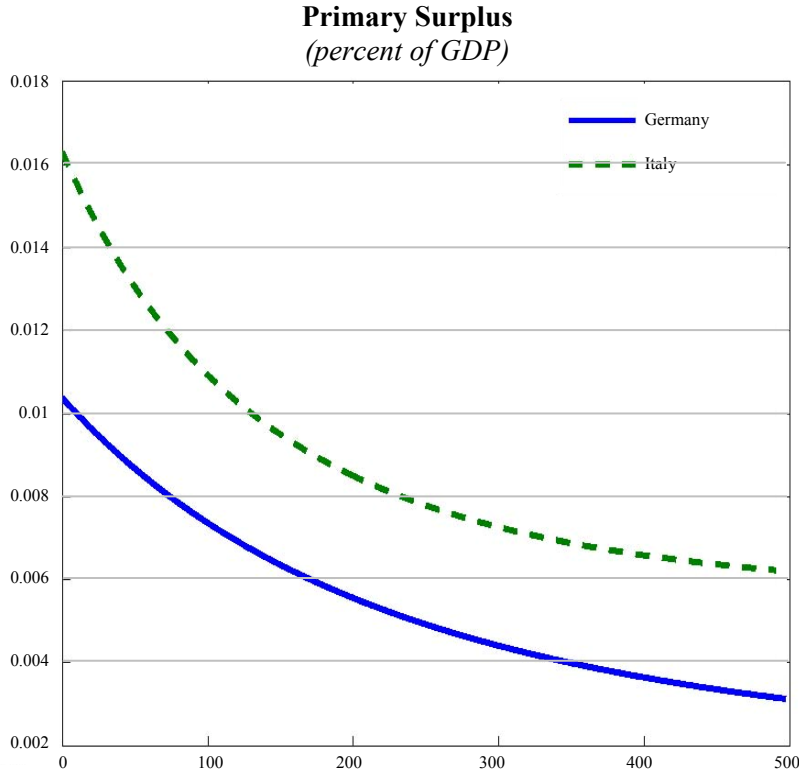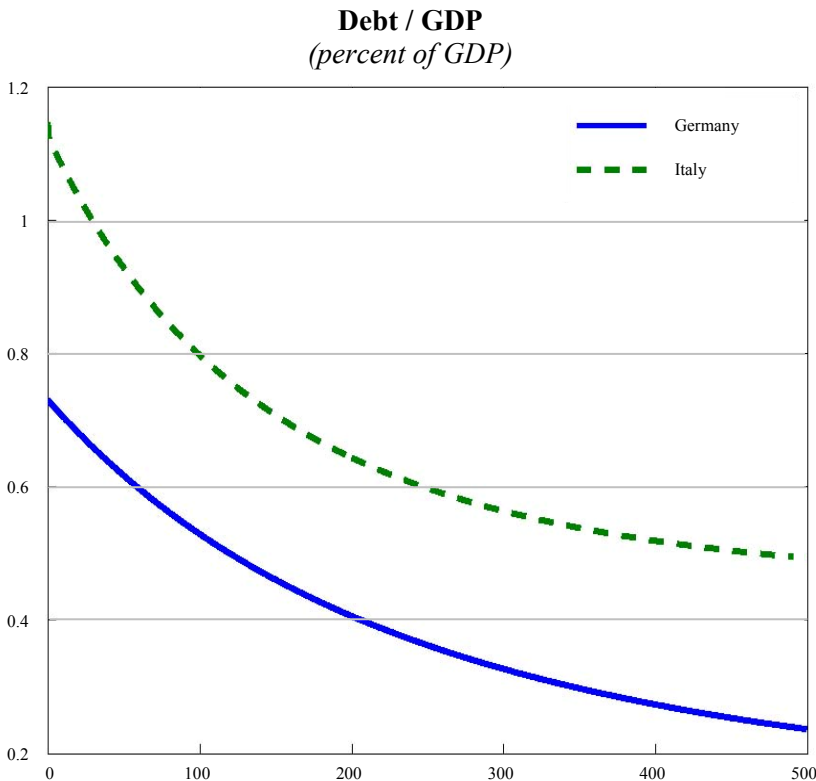
To moderate the adverse consequences of the recent downturn, governments have intervened through expansionary fiscal policy. These interventions were justifiable but have led to a steep increase in public debts. As economies gradually recover from the recession, there is disagreement about whether to stabilize debt ratios at post-crisis levels, or to bring them down to pre-crisis levels.

This paper offers a first formal theoretical rationale, within the framework of standard optimal fiscal policy theory, for implementing a debt reduction policy after an economic crisis. Moreover, we derive the optimal size of consolidation as a function of the degree of government credibility and of the post-crisis level of debt.

If agents fully trusted the commitment of governments to always honor their debt obligations, no further fiscal consolidation would be required. But if agents fear government default and a frontloaded debt reduction reduces such fears (thereby reducing risk premia on sovereign bonds and interest rates) a quick fiscal consolidation path, such as the one advocated by several

international organizations and observers, would be optimal.

The model can be extended in several possible dimensions. First, the assumption that default is not an equilibrium outcome should be relaxed. As our analysis refers to advanced countries, this assumption may be reasonable. Much less so for developing countries. Therefore one important extension would be to include a positive possibility of default in equilibrium. In this kind of model we conjecture that two possible equilibria can arise. When agents assign a low probability to the event of default, the low increase in the interest rate (with respect to the full credibility case) may be not enough to justify actual default. But when agents assign a very high probability of default, then the increase in the interest rate may support their believes because it may be optimal for the government to default. Because of the very high interest rate the cost of a transitory exclusion from the financial markets is lower than the distortionary cost of taxation to repay debt.

Another interesting extension would be to analyze fiscal and monetary coordination. In particular, it would be interesting to understand whether optimality requires that fiscal consolidation precedes or follows monetary tightening in the aftermath of a crisis, and whether a certain amount of inflation tax is an optimal way to pay the fiscal costs of the crisis.

Finally, in the paper we assumed that the government expenditure follows an exogenous stochastic process, as it is customary in the public finance literature. Because of this assumption, however, we cannot address the issue of the optimal composition of the post-crisis fiscal adjustment. In particular, should the fiscal authority reduce debt by higher taxes or by lower expenditure? Under standard assumptions on the utility and the production functions the optimal thing to do would probably be a mix of the two.

We leave all these extensions for future research.

APPENDIX

Proof of Proposition 1

First we show that constraints equation 3, equation 4 and equation 15 imply equation 20.

Consider the period-by-period budget constraint after substituting for the household optimality conditions:

$$b_{t-1} = \frac{u_{c,t} s_t}{u_{c,t}} + \beta E_t \frac{u_{c,t+1}}{u_{c,t}} \hat{\pi}_t b_t \tag{33}$$

where $s_t \equiv c_t - \frac{u_{l,t}}{u_{c,t}}(1 - l_t)$, b_t is the amount of bond holdings and $\hat{\pi}_t$ is the perceived probability at time t about government default in $t+1$. Multiplying both sides of equation 33 by $u_{c,t} A_t$, where $A_t \equiv \prod_{k=0}^{t} \hat{\pi}_{k-1}$ we get:

$$b_{t-1} u_{c,t} A_t = (u_{c,t} c_t - u_{l,t}(1 - l_t)) A_t + \beta E_t u_{c,t+1} A_t \hat{\pi}_t b_t \tag{34}$$

Notice that A_t has a recursive formulation given by:

$$A_t = A_{t-1} \hat{\pi}_{t-1} \tag{35}$$

Forwarding equation 35 one period we get:

$$A_{t+1} = A_t \hat{\pi}_t \tag{36}$$

Inserting equation 36 into equation 34 we get:

$$b_{t-1} u_{c,t} A_t = (u_{c,t} c_t - u_{l,t}(1 - l_t)) A_t + \beta E_t u_{c,t+1} A_{t+1} b_t \tag{37}$$

Keeping iterating forward equation equation 37 and imposing the transversality condition $\lim_{t \to \infty} \beta^t A_t b_t u_{c,t} \to 0$, we get:

$$b_{t-1} u_{c,t} A_t = \sum_{j=0}^{\infty} \beta^j (u_{c,t+j} c_{t+j} - u_{l,t+j}(1 - l_{t+j})) A_{t+j} \tag{38}$$

To prove the reverse implication, take any feasible allocation $\{c_{t+j}, l_{t+j}\}_{j=0}^{\infty}$ that satisfies equation 20.

Define:

$$b_{t-1} = E_t \sum_{j=0}^{\infty} \beta^j A_{t+j} u_{c,t+j} s_{t+j} \frac{1}{u_{c,t} A_t} \tag{39}$$

It follows that:

$$b_t = E_{t+1} \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t+1} A_{t+1}} \tag{40}$$

$$
\begin{aligned}
b_{t-1} &= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + E_t \sum_{j=1}^{\infty} \beta^j A_{t+j} u_{c,t+j} s_{t+j} \frac{1}{u_{c,t} A_t} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \beta E_t \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t} A_t} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \frac{\beta}{u_{c,t} A_t} E_t u_{c,t+1} A_{t+1} E_{t+1} \sum_{j=0}^{\infty} \beta^j A_{t+1+j} u_{c,t+1+j} s_{t+1+j} \frac{1}{u_{c,t+1} A_{t+1}} = \\
&= \frac{A_t u_{c,t} s_t}{u_{c,t} A_t} + \frac{\beta}{u_{c,t} A_t} E_t u_{c,t+1} A_{t+1} b_t
\end{aligned}
\tag{41}
$$

Using equation 36 we get:

$$
b_{t-1} = s_t + \frac{\beta}{u_{c,t}} E_t u_{c,t+1} \hat{\pi}_t b_t
\tag{42}
$$

Using the households' optimality conditions given by (4) and (15), equation (42) coincides with equation (3).

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A NOTE ON OPTIMAL FISCAL RULE FOR TURKEY

Mehmet Yorukoglu[*]

An optimal dynamic fiscal loss model for Turkey is presented in this note. The model is used as a benchmark to gauge the success of potential simple fiscal rules. Optimal linear and non-linear rules are shown to perform well.

1   Introduction

For many reasons, governments seek to have stable expenditure paths through time. That individuals have a preference for smooth consumption paths is a relatively well-understood and well-studied phenomenon. However, empirical evidence across countries show that governments' preference for smooth consumption may be even stronger than that of individuals. For most of the countries where governments can easily borrow to smooth their expenditures against shocks, standard deviation of government expenditures is significantly smaller than the standard deviation of consumption of private agents. Shocks to output, government expenditures, and financial sector are inevitable. Together with these shocks, governments' strong taste for smooth consumption make unexpected hikes in debt to output ratio quite common. However, governments can borrow to smooth consumption during bad times in a sustainable manner, only if they can achieve to reduce their debt levels during good times. Here lies an important time-inconsistency problem, and failing to solve this problem in a credible way may paralyze governments' ability to borrow in bad times, making them pay very high risk premia as a consequence. Amending fiscal rules into law in a credible manner can help solve this problem and may be used as the necessary commitment device. To serve as a successful commitment device a fiscal rule must be credible, simple, and transparent.

In an environment where there are no shocks coming to economy, the government's problem would be simple. The government would choose an ideal debt to output level and would balance its budget at this level. Through time, the debt to output ratio, and the government expenditure would both be smooth – except that the latter grows at the growth rate of output. In reality, however, there are significant shocks coming to the economic environment. Under the environment with shocks, it makes sense that the government determines an *ideal debt to output ratio b*[*], and a *desired smooth government expenditure path*, g_t[*], so that no matter what shocks come, it will stay close to this ratio and the path through time. There is a trade off between deviating from the ideal debt to output ratio, and deviating from the desired smooth government expenditure path. If the government chooses to stay very close to one of these, it will have to sacrifice from being close to the other. Therefore the government will have to balance out these two deviations according to its preferences, *i.e.*, how much these deviations matter for the government.

The problem of the government can be modeled as a *dynamic fiscal loss minimization problem* where given an initial debt, output level, and the government's expectations about future income path, it picks an optimal path of expenditures and debt for current and future periods. The government does that to minimize a measure of total sum of deviations from the ideal debt to output ratio, *b*[*], and the desired smooth government expenditure path, g_t[*], through time.

In this note, we model and solve a *dynamic fiscal loss minimization problem* for Turkey. We use the optimal solution to this problem as a benchmark to measure the success of potential simple

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    The views presented in this note are merely the author's personal views, they do not bind CBRT. The usual disclaimer applies.

fiscal rules. We calibrate the parameters and estimate the shock processes using Turkish data. Here we have two alternatives for modelling the income process. In the first alternative, a stochastic income process for Turkey can be estimated using historical data and a dynamic stochastic fiscal loss minimization problem can be solved. The second alternative is to use historical income data for future realizations of income in a dynamic fiscal loss minimization problem under the assumption of perfect foresight for government. Since estimating a reasonably accurate stochastic income process using historic data may be a problem, as a first step, we follow the second course in this note.

2   Economic environment

Consider a government which starts time zero with initial expenditure and debt levels, g_0 and b_0, respectively. Let the output in the economy at time zero be y_0. Assume that the economy grows at rate γ. Given the initial expenditure level, government desires to set its future expenditure levels through time according to $g_0^* = sy_0$ and $g_t^* = \gamma^t g_0^*$. Here s is the desired government expenditure to output ratio and given the initial desired government expenditure level g_0^* future expenditure levels smoothly grows at rate γ. This implies $g_t^* = s\gamma^t y_0$.

Given how the market's perceptions about the country's potential risk relates to its debt to output ratio, there is a desired level of debt to output ratio, denoted by b^*. The government seeks to keep its debt to output ratio $\dfrac{b_t}{y_t}$ as close to b^* as possible. Assume that government taxes income at the constant rate τ.

Consider a government seeking to minimize the dynamic loss function:

$$L = \min_{\{g_t, b_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left(\frac{1}{1+r}\right)^{t-1} \left[\underbrace{\alpha_g \left(\frac{g_t}{y_0\gamma^t} - s\right)^2}_{\text{expenditure smoothing}} + \underbrace{\alpha_b \left(\frac{b_t}{y_t} - b^*\right)^2}_{\text{debt smoothing}} \right] \right\} \tag{1}$$

subject to:

$$g_t + (1+r)b_{t-1} = b_t + \tau y_t \tag{2}$$

$$b_0 \text{ given.}$$

In (1), the loss function has two components; expenditure smoothing term and debt smoothing term. Here g_t and b_t denote the government expenditure and government debt at time t, respectively. The political preference parameters α_g and α_b can be seen as conveying the relative importance of expenditure smoothing and debt smoothing for the government. The government is assumed to discount future loss at rate $\dfrac{1}{1+r}$. The time t budget constraint of the government is given by (2). Given the initial debt and output level, b_0 and y_0 the government decides about the expenditure and debt sequences $\{g_t, b_t\}_{t=1}^{\infty}$, that will satisfy the budget constraint and that will minimize the total fiscal loss. Notice that one of the two political preference parameters, α_g and α_b are redundant. We can normalize one of these parameters.

Since the variables y_t , g_t and b_t all grow through time, transforming these variables into stationary ones will make the analysis more tractable. To this end, let $\widehat{y}_t = \frac{y_t}{\gamma^t}$, $\widehat{g}_t = \frac{g_t}{\gamma^t}$, and $\widehat{b}_t = \frac{b_t}{\gamma^t}$. The budget constraint can be transformed to:

$$\frac{g_t}{\gamma^t} + (1+r)\frac{b_{t-1}}{\gamma^t} = \frac{b_t}{\gamma^t} + \tau\frac{y_t}{\gamma^t}$$

which yields:

$$\widehat{g}_t = \tau\widehat{y}_t + \widehat{b}_t - (1+r)\frac{\widehat{b}_{t-1}}{\gamma}.$$

Notice that $\dfrac{b_t}{y_t} = \dfrac{b_t}{\gamma^t}\dfrac{\gamma^t}{y_t} = \dfrac{\widehat{b}_t}{\widehat{y}_t}.$

Let's restate the problem of the government. The government's problem in transformed variables reads:

$$L = \min_{\{\widehat{g}_t,\widehat{b}_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left(\frac{1}{1+r}\right)^{t-1} \left[\alpha_g(\widehat{g}_t - g^*)^2 + \alpha_b \left(\frac{\widehat{b}_t}{\widehat{y}_t} - b^*\right)^2 \right] \right\}$$

subject to:

$$\widehat{g}_t = \tau\widehat{y}_t + \widehat{b}_t - (1+r)\frac{\widehat{b}_{t-1}}{\gamma}$$

$$\widehat{b}_0 \text{ given.}$$

The Lagrange Equation corresponding to this problem reads:

$$L = \min_{\{\widehat{g}_t,\widehat{b}_t\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left(\frac{1}{1+r}\right)^{t-1} \left(\left[\alpha_g(\widehat{g}_t - g^*)^2 + \alpha_b \left(\frac{\widehat{b}_t}{\widehat{y}_t} - b^*\right)^2 \right] \right. \right.$$
$$\left. \left. \lambda_t \left[\widehat{g}_t - \tau\widehat{y}_t - \widehat{b}_t + (1+r)\frac{\widehat{b}_{t-1}}{\gamma} \right] \right) \right\}.$$

Efficiency conditions of this problem are:

$$\frac{dL}{d\widehat{b}_t} = \alpha_g(\widehat{g}_t - g^*)\frac{d\widehat{g}_t}{d\widehat{b}_t} + \alpha_b \left(\frac{\widehat{b}_t}{\widehat{y}_t} - b^*\right)\frac{1}{\widehat{y}_t} + \frac{1}{1+r}\alpha_g(\widehat{g}_{t+1} - g^*)\frac{d\widehat{g}_{t+1}}{d\widehat{b}_t} = 0,$$

and:

$$\widehat{g}_t - \tau\widehat{y}_t - \widehat{b}_t + (1+r)\frac{\widehat{b}_{t-1}}{\gamma} = 0.$$

Plugging this into the first condition yields:

$$\widehat{b}_t = \frac{\frac{\alpha_g}{\gamma}\left(\tau\widehat{y}_{t+1} + \widehat{b}_{t+1} - g^*\right) - \alpha_g\left(\tau\widehat{y}_t - \frac{1+r}{\gamma}\widehat{b}_{t-1} - g^*\right) + \alpha_b\frac{b^*}{\widehat{y}_t}}{\frac{\alpha_b}{\widehat{y}_t^2} + \frac{\alpha_g(1+r)}{\gamma^2} + \alpha_g}.$$

The first order condition given in (3) gives us optimal debt to output level through time, but unfortunately it is a relatively complex dynamic relationship. We can compute the optimal solution but it does not directly provide us a simple fiscal rule that we can practically use. However, we can use the optimal solution to gauge the relative success of potential simple rules. That is the route that we follow in the rest of our analysis.

3   Results

We pick parameter values that represent Turkish economy as close as possible. The tax rate τ is set to 0.3 so that government expenditures to output ratio is 0.3. Ideal debt to output ratio, b^* is picked as 0.3. We normalize α_b to one and we will consider a range of values for α_g. The average growth rate of real GDP in Turkey between 1970-2009 is used to calibrate γ, so that $\gamma = 4\%$. Initial output level y_0 is normalized to one and initial debt level b_0 is set to 0.45. Normalized real output growth numbers between 1970-2009 is used for future real output growth series.

The solution to the dynamic fiscal problem will be used as a benchmark to measure the success of potential simple linear rules. We will consider three potential fiscal rules:

i) sample fiscal rule considered:

$$d_t = d^* - 0.33(g_t - g^*) + 0.75(d_{-1} - d^*)$$

ii) optimized linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*) + \alpha_d(d_{-1} - d^*)$$

iii) optimized non-linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*)^{\phi_g} + \alpha_d(d_{-1} - d^*)^{\phi_d}$$

In order to grasp the optimal fiscal policy better, consider an environment with no output shocks where the economy grows at a constant rate, 4 per cent. Assume that the initial debt to output ratio is 45 per cent and desired level of debt to output ratio is 30 per cent. Figure 1 and 2 exhibits the transition of optimal debt to output and optimal government expenditure to output ratios during transition to the steady state of this economy for different values of alpha. Three values of alpha are used, $\alpha = 0.1, 10, 30$. For a low level of α – for $\alpha = 0.1$, for instance – debt smoothing is more important for the government compared to expenditure smoothing. As a result, at the expense of a more volatile expenditure path, the government chooses to have a debt to output ratio path close to the ideal level, 0.3. This is clearly seen in Figure 1.

For $\alpha = 0.1$, starting from a 45 per cent level, the transition to the steady state for debt to output ratio takes only one period. For larger α the transition takes longer as expected. For $\alpha = 30$, transition is slow; even after 20 years transition is not totally completed. Figure 2 exhibits government expenditure to output ratio during transition to the steady state for again $\alpha = 0.1, 10, 30$. For $\alpha = 0.1$, the transition is fast. It starts from a government expenditure to output ratio of 16 per cent, far below the desired level of 30 per cent. For a typical government this means

**Debt-to-output Ratio During Transition to Steady State
for Different *α* Values**
(no output shocks)

Figure 2

**Expenditure-to-output Ratio During Transition to Steady State
for Different *α* Values**
(no output shocks)
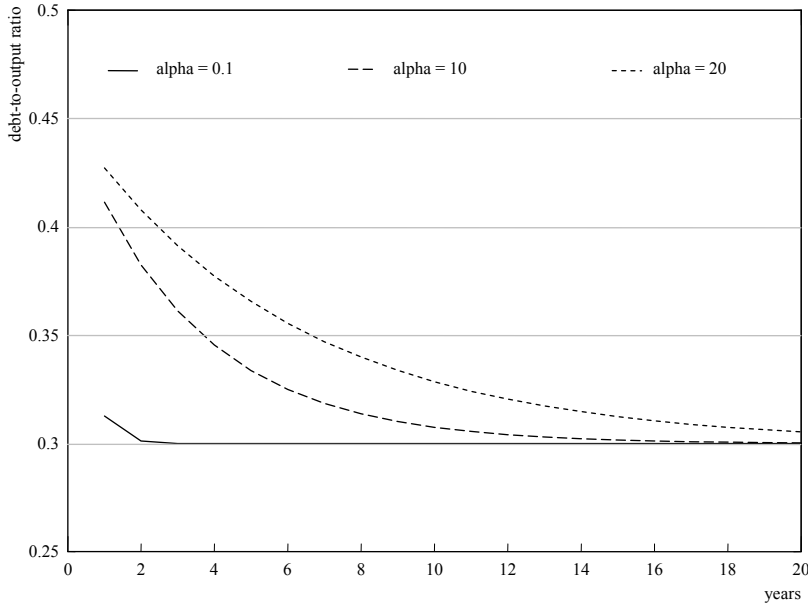
a deadly tight fiscal policy on transition. Most of the governments would probably not be able stand that tight of a fiscal policy profile, showing us that $\alpha = 0.1$ does not represent a very realistic and credible preference parameter.

For higher level of α, however, the transition is more comfortable. For $\alpha = 30$, a two per cent cut in the expenditure to output ratio, initially during transition, does the job.

Using the historical output growth data for Turkey, Figure 3 plots the paths for optimal government expenditure-to-output ratio for $\alpha = 10$ and 30. Output shocks create fluctuations around the desired level of 30 per cent. Notice that the fluctuations are smaller for higher α. Similarly Figure 4 shows the optimal paths for debt to output ratio. As expected the transition is faster and fluctuations are smaller for lower α.

Figure 5 plots the paths for the expenditure to output ratio derived from the optimal solution and from the sample fiscal rule considered using $\alpha = 30$. The sample fiscal rule creates significant fluctuations in the ratio, around the ideal level, 0.3. Similarly, the next figure exhibits the

Figure 3

Government Expenditure-to-output Ratio During Transition with Actual Growth Numbers

Optimal Government Expenditure-to-output Ratio
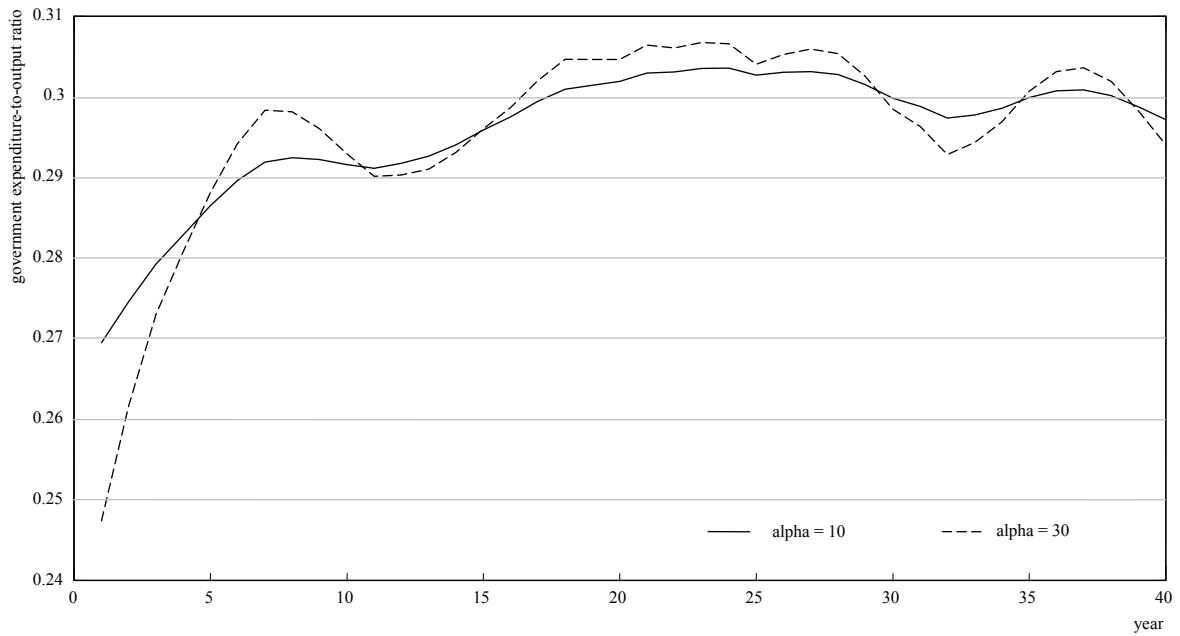
Figure 4

Government Debt-to-output Ratio During Transition with Actual Growth Numbers

Debt-to-output Ratio for Different Values of α
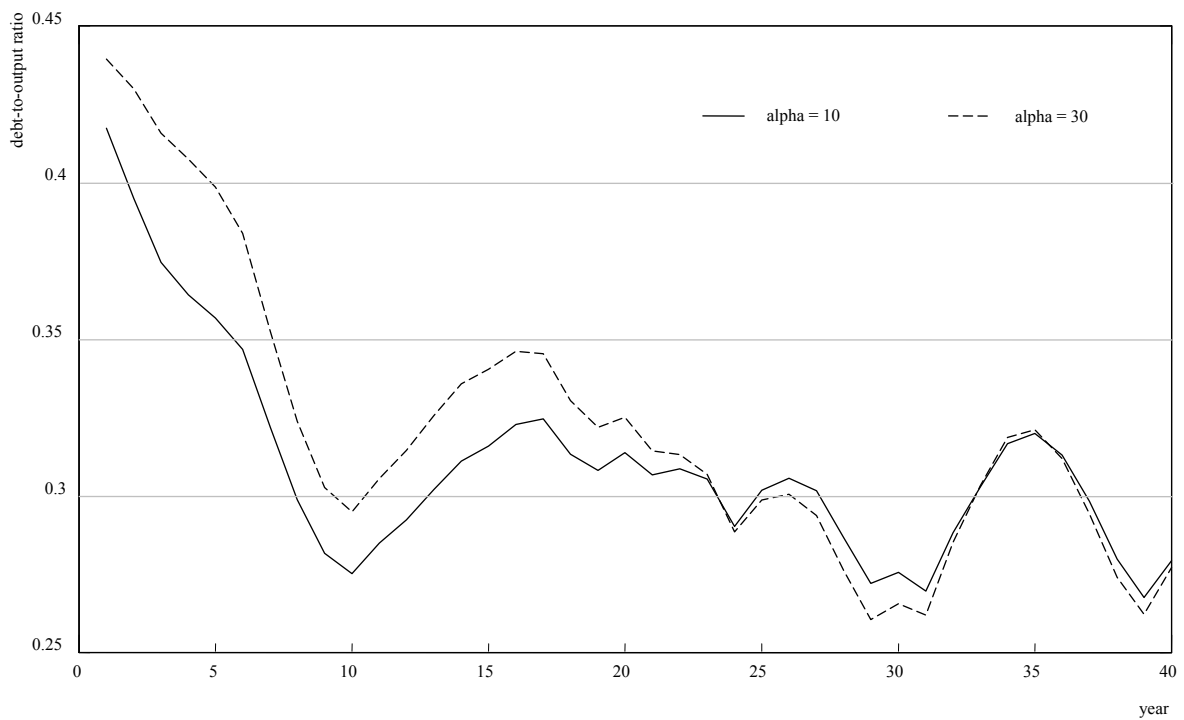
Figure 5

Expenditure-to-output Ratio Optimal Versus Sample Fiscal Rule Compared
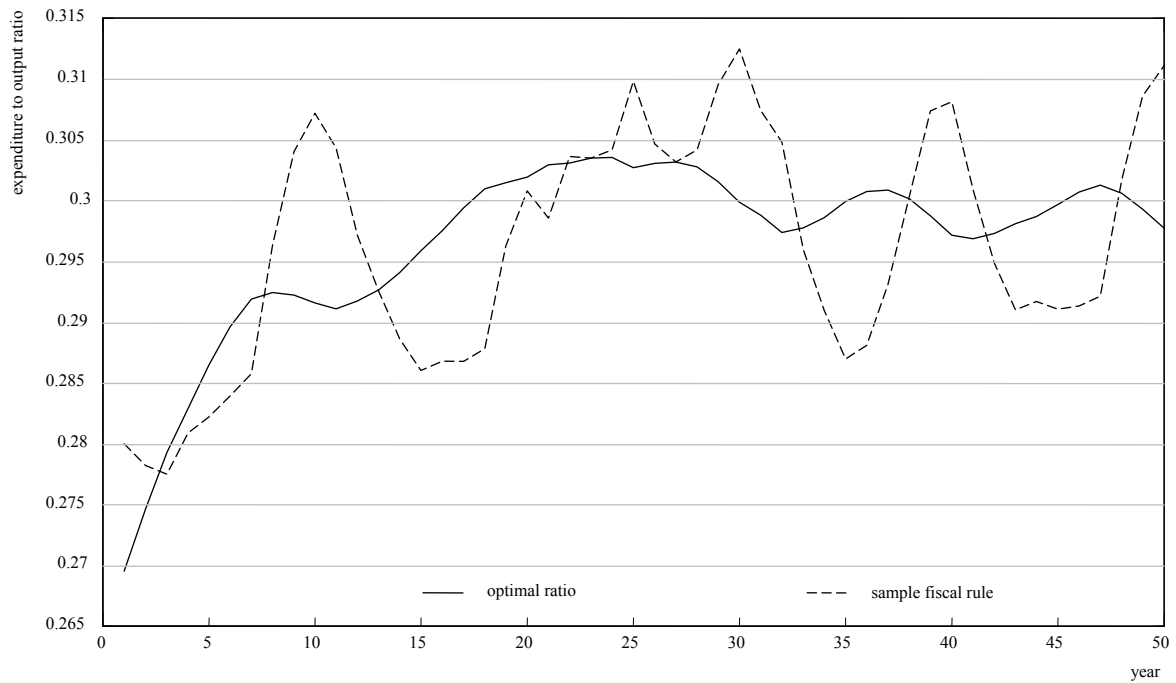
Figure 6

Optimal Debt-to-output Ratio Compared to the Sample Fiscal Rule
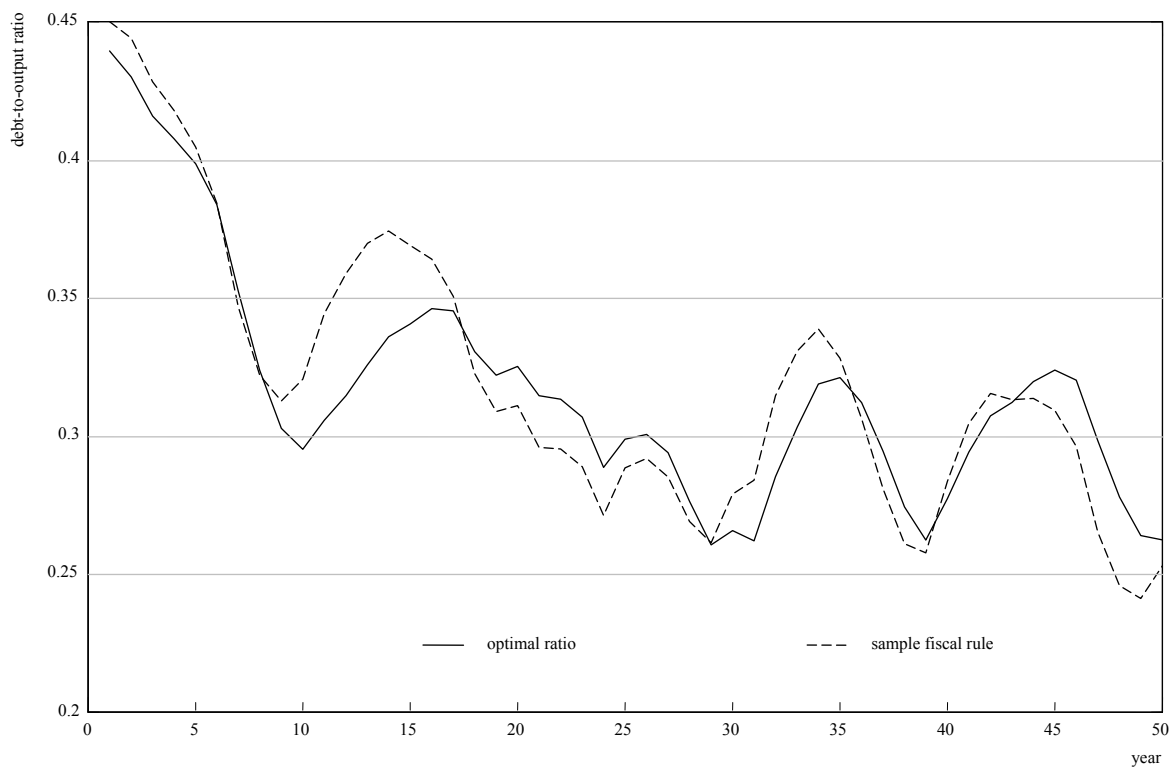
Table 1

	α_g	α_b	ϕ_g	ϕ_d
Sample fiscal rule	−0.33	0.75	1	1
Optimal linear rule	−0.24	0.86	1	1
Optimal non-linear rule	−0.21	0.98	1.13	0.88

Table 2

	Loss Function	Std. of Govt. Exp.	Std. of Govt. Debt
Optimal solution	0.1915	0.31	2.42
Sample fiscal rule	0.2494	0.80	3.17
Optimal linear rule	0.2217	0.55	2.84
Optimal non-linear rule	0.2115	0.39	2.79

paths for the debt to output ratio derived from the optimal solution and from the fiscal rule. The transition takes longer for the fiscal rule yet, there is not much difference in terms of volatility of the fluctuations between the optimal solution and the sample fiscal rule. Figure 5 and 6 show that in terms of debt to output ratio the sample fiscal rule performs quite similar to the optimal solution, however in terms of expenditure to output ratio its performance is not that satisfactory. The large fluctuations in the expenditure to output ratio may create significant burden on the governments trying to follow the considered sample rule, which may undermine the credibility of the program.

3.1   Optimal linear and non-linear rules

Consider the linear and non-linear rules of the following forms.

The linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*) + \alpha_d(d_{-1} - d^*),$$

The non-linear rule:

$$d_t = d^* - \alpha_g(g_t - g^*)^{\phi_g} + \alpha_d(d_{-1} - d^*)^{\phi_d}$$

For the linear and the non-linear rules, optimal parameter values that jointly minimize the loss function are computed for $\alpha = 30$. Table 1 gives the parameter values for the optimal linear and non-linear rules. Notice that for the optimal non-linear rule the elasticity parameter of the growth term implies a convex (>1) where as the elasticity parameter of the debt term implies a concave (<1) relationship.

Table 2 gives the value of the loss function, standard deviation of government expenditures and the standard deviation of government debt for the optimal solution, the sample fiscal rule, optimal linear rule, and the optimal non-linear rule, respectively. Notice that the optimal linear rule

improves the loss function significantly compared to the sample fiscal rule. Similarly, the volatility of the government expenditures is significantly reduced through optimal linear and non-linear rules. However, the volatility of government debt has not improved that significantly.

The paths of expenditure to output ratio are plotted for the optimal solution, the sample fiscal rule, the optimal linear and optimal non-linear rules respectively in Figure 7. The optimal non-linear rule notably reduces the magnitude of the fluctuations in the government expenditure to output ratio, making its application relatively comfortable for the government. Next, Figure 8 exhibits the paths of debt to output ratio for different rules. The paths do not differ from each other significantly.

The value of the loss function for different values of alpha in the range $\alpha \in [0.1, 60]$ is shown in Figure 9. By definition, the loss function is at minimum for all values of alpha for the optimal solution. The loss function is at maximum for the sample fiscal rule. Notice that for high values of α the loss function for the optimal non-linear rule approaches to the loss function of the optimal solution.

3.2   *How robust are the parameter values to the value of alpha?*

The optimal parameter values for the linear and non-linear rules are shown for different values of alpha in Figure 10. It is seen that optimal parameter values are quite robust to the political preference parameter α. The value range for α is [0.1, 60] with increments of 0.1. This is a rather encouraging result, since the optimal fiscal rule seems to be almost independent of government's preference of α. Figure 11 plots the standard deviation of government expenditure derived from different rules for different α values. It is seen that for all values of alpha in the range the volatility of government spending is significantly lower for the optimal linear and non-linear fiscal rules.

Similarly, Figure 12 exhibits the standard deviation of debt to output ratio from different fiscal rules for the wide range of α. Notice that for reasonable values of α, *i.e.* $\alpha > 20$, in fact the optimal non-linear rule outperforms even the optimal solution in the dimension of debt volatility.

3.3   *How robust are the results to the data starting point?*

Since we are using actual growth data, the results may depend on the data starting point. Starting points have no significance for our study, therefore we need to show that the results are robust to different data starting points. To that end, we computed the parameters of the optimal non-linear fiscal rule for different starting points. In Figure 13, using each year in the 40 year growth data as the starting point, computed parameters are shown. It is seen that the parameters are relatively robust to the data starting point.

3.4   *How robust are the results to other shocks?*

In addition to shocks to output, other shocks like shocks to government expenditures and interest rate shocks may also be important. Here we add exogenous government expenditure shocks and interest rate shocks to the analysis. We use identically and independently distributed shocks with some persistence. Shocks are assumed to persist for two periods. We introduce these shocks in the following way so that the problem of the government now reads:

Figure 7

Government Expenditure-to-output Ratio for Different Rules

Figure 8

Debt-to-output Ratio, Different Fiscal Rules Compared

Figure 9

Value of the Loss Function for Different Rules for Different Levels of *α*

Figure 10

Optimal Parameter Values for Different *α*

Figure 11

Standard Deviation of Government Expenditure for Different *α*

Figure 12

Standard Deviation of Debt-to-output Ratio for Different *α*
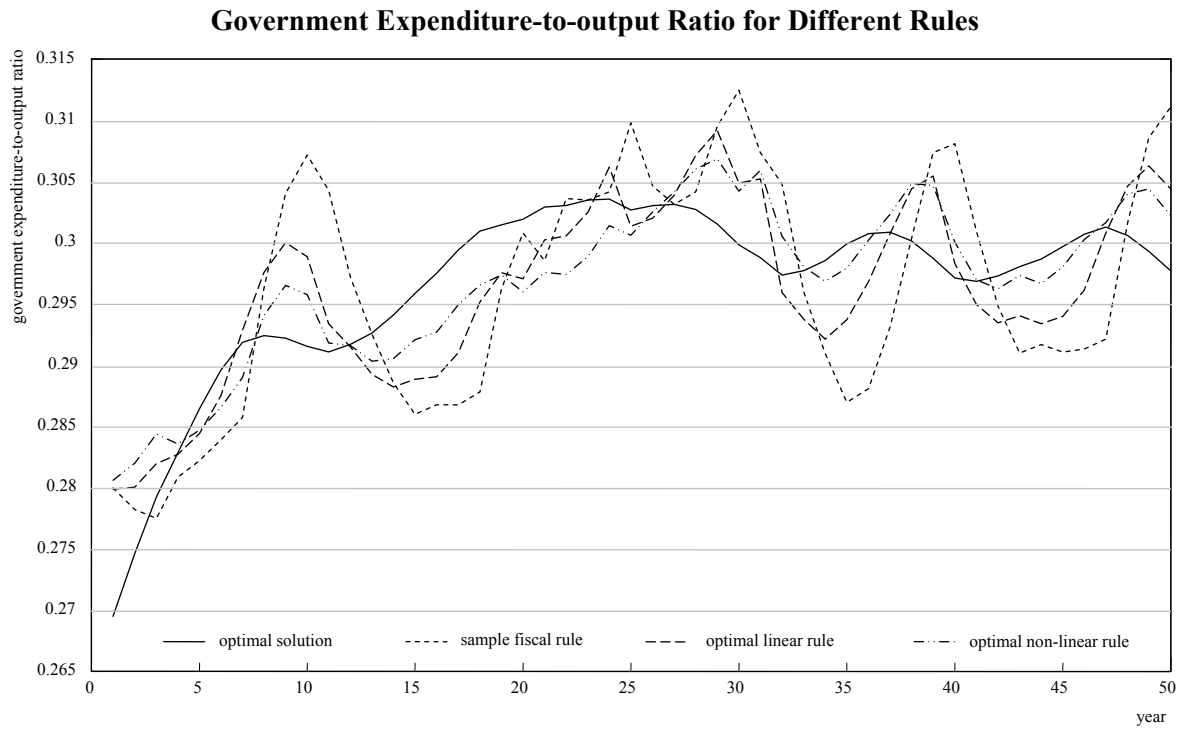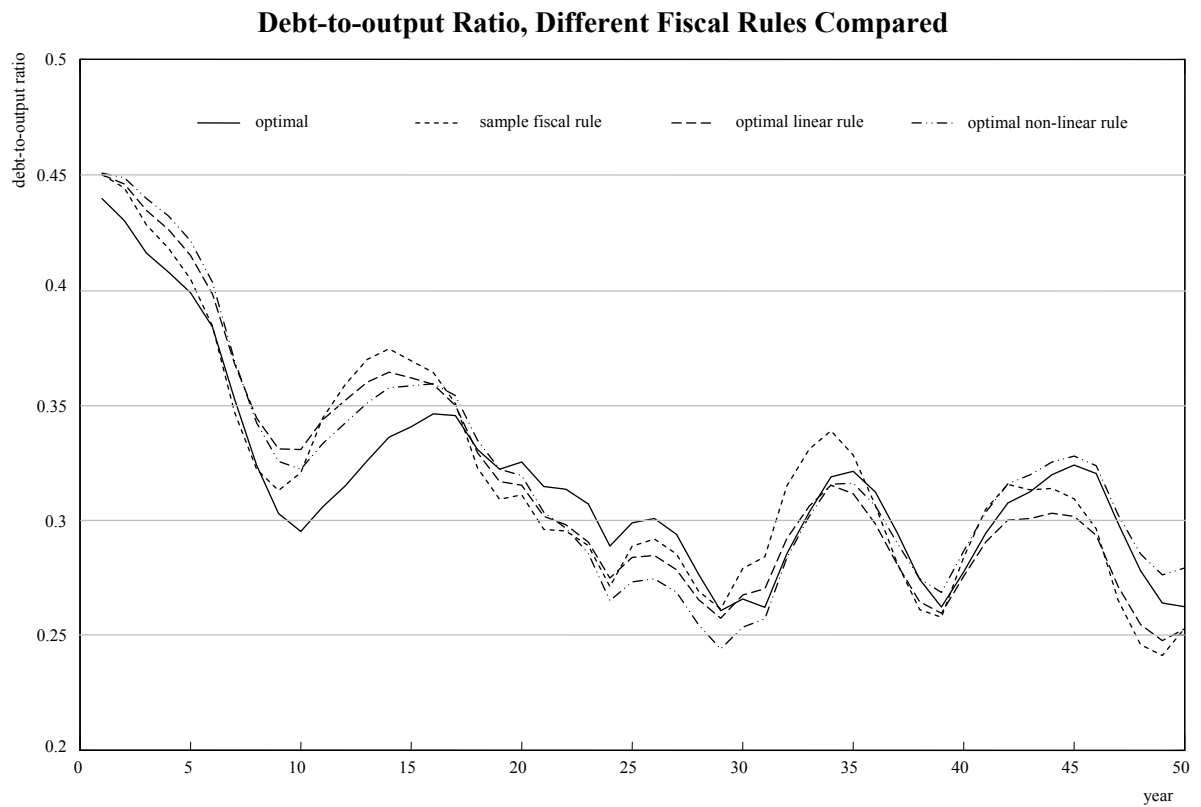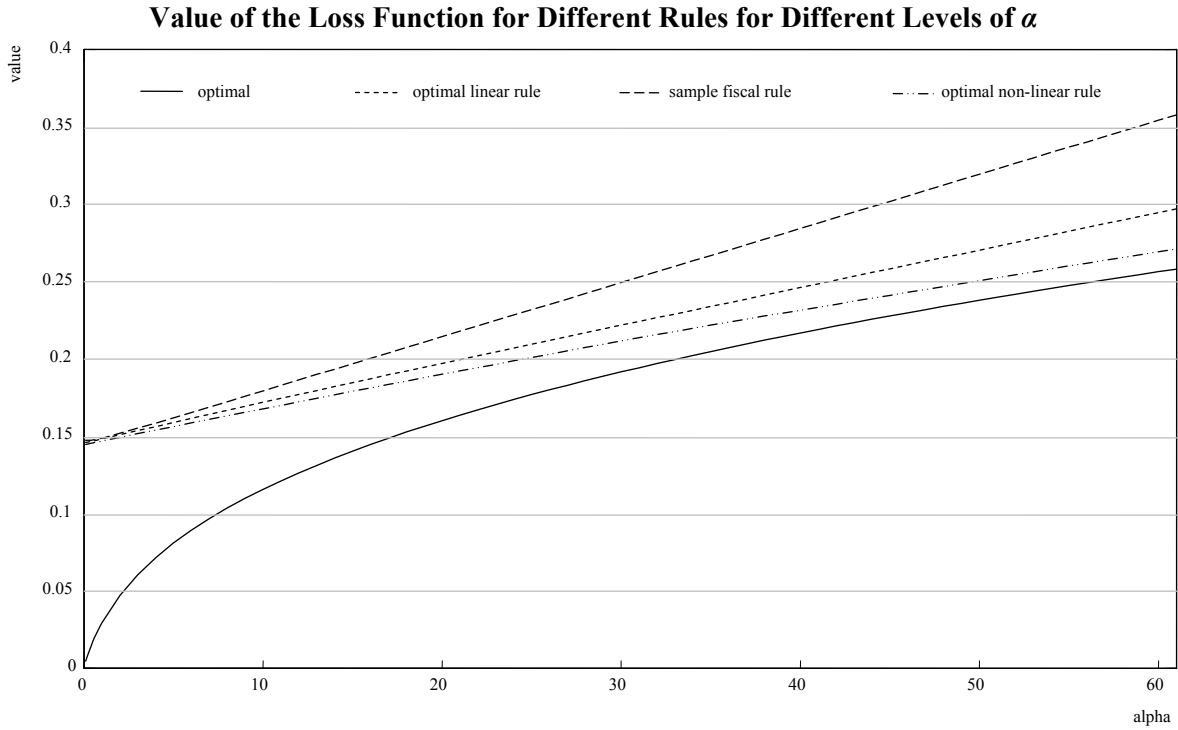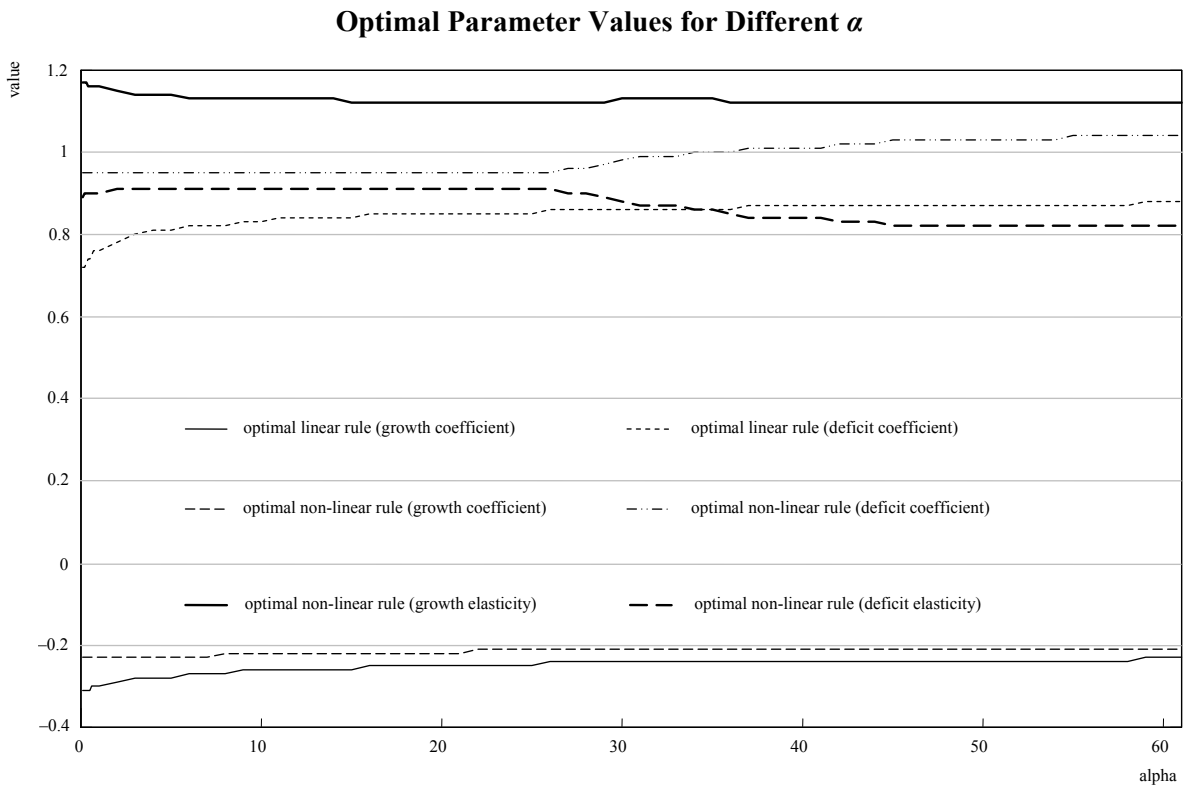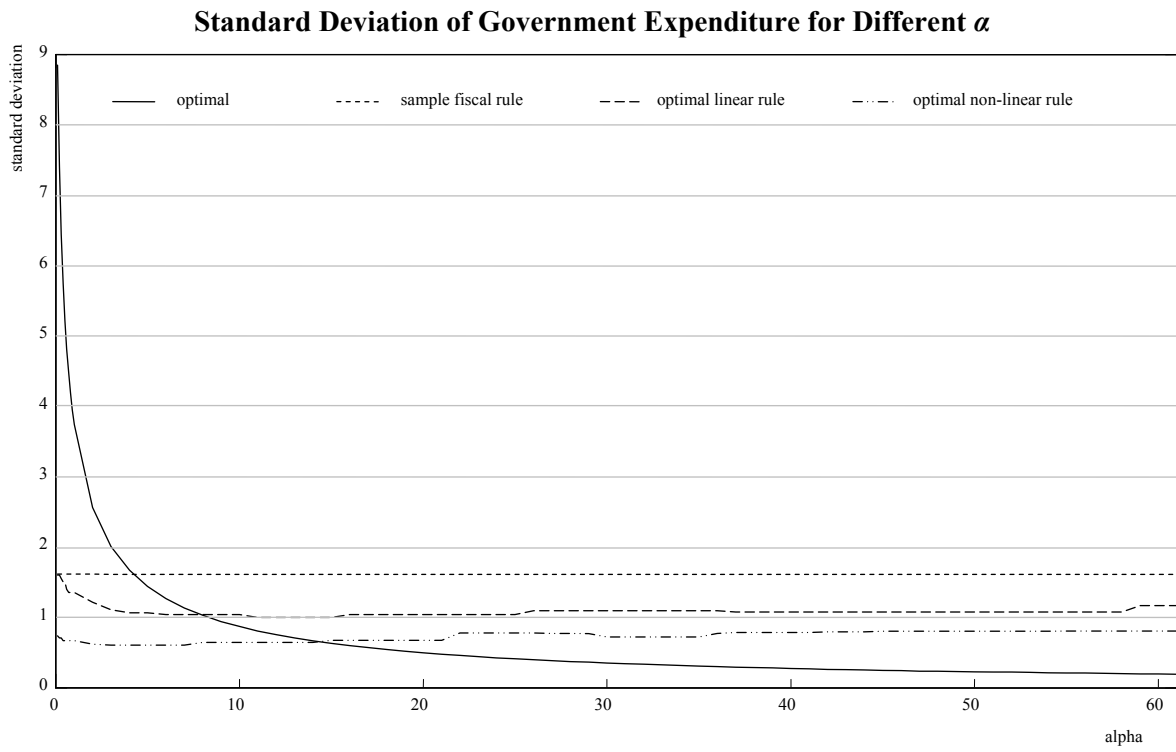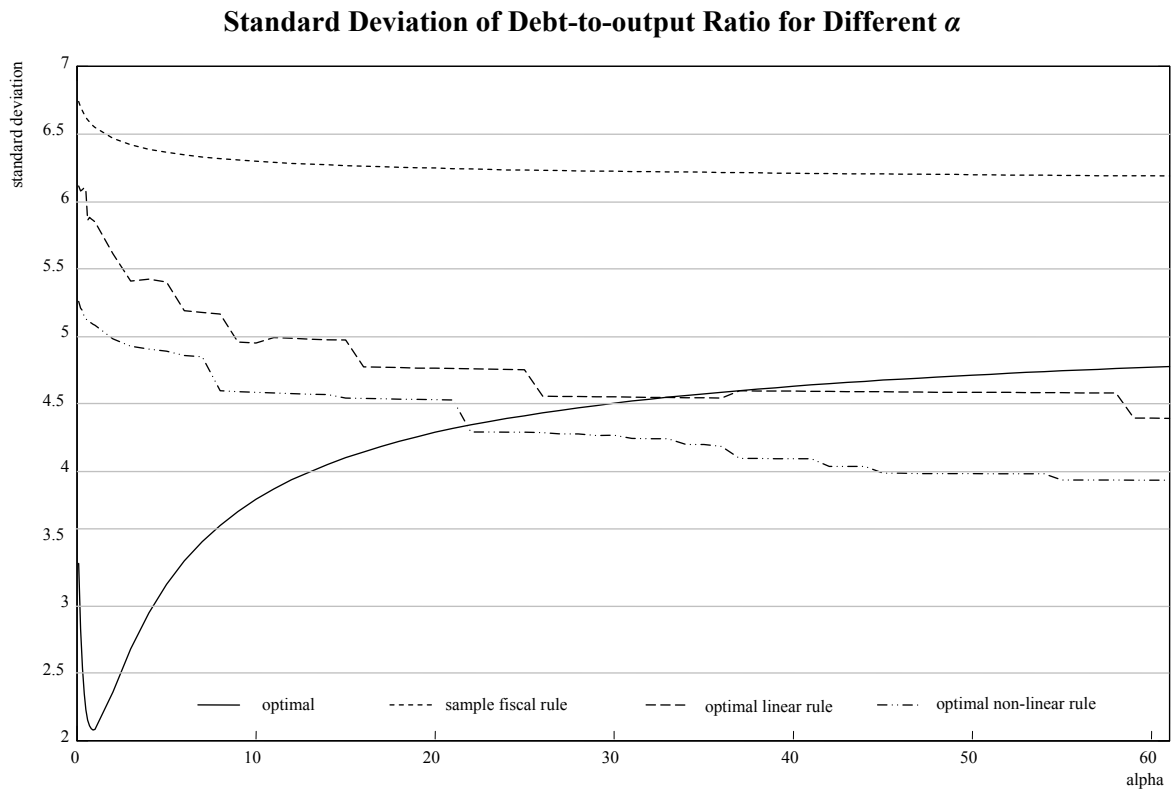
Figure 13

Sensitivity of Parameter Values for the Optimal Non-linear Rule
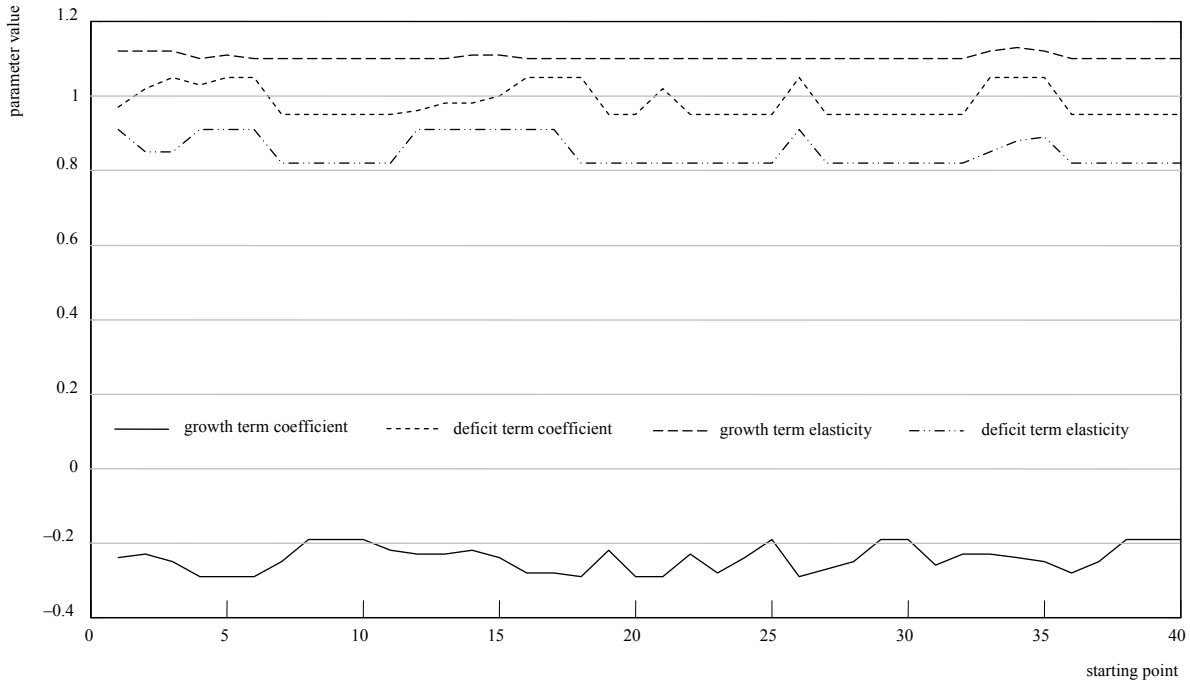
$$L = \min_{\left\{\widehat{g}_t, \widehat{b}_t\right\}_{t=1}^{\infty}} \left\{ \sum_{t=1}^{\infty} \left(\frac{1}{1+r}\right)^{t-1} \left[\alpha_g \left(\widehat{g}_t - \underbrace{z_t g^*}_{\text{expenditure shock}} \right)^2 + \alpha_b \left(\frac{\widehat{b}_t}{\widehat{y}_t} - b^* \right)^2 \right] \right\},$$

subject to:

$$\widehat{g}_t = \tau \widehat{y}_t + \widehat{b}_t - (1 + r_t) \frac{\widehat{b}_{t-1}}{\gamma},$$

$$z_t \text{ is iid with mean } 1,$$

$$r_t = \underbrace{x_t r}_{\text{interest rate shock}} , x_t \text{ is iid with mean } 1,$$

$$\widehat{b}_0 \text{ given.}$$

Again, for the linear and the non-linear rule, optimal parameter values that jointly minimize the loss function are found for $\alpha = 30$. Table 3 gives the parameter values for the optimal linear and non-linear rules with government expenditure and interest rate shocks.

Notice that adding government expenditure and interest rate shocks does not change the values of optimal parameters for the linear and non-linear rules significantly (compare Table 1 with Table 3).

Table 3

	α_g	α_b	ϕ_g	ϕ_b
Sample fiscal rule	−0.33	0.75	1	1
Optimal linear rule	−0.26	0.86	1	1
Optimal non-linear rule	−0.23	1.00	1.14	0.89

4   Conclusions

• The form of the sample fiscal rule considered (including terms with deviations from potential growth and deviations from ideal deficit level) is successful, but the parameters can be significantly optimized using Turkish growth data.

• Optimized linear rule significantly improves the loss function compared to the sample fiscal rule. Volatility (standard deviation) of government expenditures is drastically reduced by the optimized rule – by more than 30 per cent (from 0.8 to 0.55 per cent), making the rule much easier to apply politically for the government, hence increases the credibility of the applicability of the rule. Volatility of government debt is reduced by around 10 per cent through the optimized linear rule. Hence much of the improvement comes through the smoother government expenditure profile achieved.

• An optimized non-linear rule can further improve performance significantly. Although the optimized elasticity parameters (powers) of the non-linear rule are close to one (close to linear), using optimized non-linear rule reduces the loss function significantly. Compared to the sample fiscal rule considered, using the optimal non-linear rule reduces the volatility (standard deviation) of the government expenditures by more than 50 per cent (from 0.8 to 0.39 per cent). The volatility of government debt is reduced by around 15 per cent. Therefore optimal non-linear rule can improve the performance of the fiscal rule very significantly.

• The optimal parameter values for the linear and non-linear rules do not depend on the value of the political preference parameter, α. This is a very encouraging result since it implies that our results are robust to government preferences. Hence we don't need to know the government's exact preference about α to come up with the optimal fiscal rule.

• Adding government expenditure and interest rate shocks to the environment does not change the optimal parameter values for the linear and non-linear rules either. Hence the results are robust to potential alternative sources of shocks too.

• The last two robustness results increase the applicability and credibility of the optimal rules.

THE NEW MEDIUM-TERM BUDGETARY OBJECTIVES
AND THE PROBLEM OF FISCAL SUSTAINABILITY AFTER THE CRISIS

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The paper analyses the medium-term objectives (MTOs) recently adopted by the EU Member States as a reference for the multilateral budgetary surveillance, assessing the ability of the new MTOs to promote long-term fiscal sustainability. The paper calibrates the (yet undisclosed) algorithm for computing the minimum budgetary targets that EU countries can declare as MTO and discusses two novel features of the algorithm: a supplementary debt-reduction effort requested from high-debt countries, and the partial frontloading of the expected future increases in age-related expenditure – the cost of ageing. The paper evaluates the impact of the crisis on EU countries' current as well as future MTOs through the channels of higher public debt, lower growth potential, and higher cost of ageing. On the basis of alternative scenarios for macroeconomic and budgetary conditions as of 2012 – when the next revision of MTOs is scheduled –, the paper concludes that prospective MTOs would be more stringent than the current ones. Therefore, a path for gradual fiscal tightening is already embedded into the European fiscal framework and should be considered when discussing exit strategies. Finally, an alternative indicator linking MTOs to the current fiscal and financial imbalances is presented.

1   Introduction

The reform of the Stability and Growth Pact (SGP) introduced a number of relevant amendments to both the preventive and corrective arm of the EU fiscal framework. In particular, a new definition of the medium-term objectives (MTOs), which inform the EU multilateral budgetary and macroeconomic surveillance, was incorporated in the Stability and Convergence Programmes (SCPs) and their assessment by the European Commission.

EU Member States indicate MTOs for budget balances in structural terms, *i.e.*, cyclically-adjusted and net of one-off and temporary measures. The revised SGP establishes that MTOs may be country-specific, depending on national macroeconomic and public finances conditions and having regard to risks to long-term sustainability of public finances. General criteria for determining the medium-term budgetary targets agreed by the European Council consider the government debt, the potential output growth, and a safety margin with respect to the Maastricht limit of 3 per cent of GDP for the nominal budget deficit.

Initially, the revised SGP did not provide a well-defined rule for implementing the MTO determination criteria and then large room for judgmental analysis was left to each Member State when setting budgetary targets. In 2009, Member States and the European Commission agreed on a methodology for computing MTOs that renders operational the MTO determination criteria. The methodology encompasses not only public debt, potential growth, and budgetary safety margins, but also the implicit government liabilities associated with rising expenditure due to ageing populations. Two novel features are incorporated: a supplementary debt-reduction effort – required from EU countries whose debt-to-GDP ratio exceeds the Maastricht 60 per cent reference value –

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aimed at promoting convergence of debt ratios towards prudent levels; and a partial frontloading of cost of ageing – requested from all EU countries indistinctly – that seeks to cover part of the future increases in age-related spending. In the 2009 updates of SCP, 15 EU countries have declared MTOs calculated using the new methodology; however, neither they nor the European Commission have ever disclosed the new, specific algorithm for computing MTOs.

In the current debate on fiscal consolidation and high public indebtedness, the current MTOs could potentially play a role as part of the exit strategies. Being a formal constraint on fiscal policies in terms of medium-term budgetary outcomes, MTOs could help in planning a gradual reversal of expansionary stimulus. They could also facilitate coping with the problems of high debt and ageing-related implicit liabilities by requesting additional public savings through the supplementary debt-reduction effort and the partial front-loading of cost of ageing. There is a risk, on the other hand, that economic recovery falters because fiscal tightening starts too early and adjusts too much. In this regard, the current MTOs that many EU countries have declared in the 2009 updates of SCP are excessively demanding and imply unrealistically large budgetary consolidation efforts going forward. Furthermore, the prospective MTOs will probably be even more stringent than the current ones.

The paper is organized as follows. Section 2 describes the institutional framework of the new MTO methodology. Section 3 explores the analytical underpinnings of MTOs, conducts a calibration exercise to uncover the (yet undisclosed) algorithm for computing MTOs, and provides a critical assessment on the implications on fiscal sustainability of the supplementary debt-reduction effort and the frontloading of cost of ageing. Section 4 assesses the impact of the financial and economic crisis on EU Member States' MTOs. Section 5 elaborates an alternative modality for determining MTOs that replaces the supplementary debt-reduction effort by a synthetic exposure index that measures funding pressures and risks facing all sectors in a given country at a certain point in time. The index includes variables related to the short-term sustainability of public debt, the risk of distress in the financial and banking system, and the build-up of sectoral and external imbalances. Section 6 concludes.

2   Institutional framework of the new MTO methodology

The legal basis of the new MTO methodology is found in the Conclusions of the 2005 Spring Council of the European Union (2005a), which defined the main economic principles of the SGP reform and ensured the required political commitment to make the endorsement of the European fiscal framework fully credible (European Commission, 2005 and 2006). Given the previous failures by EU Member States to reach MTOs, the European Council strengthen the SGP preventive arm by allowing MTOs for structural budget balances to be country-specific and to take into account differences across countries in their economic fundamentals and risks to public finance sustainability.

MTO differentiation, in turn, had to consider the countries' government debt and implicit liabilities – especially those associated with rising age-related expenditure –, potential growth, and a safety margin minimizing chances of having budget deficits breaching the Maastricht 3 per cent reference value. In addition, the importance of fiscal soundness for monetary stability in a currency union warranted further differentiation by membership to the Euro Area and ERM II. Thus, Member States adopting the Euro, or in the process of doing it, were requested to declare MTOs in a range between a structural deficit of 1 per cent of GDP – for low debt/high potential growth countries – and a balanced or in surplus structural budgetary position for high debt/low potential growth countries.

The European Council made explicit a triple aim pursued by MTOs: (i) providing the aforementioned safety margin, (ii) ensuring rapid progress towards public finance sustainability; and (iii) allowing an appropriate budgetary margin of manoeuvre to support public investment. This triple aim suggested that MTOs would facilitate the use of fiscal policies for short-run stabilization purposes, while seeking the preservation of long-run fiscal soundness. General criteria for the quantitative determination of country-specific MTOs transpired from the triple aim as well as from the broad goals of the SGP reform. MTO determination criteria were, nevertheless, too general and even the European Council acknowledged that modalities for implementing and operationalizing them had to be carefully elaborated.

The consideration of public debt and implicit liabilities in the determination of country-specific MTOs raised a number of conceptual and methodological issues on the indicators of government liabilities to be used (stock vs flow measures) and the definition of implicit liabilities to be adopted (broad vs narrow definition, backward- vs forward-looking notions, inclusive or not of contingent liabilities such as financial bail-outs). While technical discussion were taking place, MTOs were determined on the sole basis of the government debt-to-GDP ratio, potential growth, and the budgetary safety margin, leaving implicit liabilities aside. Lacking clear indications on the hierarchical order to be attached to these three variables, the European Commission and the Member States agreed that the MTO determination criterion related to debt should be given more relevance.

Over the transition period, different modalities to combine the variables relevant for determining MTOs in a well-defined quantitative framework were discussed (European Commission, 2007). A final agreement was achieved in the Spring 2009 and officially came into force in November 2009 with the introduction of the corresponding provisions in the Code of Conduct (CoC). For the first time 15 EU Member States have declared MTOs computed using the new methodology in their 2009 updates of SCP. However, neither they nor the European Commission have ever disclosed the specific MTO algorithm.

3   Analytical underpinnings of the new MTO methodology

The MTO is a quantitative target for the structural budget balance that an EU Member State commits itself to achieve over a certain time horizon, usually the planning horizon of the SCP. The MTO should therefore constrain the country's fiscal policies to eventually deliver an overall budget balance – adjusted by cyclical fluctuations, net of one-offs and temporary measures, and expressed as percentage of GDP – that meets the target or improves upon it. The quantitative determination of country-specific MTOs has always been a politically-sensitive issue and the triple aim pursued largely shapes the determination criteria.

First, the MTO intends to provide a safety margin against the possibility that, given an unexpected worsening of economic conditions, the nominal budget deficit suddenly rises and exceeds the Maastricht 3 per cent of GDP reference value. This notion underpins the country-specific MTO minimum benchmark, calculated using a country's sensitivity of budget balance to output gap together with an estimate of output volatility – e.g., the extreme (negative) value of the country's output gap that might occur in the future with a certain probability (European Commission, 2007; Codogno and Nucci, 2007). Thus, a country whose budget balance is more (less) sensitive to cyclical fluctuations – probably as a result of institutional arrangements concerning the operation of automatic stabilisers – should be committed to a more (less) demanding MTO and therefore to a tighter (looser) medium-term target for the structural budget balance. A similar commitment is expected from a country exhibiting a business cycle with large

(small) output movements since an unexpected, large drop in economic activity is more likely (unlikely) to occur, dragging down the budget balance.

Second, the MTO aims to ensure progress towards sustainability of public finances, defined broadly to include both the explicit liabilities corresponding to the current stock of debt and the implicit liabilities associated with the expected deterioration of fiscal balances due to rising age-related expenditure induced by demographic trends (*i.e.*, the cost of ageing). As far as sustainability of explicit liabilities is concerned, the MTO seeks convergence of high debt levels towards the Maastricht 60 per cent of GDP reference value. Thus, a country whose debt-to-GDP ratio is above (below) that threshold should pursue a more (less) demanding MTO, as well as a country having low (high) prospective growth rates of potential GDP. High-debt and low-growth countries would then seek to achieve a stronger fiscal position leading to debt growth below nominal GDP growth, eventually converging to the Maastricht reference value. With respect to sustainability of implicit liabilities, the MTO aims at the partial frontloading of the cost of ageing. Such a frontloading requires a country to improve budget balances and increase public savings in the present (hence reducing the pace of debt accumulation or even increasing assets), so that it makes additional financial resources available in the future (under the form of a lower debt burden or even a higher stock of assets) to cope better with the increase in age-related expenditure when it eventually kicks in. According to this notion, a more (less) demanding MTO is therefore expected from a country facing a high (low) cost of ageing or is willing to frontload a larger (smaller) proportion of that cost.

Third, the MTO allows for room of manoeuvre for a country that chooses to undertake public investment as a means to support aggregate demand or to promote economic growth. In particular, a low-debt country is granted a less demanding MTO so that its fiscal budget can accommodate additional investment spending without failing to fulfil the committed MTO.

For the purpose of our analysis, we presume that the MTO determination criteria are implemented by a formal rule or algorithm that sets a minimum value for the MTO a country can declare and is committed to achieve. In fact, the CoC explicitly gives freedom to all EU countries to commit themselves to more ambitious targets than those implied by the MTO determination criteria, "as if" there was a formal rule for implementing them. In the 2009 updates of SCP, 15 EU countries have declared the MTOs that result from implementing the MTO determination criteria as agreed in Spring 2009. But they have not disclosed the MTO methodology underlying their committed budgetary targets. In the next part of this section, we attempt to uncover that algorithm on the basis of the CoC statements, official publications by the European Commission, some pieces of information collected from the 2009 updates of SCP, a few assumptions concerning the algorithm specification, and the countries' declared MTOs following the new methodology.

3.1   *A calibrated model for the MTO determination*

The algorithm implementing the MTO determination criteria loads as input the fiscal and macroeconomic variables relevant for the MTO triple aim, and delivers as output the minimum budgetary target that a country can go for. Given the minimum target resulting from the algorithm (hereinafter denoted MTOMT), a country must commit to achieve an MTO (denoted MTOD, with D standing for "declared") that is equal or more demanding than that minimum. While MTOD is observed, MTOMT is not, but it must satisfy MTOMT ≤ MTOD.

To uncover the MTOMT algorithm, we follow closely the CoC statements suggesting that MTOMT must be the most demanding value among three alternatives:[1] (i) the country-specific

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[1]   The more informative part of the CoC (2009, p. 4).concerning the MTO determination states: *"Specifically, the country-specific (continues)*

MTO minimum benchmark (MTOMB), which constitutes the aforementioned safety margin and whose value has been already disclosed by the European Commission (2007, p.107); (ii) the country-specific commitment by participants of Euro Area and ERM II to achieve at least a structural deficit of 1 per cent of GDP (MTOEA); and (iii) the country-specific MTO that addresses the issues of sustainability of public finances and budgetary manoeuvre granted to low-debt countries (MTOSM, with *S* standing for "sustainability" and M for "manoeuvre"). Hence, for country *i* the algorithm states:

$$MTOMT_i = \text{Max}\ (MTOMB_i,\ MTOEA_i,\ MTOSM_i) \tag{1}$$

with *MTOEAi* being –1 if country *i* belongs to Euro Area or ERM II and 0 otherwise.

The CoC gives some guidance on how to calculate the *MTOSM* by saying that it should encompass three components: (i) the budget balance that stabilises the debt-to-GDP ratio at 60 per cent given a country's long-term growth rate of potential GDP; (ii) a supplementary debt-reduction effort for countries whose debt exceeds 60 per cent of GDP; and (iii) a proportion of the adjustment needed to cover the present value of the future increase in age-related expenditure (*i.e.,* the cost of ageing). The precise algorithm for computing these three components of MTOSM, however, is not disclosed in the CoC but we now attempt to uncover it.

The debt-stabilising balance is a standard result in the analysis of debt dynamics and should be computed as $-(60\ g_i)/(1+g_i)$, where *gi* denotes country *i*'s long-term growth rate of potential GDP at current prices and is regularly estimated by the Ageing Working Group (AWG) for all EU countries (European Commission and Economic Policy Committee, 2008 and 2009).[2]

The adjustment needed to finance the country's cost of ageing is simply the S2E indicator calculated by AWG's assessment of long-term sustainability of public finances (European Commission, 2009b). By reading several 2009 updates of SCP, we find evidence that the CoC's required proportion of this adjustment is either 33 per cent of the S2E indicator or the annualized value of cost of ageing cumulated until 2040.[3] In the former case, we must use 0.33 *S2Ei* for country.

The supplementary debt-reduction effort is a novel feature of the MTOSM, with neither the literature on debt sustainability nor the AWG sustainability framework offering an apparent counterpart. We therefore must make a specification assumption taking into account the stated purpose of the effort, namely to induce convergence of debt-to-GDP ratios in high-debt countries towards the Maastricht 60 per cent reference value. Accordingly, we specify the effort to be proportional to the excess of the debt-to-GDP ratio over and above the 60 per cent reference value. Hence, we postulate $k\ (d_i{-}60)$ where *di* is country *i*'s debt-to-GDP ratio and the parameter *k* is calibrated below.

The three components of MTOSM for country *i* are given by:

$$MTOSM_i = -(60\ g_i)/(1+g_i) + k\ (d_i - 60) + 0.33\ S2E_i \tag{2}$$

MTOs should take into account three components: i) the debt-stabilising balance for a debt ratio equal to the (60 per cent of GDP) reference value (dependent on long-term potential growth), implying room for budgetary manoeuvre for Member States with relatively low debt; ii) a supplementary debt-reduction effort for Member States with a debt ratio in excess of the (60 per cent of GDP) reference value, implying rapid progress towards it; and iii) a fraction of the adjustment needed to cover the present value of the future increase in age-related government expenditure. This implies a partial frontloading of the budgetary cost of ageing irrespective of the current level of debt. In addition to these criteria, MTOs should provide a safety margin with respect to the 3 per cent of GDP deficit reference value and, for euro area and ERM II Member States, in any case not exceed a deficit of 1 per cent of GDP".

[2]   The CoC (2009, p. 4) states: *"Potential growth and the budgetary cost of ageing should be assessed in a long-term perspective on the basis of the projections produced by the Working Group on Ageing attached to the Economic Policy Committee".*

[3]   Germany's SCP states: *"The medium-term objective of –½ per cent of GDP results under both possible calculation methods, i.e., whether 33 per cent of the costs as a result of ageing are prefinanced or all costs as a result of ageing are covered until 2040".* (p. 27). See also Bulgaria's SCP, p. 30, Italy's SCP, p. 17, and Luxembourg's SCP, p. 10-11.

To calibrate k, we take advantage of the countries' MTOs declared in the 2009 updates of SCP and proceed guided by an educated guess. Nowadays, high-debt EU countries – which would be relatively more penalized by the supplementary debt-reduction effort – are likely to prefer having as much fiscal space as possible in order to cope with the crisis and promote the recovery. Consequently, it is likely that in the 2009 updates of SCP, they have declared their MTOD equal to their minimum budgetary targets MTOMT. By assuming such a case, for a high-debt country j we can set *MTOMTj = MTODj*; or alternatively use (1) and (2) to obtain equation (3) below. By applying equation (3) to a high-debt country j, we obtain one equation in the unknown parameters k that allows us to calibrate it:

$$MTODj = \text{Max}\ (MTOMBj,\ MTOEAj,\ -(60\ gj)/(1+gj) + k\ (dj - 60) + 0.33\ S2Ej) \tag{3}$$

At the end of 2008 – the last year for which accurate data are available – Italy was the most indebted EU country. In its 2009 update of SCP, Italy declared MTOD of zero – *i.e.*, a balanced budget in structural terms –; since MTOMB is –1.4 and MTOEA is –1, then we assume it should have been MTOD = 0 = MTOMS. Taking on board the values of gj, dj, and $S2Ej$ for Italy reported in Table 2, the equation solves for the calibrated parameter $k = 0.033$.

The calibrated algorithm provides us with estimates of MTOMT and MTOSM, denoted MTOMT* and MTOSM*. Table 1 reports these estimates for EU countries together with their MTOD (if any). For the 15 countries that did declare MTO, two comparisons between MTOMT* and MTOD give us some comfort about the reliability of our estimates in terms of approaching the true (undisclosed, unobserved) MTOMT. First, the condition MTOMT ≤ MTOD must always hold and we find that our estimates do satisfy MTOMT* ≤ MTOD in 11 out of the 15 countries.[4] Second, using again an educated guess, a case can be made that countries would prefer either to declare MTOD very close to MTOMT – to gain as much fiscal space as possible, as argued before – or to declare MTOD well above MTOMT – to signal commitment towards fiscal discipline that might bring about gains in terms of market confidence and even financial stability.[5] MTOD being neither close nor far from MTOMT is unlikely to be a preferred option. Our estimates MTOMT* indeed reproduce the case made for extreme options: leaving Luxembourg aside, in 7 out of 14 countries the MTOMT* differs from MTOD by less than 0.3 percentage points – Germany, Ireland, Italy, Latvia, Hungary, Malta, Netherlands; in 6 countries the discrepancy between MTOMT* and MTOD is larger than 1 percentage point – Bulgaria, Estonia, France, Austria, Finland, and Sweden –; and only in Poland the discrepancy of 0.5 percentage points is neither small nor large.

3.2   Strengths and weaknesses of the new MTO methodology

The new methodology for implementing MTO determination criteria certainly improves upon the ad hoc approach adopted in the past. The MTO methodology enhances the transparency, simplicity, and political commitment of the procedures for setting medium-term budgetary targets. MTOs are now embedded into a well-defined quantitative framework: for each EU country, precise values can be computed for the MTO minimum benchmark, the debt-stabilising budget balance, the supplementary debt-reduction effort, and the partial frontloading of the cost of ageing. Furthermore, MTOs give now an explicit role to government liabilities, both explicit and implicit,

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[4]   For Ireland, Hungary and Netherlands, our MTOMT* only slightly exceeds the MTOD value or the lower bound of the MTOD range.

[5]   A country announcing a commitment to a very demanding MTO – *i.e.*, well above MTOMT – may lack credibility and hence it makes no sense to make such announcement. In addition, there is the risk of declaring a too ambitious MTO and subsequently find that recovery falters and it is difficult – even undesirable – to deliver fiscal consolidation, which would undermine the confidence sought in the first place. We think these arguments apply to Italy and hence warrant the educated guess underlying the algorithm calibration, namely that this country has declared an MTOD close to MTOMT.

Table 1

MTOMT* vs MTOs declared in SCP 2009

(percent of GDP unless otherwise specified)

Country		Growth Rate of Potential GDP at Current Prices *(average 2010-60, percent)*	Budget Balance Stabilising Debt-to-GDP Ratio at 60 per cent[1]	Debt at End-2008	Estimated Supplementary Debt-reduction Effort[2]	S2E	MTOSM*[3]	MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*)	MTO Declared by Country in SCP 2009[4]
Belgium	BE	3.8	−2.2	89.8	1.0	4.8	0.3	−1.3	−1.0	0.3	no comm.
Bulgaria	BG	3.7	−2.1	14.1	0.0	1.5	−1.6	−1.8		−1.6	0.5
Czech Republic	CZ	3.6	−2.1	30.0	0.0	3.7	−0.9	−1.6		−0.9	no comm.
Denmark	DK	3.8	−2.2	33.4	0.0	1.4	−1.7	−0.5	−1.0	−0.5	no comm.
Germany	DE	3.2	−1.9	65.9	0.2	3.3	−0.6	−1.6	−1.0	−0.6	−0.5
Estonia	EE	3.8	−2.2	4.6	0.0	−0.1	−2.2	−1.9	−1.0	−1.0	0.0 or higher
Ireland	IE	4.4	−2.5	43.2	0.0	6.7	−0.3	−1.5	−1.0	−0.3	−0.5 to 0.0
Greece	EL	3.7	−2.1	99.2	1.3	11.5	3.0	−1.4	−1.0	3.0	no comm.
Spain	ES	3.9	−2.2	39.7	0.0	5.7	−0.4	−1.2	−1.0	−0.4	no comm.
France	FR	3.9	−2.2	67.4	0.2	1.8	−1.4	−1.6	−1.0	−1.0	0.0
Italy	IT	3.5	−2.0	105.8	1.5	1.5	−0.0	−1.4	−1.0	−0.0	0.0
Cyprus	CY	4.8	−2.7	48.4	0.0	8.3	0.0	−1.8	−1.0	0.0	n.a.
Latvia	LV	3.4	−2.0	19.5	0.0	1.0	−1.7	−2.0	−1.0	−1.0	−1.0
Lithuania	LT	3.5	−2.0	15.6	0.0	3.2	−1.0	−1.9	−1.0	−1.0	no comm.
Luxembourg	LU	4.6	−2.6	13.5	0.0	12.9	1.6	−1.0	−1.0	1.6	0.5
Hungary	HU	3.7	−2.1	72.9	0.4	1.5	−1.2	−1.6		−1.2	−1.5
Malta	MT	3.7	−2.1	63.6	0.1	5.7	−0.1	−1.7	−1.0	−0.1	0.0
Netherlands	NL	3.5	−2.0	58.2	0.0	5.0	−0.4	−1.1	−1.0	−0.4	-0.5 to 0.5
Austria	AT	3.7	−2.1	62.6	0.1	3.1	−1.0	−1.6	−1.0	−1.0	0.0
Poland	PL	3.5	−2.0	47.2	0.0	−1.2	−2.4	−1.5		−1.5	−1.0
Portugal	PT	3.9	−2.2	66.3	0.2	1.9	−1.4	−1.5	−1.0	−1.0	n.a.
Romania	RO	3.8	−2.2	13.6	0.0	4.9	−0.6	−1.8		−0.6	n.a.
Slovenia	SI	3.4	−2.0	22.5	0.0	8.3	0.7	−1.6	−1.0	0.7	no comm.
Slovakia	SK	3.7	−2.2	27.7	0.0	2.9	−1.2	−2.0	−1.0	−1.0	no comm.
Finland	FI	3.7	−2.1	34.2	0.0	4.5	−0.6	−1.2	−1.0	−0.6	0.5
Sweden	SE	3.9	−2.3	38.0	0.0	1.6	−1.7	−1.0		−1.0	1.0
United Kingdom	UK	4.1	−2.4	55.5	0.0	3.6	−1.2	−1.4		−1.2	no comm.

[1] Computed as $-(60*g)/(1+g)$ where g is average nominal potential GDP growth rate over 2010-60. – [2] Computed as $0.033*(d-60)$, where d is 2008 debt as percent of GDP. – [3] Computed as $-(60*g)/(1+g)+0.033*(d-60)+0.33*S2E$. – [4] Declared MTO: "no comm." indicates that no commitment is explicitly made by the country in the SCP 2009; "n.a." indicates SCP 2009 is not available.

Note: Luxembourg declared MTO is below MTOMT* because the country opted to cover cost of ageing cumulated up to 2040.

Sources: Debt levels are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010. Debt for Cyprus, Portugal, and Romania in 2012 is from European Commission's (2009) *Autumn Forecast*, and refers to 2011. Average nominal potential GDP growth rates over 2010-60 and *S2E* indicators are from European Commission's *Ageing Report 2009* and *Sustainability Report 2009*.

in the setting of minimum budgetary targets. MTOs, therefore, can modulate the constraints imposed on budgetary policies of a Member State to its own fiscal behaviour in the past – summarized by the current public debt level – as well as to its fiscal challenges in the future, especially the impact of ageing on public spending.

The consideration of explicit liabilities as determinants of MTOs involves a clear distinction between low-debt and high-debt countries and allows for a differentiated treatment of both groups. Low-debt countries are granted a larger margin of manoeuvre in managing government debt – for instance, to finance additional public investment. They are not seen as posing immediate threats for the macroeconomic and financial stability of E(M)U, and any slight increase in their debt levels is not perceived as a potential source of destabilising, cross-border, financial spillovers. High-debt countries, on the other hand, are required to achieve more demanding MTOs, which boils down to generate higher public savings – as proportion of GDP – in order to gradually reduce their debt ratios and the potential threats they entail to the E(M)U. The supplementary debt-reduction effort implements such a requirement in practice.

The introduction of implicit liabilities in the MTOs, in particular, ensures that a budgetary safety margin is being procured so as to cope with the projected increase in age-related expenditure. A full frontloading of the cost of ageing would pre-finance the whole expected increase in age-related expenditure over a long term horizon, whereas a partial frontloading implies that the remaining gap will have to be somehow financed later on – e.g., through the implementation of additional structural reforms to cut prospective spending, or the reduction of other public expenditures unrelated to social security, or the increase in taxes, or a mix of the previous alternatives. To acknowledge Member States' ownership on the choice of policies financing the cost of ageing, the new MTO methodology opted for a minimum, partial degree of frontloading (the coefficient k discussed above).

In the remaining part of this section, we assess critically the extent to which the specific modalities for introducing government liabilities into the MTO algorithm make a contribution to the preservation of long-term fiscal sustainability, which admittedly should be the ultimate goal of those modalities. Contrary to the great expectations created by the new MTO methodology, the analysis shows that, on the one hand, the supplementary debt-reduction effort does not accelerate significantly the convergence of debt-to-GDP ratios towards the Maastricht 60 per cent reference value and, on the other, the partial frontloading of cost of ageing falls short of providing enough incentives to undertake structural reforms to reduce the future path of age-related expenditure *vis-à-vis* the alternative of engaging in a standard medium-term consolidation process.

According to the supplementary debt-reduction effort in equation (2), for a high-debt country, a 10-percentage-point increase in the debt-to-GDP ratio raises the MTOSM* by 0.33 percentage points of GDP, and, provided that MTOSM* is the maximum in equation (1), it also raises the MTOMT* by the same amount. To be sure, such an increase in the MTOMT* represents a significant adjustment on the structural budget balance that should be achieved in the medium term. It is then apparent that the required effort penalizes high-debt countries and imposes the necessity of further fiscal tightening in the next few years.

But the stated purpose of the supplementary debt-reduction effort is to ensure rapid progress towards sustainability, not to penalize high-debt countries for its own sake by triggering further requirements of fiscal discipline. Therefore, an assessment of the effort on its own merits should be based on how much it accelerates convergence of the debt ratio towards the Maastricht 60 per cent reference value, and not on how much medium-term consolidation it requires from high-debt countries. In this regard, it turns out that the effort has little impact, if any, on the pace at which the debt-to-GDP of a high-debt country would decline over time if the MTO were reached as scheduled, and even if the MTO were permanently hit. In other words, the supplementary

debt-reduction effort is ineffective as a means of inducing convergence, as the simple debt dynamics exercise below illustrates.

Consider a high-debt country having representative values for all the relevant variables and parameters involved in the dynamics of public debt and the determination of MTOs: nominal GDP growth rate is constant at 3.5 per cent, nominal interest rate is 5 per cent, the S2E is constant at 2.5 per cent of GDP (as the simple average for Germany, France, Italy, and UK), MTOMB is –1.5 per cent of GDP, and MTOEA is –1 percent of GDP. The country inherits a level of debt that could be 70, 90, or 110 per cent of GDP. Assume that in each and every year, the country declares MTOD identical to the MTOMT and is always capable of achieving the committed target by running a structural budget balance in line with MTOMT. Finally, consider two algorithms for computing MTOMT: the first MTOMT is the current one adopted in the EU given by equation (3) with k=0.033; the second MTOMT is similar to equation (3) but with $k = 0$, thus excluding the supplementary debt-reduction effort. The paths of debt-to-GDP ratio corresponding to the alternative initial debt levels and the two MTOMT algorithms are depicted in Figure 1. The paths of MTOMTs are depicted in Figure 2.

It is apparent that MTOMTs drive the dynamics of the debt ratios at any time. The MTOMT with supplementary debt-reduction effort initially follows the MTOSM, which is more demanding than MTOMB and MTOEA, and is updated periodically as the debt ratio declines over time; at some point, however, the MTOEA prevails and then MTOMT stabilises at –1 percent of GDP. The MTOMT without the supplementary debt-reduction effort is always constant at the MTOEA of –1 percent of GDP.

The exercise puts forward that the MTOMT with supplementary debt-reduction effort does not perform terribly better than the MTOMT without such effort in terms of inducing faster convergence of the debt-to-GDP ratios towards the 60 per cent value. For initial debt levels at 70 and 90 per cent of GDP, the paths of debt ratio for the two MTOMTs are almost indistinguishable. Starting with debt at 110 per cent of GDP, the MTOMT with effort needs 23 years to bring debt below 60 per cent of GDP, while the MTOMT without effort needs just 6 years more.

The intuition shown by the exercise can be extended to a formal argument: for high-debt countries the growth dividend largely dominates the net borrowing resulting from hitting MTOs and thus drives the pace of debt dynamics regardless of the size of MTOs. The argument indeed holds not only for very-high-debt countries but also for high-debt countries because both the MTOMT and the growth dividend are decreasing in the level of debt. Hence, for practical purposes, the inclusion of supplementary debt-reduction effort in the methodology for implementing the MTO determination criteria does little to ensure more rapid progress towards sustainability, *vis-à-vis* the exclusion of such effort. There is, on the other hand, the effect of imposing larger consolidation efforts in the medium term, but this is inconsistent with the purpose stated by the CoC.

Turning to the frontloading of the cost of ageing, it should be noted that explicit and implicit liabilities affect symmetrically the long-term solvency condition of the government. In the intertemporal budget constraint, the future increases in spending flows associated with ageing can be converted into a notional stock by computing net present values (NPV). That notional stock is fully comparable with the current stock of outstanding debt as both will imply the necessity of collecting taxes to pay for either additional primary spending or interests. For the same token, structural reforms that reduce future age-relating expenditure imply a reduction in the NPV of future spending flows that is comparable to a one-shot reduction in the outstanding debt stock.

The symmetry acknowledged in the solvency condition is absent in the MTO determination. Note first that the supplementary debt-reduction effort depends on the stock of explicit liabilities, while the frontloading of the cost of ageing is indeed a flow given by a proportion (say 0.33) of the

S2E indicator. Consider a country with a debt ratio of 100 per cent of GDP that undertakes pension reforms and improves permanently the primary balance-to-GDP ratio by 0.5 percentage points. The S2E indicator declines by a similar amount and hence the MTOMT would decrease by 0.17 percentage points through the frontloading of cost of ageing. Assuming the interest-growth differential to be constant at 1.5 per cent over time (as in the previous simulations), the NPV of the permanent improvement in the primary balance ratio is 33.3 per cent of GDP. Therefore, from the point of view of intertemporal solvency, the pension reforms deliver an improvement equivalent in NPV to a one-shot reduction in the outstanding debt of 33.3 percentage points of GDP. But as far as MTOMTs are concerned, such a one-shot reduction in the debt-to-GDP ratio would bring about a decline in MTOMT of 1.09 percentage points through the supplementary debt-reduction effort.

It is apparent then that, for a Member State considering a standard short-term budgetary consolidation that reduces the debt ratio against the alternative of launching a long-term

Figure 1

Debt Paths Under MTOMT With and Without Supplementary Debt-reduction Effort SDRE
(percent of GDP)
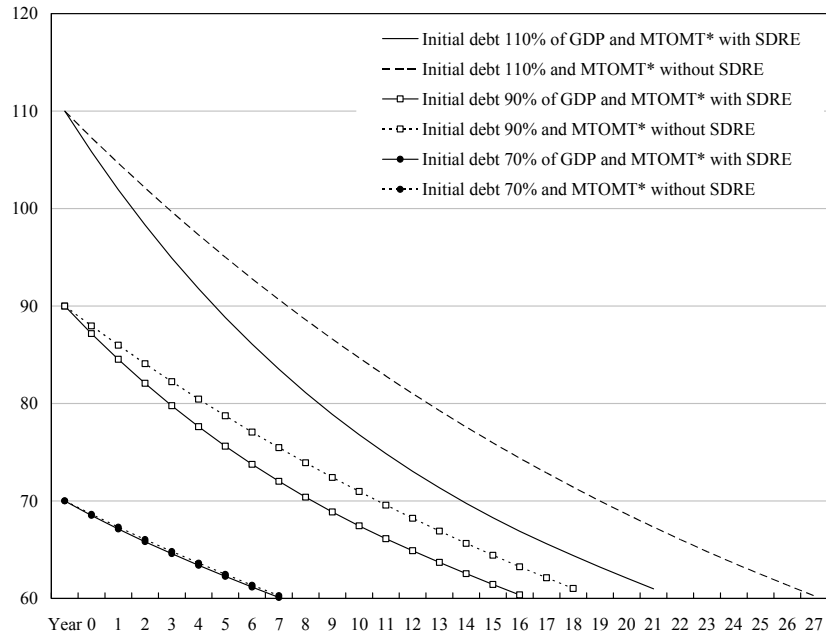
Figure 2

Paths of MTOMT With and Without Supplementary Debt-reduction Effort SDRE
(percent of GDP)
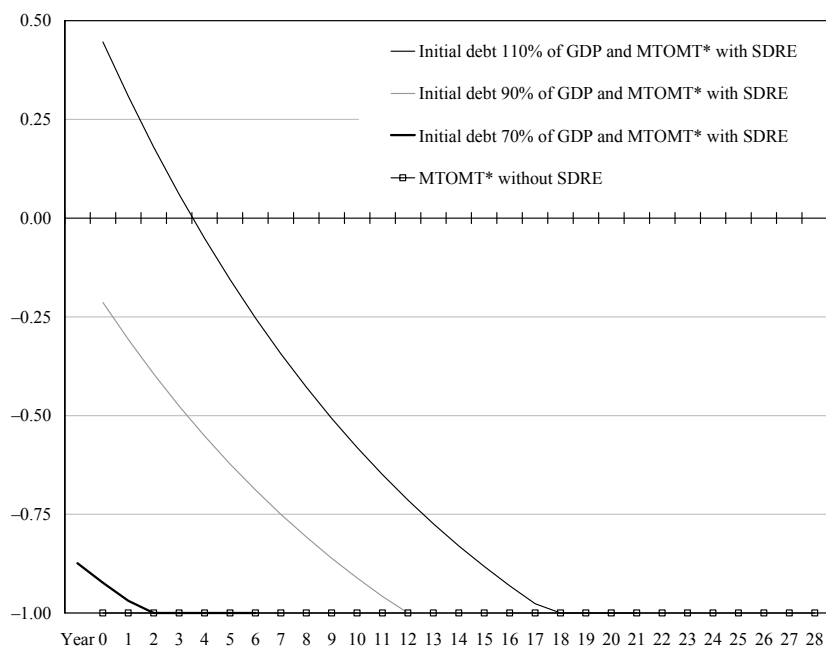
structural reform, but both having the same impact on solvency, the MTOs do not offer a balanced incentives but a clear preference for consolidation and very limited gains for structural reforms. It might be argued that there are reasons why explicit and implicit liabilities are not directly comparable, but still the difference between the gains in terms of lower MTOs resulting from reducing one or the other (1.09 vs 0.17) is too large and probably unwarranted.

4   The impact of the financial and economic crisis on MTOs

The financial and economic crisis along with the expansionary policies undertaken to support aggregate demand have led to sizable budget deficits and borrowing needs. The budgetary outcomes are not expected to recover rapidly in the next few years and indeed the mounting debt levels will have to be carried over for many years. The severity of the 2008-09 crisis and the magnitude of the fiscal challenges going forward are apparent from a comparison between the SCP updates submitted by EU Member States in 2007, 2008, and 2009, in terms of declared MTOs, dates of achievement, and gaps between structural budget balances and MTOs (Table 2).

In the 2007 updates of SCP, submitted before the crisis unfolded, the expectation was that achieving MTOs would not be a too difficult task. In fact, all countries but UK declared MTOs and were committed to achieving them no later than 2012. There were 12 countries whose initial structural budget balance as of 2007 was already above the declared MTO value. Consolidation efforts were expected from the 14 countries with a 2007 budgetary position below MTO, but the required efforts were fairly small as the gap to be bridged by gradually improving structural budget balances over the programme period was less than 2.5 percentage points of GDP for 11 out of 14 cases. Overall, as early as 2010, three years after the update submission, as many as 17 countries would have achieved their committed MTOs.

The picture radically changed as EU Member States started to factor in the fiscal effects of the crisis and policy interventions. By the time of submitting the 2008 updates of SCP, the uncertainty of the environment and the difficulties to envisage future macroeconomic and policy scenarios induced EU countries to relax commitments on MTOs. Eventually they declared MTOs but postponed the date of achievement or refrained from committing themselves to any date. Only 5 out of 27 EU Member States indicated that their MTOs would be achieved throughout the programme period.

At present, the 2009 updates of SCP recently submitted are meant to incorporate at length the impact of the crisis on public finances and to discuss consolidation policies to be implemented to restore fiscal soundness, especially those EU Member States going through the excessive deficit procedure. The expectation now is that achieving MTOs in the aftermath of the crisis would be rather difficult and sizable consolidation efforts should be undertaken. On the one hand, as many as 13 EU countries have either refrained from declaring MTOs or failed to submit the SCP 2009 updates altogether. Reluctance to declare MTOs and achievement dates suggests that countries are seeking flexibility to modulate their exit strategies, whose short-run effects are certainly contractive, to the pace of the economic recovery, which is expected to be slow. On the other hand, there are 15 countries that declared MTOs but posted an initial structural budget balance in 2009 far below the MTO values, with the sole exception of Sweden. The political feasibility of the consolidation efforts needed to achieve the committed MTOs remains to be seen. Only a small handful of countries would reach their MTOs in 2012, three years after the update submission.[6]

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[6]   Several EU Member States countries have not declared MTOs so the gap to be bridged cannot be properly assessed. But if we consider the less demanding requirement on the budgetary targets, namely the MTOMBs whose representative value is around – 1.5 per cent of GDP, it turns out that the initial budgetary positions of EU countries incurring in structural deficits are, on average, 3.5 percentage points below the representative MTOMB.

Table 2

Declared MTOs, Dates of Achievement and Gaps Between Structural Budget Balances and MTOs in SCP 2007, 2008 and 2009
(percent of GDP)

Country		SCP 2007							SCP 2008		SCP 2009						
		MTO Declared by Country[1]	Date to Achieve MTO[2]	Structural Balance 2007	Distance to MTO[3]	Structural Balance 2010	Distance to MTO[3]	Achievement of MTO by 2010?	MTO Declared by Country[1]	Date to Achieve MTO[2]	MTO Declared by Country[1]	Date to Achieve MTO[2]	Structural Balance 2009	Distance to MTO[4]	Structural Balance 2012	Distance to MTO[4]	Achievement of MTO by 2012?
Belgium	BE	0.5	2009	–0.3	–0.8	1.0	0.5	yes	0.5	n.d.	no comm.	n.d.	–3.7		–2.0		
Bulgaria	BG	1.5	2010	2.9	1.4	3.1	1.6	yes	1.5	t.p.p.	0.5	n.d.	–1.0	–1.5	1.0	0.5	yes
Czech Republic	CZ	–1.0	2012	–4.1	–3.1	–2.5	–1.5	no	–1.0	2012	no comm.	n.d.	–5.5		–2.6		
Denmark	DK	0.75 to 1.75	t.p.p.	3.5	2.3	2.5	1.3	yes	0.75 to 1.75	t.p.p.	no comm.	n.d.	–0.6		–0.8		
Germany	DE	0.0	2007	–0.3	–0.3	0.0	0.0	yes	0.0 to 0.5	n.d.	0.0 or higher	n.d.	–1.5	–1.0	–3.0	–2.5	no
Estonia	EE	0.0	t.p.p.	1.2	1.2	1.3	1.3	yes	0.0	2011	0.0 or higher	n.d.	–0.8	–0.8	0.5	0.5	yes
Ireland	IE	0.0	2007	0.5	0.5	–0.7	–0.7	no	0.0 to 0.5	n.d.	–0.5 to 0.0	n.d.	–9.3	–9.0	–6.8	–6.6	no
Greece	EL	0.0	2012	–2.8	–2.8	–0.5	–0.5	no	0.0	n.d.	no comm.	n.d.	–7.8		–2.1		
Spain	ES	0.0	2007	2.2	2.2	1.9	1.9	yes	0.0	n.d.	no comm.	n.d.	–10.0		–4.6		
France	FR	0.0	2012	–2.0	–2.0	–1.0	–1.0	no	0.0	2012	0.0	n.d.	–5.8	–5.8	–2.8	–2.8	no
Italy	IT	0.0	2011	–2.2	–2.2	–0.5	–0.5	no	0.0	n.d.	0.0	n.d.	–3.6	–3.6	–2.0	–2.0	no
Cyprus	CY	0.0	2007	0.3	0.3	0.8	0.8	yes	0.0	n.d.	n.a.	n.d.	–3.4		na		
Latvia	LV	–1.0	t.p.p.	–0.5	0.5	1.7	2.7	yes	–1.0	n.d.	–1.0	n.d.	–8.1	–7.1	–0.5	0.5	yes
Lithuania	LT	–1.0	2009	–1.2	–0.2	1.1	2.1	yes	–1.0	2010	no comm.	n.d.	–7.5		–1.7		
Luxembourg	LU	–0.8	2007	0.7	1.5	1.6	2.4	yes	–0.8	n.d.	0.5	n.d.	0.4	–0.1	–4.0	–4.5	no
Hungary	HU	–0.5	n.d.	–4.8	–4.3	–2.5	–2.0	no	0.5	n.d.	–1.5	n.d.	–2.5	–1.0	–1.5	0.0	yes
Malta	MT	0.0	2010	–2.1	–2.1	0.1	0.1	yes	0.0	2011	0.0	n.d.	–3.3	–3.3	–3.3	–3.3	no
Netherlands	NL	–1.0 to –0.5	t.p.p.	–0.3	0.5	0.8	1.6	yes	–0.5 to –1.0	t.p.p.	–0.5 to 0.5	n.d.	–3.5	–3.5	–3.6	–3.6	no
Austria	AT	0.0	2010	–0.7	–0.7	0.1	0.1	yes	0.0	n.d.	0.0	n.d.	–2.6	–2.6	–2.4	–2.4	no
Poland	PL	–1.0	2011	–2.4	–1.4	–1.1	–0.1	no	–1.0	2012	–1.0	n.d.	–7.1	–6.1	–2.9	–1.9	no
Portugal	PT	–0.5	2010	–2.1	–1.6	–0.3	0.2	yes	–0.5	n.d.	n.a.	n.d.	–6.6		na		
Romania	RO	–0.9	n.d.	–3.4	–2.5	–2.7	–1.8	no	–0.9	2012	n.a.	n.d.	–7.1		na		
Slovenia	SI	–1.0	t.p.p.	–0.8	0.2	–0.1	0.9	yes	–1.0	n.d.	no comm.	n.d.	–4.8		–2.1		
Slovakia	SK	–1.0 or higher	2010	–3.0	–2.0	–1.2	–0.2	no	–1.0	2010	no comm.	n.d.	–5.2		–2.6		
Finland	FI	2.0	t.p.p.	4.2	2.2	2.8	0.8	yes	2.0	t.p.p.	0.5	n.d.	0.3	–0.2	–1.0	–1.5	no
Sweden	SE	1.0	t.p.p.	2.4	1.4	3.4	2.4	yes	1.0	t.p.p.	1.0	n.d.	1.4	0.4	0.6	–0.4	no
United Kingdom	UK	no comm.	n.d.	–3.0		–1.9			no comm.	n.d.	no comm.	n.d.	–9.0		–4.7		

[1] Declared MTO: "no comm." indicates that no commitment is explicitly made by the country in the SCP; "n.a." indicates SCP is not available. – [2] Date to achieve MTO: "n.d." indicates that the date of achievement is not declared in the SCP; "t.p.p." indicates the MTO is achieved throughout the programme period; "n.a." indicates the SCP is not available. – [3] For Denmark and Netherlands, distance to the central point of MTO range; for Slovakia, distance to the minimum value of MTO range. – [4] For Ireland and Netherlands, distance to the central point of MTO range; for Estonia, distance to the minimum value of MTO range.

Sources: SCP 2007's declared MTO and structural balances are from European Commission's *Public Finances in EMU 2008*, p. 37 and country annexes respectively.
SCP 2008's declared MTO are from 2008 Updates of Stability and Convergence Program.
SCP 2009's declared MTO and structural balances are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010.

Figure 3

MTOs Declared in 2009 SCP vs MTOMT*
for Debt 2008/No-crisis and Debt 2012/Lost Decade
(percent of GDP)

× MTO SCP 2009   ■ MTOMT* for Debt 2008 and No-crisis scenario
▲ MTOMT* for Debt 2012 and Lost decade scenario
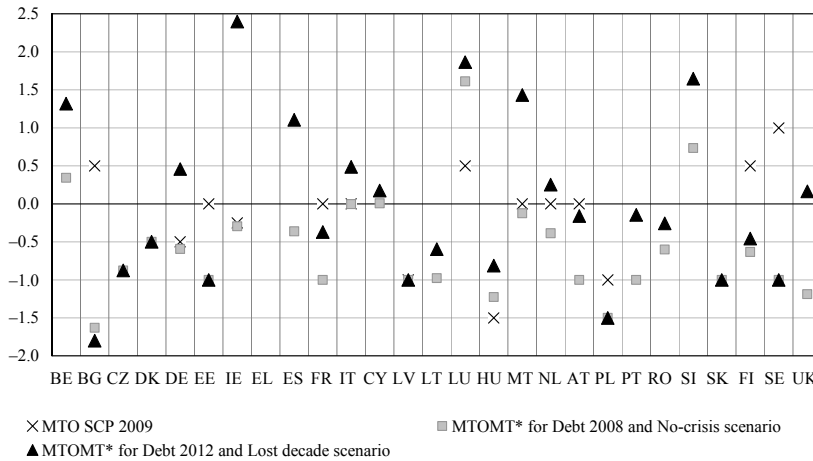
In any case, it must be recognized that the credibility of MTOs as constraints on medium-term fiscal policies has been undermined since the beginning of the crisis, either because countries are not committed to achieve any target or because they are committed to achieve too ambitious targets.

The current MTOs declared in the 2009 updates of SCP have been set using: (i) the debt stocks at the end of 2008, which for practical purposes should be deemed pre-crisis levels, and (ii) the AWG projections of potential growth and age-related expenditure covering 2008-60 elaborated before the crisis (denoted "no-crisis scenario"), which are involved in computing both the debt-stabilising budget balance and the partial frontloading of cost of ageing. But in the next few years, naturally, the crisis will have changed these elements and MTOs will have to be adjusted accordingly (Table 3). To gauge the MTO values that could be established in the next revision scheduled by 2012, we construct an alternative scenario based: (i) debt projections for 2012 reported by EU countries in their SCP 2009 updates, and (ii) the AWG projections under the "lost decade scenario".[7]

Figure 3 reports the current MTOs – if declared – along with our estimates MTOMT* for the prospective alternative scenario. Our estimates give an order of magnitude of the overall impact on MTOs of the crisis, mediated through the explosion of debt and the rise in implicit liabilities due to lower potential growth and higher cost of ageing, if the lost decade scenario were to materialize. There are 19 countries with MTOMT*s for the alternative scenario that exceed the MTOMT* underlying the current MTOs. Belgium, Germany, Ireland, Spain, Malta, Portugal, Slovenia, and UK are those with the largest increases of MTOMT* in the alternative scenario *vis-à-vis* the current situation. The cases of Ireland and Spain are particularly worrisome because both explicit and implicit liabilities rise significantly.

MTOs cannot be below the true MTOMT that we try to estimate through MTOMT* and we note that future MTOMT* are much higher than current MTOMT*. Therefore, our analysis suggests that, conditional upon the materialization of the underlying projections on debt and potential growth, a tightening on MTOs is a likely outcome of the next round of revisions around 2012. The debate on exit strategies for EU Member States should then take on board that MTOs based on the new methodology will become more demanding in the future following the deterioration of public finance conditions already taking place.

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[7] AWG has recently made available an alternative set of projections of growth and age-related expenditure that do take the crisis on board and explore different paths of recovery; among them, the so-called "lost decade scenario" envisages lower growth rates of potential GDP for all EU countries until 2020 *vis-à-vis* the "no-crisis scenario". Because of institutional features of pension and health systems, a sufficiently long period of lower output levels could give rise to a tilted, upward shift in the path of age-related expenditures as proportion of GDP, eventually increasing the cost of ageing (European Commission, 2009b; European Commission and Economic Policy Committee, 2009).

Table 3

MTOMT* Under Debt as of 2008 and 2012 and No-crisis and Lost Decade Scenarios

(percent of GDP unless otherwise specified)

Country		Growth Rate of Potential GDP at Current Prices (average 2010-60, percent)		Budget Balance Stabilising Debt-to-GDP Ratio at 60 per cent in scenario …		Debt		Supplementary Debt-reduction effort (Calibrated) for Debt as of …		S2E		MTOSM* for No-crisis Scenario and Debt as of …		MTOSM* for Lost Decade Scenario and Debt as of …		MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) for No-crisis Scenario and Debt as of …		MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) for Lost Decade Scenario and Debt as of …	
		NCS	LDS	NCS	LDS	2008	2012	2008	2012	NCS	LDS	2008	2012	2008	2012			2008	2012	2008	2012
Belgium	BE	3.8	3.7	−2.2	−2.1	89.8	100.6	1.0	1.3	4.8	6.4	0.3	0.7	1.0	1.3	−1.3	−1.0	0.3	0.7	1.0	1.3
Bulgaria	BG	3.7	3.6	−2.1	−2.1	14.1	14.4	0.0	0.0	1.5	0.8	−1.6	−1.6	−1.8	−1.8	−1.8		−1.6	−1.6	−1.8	−1.8
Czech Republic	CZ	3.6	3.6	−2.1	−2.1	30.0	42.0	0.0	0.0	3.7	3.7	−0.9	−0.9	−0.9	−0.9	−1.6		−0.9	−0.9	−0.9	−0.9
Denmark	DK	3.8	3.7	−2.2	−2.1	33.4	48.3	0.0	0.0	1.4	1.2	−1.7	−1.7	−1.7	−1.7	−0.5	−1.0	−0.5	−0.5	−0.5	−0.5
Germany	DE	3.2	3.1	−1.9	−1.8	65.9	81.0	0.2	0.7	3.3	4.8	−0.6	−0.1	0.0	0.5	−1.6	−1.0	−0.6	−0.1	0.0	0.5
Estonia	EE	3.8	3.5	−2.2	−2.1	4.6	14.2	0.0	0.0	−0.1	−0.5	−2.2	−2.2	−2.2	−2.2	−1.9	−1.0	−1.0	−1.0	−1.0	−1.0
Ireland	IE	4.4	4.1	−2.5	−2.4	43.2	83.9	0.0	0.8	6.7	12.1	−0.3	0.5	1.6	2.4	−1.5	−1.0	−0.3	0.5	1.6	2.4
Greece	EL	3.7	3.6	−2.1	−2.1	99.2	117.7	1.3	1.9	11.5	10.7	3.0	3.6	2.7	3.3	−1.4	−1.0	3.0	3.6	2.7	3.3
Spain	ES	3.9	3.8	−2.2	−2.2	39.7	74.1	0.0	0.5	5.7	8.6	−0.4	0.1	0.6	1.1	−1.2	−1.0	−0.4	0.1	0.6	1.1
France	FR	3.9	3.7	−2.2	−2.2	67.4	87.1	0.2	0.9	1.8	2.7	−1.4	−0.7	−1.0	−0.4	−1.6	−1.0	−1.0	−0.7	−1.0	−0.4
Italy	IT	3.5	3.3	−2.0	−1.9	105.8	114.6	1.5	1.8	1.5	1.9	0.0	0.3	0.2	0.5	−1.4	−1.0	0.0	0.3	0.2	0.5
Cyprus	CY	4.8	4.6	−2.7	−2.6	48.4	63.4	0.0	0.1	8.3	8.2	0.0	0.1	0.1	0.2	−1.8	−1.0	0.0	0.1	0.1	0.2
Latvia	LV	3.4	3.2	−2.0	−1.8	19.5	56.8	0.0	0.0	1.0	1.5	−1.7	−1.7	−1.3	−1.3	−2.0	−1.0	−1.0	−1.0	−1.0	−1.0
Lithuania	LT	3.5	3.2	−2.0	−1.8	15.6	41.0	0.0	0.0	3.2	3.8	−1.0	−1.0	−0.6	−0.6	−1.9	−1.0	−1.0	−1.0	−0.6	−0.6
Luxembourg	LU	4.6	4.5	−2.6	−2.6	13.5	29.3	0.0	0.0	12.9	13.5	1.6	1.6	1.9	1.9	−1.0	−1.0	1.6	1.6	1.9	1.9
Hungary	HU	3.7	3.4	−2.1	−2.0	72.9	73.6	0.4	0.4	1.5	2.2	−1.2	−1.2	−0.8	−0.8	−1.6		−1.2	−1.2	−0.8	−0.8
Malta	MT	3.7	3.5	−2.1	−2.0	63.6	67.3	0.1	0.2	5.7	9.7	−0.1	0.0	1.3	1.4	−1.7	−1.0	−0.1	0.0	1.3	1.4
Netherlands	NL	3.5	3.4	−2.0	−2.0	58.2	73.0	0.0	0.4	5.0	5.5	−0.4	0.0	0.2	0.3	−1.1	−1.0	−0.4	0.0	−0.2	0.3
Austria	AT	3.7	3.6	−2.1	−2.1	62.6	73.8	0.1	0.5	3.1	4.5	−1.0	−0.6	−0.5	−0.2	−1.6	−1.0	−1.0	−0.6	−0.5	−0.2
Poland	PL	3.5	3.3	−2.0	−2.0	47.2	55.8	0.0	0.0	−1.2	−1.4	−2.4	−2.4	−2.4	−2.4	−1.5		−1.5	−1.5	−1.5	−1.5
Portugal	PT	3.9	3.8	−2.2	−2.2	66.3	91.1	0.2	1.0	1.9	3.1	−1.4	−0.6	−1.0	−0.1	−1.5	−1.0	−1.0	−0.6	−1.0	−0.1
Romania	RO	3.8	3.6	−2.2	−2.1	13.6	31.3	0.0	0.0	4.9	5.6	−0.6	−0.6	−0.3	−0.3	−1.8		−0.6	−0.6	−0.3	−0.3
Slovenia	SI	3.4	3.5	−2.0	−2.0	22.5	42.7	0.0	0.0	8.3	11.1	0.7	0.7	1.6	1.6	−1.6	−1.0	0.7	0.7	1.6	1.6
Slovakia	SK	3.7	3.8	−2.2	−2.2	27.7	42.2	0.0	0.0	2.9	2.9	−1.2	−1.2	−1.2	−1.2	−2.0	−1.0	−1.0	−1.0	−1.0	−1.0
Finland	FI	3.7	3.6	−2.1	−2.1	34.2	54.4	0.0	0.0	4.5	4.9	−0.6	−0.6	−0.5	−0.5	−1.2	−1.0	−0.6	−0.6	−0.5	−0.5
Sweden	SE	3.9	3.8	−2.3	−2.2	38.0	45.2	0.0	0.0	1.6	3.1	−1.7	−1.7	−1.2	−1.2	−1.0		−1.0	−1.0	−1.0	−1.0
United Kingdom	UK	4.1	4.0	−2.4	−2.3	55.5	90.9	0.0	1.0	3.6	4.4	−1.2	−0.2	−0.9	0.2	−1.4		−1.2	−0.2	−0.9	0.2

NCS = No-crisis scenario, LDS = Lost Decade scenario.

Sources: Debt levels are from 2009 Updates of Stability and Convergence Program, submitted by countries in January 2010.

Debt for Cyprus, Portugal and Romania in 2012 is from European Comission (2009), *Autumn Forecast*, and refers to 2011.

For both no-crisis and lost decade scenarios, the average nominal potential GDP growth rates over 2010-60 and S2E indicators are from European Commission's Ageing Report 2009 and Sustainability Report 2009.

5 An alternative method for the supplementary debt-reduction effort based on an exposure index

On theoretical grounds, an important feature of the new MTO methodology is that it establishes a link among three issues involved in the conduct of fiscal policy and the setting of credible budgetary targets: the amount of outstanding debt, the existence of implicit liabilities, and the determination of possible leeway to undertake discretionary measures and public investment. On practical grounds, nevertheless, the advantages of the MTO methodology have been severely undermined by the current crisis and the discretionary policies deployed to cope with it inasmuch as debt ratios have skyrocketed and eventually overshadowed any other variable in the determination of MTOs. In this particular crisis, the increase in explicit liabilities during 2008-09 has not been a consequence of profligate governments but of governments coping either with the collapse of an unsustainable debt-led growth process at home (UK, Ireland) or with the contraction of output due to the collapse in international trade (Germany, Italy). In such a context, focusing narrowly on the level of public debt may not be sufficient to address the stance of fiscal policy in order to set MTOs. Characteristics of the public debt, the performance of financial and banking system, and sectoral and external imbalances may all be important and worth considering in assessing the fiscal stance in the short- and medium-term.

In this section, we elaborate an alternative formulation for MTOs in which the supplementary debt-reduction effort is replaced by a synthetic exposure index that measures funding pressures and risks facing all sectors in a given country at a certain point in time. The exposure index not only includes the public debt-to-GDP ratio but also several variables related to the short-term sustainability of public debt, the risk of distress in the financial and banking system – and thus the implicit liabilities for the public sector associated to possible bail-outs, and the build-up of sectoral and external imbalances. A similar analysis has been recently carried out by the European Commission (2010).

For the public sector, we consider the composition of debt in terms of residual maturity and the share held by non-resident investors. Maturity composition is gauged by the stock of government liabilities coming due in the next three years, which simultaneously measures short-term refinancing needs and is a proxy for rollover risk facing the government. The share of foreign holdings of public debt assesses the reliance of the government on foreign savings to place debt in the market, as well as its exposure to a situation where investors increase home bias.

The banking sector's risk exposure on assets is assessed focusing on debtors' characteristics to emphasize counterparty risk. We first separate credit extended to domestic agents and to foreigners. Within domestic debtors, we consider the share of loans given to households and to corporates, whereas within foreign debtors, we consider the share of loans given to residents of emerging markets and to residents of developed countries. Funding pressures facing the banking sector, on the other hand, is gauged by the banks' total debt, the share of debt maturing in the next three years, and the ratio between total domestic loans and domestic deposits. The latter is a sort of funding gap measuring the reliance of the banking system on the wholesale funding markets, as well as its exposure to a situation where these markets dry up.

As far as sectoral imbalances are concerned, we consider the net borrowing position of four sectors – households, non-financial corporate, financial corporate, and the general government – as an indicator of their financing needs originated in income-expenditure imbalances. External imbalances are assessed using the net borrowing position of the economy as a whole – *i.e.*, the current account – and the debt composition by maturity aggregated across the aforementioned four sectors. The two indicators measure the funding pressures facing the country – arising from income-expenditure imbalances and short-term refinancing needs – and reflect the country's exposure to a liquidity crisis or sudden stops.

5.1   Data and results

For the variables described above, we collected data corresponding to the main 10 Euro Area countries in 2005 – well before the start of the crisis – and 2009, the last year in terms of data availability.[8] All variables are expressed in terms of GDP. We then selected six sub-indices addressing the exposure of public sector, the composition of foreign assets, domestic assets, and liabilities of the banking sector, and the sectoral net borrowing and debt composition of the four sectors mentioned above. For each sub-index we ranked the performance of all countries from the best grading 1 to the worst performer grading 10. We averaged (without weighting) the single sub-component scores along all the dimensions under study and ranked the countries accordingly.

The resulting ranking constitutes the exposure index, giving 1 to the best performer and 10 to the worst. The higher the value assigned by the indicator to a country, the more exposed the country is from a financial and fiscal point of view. Thus, the exposure index intends to provide an easy read of each country's fiscal and financial position relative to its peers within the Euro Area. In addition, as the exposure indicator summarizes variables associated with the funding pressures of the four sectors, it can be seen as measuring the outstanding amount of public as well as private liabilities in the economy. The exposure index and the underlying sub-indicators are reported in Table 4.

As far as the public debt sub-index is concerned, Italy and Greece rank poorly. Italy presents the highest debt in 2009 but performs relatively well in terms of the share of debt held by foreigners. By contrast, Greece presents a slightly lower public debt in 2009 with a similar maturity composition as the Italian one, but features a larger foreign exposition. From 2005 to 2009, the relative position of Portugal deteriorates due to the increase in the level of public debt, whereas the positions of Belgium and the Netherlands worsen on the account of higher debt held abroad. In spite of the increase in the debt-to-GDP ratio in 2009, the relative average positions of Germany, Ireland, and France stay constant, whereas the overall condition for Austria improves.

The bank loan exposure to foreign countries (second sub-index) is a useful indicator of the degree of financial internationalization. However, in times of crisis, it becomes a good proxy of the risk of financial contagion. In 2009, Ireland scores high in terms of banking sector exposure to advanced economies whereas Austria is largely exposed towards emerging markets. Looking at the domestic bank exposure (third sub-index), Ireland and Spain lead the ranking with respect to peer countries. The sub-index on the banking sector funding measure stress felt by banks in case of a liquidity crisis or a depositors run. Ireland is again the most exposed country in 2009, followed by Spain and the Netherlands.

The analysis of sectoral balances (fifth sub-index) shows that Greece is again the worst performer in 2009, with imbalances in both households and the government leading to a large current account deficit. Portugal and Ireland also perform poorly with sizable government borrowing and external imbalances. Sectoral short-term refinancing needs indicator (last sub-index) rank Ireland and Portugal as the most exposed economies in 2009, given their high stocks of

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[8]   Data for GDP and public debt are from AMECO. The figures on the "share of public debt maturing in the following 3 year" and the "Foreign holding of public debt" are either from national Central Banks' or National Debt Management Bodies or National Treasury sources. Data on the "Banking Sector, loan exposure to foreign debtors" are from BIS (Consolidated foreign claims of reporting banks - ultimate risk basis). As they are expressed in million of dollar the ratio with respect to GDP has been obtained using IMF GDP in PPS (WEO database). Data on "Banking Sector, loan, exposure to domestic debtors" are from, ECB, Money, banking and financial markets, MFI balance sheets. Data on Banking sector funding are from ECB, Money, banking and financial markets, MFI balance sheets as far as the ratio between loan and deposit is concerned. Debt securities outstanding as well as Debt securities maturing in the following 3 year are from national Central Banks and National Treasury databases. Data on sectoral net borrowing are from AMECO. Data on sectoral short-term refinancing needs are from national central banks or treasuries as far as the series of "Financial Corporates Bonds", "Non-financial Corporates – Bonds" and "General Government short-term share of public debt" are concerned. Data on Non-financial corporate (loans) and on short-term household loans are from Eurostat, financial Accounts Database.

short-term debt held by financial corporates, non-financial corporate, and households. Italy follows due to the high amount of outstanding short-term public debt.

The exposure index at the bottom of Table 4 shows that from 2005 to 2009 Ireland has worsened significantly as a consequence of imbalances borne by the household and financial corporate sectors. By contrast, the relative positions of Italy and Greece have deteriorated mainly on the account of the increasing public debt. But since the exposure indicator for Italy does not signal any particular stress in the financial corporate's and households' indebtedness, the country exhibits middle risk.

5.2   *Applying the exposure index to the new MTO calculation*

The fiscal and financial exposure index can be used to rank all countries on a 0-1 interval, as presented in Table 5. In order to compute minimum budgetary targets MTOMT*s taking on board a wider range of liabilities as well as sectoral and external imbalances, we use the exposure index in substitution of the (calibrated) supplementary debt-reduction effort (Table 5). On average, MTOMT*s with exposure index are more or less demanding depending on the assessment of imbalances in the banking, financial corporate, and household sectors. High-debt countries with low underlying sectoral imbalances converge to a minimum budgetary target less stringent than what estimated using the supplementary debt-reduction effort.

Under the no-crisis scenario, Germany, the country with the less worrying sectoral imbalances, has an MTOMT* with exposure index less demanding that the MTOMT* with supplementary debt-reduction effort (–0.8 per cent of GDP rather than –0.6 per cent). Compared to the MTO declared in the 2009 update of SCP, this result would assure to German authorities some additional leeway for expansionary fiscal policy in case of need. For Italy, an economy with high-debt but limited sectoral imbalances, our alternative methodology implies a less demanding MTOMT* (–1 per cent of GDP instead of a balanced positions). The difference is substantial as it would allow to Italy to save, ceteris paribus, two years of the 0.5 percentage points consolidation required by the SGP. By contrast, the introduction of the exposure index would require a much tighter MTOMT* for Ireland (0.7 per cent of GDP against –0.3 per cent). Being an economy characterized by low public debt but with large external imbalances and refinancing needs, fiscal policy should consolidate to improve public finances but also to reduce persistent external imbalances.

6   Conclusions

The objective of this paper has been threefold. Firstly, by relying on the information contained in the last batch of the SCPs, it analyzed the new MTO methodology recently adopted by EU Member States on the basis of a calibrated algorithm that closely follows the still undisclosed formulation on which Member States agreed upon. In this framework, the most critical aspects regarding the modalities to take on board government liabilities have then been extensively discussed. Secondly, it presented an assessment of the impact of the current crisis on the modalities for determining MTOs. Current and future lower bounds for MTOs have been calculated measuring the incidence on the budgetary targets of changes in public debt, potential growth, and the projected cost of ageing. Thirdly, relying on the presumption that the new MTO methodology focus only on a handful of fiscal and growth variables and neglects other important determinants affecting the short-term sustainability of public finances, the paper has outlined a simple alternative modality to introduce into the MTO determination other elements connected with the building-up of external and domestic imbalances. The proposed modality to take into account of such explicit

Table 4

Ranking of Countries and the Composition of the Exposure Index

	Year	BE	DE	IE	EL	ES	FR	IT	NL	AT	PT
Public Sector						**Public Debt**					
	2009	8	5	3	9	1	6	10	2	4	7
	2005	8	7	1	9	2	6	10	3	5	4
						Share of Debt Maturing in the Following 3 Years					
	2009	9	4	2	8	3	7	10	5	1	6
	2005	9	4	3	2	5	10	7	6	1	8
						Foreign Holdings of Public Debt					
	2009	5	4	8	7	3	6	2	9	1	10
	2005	4	2	9	7	3	5	1	6	8	10
						Relative Position Average					
	2009	7.3	4.3	4.3	8.0	2.3	6.3	7.3	5.3	2.0	7.7
	2005	7.0	4.3	4.3	6.0	3.3	7.0	6.0	5.0	4.7	7.3
Banking Sector – Loan Exposure to Foreign Debtors						Developed Countries					
	2009	8	6	10	1	5	7	2	9	4	3
	2005	9	8	1	2	5	7	3	10	6	4
						Emerging Markets					
	2009	9	2	5	6	8	4	1	7	10	3
	2005	7	4	1	3	8	5	2	9	10	6
						Relative Position Average					
	2009	8.5	4	7.5	3.5	6.5	5.5	1.5	8	7	3
	2005	8	6	1	2.5	6.5	6	2.5	9.5	8	5
Banking Sector – Loan Exposure to Domestic Debtors						Households					
	2009	2	6	10	3	9	5	1	7	4	8
	2005	3	7	9	2	6	4	1	10	5	8
						Corporates					
	2009	1	2	10	3	9	4	5	7	6	8
	2005	1	4	10	3	8	2	5	6	7	9
						Relative Position Average					
	2009	1.5	4.0	10.0	3.0	9.0	4.5	3.0	7.0	5.0	8.0
	2005	2.0	5.5	9.5	2.5	7.0	3.0	3.0	8.0	6.0	8.5
Banking Sector Funding						Loan/Deposit Ratio					
	2009	1	3	10	2	5	7	9	6	4	8
	2005	1	3	9	2	6	5	10	8	4	7
						Debt Securities Outstanding					
	2009	2	5	9	1	6	3	4	10	7	8
	2005	3	5	9	1	7	2	4	10	6	8
						Debt Securities Maturing in the Following 3 Years					
	2009	1	3	9	4	6	2	5	10	7	8
	2005	3	6	9	1	8	2	4	10	5	7
						Relative Position Average					
	2009	1.3	3.7	9.3	2.3	5.7	4.0	6.0	8.7	6.0	8.0
	2005	2.3	4.7	9.0	1.3	7.0	3.0	6.0	9.3	5.0	7.3
Sectoral Net Borrowing						Non-financial Corporations					
	2009	5	4	2	3	7	6	9	1	8	10
	2005	3	5	4	2	10	8	7	1	6	9
						Households and NPISH					
	2009	7	3	6	10	1	4	5	9	2	8
	2005	6	1	9	10	8	4	3	7	2	5
						General Goverment					
	2009	5	1	9	10	8	7	4	3	2	6
	2005	5	7	1	9	2	6	8	3	4	10
						ROW - Current Account					
	2009	4	1	7	10	8	6	5	2	3	9
	2005	3	2	7	10	8	6	5	1	4	9
						Relative Position Average					
	2009	5.3	2.3	6.0	8.3	6.0	5.8	5.8	3.8	3.8	8.3
	2005	4.3	3.8	5.3	7.8	7.0	6.0	5.8	3.0	4.0	8.3
Sectoral Short-term Refinancing Needs						Financial Corporates - Bonds					
	2009	1	3	9	4	6	2	5	10	7	8
	2005	3	6	9	1	8	2	4	10	5	7
						Non-financial Corporates - Bonds					
	2009	4	9	6	3	2	10	5	7	1	8
	2005	3	9	2	7	4	10	6	8	1	5
						Non-financial Corporates - Loans					
	2009	8	1	10	2	5	6	9	3	4	7
	2005	9	1	10	3	5	4	8	6	2	7
						Households					
	2009	1	3	10	9	5	2	4	6	7	8
	2005	1	5	10	9	3	2	4	6	8	7
						General Government					
	2009	9	4	2	8	3	7	10	5	1	6
	2005	9	4	3	2	5	10	7	6	1	8
						Relative Position Average					
	2009	4.6	4	7.4	5.2	4.2	5.4	6.6	6.2	4	7.4
	2005	5	5	6.8	4.4	5	5.6	5.8	7.2	3.4	6.8

	Year	BE	DE	IE	EL	ES	FR	IT	NL	AT	PT
Exposure Index	2009	4.8	3.7	7.4	5.0	5.6	5.2	5.0	6.5	4.6	7.1
	2005	4.8	4.9	6.0	4.1	6.0	5.1	4.8	7.0	5.2	7.2
Relative Position	2009	3	1	10	5	7	6	4	8	2	9
	2005	2	4	8	1	7	5	3	9	6	10

Table 5

MTOMT* Using Exposure Index
(percent of GDP unless otherwise specified)

Country		Growth rate of Potential GDP at Current Prices, Average 2010-60 *(percent)*		Budget Balance Stabilising Debt-to-GDP Ratio at 60 Per Cent		Exposure Index	S2E		MTOSM* Using Exposure Index		MTOMB	MTOEA	MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) Using Exposure Index		MTOMT* = Maximum (MTOMB, MTOEA, MTOSM*) Using Supplementary Debt-reduction Effort		MTO Declared by Country in SCP 2009[1]
		No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.		No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.			No-crisis scen.	Lost decade scen.	No-crisis scen.	Lost decade scen.	
Belgium	**BE**	3.8	3.7	–2.2	–2.1	0.3	4.8	6.4	–0.3	0.3	–1.3	–1.0	–0.3	0.3	0.3	1.0	no comm.
Germany	**DE**	3.2	3.1	–1.9	–1.8	0.0	3.3	4.8	–0.8	–0.2	–1.6	–1.0	–0.8	–0.2	–0.6	0.0	–0.5
Ireland	**IE**	4.4	4.1	–2.5	–2.4	1.0	6.7	12.1	0.7	2.6	–1.5	–1.0	0.7	2.6	–0.3	1.6	–0.5 to 0.0
Greece	**EL**	3.7	3.6	–2.1	–2.1	0.4	11.5	10.7	2.1	1.8	–1.4	–1.0	2.1	1.8	3.0	2.7	no comm.
Spain	**ES**	3.9	3.8	–2.2	–2.2	0.5	5.7	8.6	0.2	1.2	–1.2	–1.0	0.2	1.2	–0.4	0.6	no comm.
France	**FR**	3.9	3.7	–2.2	–2.2	0.4	1.8	2.7	–1.2	–0.8	–1.6	–1.0	–1.0	–0.8	–1.0	–1.0	0.0
Italy	**IT**	3.5	3.3	–2.0	–1.9	0.4	1.5	1.9	–1.2	–1.0	–1.4	–1.0	–1.0	–1.0	0.0	0.2	0.0
Netherlands	**NL**	3.5	3.4	–2.0	–2.0	0.7	5.0	5.5	0.4	0.6	–1.1	–1.0	0.4	0.6	–0.4	–0.2	–0.5 to 0.5
Austria	**AT**	3.7	3.6	–2.1	–2.1	0.2	3.1	4.5	–0.9	–0.4	–1.6	–1.0	–0.9	–0.4	–1.0	–0.5	0.0
Portugal	**PT**	3.9	3.8	–2.2	–2.2	0.9	1.9	3.1	–0.7	–0.2	–1.5	–1.0	–0.7	–0.2	–1.0	–1.0	n.a.

[1] Declared MTO: "no comm." indicates that no commitment is explicitly made by the country in the SCP; "n.a." indicates SCP is not available.
Sources: For both no-crisis and lost decade scenarios, the average nominal potential GDP growth rates over 2010-60 and *S2E* indicators are from European Commission's *Ageing Report 2009* and *Sustainability Report 2009*.

current liabilities is based on the construction of an exposure indicator that adopts a simple metric – based on a number of variables such as the composition of public debt by maturity, the structure of the private sector indebtedness, and financial market judgements – and allows for easily ranking countries along different fiscal and financial dimensions.

Our results show that the new MTO values heavily depend on the current debt ratios. Given the relevance of this channel, the credibility of the medium-term fiscal targets is chiefly influenced by the consolidation of current budget balances. Such a consolidation, on the other hand, may eventually be procyclical in coincidence with the large slumps of the economy in the present. By contrast, the new MTO formulation gives less incentive to undertake structural reforms which may contain the projected increase in age-related expenditure and reduce non-contractual future spending commitments without necessarily adjusting current budget balances.

Furthermore, by analysing what reported in 2009 SCPs, the paper showed that, due to the impact of the crisis, EU Member States reacted either delaying the date of achievement of MTOs or even not declaring them. In this respect, the new MTOs methodology appears as being quite sensitive to the impact of current crisis, determining tighter targets which would require additional budgetary efforts on top of the ones already planned by governments. This could reduce governments' incentives in committing towards too ambitious objectives over the medium term horizon, leading to a reduced political ownership of this rule and eventually undermining fiscal discipline. On the basis of debt and GDP growth projections, the paper also proved that the new MTO methodology would result in more restrictive targets at the moment of their revision scheduled for 2012.

Finally, the introduction of the fiscal and financial exposure indicator in the algorithm for computing MTOs shows that in times of crisis, countries with large domestic and/or external imbalances may be called for to set fiscal targets much more ambitious than those determined on the sole basis of the current debt-to-GDP ratio. Notwithstanding the relevance of these results, our findings should be interpreted with caution because they are still subject to large uncertainty as the exposure indicator is heavily influenced by the variables chosen to perform the ranking of countries, and because the relative position of a country could vary according to the modalities chosen to group the sub-indicators. Given these limitations, the exposure index metric should be considered as a preliminary attempt aimed at introducing in the current policy debate two important issues: the impact of current explicit liabilities on the determinants of fiscal targets; and the role of domestic and external imbalances for the conduct of efficient and credible fiscal policies.

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COMMENTS ON SESSION 4
THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

Carlo Cottarelli[*]

I was fortunate enough to be asked to comment on three papers with which I have little reasons to disagree. These are very useful papers, and I enjoyed reading them. The downside of this is that I do not have too much to suggest about these papers. So, after commenting on some aspects of these papers, particularly the one on the effect of banking crises on public finances, I will provide some of my views regarding the challenges that countries are facing in terms of exiting the accumulation of public debt related to the crisis.

Comments on the papers "The Consequences of Banking Crises for Public Debt" by Davide Furceri and Aleksandra Zdzienicka, "Cyclical and Structural Components of Corporate Tax Revenues in Japan" by Junji Ueda, Daisuke Ishikawa and Tadashi Tsutsui and "Structural Aspects of the Japanese Budget" by Michio Saito

I will start from a comment on Davide's paper on the consequences of banking crises on public debt.

The paper is convincing in showing that banking crises have major implications for the fiscal accounts and that these implications depend on the specific features of the crises, such as its severity for output loss, the extent of discretionary actions, and, over the medium term, the quality of fiscal institutions. Other factors such as openness, size, degree of developments, are not important. All this is very intuitive, and, if anything, my only complaint is that these results are in a way too intuitive, or pretty obvious. There are some not obvious results, in particular, those relating the cost of the financial crises to the modalities of support – e.g., liquidity support would have a stronger impact than direct recapitalization – but these are the results that the authors themselves regard as to be taken with caution.

However, the paper does not focus on one important aspect, namely the potential interaction between banking crises and the exchange rate. Many banking crises are associated with large swings in exchange rates (for example, the banking crises in Asia in the 1990s, or Turkey in 2001). These exchange rate swings have huge implications for public debt ratios whenever public debt is denominated in foreign exchange. The effect of exchange rate corrections on public debt could be a persistent one if the exchange rate was initially overvalued and, following the crisis, stabilizes at a level closer to that determined by long-term fundamentals. The paper could have taken these factors into account.

Focusing on the recent crisis, what are the implications of the paper for the persistence of the shocks suffered by the fiscal accounts? The key message of Davide's paper is that the persistence of the shocks depends on their nature. Thus, it is important to look at the reasons why the debt-to-GDP ratio is rising as a result of the current crisis. I will focus on the advanced countries because this is where the major fiscal problems are.
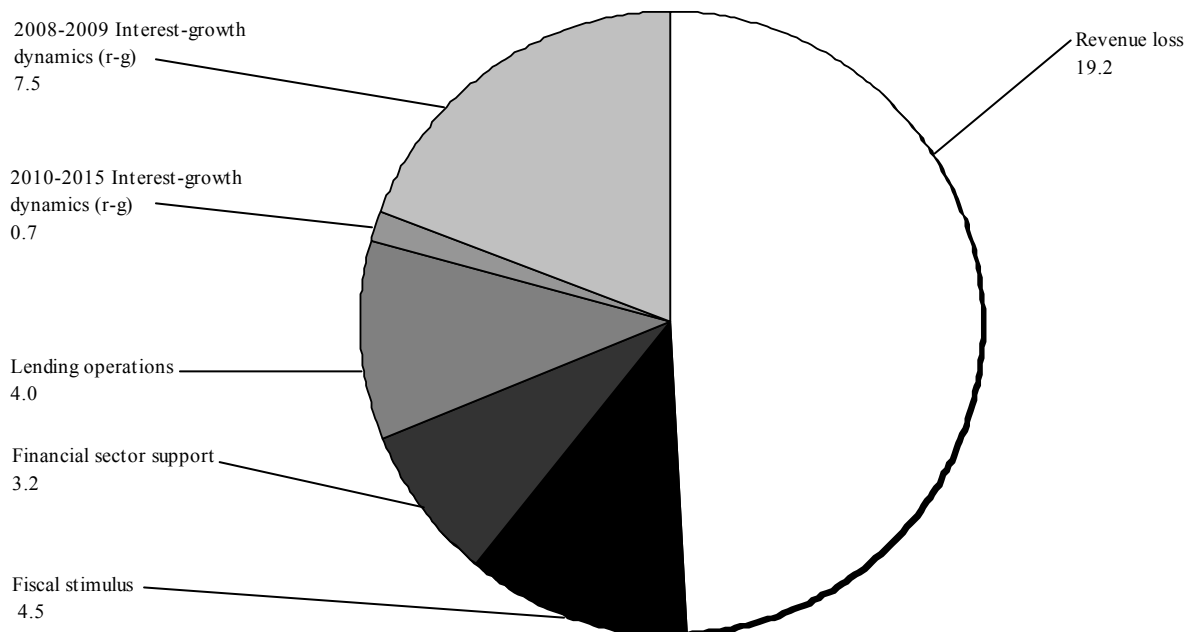
The pie chart in Figure 1 breaks down the increase in general government gross debt in the advanced G-20 countries into its various components. Some of them reflect factors that have temporary effects on the deficit, others that have permanent effects on the deficits. But even those

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[*] IMF.

Figure 1

G-20 Advanced Economies: Increase in Public Debt, 2008-15
(total increase: 39.1 percentage points of GDP; 2009 PPP weighted GDP)

2008-2009 Interest-growth dynamics (r-g) 7.5

2010-2015 Interest-growth dynamics (r-g) 0.7

Lending operations 4.0

Financial sector support 3.2

Fiscal stimulus 4.5

Revenue loss 19.2

Source: IMF staff estimates based on the April 2010 WEO.

that have temporary effects on the deficit have a permanent effect on debt ratios. Let us consider these factors one by one.

Fiscal stimulus: this includes measures undertaken specifically with the goal of alleviating the crisis. The effect is small and is temporary on the deficit (as most of these measures were temporary or easily reversible), but their effect on the stock of debt is permanent unless not only they are allowed to expire but are offset with a (temporary) fiscal tightening.

The effect of the operations in direct support of the financial sector on the debt could, in part, at least, be temporary: assets have been typically accumulated against these operations, and they could be sold over time. Part of the support, however, will result in permanent losses, whose effect is permanent. In any case, this item is rather small, compared with the overall increase in public debt.

About 10 percent in the overall increase in public debt relates to lending operations introduced during the crisis to alleviate the credit crunch that was affecting some nonfinancial sectors (e.g., lending to students by the U.S. government). If these loans are repaid overtime, and new lending is taken over by the private financial sector as the latter recovers, the effect on gross debt will be temporary.

However, the largest item, explaining about half of the increase, reflects the huge revenue losses arising from the crisis, the loss in output (with respect to the pre-crisis potential, as well as lower payments from the financial sector and higher asset prices, to the extent pre-crisis revenues

from these sources were above equilibrium). With respect to these losses, one important element of uncertainty relates to the extent to which the crisis led to a permanent drop in potential output levels. If it did, the flow loss will not be fully recovered. But in any case the stock loss would not be recovered.

Finally, the increase in the debt ratio is also partly due to the direct effect of the decline in the denominator of the ratio (output), or, more precisely, to the extent to which this drop was not affected by a drop in interest rates (it is the differential between interest rates and growth that drives the output-to-GDP ratio). As we are observing the increase in the debt ratio between 2007 and 2015 – a year by when the output gap is expected to be closed – this effect could be expected to be permanent (as it already reflects the recovery of output arising from the closing of the output gap). However, to the extent that the recovery of potential output is currently underestimated in the fiscal projections underlying the figure, the case could be made that GDP in the period ahead could rise faster than projected, which would lead to a lower increase in the debt ratio (or a decline following 2015). Whether this will happen or not – even assuming that the decline in potential output is indeed overestimated – depends on the reaction of interest rates to the higher output growth. If interest rates are also higher, there will not be any benefit in terms of the dynamics of the debt ratio.

Altogether, we can safely conclude that a large part of the shock to public debt is definitely of a permanent nature and will require policy actions to reverse it.

COMMENTS ON SESSION 4
THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

Richard Hemming[*]

1 Comments on "The New Medium-term Budgetary Objectives and the Problem of Fiscal Sustainability After the Crisis" by Paolo Biraschi, Marco Cacciotti, Davide Iacovoni and Juan Pradelli

This interesting paper discusses the new methodology that has been developed to determine medium-term objectives (MTOs) for the structural budget balances of EU Member States. The new methodology is supposed to provide the transparent quantitative basis for determining MTOs that is currently lacking. It is therefore rather strange that the algorithm is not available, despite countries having used it to derive MTOs for 2009 Stability and Convergence Programmes. However, this paper contributes to transparency by deriving the algorithm for reported MTOs. A good bit of guesswork is involved, but it is difficult to believe that the authors are way off the mark. Moreover, their conclusions, which are that the new methodology appears to be weak in terms of the speed with which debt ratios are brought back to 60 per cent (the supplemental debt-reduction effort) and the incentive to reduce implicit pension liabilities, are probably robust.

In terms of detail, the explanation of the way the algorithm is derived would benefit from a clear mapping of MTOs that are designed to provide a safety margin, achieve sustainability, and accommodate growth-oriented spending and fiscal stabilization to the specific focus on the maximum MTO implied by the safety margin, the commitment to achieve a structural deficit no larger than 1 percent of GDP, and a combination of the debt stabilizing budget balance, the deviation of the debt ratio from 60 per cent of GDP, and implicit liabilities. This section of the paper is quite heavy going, and could be made easier for the reader.

The paper then proceeds to look at the impact of the recent financial and economic crisis on MTOs. The paper argues – in my view quite correctly – that fiscal stabilization and financial sector support costs have weakened debt positions and increased implicit liabilities in many countries and the fiscal adjustment strategies implied by the tighter MTOs that result could prove counterproductive for economies trying to recover from recession. The calculations of the impact of the crisis on MTOs reveal some large changes in MTOs that could indeed threaten fledgling recoveries if translated into front-loaded fiscal adjustment.

In the final section, the paper proposes an alternative approach to thinking about the required supplementary debt-reduction effort. The idea is that the risk created by particular debt level depends on a variety of factors that vary across countries, and it would be better to focus on some of these factors, and not on deviations from a common target, in deriving the supplementary debt-reduction effort a country should make, and thus its MTO. To this end, the authors construct an exposure index based on characteristics of government debt (level, composition and rollover requirements) as well as other domestic and external imbalances. This is a valuable contribution in an EU context, but the authors could acknowledge similar work that has been done on emerging markets with the specific objective of determining the "debt tolerance" of different countries. The authors should also review their discussion of the country estimates of the exposure index. These are generally as one would expect, but their interpretation, and that of the revised MTOs associated with the exposure index, may need to be modified in light of developments in southern Europe.

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2   Comments on "Implications of the Crisis for Public Finances: The Case of Austria" by Lukas Reiss and Walpurga Köhler-Töglhofer

Many countries have suffered larger output losses and sharper deteriorations in their fiscal positions because of the financial crisis than Austria. But the debt will continue to grow in the absence of fiscal adjustment, and the 4 percentage points of GDP adjustment required over the medium term to satisfy the conditions of the EU fiscal framework, cover the rising costs of population aging, and provide room to respond to future crises, while much less than in some other countries, is certainly no small matter.

Against this background, the emphasis that this paper places on growth-oriented adjustment is welcome. If the adjustment measures are of good quality, the more likely it is that adjustment targets will be met without imposing unnecessary economic and social costs.

The authors favor expenditure cuts, which are the source of most successful adjustments, but the paper does not say very much about where the cuts should fall. Rather, the authors place their faith in the new medium-term expenditure framework (MTEF) and budget structure. Not enough detail is provided to compare the MTEF and budget structure with best practice, but if budgets are guided by well-designed strategies and linked to results, then there is a good chance that the quality of budgeting will improve and cuts will reflect a careful prioritization of spending.

The paper is more precise on tax changes, favoring specific tax increases that are "growth-friendly" (*i.e.*, higher property, fuel, alcohol and tobacco taxes). These recommendations are fine as far as they go, although the best thing for growth would be to reduce the high explicit and implicit marginal tax taxes rates on labour. Piecemeal tax increases are not a substitute for comprehensive tax reform, especially over the medium-term.

The remainder of the paper focuses on supporting structural reforms, especially to increase labour supply, which seem appropriate, and the dangers of relying on inflation or bracket creep to reduce debt, which are widely understood. I would have preferred that the paper drop these sections, which do not add much, and instead spell out and justify an adjustment strategy in more detail.

COMMENTS ON SESSION 4
THE LEGACY OF THE CRISIS AND THE EXIT STRATEGY

Tomasz Jędrzejowicz[*]

I would like to begin by thanking Daniele Franco and Banca d'Italia for inviting me to this workshop and giving me an opportunity to discuss two excellent papers: "A Note on Optimal Fiscal Rule for Turkey" by Mehmet Yörükoğlu and "Optimal Fiscal Policy in the Post-crisis World" by Francesco Caprioli, Pietro Rizza and Pietro Tommasino.

As this session is devoted to the legacy of the crisis, let me begin with a few remarks on how the crisis has affected fiscal policies. Over the recent months we have witnessed a massive increase in public deficits, arising from the operation of automatic stabilisers, discretionary fiscal stimulus measures, government support to financial institutions, as well as a reversal of revenue windfalls arising from asset price bubbles. In addition, as potential output estimates have been revised downwards, structural fiscal positions were revealed to have been much worse than estimated before the crisis.

The effect of this widening of fiscal imbalances has been on the one hand prevention of an even deeper recession of uncertain magnitude. On the other hand, however, they have resulted in a huge build-up of public debt, amounting to around 30-40 per cent of GDP. As a result, debt ratios in developed countries are on average projected to exceed 100 per cent of GDP and continue rising. Sizeable structural deficits persist and debt dynamics are turning from a very favourable environment observed in recent years to an adverse mix of slower potential growth and, at least in the medium term, a likely increase in long-term interest rates.

In this environment, it may be useful to ask the question about the optimal or acceptable debt ratio – what should governments aim to do in the current context – simply stop the build-up of public debt or rather reduce it and if so then to what level.

The key consideration in this respect is an "acceptable" debt threshold, found in the empirical literature to be critical in terms of the impact of government policy on the economy. Beyond this threshold, estimated by some studies at around 90-100 per cent of GDP, risk premia may be expected to rise sharply, the behaviour of economic agents may change, as they become more Ricardian and economic growth suffers. These effects are reflected in the Caprioli, Rizza and Tommasino paper.

Other considerations have also been mentioned in the literature for thinking about the optimal or desired level of public debt. One is the idea of using deficit financing to finance only public investment, implying that the optimal level of public debt is a function of the desired stock of public capital.

Another important argument is that of intergenerational equity and demographics in general. The projected increase in old-age dependency rations and the ensuing increases in ageing-related public expenditure pressures are an important argument for pre-funding, *i.e.* reducing debt ratios or even building up net asset positions today, so as to ease the burden falling on future generations.

The issue of the optimal/acceptable debt ratios is to some extent addressed by both of the papers I shall discuss, as they both address the issue of targeting an optimal or acceptable debt ratio and both do so using theoretical models. However, while the paper by Caprioli, Rizza and Tommasino focuses on the period after or during a crisis, the paper by Yörükoğlu discusses a fiscal

rule to be employed in "normal" times. In addition, the frameworks of the two papers differ a lot, so I shall discuss them separately.

1   Comments on "Optimal Fiscal Policy in the Post-crisis World" by Francesco Caprioli, Pietro Rizza and Pietro Tommasino

The paper by Caprioli, Rizza and Tommasino describes an infinite horizon economy model, with an infinitely lived representative consumer and a benevolent fiscal authority which issues and services debt and imposes distortionary taxation. In the first stage, consumers are fully confident about government solvency, there is therefore no need to reduce the initial debt ratio. As a result, it is optimal to stabilise debt, keep the tax level smooth and thus facilitate consumption smoothing. In the second step, consumers' fear of government default is introduced, although it is ungrounded, as the government has no intention of defaulting. In these circumstances, debt reduction becomes an optimal policy, so as to avoid an increase in risk premia.

The lack of possibility of default in the model is not quite intuitive, and the authors mention a possible extension in the form of introducing a strategic default.

However, it is worth considering, whether a forced default would not be more likely to occur in reality. Based on evidence gathered mainly in emerging market economies, sovereign default literature suggests that defaults carry high economic and political costs and that these reputational costs are actually higher if the default is strategic. In addition, the consumers' perception of default risk in the model depends only on the debt level, while it could be broadened to include other factors, such as political factors, fiscal institutions or size of government. A potential solution to both issues could be the introduction of a fiscal limit *à la* Bi and Leeper (2010) in the form of a dynamic Laffer curve. One could also consider modelling default as a political decision conditional on the fiscal limit.

Let me now move to the policy conclusions of the paper. In the first stage, when there is full trust in government solvency, after a crisis leading to a build-up of public debt, the debt ratio is stabilised at the resulting level, without any debt reduction. This would imply debt ratcheting, with each subsequent crisis or downturn. In the second stage, once consumers begin to fear a default, following a build-up of public debt, the debt ratio needs to be reduced, but the question is to what level. Authors note, that after 20 periods, the debt-to-GDP ratio is equal to about 100 per cent of GDP in the case of a fully credible government, while it is equal to 35 per cent in the other scenario. However, the rationale behind the 35 per cent of GDP debt ratio is not given in the paper. It is also worth considering, whether debt should be reduced to the critical level, beyond which consumers begin fearing default or rather even further, so as to ensure a safety margin when the next crisis hits.

2   Comments on "A Note on Optimal Fiscal Rule for Turkey" by Mehmet Yörükoğlu

Let me now turn to the Mehmet Yörükoğlu paper on the optimal fiscal rule for Turkey. In looking for such a fiscal rule, the paper addresses a dynamic fiscal loss minimization problem, aiming to minimise deviations of both spending and debt from optimal levels. As noted in the paper, as well as in literature dealing with fiscal rules more generally, one of the desirable features of a fiscal rule is simplicity. In this respect, the rule proposed in the paper may be considered simple in a model setting, but not necessarily for politicians to apply and for the general public to monitor compliance.

A key aspect of the paper is the dual objective of the rule, which is to stabilise the spending and debt ratios. The relative importance of the two objectives is denoted by α_g and α_b, which are called political preference parameters in the paper. However, the targeted stability of the two ratios will have different macroeconomic implications and as such, their relative importance may be more than simply an issue of political preference. The case for a relatively stable expenditure ratio appears to be strong. Expenditure volatility has been found in empirical studies to be harmful for economic growth. One reason for this may be, that a relatively stable expenditure ratio is a key ingredient for the successful operation of automatic stabilisers on the revenue side. Meanwhile, adjusting the spending ratio to debt fluctuations implies a strongly procyclical fiscal policy. For example, if the debt ratio increases in a downturn, the rule would call for a procyclical cut in public expenditure. In fact, even maintaining a stable ratio of public expenditure to nominal GDP would result in a procyclical policy, with spending rising faster in upturns. An option could be to target a stable ratio of spending to potential GDP, provided that the underlying fiscal position is sound, although using an unobserved variable as a policy target entails another set of problems.

Meanwhile, maintaining a stable debt ratio has different effects. Fluctuations of the debt ratio over the economic cycle are a natural and desirable consequence of the operation of automatic stabilisers, as well as timely discretionary anti-cyclical policy, provided that such is carried out. If a government were to try to minimise these fluctuations, this would again imply a pro-cyclical policy. More generally, changes of the debt ratio by themselves do not have negative effects, provided that fiscal policy remains sustainable. In this respect, keeping debt below the critical debt threshold referred to earlier, is likely more relevant for policymaking than maintaining a stable debt ratio.

The paper could generally reflect more on the cyclical impact of fiscal policy and take this impact into account when discussing the design of an optimal fiscal rule. The author applies the fiscal rule to historical output growth figures, but does not address the issue of the impact of fiscal policy on the growth path. Even if output stabilisation was not to be explicitly featured as a target of the rule, it could be useful to evaluate the rules considered from the viewpoint of the impact of resulting fiscal policy on output.