Determinants and Consequences of Fiscal Consolidations in OECD Countries

Silvia Ardagna*
Harvard University

December 2007

Abstract

This paper provides evidence on the determinants and channels through which fiscal contractions influence the dynamics of the debt-to-GDP ratio and GDP growth. Using data from a panel of OECD countries from 1970 to today, the paper shows that the success of fiscal adjustments in decreasing the debt-to-GDP ratio depends on the size of the fiscal contraction but not on its composition. The rate of growth of output is important, but higher GDP growth does not drive the success of a fiscal stabilization. Moreover, the political orientation and the strength of the government in office matter too. The paper also shows that whether a fiscal adjustment is expansionary depends largely on the composition of the fiscal manoeuvre and that the effects of the composition on growth work mostly through the labor market rather than through its effect on agents' expectations of future fiscal policy. Finally, the evidence suggests that successful and expansionary fiscal contractions are not the result of accompanying expansionary monetary policy or exchange rate devaluations.

1 Introduction

In the last forty years, periods of large fiscal expansions alternated with years of sharp fiscal contractions in all OECD countries. These episodes have been associated with a variety of outcomes: in some cases (but not in all) the fiscal tightening led to a reduction of the debt-to-GDP ratio (i.e.: successful fiscal adjustments); in several episodes (but not in all) private consumption, private investment, and GDP growth rates increased during the consolidation and in its immediate aftermath

*Silvia Ardagna, Department of Economics, Harvard University, Cambridge, MA 02138, sardagna@harvard.edu.

(i.e.: expansionary fiscal adjustments), contrary to the predictions of a standard Keynesian model.[1]

Cross-country differences in the consequences of fiscal consolidations have stimulated a lively debate on the determinants and effects of large changes in the fiscal stance. Theoretically, two non-mutually exclusive explanations have been proposed for expansionary and successful fiscal adjustments. One view is related to the impact that current fiscal policy has on the economy through its influence on agents' expectations about the stance of the future fiscal policy (*the expectation view*). This literature predicts that a fiscal contraction can be expansionary if agents perceive that the adjustment signals a change in regime that will lead to the stabilization of the debt-to-GDP ratio and solve the country's fiscal imbalance. For example, the fiscal contraction generates a positive wealth effect and aggregate demand can increase if, in response to an increase in current taxation, agents expect that fiscal policy in the future need not be tighter, or even anticipate a reduction in the tax burden. The other view stresses the effect of the composition of current fiscal policy (whether the deficit reduction is achieved through tax increases or through spending cuts) on the economy through the labor market and the cost side of the firms (*the labor market view*). This view suggests that stabilizations that result from cutting public spending, especially transfers and government wage bills, rather than increasing taxes are more likely to be successful and expansionary. They induce a moderation in the wage claims by unions, stimulating employment, capital accumulation, and growth.[2]

There is evidence of both channels in the literature and Ardagna (2004) provides an overall empirical assessment of their relative importance and shows that the composition of fiscal policy is a crucial element for growth and that the labor market is an important channel for the transmission of fiscal policy shocks. More generally, quite a large body of empirical evidence has accumulated on successful and expansionary fiscal stabilizations,[3] and the following ingredients seem to be important for a successful, long lasting and expansionary fiscal adjustment: a composition of the adjustment which emphasizes spending cuts on transfers, welfare

[1] See, for example, Alesina and Ardagna (1998), Alesina and Perotti (1995), Alesina, Perotti and Tavares (1998), Giavazzi and Pagano (1990) and (1996), and McDermot and Wescott (1996).

[2] See Blanchard (1990), Bertola and Drazen (1993), Miller et al. (1990), and Sutherland (1997) for models that explain expansionary fiscal contractions through the expectation channel, and Alesina et al. (2002), Alesina and Perotti (1997), and Daveri and Tabellini (2000) for contributions that explain expansionary fiscal contractions through the labor market channel.

[3] A non exhaustive list of papers includes: Cournede and Gonand (2006), Alesina and Perotti (1995), and (1997), Alesina and Ardagna (1998), Ardagna (2004), Giavazzi and Pagano (1990), Giavazzi, Jappelli and Pagano (2000), Guichard et al. (2007), Kumar et al. (2007), McDermot and Wescott (1996), OECD Economic Outlook (2007), von Hagen, and Strauch (2001), von Hagen, Hallet and Strauch (2002), von Hagen (2002).

programs and the government wage bill, rather than tax increases; a fiscal manoeuvre that consistently reduces the primary deficit-to-GDP ratio in a short period of time; and initial conditions signalling that a country's fiscal position is not on a sustainable course. Also, higher GDP growth due, for example, to other policy measures or to exogenous shocks, matters for successful fiscal adjustments, but the effects of fiscal policy characteristics do not vanish when one controls for the effect of GDP growth on the likelihood that governments achieve a permanent reduction of the debt-to-GDP ratio. Finally, the evidence shows that episodes of successful and expansionary fiscal contractions are not simply due to expansionary monetary policy and exchange rate devaluations implemented to offset the fiscal contraction, even though exchange rate devaluations immediately before the fiscal tightening contributed in many episodes to the stabilization of the debt-to-GDP ratio and to a boom of the economy.

This paper contributes to this strand of the literature by examining new evidence on fiscal adjustments in OECD countries from 1970 to today. The paper focuses on the medium-term response of the debt-to-GDP ratio and on GDP growth and examines both statistical and econometric evidence on the determinants and consequences that characterize fiscal stabilization programs. In particular, the paper investigates whether the size and composition of fiscal policy are crucial elements for successful and expansionary fiscal adjustments and whether the effects of fiscal consolidations depend on countries' initial fiscal and macroeconomic conditions. Finally, the role played by other economic policies (monetary policy and exchange rate devaluations) implemented at the time of the fiscal tightening is also considered.

The paper is very closely related to the work of Alesina and Ardagna (1998) and Ardagna (2004). As in Alesina and Ardagna (1998), the paper selects episodes of fiscal adjustments, summarizes some basic statistics on government budgets and on macroeconomic outcomes from a few years before to a few years after the episodes of fiscal tightening, and identifies some empirical regularities that distinguish different types of episodes. As in Ardagna (2004), the paper performs an econometric analysis to assess the importance of the factors and the channels through which fiscal policy induces a reduction in the debt-to-GDP ratio and an expansion in output. In doing so, the paper addresses the joint endogeneity of the likelihood that governments implement successful fiscal contractions and of GDP growth; it controls for the stance of monetary and exchange rate policies around the time of the adjustment; and it explicitly accounts for the fact that what matters for economic activity is not only the current discretionary reduction in the deficit, but also the resulting expectations about the stance of future fiscal policy.

Results are consistent with the existent empirical literature and adding ten more years of data and more evidence from episodes of fiscal consolidations occurred

after 1994 does not really alter the conclusions reached so far. The most significant difference is on the role played by the composition of the fiscal manoeuvre in episodes of successful fiscal consolidations. In particular, while the existent literature finds that fiscal policy composition is an important element in explaining fiscal adjustments that lead to a permanent reduction of the debt-to-GDP ratio, this paper does not. However, as the existent literature, this paper finds that a composition of the adjustment which emphasizes spending cuts on transfers, welfare programs and the government wage bill, rather than tax increases, is a critical factor in explaining fiscal adjustments associated with a boom in economic activity.

The rest of the paper is organized as follows. Section 2 presents the data and discusses the statistical evidence on fiscal adjustments. Section 3 describes the econometric issues and illustrates the specification for the benchmark model. Section 4 discusses the results. The last section concludes.

2 Data and statistical evidence

We use a panel of OECD countries for a maximum time period from 1970 to 2006. The countries included in the sample are: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, United Kingdom, and United States. All fiscal and macroeconomic data are from the OECD Economic Outlook Database no. 81. The political data are from the World Bank database DPI 2006.

We identify episodes of fiscal contractions following the literature on fiscal adjustments and using the same criteria as in Alesina and Ardagna (1998). Specifically, we use the following rule to define a period of fiscal adjustment.

Definition 1: An episode of large fiscal adjustment is a period in which the cyclically adjusted primary balance improves by at least 2 per cent of GDP or a period of two consecutive years in which the cyclically adjusted primary balance improves by at least 1.5 per cent of GDP per year, in both years.

This is a rather demanding criteria, which rules out small, but prolonged, adjustments. We choose it because we are particularly interested in adjustments which are very sharp and large and clearly indicate a change in the fiscal stance. Also, we use the primary deficit, rather than the total deficit, to avoid that episodes selected result from the effect that changes in interest rates have on government expenditures. Moreover, we cyclically adjust the primary deficit to leave aside variations of the fiscal variables induced by business cycle fluctuations.[4] Hence,

[4]The cyclical adjustment is based on the method proposed by Blanchard (1993) and follows the application in Alesina and Perotti (1995).

episodes selected through this technique should not result from the automatic response of fiscal variables to economic growth or monetary policy changes, but they should reflect discretionary policy choices of fiscal authorities. Needless to say, there can still be an endogeneity issue related to the occurrence of fiscal contractions, because, in principle, discretionary policy choices of fiscal authorities can be affected by countries' macroeconomic conditions. However, note that the budget for the current year is approved during the second half of the previous year and, even though additional measures can be taken during the course of the year, they usually become effective with some delay, generally toward the end of the fiscal year. Hence, the assumption that the cyclically adjusted primary deficit does not depend on GDP is likely to be a reasonable approximation to reality.

Definition 1 selects 86 periods of fiscal contractions listed in Table 1. The majority of the episodes are well known in the literature and several alternative definitions of fiscal episodes select them. The inclusion of other periods in the samples, instead, is sensitive to the rule used to identify the episodes.

We are interested in two outcomes of very tight fiscal policies: whether they are associated with an expansion during and in their immediate aftermath and whether they are successful in solving fiscal unbalances. Thus, a "tight episode" is defined expansionary according to definition 2 and successful according to definition 3 below.

Definition 2: A period of fiscal adjustment is expansionary if the average growth rate of GDP, in difference from the G7 average (weighted by GDP weights), in the period of the adjustment and in the two years after is greater than the average value of the same variable in all episodes of fiscal adjustments.

Definition 3: A period of fiscal adjustment is successful if three years after the fiscal adjustment, the ratio of the debt-to-GDP is 5 percent of GDP below its level in the year of the fiscal adjustment.

There is of course some degree of arbitrariness in these definitions. However, our results are not very sensitive to the exact criteria used. Definition 2 isolates 41 (39) episodes of expansionary (contractionary) fiscal adjustments, while definition 3 identifies 23 (37) episodes of successful (unsuccessful) fiscal episodes.[5]

2.1 Fiscal policy in expansionary and successful fiscal consolidations

We begin by investigating the characteristics of the fiscal manoeuvre in expansionary/contractionary and successful/unsuccessful fiscal adjustments. Results are in

[5]Note that we are not able to classify all the 86 episodes of fiscal adjustments in expansionary/contractionary, successful/unsuccessful for two reasons: i) for some country-years data on the debt-to-GDP ratio are not available, ii) some episodes occur at the end of the sample period and , hence, we do not have evidence on the future dynamic of GDP growth and of the public debt.

Tables 2 and 3 respectively. The period "before" the adjustment is the two year period preceding the adjustment year(s). The period "after" is the two year period following the last year of the adjustment. The period "during" is, of course, the year(s) of the adjustment. All the variables in the table are yearly averages.

Several interesting observations emerge from these tables. There does not seem to be much evidence that the expansionary episodes are those which occur when debt is high or more rapidly raising. Second, expansionary adjustments are not much larger than contractionary ones: during the expansionary adjustments, the primary deficit falls by 2.80 per cent of GDP, against 2.65 in contractionary cases and these numbers become equal to 2.59 and 2.67, respectively, when we measure the size of the fiscal adjustment using the cyclically adjusted primary deficit-to-GDP ratio. This observation is not consistent with econometric results by Giavazzi and Pagano (1996). In their work on private consumption, they argue that a large adjustment, by inducing a permanent change of fiscal regime, can be expansionary through an effect on expectations, which would not be present in a small adjustment. Third, larger adjustments are more expenditure based. As Figure 1 shows, spending are cut more during expansionary episodes and revenues increase less. Specifically, more than 79% of the improvement in the primary balance-to-GDP ratio is due to expenditures cuts and less than 21% comes from increases in taxes. These numbers are equal to 59% and 41%, respectively, in contractionary fiscal adjustments. Third, when we consider the changes to the individual budget items, there is also a noticeable difference across the two types of episodes. For example, while in expansionary fiscal consolidations, the percentage of the reduction of the primary deficit-to-GDP ratio due to reductions in transfer payments, the government wage bill, and public investment is of the same order of magnitude (between 22% and 26%), in contractionary episodes, almost 40% of the improvement in the primary deficit is due to cuts in public investment, only 10% comes from a reduction in the government wage bill, while cyclically adjusted transfer payments increase. Similarly, on the revenue side of the budget, while we observe a reduction in income taxes and a modest increase in social security contributions in expansionary fiscal adjustments, the contribution of income taxes to the deficit reduction is equal to 17% in contractionary fiscal stabilizations.

Let's now analyze successful and unsuccessful fiscal adjustments (see Table 3 and Figure 2). Contrary to the evidence in Table 2, in successful fiscal episodes the fiscal situation is worse than in unsuccessful cases: the debt to GDP ratio is higher, although it is not growing faster, immediately before successful episodes. Second, the size of the adjustment is much larger in successful fiscal adjustments than in unsuccessful ones: we observe an improvement of the primary cyclically adjusted deficit of 3.25 during successful adjustments versus 2.17 during unsuccessful cases. Third, the composition of the adjustment is similar to the one we

observe when we contrast expansionary with contractionary episodes. Successful adjustments are almost exclusively expenditure based (i.e.: 75% of the improvement in the primary balance-to-GDP ratio is due to expenditures cuts and 25% comes from increases in taxes); unsuccessful adjustments are more evenly relying on a combination of spending cuts and tax increases (i.e.: 54% of the improvement in the primary balance-to-GDP ratio is due to expenditure cuts and 46% comes from increases in taxes). Particularly sizeable are the differences in the behavior of transfers: in successful cases, the cyclically adjusted transfers-to-GDP ratio is cut for a total of 0.69 percentage points (from after to before); in unsuccessful cases, cyclically adjusted transfers increase by 0.26 percent of GDP.

2.2 Macroeconomic outcomes in expansionary and successful fiscal consolidations

Tables 4 and 5 show the evidence on the macroeconomic outcomes associated with expansionary/contractionary and successful/unsuccessful fiscal stabilizations. Macroeconomic variables also behave differently across the different types of fiscal adjustments. The rate of growth of GDP relative to G7 increases during and after expansionary and successful episodes. It decreases during and after contractionary episodes and after unsuccessful ones. Note, however, that growth relative to G7 was higher immediately before successful cases, which can suggest that initial growth determines the success of the tight policy. Expansionary adjustments experience an investment boom during and immediately after the fiscal tightening, contrary to the contractionary cases. The differences in the growth rates of private consumption from before to after the expansionary/contractionary adjustment periods are not as different as the ones in private investment. Also, contrary to the statistical evidence shown in Alesina and Ardagna (1998), private investment does not boom in successful fiscal consolidations and it increases more in unsuccessful fiscal adjustments than in successful episodes (see Table 5). The trade balance improves in all types of fiscal adjustments.

Interestingly, contractionary and unsuccessful fiscal stabilizations, experience larger nominal devaluations of the exchange rate in the two years before the fiscal tightening than expansionary and successful episodes. This observation casts doubt on the claim that fiscal stabilizations that work are those anticipated by episodes of sharp exchange rate depreciations. The evidence in Tables 4 and 5 suggests, instead, that the stance of monetary policy alone is not a critical factor making the difference. The behavior of inflation also does not indicate a looser monetary stance in successful and expansionary episodes than in unsuccessful and contractionary cases.

Finally, in line with the results in Ardagna, Caselli and Lane (2007), real long-

term interest rates relative to the G7 average decrease more during expansionary and successful fiscal adjustments than in unsuccessful and contractionary ones, providing some evidence that fiscal discipline reduces the cost of serving the public debt.

3 Econometric analysis

In this section we describe the methodology applied for the econometric analysis, which follows the one in Ardagna (2004). We discuss the single equation approach, which we use to estimate the ability governments have to solve fiscal imbalances. We calculate agents' expectations that the fiscal contraction will lead, within a few years, to the stabilization of the debt-to-GDP ratio. Then, we use this variable as a regressor in the GDP growth equation to capture the effect of agents' expectations on the future course of fiscal policy. Next, we also present a simultaneous equations approach, which takes into account a potential problem of simultaneity between governments' ability to solve a fiscal imbalance and GDP growth.

3.1 Single equation approach

The ability/propensity of a government to solve a fiscal imbalance, s^*, is a latent variable not directly observed. We, instead, assume that we observe a discrete variable s. s indicates whether or not governments undertake discretionary cuts in the deficit-to-GDP ratio and obtain, within a few years, a reduction in the debt as a share of GDP.[6] Thus, we estimate the following probit model for s^*:

$$\begin{aligned} s_{it}^* &= \vartheta_{1i} + \gamma_1 y_{it-1} + a_{11}\Delta G_{it} + a_{12}\Delta T_{it} + a_{13}DEF_{it-1} + a_{14}DEB_{it-1} + \\ &+ a_{15}Left_{it} + a_{16}Centre_{it} + a_{17}Major_{it} + u_{1it} \equiv Z_{1it}\delta_1 + u_{1it} \end{aligned} \quad (1)$$

$$s_{it} = \begin{cases} 1 \; if \; s_{it}^* > 0 \\ 0 \; otherwise \end{cases} \quad (2)$$

and

$$s_{it}^e = E\left[s_{it}^* | I_t\right] = Z_{1it}\delta_1 \quad (3)$$

[6] As discussed in Ardagna (2004), there are two reasons one may want to follow this approach. First, the literature on the macroeconomic effects of fiscal adjustments is not concerned with small and continuous changes in the debt as a share of GDP. Rather, it looks at the impact of large and persistent reductions in the public debt-to-GDP ratio that result from discretionary improvements in the budget. Second, whether a fiscal adjustment has a positive effect on the economy may depend on agents' perception that the stabilization leads to a change in the fiscal regime. A small and continuous change in the debt-to-GDP ratio that does not result from any improvement in the budget can hardly be interpreted as a change in fiscal policy regime that eliminates the need for future tightening.

where $i = \{1, ..., I\}$ indicates the countries in the sample; $t = \{1, ..., T\}$ the annual observation; y measures the real per capita GDP growth rate; ΔG measures the change in the cyclically adjusted primary expenditure as a share of GDP; ΔT the change in cyclically adjusted tax revenue as a share of GDP; DEF and DEB are the ratios of government deficit and public debt to GDP respectively; $Left$ and $Centre$ are dummy variables equal to one if the government in office is left or centre oriented and zero otherwise; $Major$ is a dummy variable equal to one if a single party has the majority in the Parliament and zero otherwise, and $u_{1it} \sim N(0, \sigma_1^2)$. From equation (2), we observe a successful fiscal adjustment if $s_{it}^* > 0$. Equation (3) describes agents' expectations about s_{it}^* and assumes that the variables on the right-hand side of (1) belong to agents' information set at time t.

In the econometric analysis, a successful fiscal stabilization ($s_{it} = 1$) is defined as an episode in which the cyclically adjusted primary balance improves, and, two years after, the debt-to-GDP ratio is at least three percentage points lower than in the year of the fiscal tightening. This rule is less stringent than the one in definition 3 above. It allow us to conduct the econometric investigation in a larger sample and without loosing valuable information from country-years in which fiscal discipline is a problem, but governments do not undertake discretionary and substantial deficit cuts. Such information is likely to be valuable to consumers and investors because governments' inaction can also influence agents' expectations about the stance of future fiscal policy.

We expect agents' expectations about governments' ability to solve a country's fiscal imbalance to depend both on the size of the improvement in the primary deficit and on the way in which the improvement is obtained. In fact, the larger the cut in the deficit, the more people expect that the current fiscal package can stabilize the debt-to-GDP ratio and, hence, remove the need for further fiscal tightening in the future, (see Feldstein (1982)). Moreover, agents can believe that governments that reduce spending, especially the "untouchable" items of the budget (transfers, government wages, public employment), are more serious and committed to solve the fiscal imbalance than governments that increase taxation. They are willing to undertake unpopular policy measures, which, most likely, will have more permanent effects on the budget. This suggests that we should observe $a_{11} < 0$: for given changes in taxes, larger cuts in government spending increase the probability of a success implying both a tighter fiscal policy and a fiscal policy composition based on spending cuts. Instead, the sign of a_{12} (the coefficient of tax variable) is in theory ambiguous. Suppose, in fact, that the change in the primary balance is the only characteristic of fiscal policy that matters for governments' ability to obtain a reduction in the debt-to GDP ratio. In this case, the higher the increase in taxation, the higher the probability that the debt-to-GDP ratio decreases. Hence, $a_{12} > 0$. If, instead, the composition of the fiscal manoeuvre, but not the size, matters, then,

for given changes in government spending, larger increases in taxes should have a negative effect on s^*.

We also control for countries' initial conditions (the initial level of the deficit and debt to GDP ratios, and the lagged GDP growth rate), political variables describing the type and the ideology of the government in office, and country fixed effects. The literature on episodes of fiscal adjustments suggests that successful stabilizations are more likely to occur in "bad" rather than in "good" times (see, for example, Alesina, Ardagna and Trebbi (2006), Obstfeld (1998), and Sutherland (1997)). Political characteristics of the government in office can also play a role beyond their effect on the size and composition of fiscal policy. For example, agents might believe that left-wing governments have more chances to stabilize the debt-to-GDP ratio than right-wing ones. Because of the left's support from unions and from pensioners, they can communicate the need for the adjustment and stick to their policy in the future more easily. Similarly, agents might think that single-party majority governments are less likely to abandon the program in the future than are coalition or minority cabinets.

Equation (4) describes the real per capita GDP growth regression:

$$\begin{aligned} y_{it} &= \vartheta_{2i} + \gamma_2 s^e_{it} + a_{21}\Delta G_{it} + a_{22}\Delta T_{it} + a_{23} DEF_{it-1} + a_{24} DEB_{it-1} + \\ &\quad + a_{25} y_{it-1} + a_{26} y^{G7}_{it-1} + u_{2it} \equiv Z_{2it}\delta_2 + u_{2it} \end{aligned} \tag{4}$$

where: s^e_{it} is generated using equation (3) and the estimates from equation (1); y, s^e, ΔG, ΔT, DEF, and DEB are defined as in section 3.1.1, y^{G7} measures the weighted average (with GDP weights) real per capita GDP growth rate of the G7 countries, and $u_{2it} \sim N(0, \sigma_2^2)$. Equation (4) is estimated by OLS.

A positive and statistically significant coefficient of the variable measuring agents' expectations (i.e.: γ_2) shows evidence in favor of the expectation view. The more agents perceive that the government is able to solve the fiscal imbalance, the more they expect that future fiscal policy does not need to be as tight as current fiscal policy, and both private current consumption and investment can increase, leading to higher GDP growth. As for effect of changes to primary spending and government revenues on GDP growth, once we control for the expectation channel including s^e among the regressors in (4), ΔG and ΔT can affect the macroeconomy through other channels. Decreases in taxes have a positive effect on the economy both according to the labor market view and in a standard Keynesian model. Decreases in public spending have negative effect on growth in a Keynesian model. Instead, according to the labor market view decreases to government spending and, especially to the government wage bill and welfare payments, boost growth. Similarly, decreases in public investment can lead to higher private investment and growth if public investment is a substitute for private investment and the former is less productive than the latter.

3.2 Simultaneous equations approach

The single equation approach assumes that GDP growth influences governments' ability to solve a fiscal imbalance only with a lag. If, instead, s^* depends also on current GDP growth, then, there is a problem of simultaneity in the procedure described in section 3.1. In fact, if s^* and y are endogenous, estimates of the effects of s^e on GDP growth without controlling for the effect of current growth on s^* are biased. To address this issue, I also estimate the equation describing governments' ability to solve countries fiscal imbalances and the growth equation simultaneously. The basic model is described by equations (5) and (6):

$$\begin{aligned} s^*_{it} &= \vartheta_{1i} + \gamma_1 y_{it} + a_{11}\Delta G_{it} + a_{12}\Delta T_{it} + + a_{13}DEF_{it-1} + a_{14}DEB_{it-1} + \quad (5) \\ &\quad + a_{15}Left_{it} + a_{16}Centre_{it} + a_{17}Major_{it} + u_{1it} \\ y_{it} &= \vartheta_{2i} + \gamma_2 s^e_{it} + a_{21}\Delta G_{it} + a_{22}\Delta T_{it} + a_{23}DEF_{it-1} + a_{24}DEB_{it-1} + \quad (6) \\ &\quad + a_{25}y_{it-1} + a_{26}y^{G7}_{it-1} + u_{2it} \end{aligned}$$

where $\begin{bmatrix} u_{1it} & u_{2it} \end{bmatrix}' \sim N(0, \Omega)$ and s and s^e are defined respectively by equations (2) and (3) above.[7] The coefficients γ_1 and γ_2 now take into account the contemporaneous effect among s^*, s^e and y. a_{11} - a_{17}, and a_{21} - a_{26} measure the impact of the exogenous variables described in section 3.1. Because s^* is a latent variable, I estimate equations (5) and (6) applying Amemiya's (1978) generalized least square technique (AGLS). Newey (1987) shows that AGLS is asymptotically equivalent to the minimum χ^2 estimation procedure, and that, in overidentified systems, AGLS is efficient relative to 2IV estimators.[8]

To estimate (5) and (6), the system needs to be identified. The identification of the system requires that at least one exogenous variable in the equation for s^* is not included in the equation for growth and vice-versa. In the benchmark model, political variables do not enter the growth equation directly. The literature on political business cycles shows that the type and the ideology of the government in office affect fiscal policy variables. Through the latter, political variables can influence the macroeconomy. Moreover, section 3.1 argues that political characteristics of the government in office can also affect agents' expectations. Because the rhs of equation (6) already includes both fiscal policy variables and the variable capturing agents' expectations, it does not seem unreasonable to assume that $Left$, $Centre$,

[7] The specification assumes that agents know current growth when they form their expectations on governments' ability to stabilize the debt-to-GDP ratio. Alternatively, one can argue that agents do not know the contemporaneous growth rate but they use the forecast data on GDP growth. In this case, one introduces a forecast error in (6). The estimates are still consistent because the estimation method allows for cross-equations correlation between the errors in (5) and (6).

[8] See Ardagna (2004) and Amemiya (1978), Newey (1987), and Londregan and Poole (1990) for details on the AGLS estimation procedure.

and $Major$ do not influence GDP growth directly. The identification of the system also assumes that the lagged real per capita GDP growth rate and the lagged real per capita GDP-weighted growth rate of the G7 countries influence governments' ability to stabilize successfully only indirectly, through their effect on current GDP growth. The AGLS technique allows easily to test the overidentifying restrictions of the system and the empirical analysis will show that the model does not reject the overidentifying restrictions at conventional confidence levels.

4 Empirical results

Table 6 show the results from the single equation approach; Table 7 presents the results from the simultaneous equation approach. More specifically, in columns 1-2 of Table 6 we estimate the empirical models described in section 3.1 and in columns 1-2 of Table 7 those described in section 3.2; in columns 3-4 of both tables we present results for a reparametrized version of the equations estimated in the other columns. The reparametrization allows us to measure the effect of the size and that of the composition of the fiscal manoeuvre very easily and involves the following steps. Rather than including the terms ΔG and ΔT among the regressors, we add the terms $(\Delta G - \Delta T)$ and $(\Delta G + \Delta T)$, where the former term captures the effect of the size and the latter the effect of the composition of the fiscal adjustment. A negative value for the estimated coefficient of the term $(\Delta G - \Delta T)$ indicates that larger improvements in the primary balance increase the probability of a success or GDP growth. A negative value for the estimated coefficient of the term $(\Delta G + \Delta T)$ is evidence of a "right" fiscal policy composition. In fact, the variable $(\Delta G + \Delta T)$ assumes negative values when both government spending and taxes are cut (the "best" fiscal policy in terms of composition) and positive values when both variables increase (the "worst" fiscal policy in terms of composition).[9]

Let's now discuss the determinants of a successful fiscal stabilization, starting with column 1 of Table 6. First of all, both larger decreases in government spending and larger increases in taxes have a positive effect on governments' ability to implement a fiscal contraction and induce within a few years a decrease of the debt-to-GDP ratio. A one percentage point decrease in government spending as a share of GDP increases the likelihood of a success from 0.20 to 0.35 and a one percentage point increase in taxes raises the probability of a success from 0.20 to 0.36.[10] These effects are statistically significant at the 5% level. Second, the suc-

[9] See Ardagna (2004) for a more detailed analysis of the restrictions implied by the reparametrized models.

[10] To calculate the effect of a 1% change in a continuous variable on s^*, I consider the difference between the average probability of success using the estimated coefficients and the data in the sample

cess of a fiscal adjustment depends on the size of the fiscal contraction and not on its composition (see column 3). On the one hand, the coefficient of the change in the primary deficit as a share of GDP, $(\Delta G - \Delta T)$, is statistically significant at the 5% level and its magnitude implies that, ceteris paribus, a one percentage point improvement in the primary balance-to-GDP ratio increases the probability of success from 0.20 to 0.25. On the other hand, the coefficient of the variable that measures the effect of the composition $(\Delta G + \Delta T)$ is not statistically significant. This result contrasts with the evidence from the existent literature and from the statistical evidence in Table 3 that suggests that fiscal consolidations are also more likely to be successful if they rely sharply on spending cuts. Results in column 3, instead, show that increases in taxes have a stronger effect on s^* than decreases in government spending. Among the other regressors, past economic growth has a positive and statistically significant impact on s^*, but its effect is small: a one percentage point increase in lagged GDP growth increases the probability that the government is able to solve a fiscal imbalance from 0.20 to 0.21. Countries' initial fiscal conditions have, instead, an ambiguous effect. On the one hand, a higher level of the deficit-to-GDP ratio decreases governments' likelihood to stabilize public debt. On the other, a higher stock of public debt increases the chances of a success. Finally, left-wing and majoritarian governments are more likely to stabilize the debt than right-wing and coalition or minority governments.

Columns 2 and 4 of Table 6 show the results for the growth equation estimated with the single equation approach. Larger cuts to public spending increase GDP growth and the magnitude of the coefficient is such that if governments reduce the share of primary spending-to-GDP by one additional percentage point, GDP growth increases by 0.23 percentage point. This effect is, however, only significant at the 10% level. Tax reductions, instead, do not have a statistically significant effect on GDP growth, while agents' expectations about governments' ability to solve a fiscal imbalance are statistically significant at the 10% level, but the magnitude of the coefficient is such that the effect of expectations on growth is negligible. Results of the estimation of the reparametrized model suggest that the composition of fiscal policy is the only characteristic of the fiscal adjustment that matters for growth, while the change in the primary balance-to-GDP ratio has no effect, once we control for the effect that agents' expectations about governments' ability to

and the value of this same variable calculated assuming that the continuous variable is 1% higher (or lower) than in the actual data. The effect of a change of a dummy variable from 0 to 1 is measured as the difference between the average probability calculated if the dummy variable is equal to zero and the average probability calculated if the dummy variable is equal to one. I evaluate the average probability of success using the estimated coefficients and the data in the sample. I adopt this method throughout the paper. Alternatively, I could have measured the probability evaluating it at the average value of the explanatory variables.

solve countries' fiscal imbalances have on GDP growth.

Results from the simultaneous equations approach are in Table 7. They are very similar to the ones obtained in the single equation approach. The effect of current real GDP growth on s^* is larger than that of past economic growth. The probability that governments are able to solve a fiscal imbalance increases by 4 percentage points from 0.20 to 0.24 when real GDP growth is one percentage point higher. Previous studies have been criticized because they failed to take into account the feedback effects from GDP growth on the likelihood of a successful stabilization. Results in Table 7 show that the coefficient of current growth is significant but that high economic growth does not drive the success of a consolidation. In fact, controlling for current growth, fiscal policy variables have the same effect on s^* than in Table 6, and the estimates and t-statistics of all the other regressors are also virtually unchanged from those in Table 6.

In summary, i) the probability that tight fiscal policies lead to a decrease in the debt-to-GDP ratio depends on the size of the improvement in the primary balance and not on its composition; ii) higher GDP growth favors the success of a fiscal contraction but it is not the only important determinant of governments' ability to solve countries' fiscal imbalances; iii) there is mixed evidence to support the idea that successful fiscal adjustments are more likely to occur in times of fiscal crises; iv) controlling for the impact that fiscal policy characteristics have on GDP growth through their effects on expectations, the paper finds that GDP growth is higher the larger the decrease in public spending; v) there is no evidence that the change in the primary balance per se affects economic activity. The size of a fiscal contraction has a positive effect on growth only through its effect on agents' expectations about future fiscal policy. In fact, agents' beliefs about governments' ability to solve a fiscal imbalance have a positive effect on growth, although the effect is very little and statistically significant only at the 10% level.

4.1 The role of monetary policy

Fiscal stabilizations rarely happen in isolation; they are often part of broader policy packages. Even in a standard IS-LM model, a fiscal contraction that is accompanied by an expansionary monetary policy can lead to a boom in the economy. The specifications in Tables 6 and 7 do not control for the stance of monetary policy. Suppose, for example, that the fiscal tightening is accompanied by a lax monetary policy, or that exchange rate devaluations systematically anticipate the fiscal adjustments that turn out to be successful and expansionary. In this case, the coefficients of fiscal policy variables can be biased capturing the effect of monetary rather than fiscal policy. This paper explicitly controls for the stance of monetary and exchange rate policies providing a further check that the conclusions reached

so far are sound. I reestimate the models in columns 3 and 4 of Table 7 including as regressors in the GDP growth equation lagged values of the change in the short-term nominal interest rate and of the rate of growth of the nominal exchange rate.[11] Results are in Table 8. While a decrease in the short-term nominal interest rate increases GDP growth, there is no evidence that changes in the nominal exchange rate have a statistical significant effect on economic activity. There is mixed evidence in the literature on the link between fiscal consolidations and exchange rate devaluations as well. Some studies present evidence that stronger devaluations anticipate some expansionary fiscal adjustments, some find the opposite result.[12] This paper is not concerned with whether or not monetary policy affects the economy; what matters here is that the coefficients of fiscal policy variables do not capture the impact of monetary rather than fiscal policy. Indeed, the coefficients of fiscal policy variables and of s^e and the t-statistics in Table 8 are very similar to those in Table 7.

5 Conclusions

Using a panel of OECD data from 1970 to today, this paper provides additional evidence on the determinants of the different outcomes observed around episodes of fiscal consolidations in the OECD countries. The paper finds that the probability that tight fiscal policies lead to a decrease in the debt-to-GDP ratio increases the larger the cut in the deficit. As for the effect of changes to fiscal policy on GDP growth, the paper, instead, suggests that the composition of fiscal policy is a crucial element for growth and that the labor market is an important channel for the transmission of fiscal policy shocks. In fact, controlling for the impact that fiscal policy changes have on GDP growth through their effects on expectations, GDP growth is higher the larger the decrease of public spending. Agents' expectations about governments' ability to solve countries' fiscal imbalances are statistically significant only at the 10% level and the magnitude of the coefficient is, in general, not economically significant. Hence, the evidence on the effect of fiscal policy on economic activity through its effect on agents' expectations about future fiscal policy is not strong. Finally, the paper shows that successful and expansionary fiscal contractions are not the result of expansionary monetary policies or of exchange

[11] Data availability and comparability across countries constraints the choice of the indicators of the monetary policy's stance.

[12] Bradley and Whelan (1997), for example, claim that the increase in export due to the devaluation of the nominal exchange rate determined the boom during the Irish stabilization in 1987-1989. Lambertini and Tavares (2001) also find evidence that devaluations matter for the success of a fiscal contraction. Alesina and Ardagna (1998) show that devaluations are important elements of the policy package, but that devaluations alone are not sufficient to drive a boom in the economy.

rate devaluations.

The paper does not address some interesting issues that a recent literature on fiscal adjustment programs has considered. For example, the paper does not investigate the determinants and consequences of fiscal adjustments of different duration or the effect of fiscal rules on the likelihood and success of fiscal adjustments programs. Moreover, the paper does not study the interaction between fiscal policies, income policies, structural reforms of the product and labor markets, and privatizations. These topics certainly deserve to be investigated in future research.

References

[1] Alesina A., and S. Ardagna, 1998, Tales of Fiscal Adjustments, *Economic Policy*, October 1998, 489-545.

[2] Alesina A., S. Ardagna, R. Perotti, and F. Schiantarelli, 2002, Fiscal Policy, Profits, and Investment, *American Economic Review*, vol. 92, no. 3, June 2002, 571-589.

[3] Alesina A., R. Perotti, and J. Tavares, 1998, The Political Economy of Fiscal Adjustments, *Brookings Papers on Economic Activity*, Spring 1998.

[4] Alesina A., and R. Perotti, 1997, The Welfare State and Competitiveness, *American Economic Review*, 1997, 87, 921-939.

[5] Alesina A., and R. Perotti, 1995, Fiscal Expansions and Adjustments in OECD Countries, *Economic Policy*, n.21, 207-247.

[6] Amemiya T., 1978, The Estimation of a Simultaneous Equation Generalized Probit Model, *Econometrica*, vol.46, 1193-1205.

[7] Ahrend R., P. Catte, R. Price, (2006), "Interactions Between Monetary and Fiscal Policy: How Monetary Conditions Affect Fiscal Consolidations", OECD Economics Department Working Papers no. 521.

[8] Ardagna S., (2004a), "Fiscal Stabilizations: When Do They Work and Why", *European Economic Review*, vol. 48, No. 5, October 2004, pp. 1047-1074.

[9] Bertola G., and Drazen, Allen, 1993, Trigger Points and Budget Cuts: Explaining the Effects of Fiscal Austerity, *American Economic Review*, March 1993, 11-26.

[10] Blanchard O., 1993, Suggestion for a New Set of Fiscal Indicators, OECD Working paper.

[11] Blanchard O., 1990, Comment on Giavazzi and Pagano, *NBER Macroeconomics Annual*, MIT Press, Cambridge, MA, 1990.

[12] Bradley J., and K. Whelan, 1997, The Irish Expansionary Fiscal Contraction: A Tale From One Small European Economy, *Economic Modelling*, 14, 175-201.

[13] Cournede B, F. Gonand (2006), "Restoring Fiscal Sustainability in the Euro Area: Raise Taxes or Curb Spending"?, OECD Economics Department Working Papers no.520.

[14] Daveri F., and G. Tabellini, 2000, Unemployment, Growth and Taxation in Industrial Countries, *Economic Policy*, April 2000, 47-88.

[15] Feldstein M., 1982, Government Deficits and Aggregate Demand, *Journal of Monetary Economics*, 9(1), January 1982, 1-20.

[16] Giavazzi, F., T. Jappelli, and M. Pagano, 2000, Searching for Non-Linear Effects of Fiscal Policy: Evidence from Industrial and Developing Countries, *European Economic Review*, 2000, vol. 44, n.7, 1259-1289.

[17] Giavazzi F., and M. Pagano, 1996, Non-Keynesian Effects of Fiscal Policy Changes: International Evidence and the Swedish Experience, *Swedish Economic Policy Review*, vol. 3, n.1, Spring, 67-112.

[18] Giavazzi F., and M. Pagano, 1990, Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries, *NBER Macroeconomics Annual*, MIT Press, (Cambridge, MA), 1990, 95-122.

[19] Guihard S., M. Kennedy, E. Wurzel, and C/ Andre, (2007), "What Promotes Fiscal Consolidation: OECD COuntry Experience", OECD Economics Department Working Papers no. 553.

[20] Koen V., P. van den Noord, (2005), "Fiscal Gimmickry in Europe: One-off Measures and Creative Accounting", OECD Economics Department Working Papers no. 417.

[21] Kuma S., Leigh D., A. Plekhanov, (2007), "Fiscal Adjustments: Determinants and Macroeconomic Consequences", IMF Working Paper, n 178.

[22] Lambertini L., and J. Tavares, 2001, Exchange Rates and Fiscal Adjustments: Evidence from the ECD and Implications for EMU.

[23] Londregan J., and K. Poole, 1990, Poverty, the Coup Trap, and the Seizure of Executive Power, *World Politics*, 42, 151-183.

[24] Maffezzoli M., 2001, Non-Walrasian Labor Markets and Real Business Cycles, *Review of Economic Dynamics*, Vol. 4 (4), 860-92.

[25] McDermott J., and R. Wescott, 1996, An Empirical Analysis of Fiscal Adjustments, *IMF Staff papers*, vol. 43, n.4, 723-753.

[26] Miller M., R. Skidelsky, and P. Weller, 1990, Fear of Deficit Financing - Is It Rational ?, in R. Dornbusch and M. Draghi (eds.), Public Debt Management: Theory and History, Cambridge University Press.

[27] Newey W., 1987, Efficient Estimation of Limited Dependent Variable models with Endogenous Explanatory Variables, *Journal of Econometrics*, vol. 36, 231-250.

[28] Obstfeld M., 1998, Comment on Alesina, Perotti and Tavares, *Brookings Papers on Economic Activity*, Spring 1998.

[29] OECD, Economic Outlook, and Surveys, various years.

[30] Pagan A., 1986, Two Stage and Related Estimators and Their Applications, *Review of Economic Studies*, 517-538.

[31] Pagan, A., 1984, Econometric Issues in the Analysis of Regressions with Generated Regressors, *International Economic Review*, vol. 25, n.1, 1984, 221-247.

[32] Perotti, Roberto, 1999, Fiscal Policy When Things are Going Badly, *Quarterly Journal of Economics*, 114, November 1999, 1399-1436.

[33] Sutherland, Alan, 1997, Fiscal Crises and Aggregate Demand: Can High Public Debt Reverse the Effects of Fiscal Policy?, *Journal of Public Economics* 65, 1997, 147-162.

[34] von Hagen J., (2006), "Fiscal Rules and Fiscal Performance in the EU and Japan", University of Munich, Discussion Ppaers Series, no. 147.

[35] von Hagen J., A. H. Hallett, R. Strauch, (2002), "Budgetary Consolidation in Europe:Quality, Economic Conditions, and Persistence", *Journal of the Japanese and International Economics*, vol. 16, pp. 512-535.

[36] von Hagen J., R. Strauch, (2001), "Fiscal Consolidations: Quality, Economic Conditions, and Success, *Public Choice*, vol. 109, no.3-4, pp 327-346

Table 1: Episodes of fiscal adjustments

Austria	1996, 1997
Belgium	1982, 1984
Canada	1981, 1986, 1987, 1994, 1995, 1996, 1997
Czech Republic	1994, 1996, 1999, 2004
Denmark	1983, 1984, 1985, 1986, 2004, 2005
Finland	1976, 1988, 1994, 1996, 2000
Germany	1976, 2000
Greece	1986, 1991, 1994, 2005, 2006
Hungary	1995, 1996, 1999
Ireland	1976, 1987, 1988, 1989
Italy	1976, 1990, 1991, 1992, 1997
Japan	2006
Netherlands	1972, 1973, 1983, 1991, 1996
New Zealand	1987, 1989
Norway	1979, 1980, 1983, 2000, 2004, 2005
Portugal	1982, 1983, 1986, 2006
Slovak Republic	1995, 1997, 1998, 2001, 2003
Spain	1986, 1987
Sweden	1979, 1981, 1983, 1984, 1986, 1987, 1994, 1995, 1996, 1997
United Kingdom	1982, 1988, 1996, 1997, 1998, 2000

Source OECD

Table 2: Expansionary and contractionary fiscal adjustments-size and composition

	EXPANSIONARY					CONTRACTIONARY				
	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)
Debt	60.07	59.73	59.14	-0.34	-0.93	65.56	68.35	69.00	2.79	3.44
	3.86	*3.99*	*3.86*			*4.56*	*4.72*	*5.17*		
Change in debt	2.38	-0.29	-1.11	-2.67	-3.49	3.92	1.35	1.73	-2.57	-2.18
	0.99	*0.57*	*0.55*			*0.84*	*0.83*	*0.91*		
Primary deficit	2.94	0.14	-0.56	-2.80	-3.50	3.30	0.65	0.38	-2.65	-2.91
	0.56	*0.57*	*0.60*			*0.52*	*0.56*	*0.56*		
Primary expenditures	44.71	42.49	41.60	-2.22	-3.11	46.35	44.80	44.57	-1.55	-1.78
	1.28	*1.15*	*1.05*			*1.45*	*1.35*	*1.33*		
Transfers	18.60	17.99	17.57	-0.62	-1.03	18.97	19.09	19.16	0.12	0.19
	0.79	*0.71*	*0.62*			*0.76*	*0.69*	*0.66*		
Government wage expenditures	12.72	11.99	11.79	-0.74	-0.93	13.36	13.08	12.71	-0.28	-0.65
	0.45	*0.41*	*0.39*			*0.64*	*0.61*	*0.59*		
Government non wage expenditures	8.61	8.56	8.61	-0.04	0.00	8.66	8.51	8.56	-0.15	-0.10
	0.37	*0.37*	*0.37*			*0.43*	*0.40*	*0.39*		
Public investment	2.41	1.72	1.67	-0.69	-0.75	2.90	1.86	1.95	-1.04	-0.95
	0.26	*0.24*	*0.28*			*0.29*	*0.24*	*0.25*		
Total revenue	41.77	42.35	42.16	0.58	0.39	43.05	44.15	44.19	1.09	1.14
	1.13	*1.06*	*1.05*			*1.44*	*1.37*	*1.42*		
Income taxes	11.32	11.09	11.07	-0.23	-0.25	13.47	13.93	13.86	0.46	0.39
	0.72	*0.73*	*0.74*			*1.10*	*1.12*	*1.13*		
Social security contributions	10.23	10.34	10.27	0.11	0.04	11.49	11.46	11.38	-0.04	-0.11
	0.65	*0.62*	*0.61*			*0.84*	*0.87*	*0.86*		
Business taxes	3.01	3.67	3.85	0.66	0.84	2.49	2.62	2.61	0.13	0.12
	0.25	*0.33*	*0.34*			*0.18*	*0.16*	*0.15*		
Indirect taxes	13.72	13.71	13.57	-0.01	-0.14	12.97	13.33	13.43	0.37	0.47
	0.36	*0.30*	*0.31*			*0.38*	*0.39*	*0.38*		
Primary deficit adj.	2.78	0.19	-0.44	-2.59	-3.22	3.25	0.57	0.39	-2.67	-2.86
	0.51	*0.58*	*0.59*			*0.53*	*0.54*	*0.54*		
Primary expenditures adj.	44.60	42.65	41.86	-1.96	-2.74	46.35	44.77	44.62	-1.58	-1.73
	1.23	*1.15*	*1.06*			*1.47*	*1.33*	*1.34*		
Transfers adj.	18.50	18.14	17.84	-0.36	-0.66	18.95	19.06	19.20	0.11	0.25
	0.75	*0.72*	*0.65*			*0.77*	*0.68*	*0.68*		
Total revenue adj.	41.82	42.46	42.30	0.64	0.48	43.10	44.20	44.23	1.10	1.13
	1.13	*1.06*	*1.06*			*1.48*	*1.37*	*1.42*		

Source: OECD. Variables are in share of GDP. Primary deficit adj., Primary expenditures adj., Transfers adj., Total revenues adj., are cyclically adjusted variables. Standard deviation of the mean in parenthesis.

Table 3: Successful and unsuccessful fiscal adjustments-size and composition

	SUCCESSFUL					UNSUCCESSFUL				
	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)
Debt	72.02	70.68	65.54	-1.34	-6.48	57.74	61.38	65.66	3.64	7.93
	4.08	*4.38*	*4.58*			*4.04*	*4.36*	*4.61*		
Change in debt	2.13	-1.67	-3.45	-3.80	-5.58	3.75	1.98	3.00	-1.78	-0.75
	0.85	*0.73*	*0.31*			*1.02*	*0.63*	*0.58*		
Primary deficit	2.11	-1.33	-2.70	-3.43	-4.81	3.41	1.13	1.12	-2.29	-2.29
	0.64	*0.64*	*0.60*			*0.60*	*0.65*	*0.56*		
Primary expenditures	47.18	44.62	43.70	-2.57	-3.48	46.61	45.37	45.38	-1.24	-1.22
	1.65	*1.57*	*1.51*			*1.46*	*1.39*	*1.26*		
Transfers	19.59	19.09	18.87	-0.50	-0.72	19.32	19.29	19.36	-0.03	0.04
	0.90	*0.83*	*0.79*			*0.84*	*0.80*	*0.70*		
Government wage expenditures	14.11	13.61	13.20	-0.50	-0.91	13.35	12.93	12.72	-0.42	-0.63
	0.71	*0.67*	*0.66*			*0.58*	*0.54*	*0.53*		
Government non wage expenditures	9.07	8.86	8.91	-0.20	-0.16	8.73	8.80	8.90	0.08	0.17
	0.33	*0.35*	*0.33*			*0.38*	*0.38*	*0.36*		
Public investment	2.11	0.97	0.79	-1.14	-1.32	2.73	1.95	2.16	-0.79	-0.57
	0.33	*0.21*	*0.22*			*0.22*	*0.26*	*0.25*		
Total revenue	45.08	45.94	46.40	0.87	1.33	43.19	44.24	44.27	1.05	1.07
	1.40	*1.51*	*1.59*			*1.24*	*1.16*	*1.15*		
Income taxes	14.12	14.39	14.65	0.27	0.53	12.74	12.80	12.74	0.06	0.00
	1.19	*1.25*	*1.36*			*0.73*	*0.76*	*0.75*		
Social security contributions	10.32	10.19	9.98	-0.13	-0.34	11.82	12.17	12.27	0.35	0.44
	1.01	*1.00*	*0.98*			*0.76*	*0.75*	*0.74*		
Business taxes	2.78	3.41	3.57	0.63	0.79	2.78	3.20	3.20	0.41	0.41
	0.16	*0.24*	*0.28*			*0.25*	*0.31*	*0.28*		
Indirect taxes	14.19	14.36	14.66	0.18	0.48	12.91	12.98	13.04	0.07	0.13
	0.41	*0.45*	*0.47*			*0.35*	*0.31*	*0.30*		
Primary deficit adj.	2.11	-1.14	-2.47	-3.25	-4.58	3.18	1.01	1.13	-2.17	-2.05
	0.65	*0.62*	*0.61*			*0.56*	*0.65*	*0.55*		
Primary expenditures adj.	47.53	44.92	44.04	-2.60	-3.49	46.36	45.27	45.37	-1.10	-0.99
	1.69	*1.57*	*1.54*			*1.39*	*1.38*	*1.27*		
Transfers adj.	19.90	19.39	19.21	-0.50	-0.69	19.08	19.19	19.34	0.12	0.26
	0.93	*0.84*	*0.84*			*0.78*	*0.80*	*0.72*		
Total revenue adj.	45.42	46.07	46.50	0.65	1.09	43.18	44.26	44.24	1.08	1.05
	1.43	*1.50*	*1.58*			*1.24*	*1.15*	*1.16*		

Source: OECD. Variables are in share of GDP. Primary deficit adj., Primary expenditures adj., Transfers adj., Total revenues adj., are cyclically adjusted variables. Standard deviation of the mean in parenthesis.

Table 4: Expansionary and contractionary fiscal adjustments-macroeconomic performance

	EXPANSIONARY					CONTRACTIONARY				
	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)
GDP growth rate (G7)	-0.18	0.89	1.08	1.07	1.26	-0.24	-0.84	-1.21	-0.60	-0.97
	0.28	*0.19*	*0.22*			*0.28*	*0.25*	*0.26*		
Unemployment rate (G7)	3.09	2.98	2.40	-0.11	-0.69	0.05	0.09	0.50	0.04	0.45
	0.76	*0.74*	*0.69*			*0.46*	*0.46*	*0.52*		
Business Investment	3.09	8.54	7.64	5.45	4.55	10.66	4.34	7.26	-6.31	-3.40
	1.53	*1.18*	*1.24*			*5.03*	*3.13*	*1.72*		
Private Consumption	2.14	3.56	3.75	1.42	1.61	2.18	2.43	1.69	0.25	-0.49
	0.36	*0.31*	*0.27*			*0.34*	*0.45*	*0.34*		
Trade balance/GDP	1.36	2.42	2.18	1.07	0.82	-1.77	-1.22	-0.13	0.56	1.64
	0.63	*0.78*	*0.89*			*0.81*	*0.75*	*0.62*		
Long term real interest rates (G7)	0.19	-0.50	0.31	-0.69	0.12	0.43	0.23	0.49	-0.20	0.05
	0.36	*0.49*	*0.42*			*0.43*	*0.60*	*0.26*		
Inflation rate (G7)	2.99	3.25	2.09	0.26	-0.90	3.95	4.40	3.57	0.45	-0.38
	0.82	*0.77*	*0.53*			*0.90*	*1.06*	*0.92*		
Exchange rate	-0.92	-0.21	1.44	0.71	2.36	-1.40	-2.26	-1.76	-0.86	-0.37
	0.96	*0.88*	*0.62*			*0.74*	*1.18*	*0.84*		

Source OECD. GDP growth rate (G7), Unemployment rate (G7), Long term real interest rates (G7), Inflation rate (G7) are in difference from the weighted average for the G7 countries. Exchange rate, Business investments, Private consumption are growth rates. Standard deviation of the mean in parenthesis.

Table 5: Successful and unsuccessful fiscal adjustments-macroeconomic performance

	SUCCESSFUL					UNSUCCESSFUL				
	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)	Before (a)	During (b)	After (c)	Diff (b) - (a)	Diff (c) - (a)
GDP growth rate (G7)	0.21	0.33	0.41	0.12	0.20	-0.38	-0.01	-0.41	0.38	-0.03
	0.26	*0.28*	*0.35*			*0.30*	*0.26*	*0.22*		
Unemployment rate (G7)	1.66	1.29	0.63	-0.37	-1.03	0.81	1.12	1.34	0.31	0.52
	1.02	*1.00*	*0.93*			*0.52*	*0.54*	*0.60*		
Business Investment	7.93	9.16	8.67	1.23	0.74	3.72	6.58	5.70	2.85	1.98
	1.66	*1.80*	*1.14*			*2.26*	*1.27*	*1.50*		
Private Consumption	2.59	3.84	3.30	1.25	0.71	1.95	2.59	2.20	0.64	0.25
	0.32	*0.38*	*0.36*			*0.42*	*0.30*	*0.32*		
Trade balance/GDP	1.02	1.71	1.69	0.69	0.67	-0.03	0.73	1.28	0.77	1.31
	0.73	*0.78*	*0.76*			*0.64*	*0.84*	*0.83*		
Long term real interest rates (G7)	0.67	0.11	-0.47	-0.57	-1.14	0.46	0.36	1.03	-0.10	0.57
	0.26	*0.40*	*0.39*			*0.46*	*0.65*	*0.32*		
Inflation rate (G7)	2.22	1.49	1.71	-0.73	-0.51	1.92	2.42	1.44	0.50	-0.48
	0.71	*0.47*	*0.42*			*0.66*	*0.71*	*0.48*		
Exchange rate	-0.20	1.89	0.98	2.09	1.18	-1.04	-0.47	0.61	0.57	1.65
	1.15	*1.01*	*0.43*			*0.73*	*0.76*	*0.77*		

Source OECD. GDP growth rate (G7), Unemployment rate (G7), Long term real interest rates (G7), Inflation rate (G7) are in difference from the weighted average for the G7 countries. Exchange rate, Business investments, Private consumption are growth rates. Standard deviation of the mean in parenthesis.

Table 6: Success and growth – single equation approach

Dependent variables	**S***	**Growth**	**S***	**Growth**
	(1)	(2)	(3)	(4)
S^e		0.002		
		(1.79)		0.002
Growth				(1.79)
ΔG	-100.03	-0.23		
	(-7.58)**	(-1.88)*		
ΔT	104.9	-0.18		
	(7.05)**	(-1.36)		
(ΔG - ΔT)			-102.5	-0.027
			(8.12)**	(-0.22)
(ΔG + ΔT)			2.45	-0.203
			(0.39)	(-5.05)
Growth (t-1)	13.4	0.42	13.4	0.42
	(1.95)**	(8.17)	(1.95)**	(8.17)
Growth G7 (t-1)		0.001		0.001
		(0.002)		(0.002)
Deficit/GDP (t-1)	-26.04	0.047	-26.04	0.047
	(-5.32)**	(1.18)	(-5.32)**	(1.18)
Debt/GDP (t-1)	5.09	-0.004	5.09	-0.004
	(5.80)**	(-0.53)	(5.80)**	(-0.53)
Left government	1.45		1.45	
	(4.24)**		(4.24)**	
Centre government	-0.03		-0.03	
	(-0.05)		(-0.05)	
Majority government	0.75		0.75	
	(2.40)**		(2.40)**	
N. of observations	417	417	417	417

Notes: Probit specification in columns 1 and 3. OLS regressions in columns 2 and 4. Dependent variables: Success (S^*) in columns 1, 3, and real per capita GDP growth rate (Growth) in columns 2, 4. S^e= variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is center oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

Table 7: Success and growth – simultaneous equation approach

Dependent variables	**S^***	**Growth**	**S^***	**Growth**
	(1)	(2)	(3)	(4)
S^e		0.002		0.002
		(1.86)*		(1.86)*
Growth	31.75		31.75	
	(1.98)**		(1.98)**	
ΔG	83.86	-0.23		
	(-5.96)**	(-1.86)*		
ΔT	103.05	-0.19		
	(6.62)**	(-1.34)		
$(\Delta G - \Delta T)$			-93.4	-0.022
			(-7.16)**	(-0.17)
$(\Delta G + \Delta T)$			9.6	-0.21
			(1.36)	(-4.99)**
Growth (t-1)		0.42		0.42
		(8.23)**		(8.23)**
Growth G7 (t-1)		-0.006		-0.006
		(-0.09)		(-0.09)
Deficit/GDP (t-1)	-24.59	0.04	-24.59	0.04
	(-4.95)**	(1.04)	(-4.95)**	(1.04)
Debt/GDP (t-1)	4.67	-0.003	4.67	-0.003
	(5.15)**	(-0.44)	(5.15)**	(-0.44)
Left government	1.32		1.32	
	(3.84)**		(3.84)**	
Centre government	-0.06		-0.06	
	(-0.10)		(-0.10)	
Majority government	0.69		0.69	
	(2.22)**		(2.22)**	
N. of observations	417		417	
χ^2 test of over. restrictions	7.29		7.29	

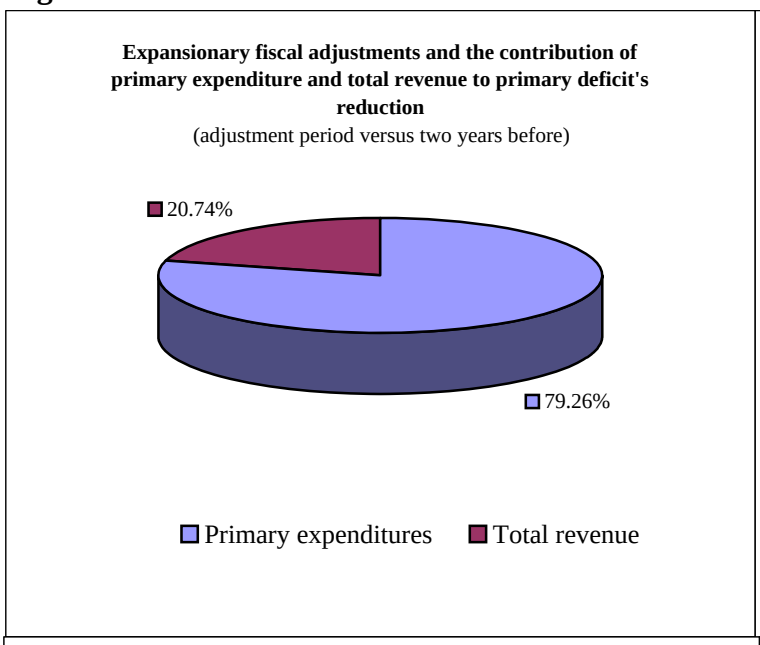
Notes: Simultaneous equations approach. Estimation by AGLS technique. Dependent variables: Success (S^*) and real per capita GDP growth rate (Growth). S^e variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is center oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

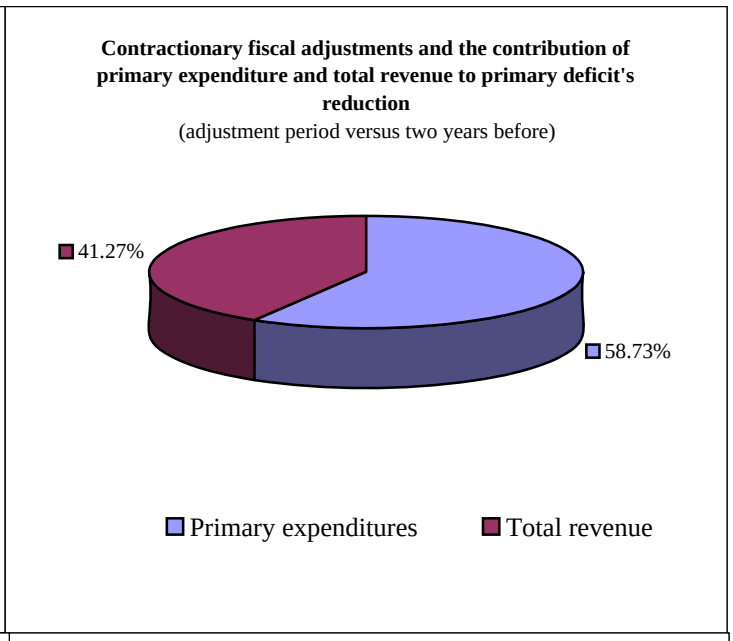
Table 8: Success, growth and monetary policy – simultaneous equation approach

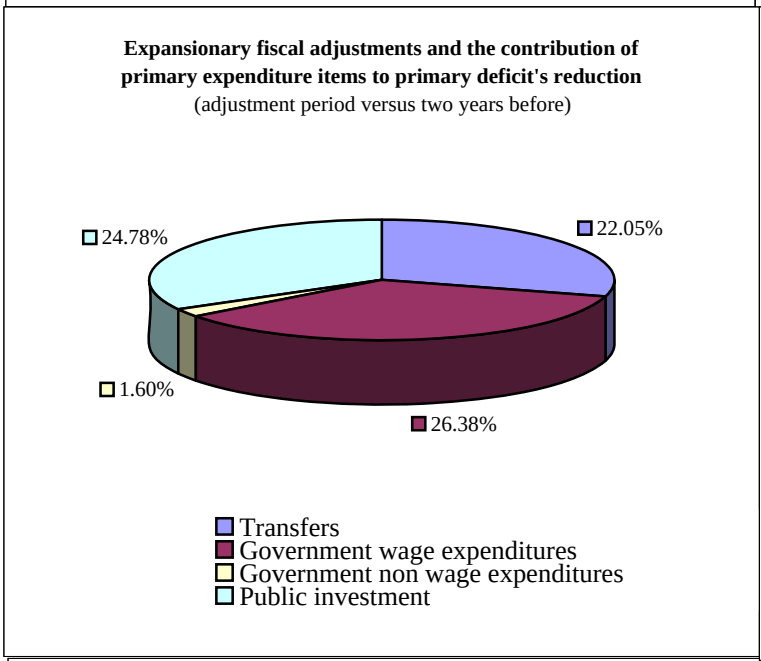
Dependent variables	**S^***	**Growth**	**S^***	**Growth**
	(1)	(2)	(3)	(4)
S^e		0.002		0.002
		(2.04)**		(1.86)*
Growth	29.7		31.84	
	(1.81)*		(2.57)**	
($\Delta G - \Delta T$)	-90.8	-0.03	-96.15	-0.03
	(-6.74)**	(-0.23)	(-7.16)**	(-0.29)
($\Delta G + \Delta T$)	8.98	-0.21	11.03	-0.17
	(1.22)	(-4.91)**	(1.48)	(-4.28)**
Growth (t-1)		0.42		0.47
		(8.28)**		(10.3)**
Growth G7 (t-1)		-0.01		0.04
		(-0.17)		(0.56)
Deficit/GDP (t-1)	-23.5	0.04	-24.9	0.02
	(-4.52)**	(1.03)	(-4.97)	(0.67)
Debt/GDP (t-1)	4.54	-0.003	4.66	-0.006
	(4.62)**	(-0.44)	(4.89)**	(-0.95)
Left government	1.27		1.32	
	(3.53)**		(3.76)**	
Centre government	-0.05		-0.28	
	(-0.08)		(-0.44)	
Majority government	0.66		0.72	
	(2.05)**		(2.18)**	
ΔEXCH (t-1)		-0.003		
		(-0.22)		
ΔRIRS (t-1)				-0.37
				(-9.01)**
N. of observations	417		402	
χ^2 test of over. restrictions	15.77		12.13	

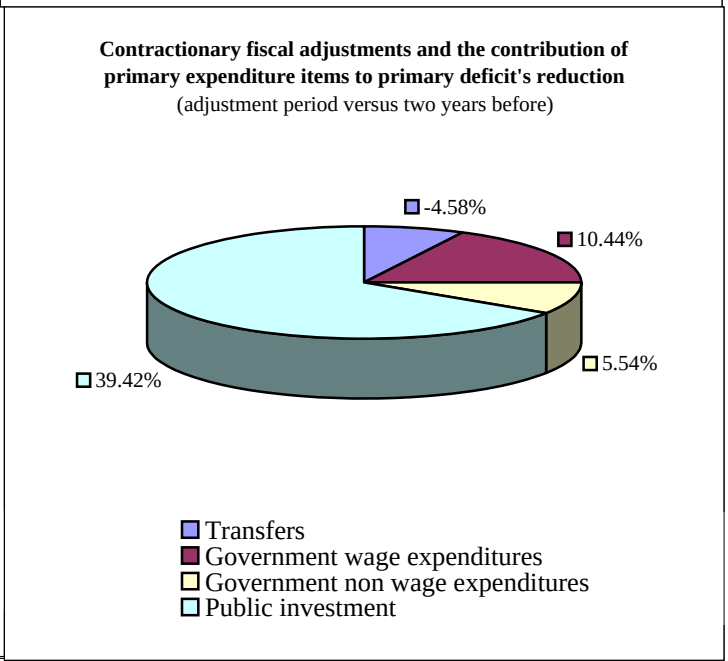
Notes: Simultaneous equations approach. Estimation by AGLS technique. Dependent variables: Success (S^*) and real per capita GDP growth rate (Growth). S^e variable measuring agents' expectations about S^*. ΔG = change in cyclically adjusted primary spending as a share of GDP. ΔT = change in cyclically adjusted government revenue as a share of GDP. Growth G7 = average real per capita GDP growth of the G7 countries. Deficit/GDP = government deficit as a share of GDP. Debt/GDP = public debt as a share of GDP. Left = 1 if government in office is left oriented, and zero otherwise. Centre = 1 if government in office is center oriented, and zero otherwise. Majority = 1 if a single party has the majority in the Parliament, and zero otherwise. Country fixed effects are included. t-statistics in parenthesis.

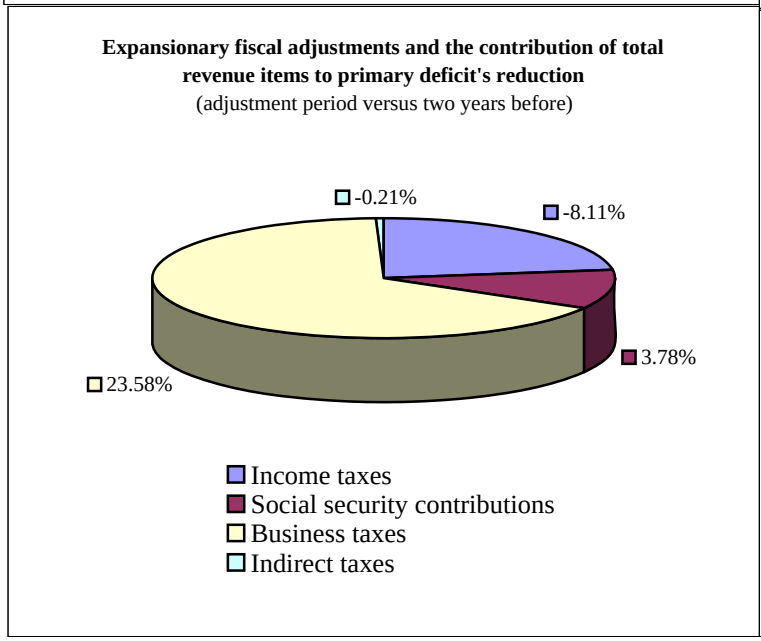
Figure 1


Expansionary fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
20.74%
79.26%
Primary expenditures
Total revenue


Contractionary fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
41.27%
58.73%
Primary expenditures
Total revenue


Expansionary fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
24.78%
22.05%
1.60%
26.38%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Contractionary fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
-4.58%
10.44%
5.54%
39.42%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment


Expansionary fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
-0.21%
-8.11%
3.78%
23.58%
Income taxes
Social security contributions
Business taxes
Indirect taxes

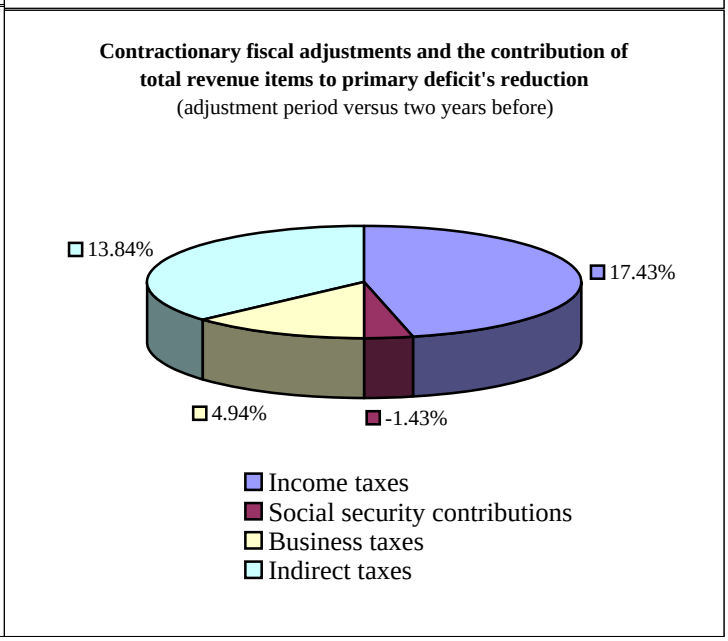
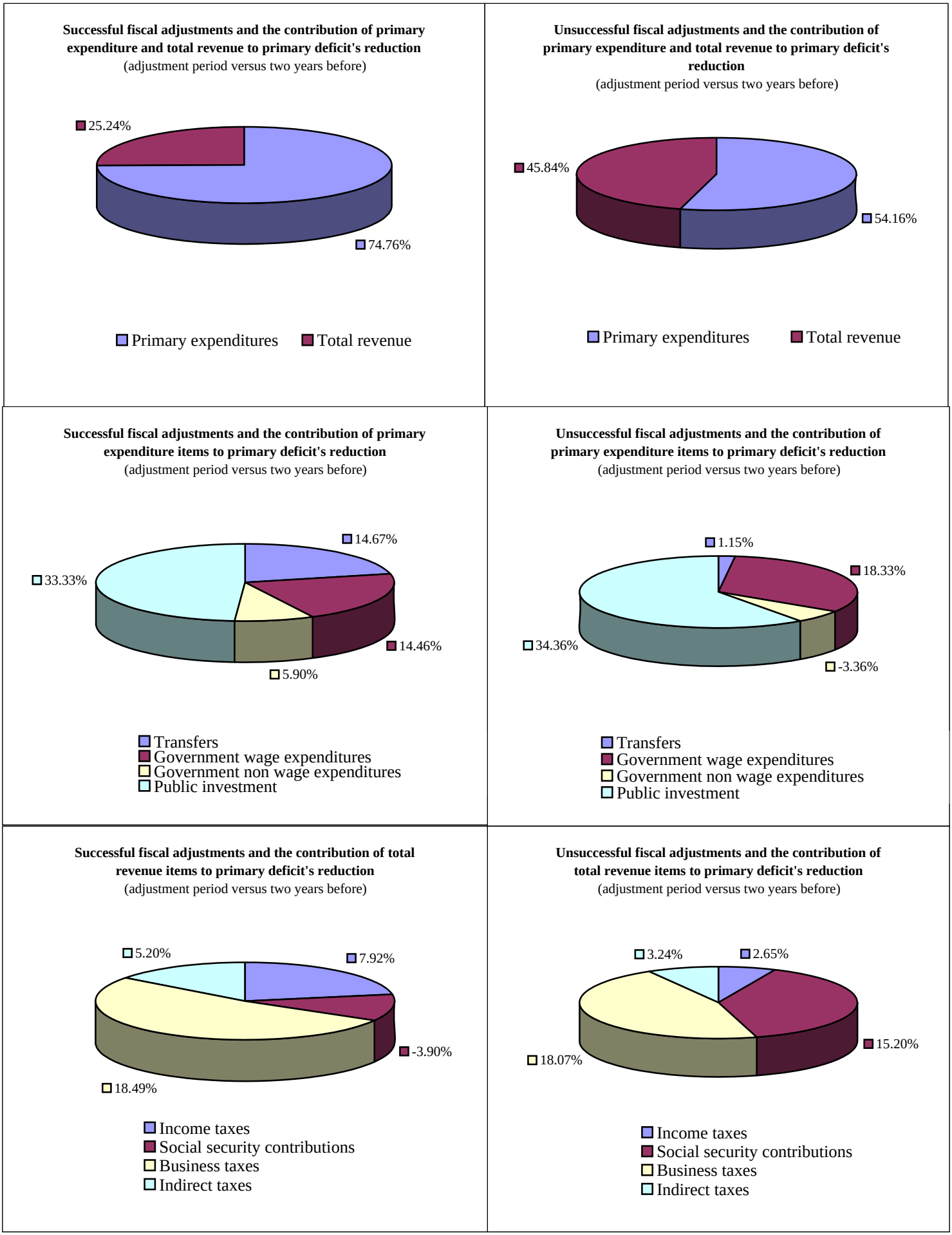

Contractionary fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
13.84%
17.43%
4.94%
-1.43%
Income taxes
Social security contributions
Business taxes
Indirect taxes

Figure 2


Successful fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
25.24%
74.76%
Primary expenditures
Total revenue
Unsuccessful fiscal adjustments and the contribution of primary expenditure and total revenue to primary deficit's reduction
(adjustment period versus two years before)
45.84%
54.16%
Primary expenditures
Total revenue
Successful fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
14.67%
33.33%
14.46%
5.90%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment
Unsuccessful fiscal adjustments and the contribution of primary expenditure items to primary deficit's reduction
(adjustment period versus two years before)
1.15%
18.33%
34.36%
-3.36%
Transfers
Government wage expenditures
Government non wage expenditures
Public investment
Successful fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
5.20%
7.92%
-3.90%
18.49%
Income taxes
Social security contributions
Business taxes
Indirect taxes
Unsuccessful fiscal adjustments and the contribution of total revenue items to primary deficit's reduction
(adjustment period versus two years before)
3.24%
2.65%
15.20%
18.07%
Income taxes
Social security contributions
Business taxes
Indirect taxes