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# Fiscal Policy and Private Consumption in Industrial and Developing Countries\*

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## Abstract

This paper empirically studies the effects of fiscal policy shocks on private consumption. Further, it tries to determine if the initial conditions of the economy, such as the financing needs of the government or previous fiscal deficits, affect that relationship. We use yearly data between 1970 and 2000 for forty countries, of which 19 are industrialized and 21 are developing countries. In general, the estimation results seem to indicate that government consumption shocks have Keynesian effects for both industrial and developing countries. In the case of tax shocks, the evidence is mixed. Furthermore, there is no evidence that favor the hypothesis of expansionary fiscal consolidations.

*JEL classification:* E62; E21; C33

*Keywords:* Fiscal policy; Private consumption; Government expenditure; Taxation; Developing countries

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# 1 Introduction

Since the paper by Giavazzi and Pagano (1990), there has been a resurgence in the debate on the effects of fiscal policy on economic activity. Specifically, there have been a growing number of empirical studies that claim that under special circumstances contractionary fiscal policy may have expansionary effects on consumption, investment and/or output, i.e. fiscal policy has non-Keynesian effects. The most cited papers within this strand of the literature are Giavazzi and Pagano (1990), Giavazzi and Pagano (1996), Perotti (1999) and Giavazzi et al. (2000). However, there is also a growing number of studies that reject the non-Keynesian hypothesis, and claim that one should not generalize the results by Giavazzi and Pagano (1990). Among these papers one could mention, among others, Hjelm (2002a), Hjelm (2002b) and van Aarle and Garretsen (2003). Clearly, the empirical results are mixed and the debate is not set yet.

On top of these mixed results, most of the cited papers have mainly focused on the experience of industrial countries. Therefore, there is little evidence that guarantees that the experience of industrial countries can be applied to developing countries. Fortunately, there is an increasing interest to include the experience of developing countries in this debate (Gavin and Perotti, 1997). So far, however, the amount of research on developing countries is limited. An exception is Giavazzi et al. (2000), who find mixed evidence about the non-Keynesian effects of fiscal policy in developing countries. Thus, more research should be done in order to include developing countries.

The present work has two objectives. The first objective is to scrutinize the work of Perotti (1999) by mimicing his work but with a more updated data set.<sup>1</sup> Secondly, include to this analysis a sample of developing countries. Therefore, we will empirically investigate the effects of fiscal policy on private consumption for both industrial and developing countries. Specifically, we will try to determine whether fiscal policy has Keynesian or non-Keynesian effects on private consumption, and if this relationship is affected by the initial conditions of the economy, such as the financing needs of the government or previous fiscal deficits. The econometric methodology, which is the same as in Perotti (1999), is based on IV GMM panel data estimation, using a yearly panel of forty countries, of which 19 are industrialized and 21 developing countries.<sup>2</sup> Further, the data spans between 1970 and 2000. The source of the data is mainly the World Development Indicators database from the World Bank.

The rest of the paper is organized in seven sections. Section 2 presents a short survey of the empirical literature. The theoretical model used as a basis for the empirical research is briefly described in section 3. The empirical methodology and the data used are discussed in sections 4 and 5 respectively. Section 6 presents the estimation results for the whole sample, the sample of industrial countries and the sample of developing countries. In section 7, we discuss and present the results for some consistency test that were made in order to confirm

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<sup>1</sup>Perotti (1999) uses a data set that includes 19 OECD countries over the period 1965 and 1994.

<sup>2</sup>We use the same sample of industrialized countries that in Perotti (1999).

the results of the benchmark case. Finally, section 8 concludes.

## 2 Survey of the literature

The literature that has evolved since the paper by Giavazzi and Pagano (1990), have mainly tried to answer whether fiscal policy has Keynesian or non-Keynesian effects on economic activity. Further, it has tried to answer under which special conditions fiscal policy has non-Keynesian effects. According to this branch of the economic literature, the impact of fiscal policy depends on: (i) the sign of the impulse (budget cut or expansion); (ii) its size and duration; (iii) the initial conditions (previous level or rate of growth of public debt, preceding exchange rate and money supply movements); (iv) the composition of the impulse (changes in taxes and transfers relative to changes in government consumption, changes in public investment or in social security entitlements).

Hemming et al. (2002) make an extensive survey of the theoretical and empirical literature on the effectiveness of fiscal policy in stimulating economic activity. They conclude that in general fiscal policy has Keynesian effects on economic activity but that the multiplying effect is small. Further, they acknowledge the possibility of non-Keynesian effects. In what follow we will extend the review of the empirical literature made by Hemming et al. (2002) in order to incorporate the latest results within the field. Specifically, we will concentrate our survey on those papers that examine cross section of countries in order to determine the existence, or not, of expansionary fiscal contractions. In general, the latest studies tend to cast doubts about the generality of the expansionary fiscal contraction hypothesis.

Table 1 summarizes the main conclusions from the surveyed papers. In this table we have also included the results of Giavazzi and Pagano (1996), Perotti (1999), and Giavazzi et al. (2000), which are the most cited articles in the empirical literature. The main conclusions of the surveyed new studies for industrial countries are as follow:

- The evidence tends not to support the expansionary fiscal contraction hypothesis. The only exception is Jönsson (2004), who finds that when fiscal contractions, in terms of public transfers, are large and persistent, there are non-Keynesian results. All the other studies obtain results that favor the view that fiscal policy has Keynesian effects.
- Regarding the sign of the impulse, the evidence seems to favor the asymmetry between contractions and expansions. Hjelm (2002b) find that private consumption grows less during contractions compared to normal periods and that there is no difference between expansions and normal times. In addition, Jönsson (2004) finds non-Keynesian effects for public transfers during contractions and Keynesian effects during expansions.
- Initial conditions are not important with the exception of the preceding exchange rate movement. Hjelm (2002a) and Hjelm (2002b) find that

contractions preceded by real depreciations improve consumption growth compared to contractions preceded by real appreciations.

- With respect to the composition of the impulse, the evidence is mixed. While van Aarle and Garretsen (2003) find that public transfers have clearer Keynesian effects than government spending and taxes, Jönsson (2004) finds that public transfers have non-Keynesian effects during contractions. Further, Hjelm (2002b) concludes that the composition is not important.
- van Aarle and Garretsen (2003) conclude that the findings for private consumption can be extended to private investment, i.e. fiscal policy has Keynesian effects on investment.

Concluding, we can say that the fact that there have been episodes of expansionary fiscal contractions, and that some episodes share certain characteristics is not rejected. However, the surveyed papers cast doubts about the generality of these results. Furthermore, as the paper by Hjelm (2002a) shows, the preceding exchange rate movement is a key element for fiscal contractions to become successful. The most cited examples of successful expansionary fiscal contractions, namely Denmark (1982-1986) and Ireland (1987-1989), where all preceded by real exchange rate depreciations. Thus, it is possible that it was the real exchange rate depreciation that caused the consumption growth rather than the contractionary fiscal policy.

When considering the effects of fiscal policy for developing countries, the evidence is limited to the work of Giavazzi et al. (2000). Giavazzi et al. (2000) find evidence of non-linear effects of fiscal policy on private savings during large changes in the surplus. Furthermore, when large changes in the surplus are preceded by rapid debt growth, they even find non-Keynesian effects of taxes on private savings.

### 3 Theoretical Model

In this section we will briefly outline the theoretical model that we will use as point of reference for our empirical investigation. For a detailed treatment of the theoretical model we make reference to Perotti (1999). The model has four basic assumptions: first, taxes have distortionary effects; second, the government has a higher discount rate than private agents, and thus the economy is initially away from a perfect tax-smoothing situation; third, there are two kinds of private agents in terms of the access to the credit market, unconstrained individuals and constrained individuals; fourth, government consumption has positive effects on economic output.

There is a fraction  $1 - u$  of unconstrained individuals, which have perfect access to the credit market. The fraction  $u$  of constrained individuals have no access to the credit market. Both kinds of agents live for three periods. The model study the change in their consumption between periods 0 and 1

Table 1: Cross-section Studies of Fiscal Policy

Study	Sample	Special circumstances	No. episodes	Type of Analysis
Giavazzi and Pagano (1996)	19 OECD countries, 1970-1992	Size and persistence (ex ante): Any period when the cyclically adjusted primary deficit as a percentage of potential GDP had a cumulative change of 3 to 5%, depending on the number of years.	223	Panel regressions of consumption functions (error correction specification)
Perotti (1999)	19 OECD countries, 1965-1994	Initial conditions: the "cyclically adjusted" government debt and the PDV of future government expenditure, as a share of trend GDP in previous year, exceeds the ninetieth percentiles of the distribution and cyclically adjusted deficit, as a share of trend GDP, exceeds 4% for two consecutive years.	Not given	Panel regressions of consumption functions (Euler equation specification)
Giavazzi et al. (2000)	18 OECD countries, 1960-1996	Size and persistence (ex ante): a large and persistent fiscal impulse when full employment surplus (as a percent of potential output) changes by at least 1.5 percentage points per year over a two-year period. Initial conditions: gross public debt exceeds 70% of potential output in previous year and growth rate of the ratio of (cyclically adjusted) gross public debt to trend GDP exceeds 4% for two consecutive years.	38 expansions, 65 contractions	Panel regressions of national savings rates
Hjelm (2002a)	19 OECD countries, 1970-1997	Size and persistence (ex ante): fiscal contraction period when the cyclically adjusted primary deficit as a percentage of potential GDP had a cumulative decrease of 3 to 5%, depending on the number of years. Initial conditions: Splits fiscal contractions with respect to REER and M2 during the preceding two years and during the contraction.	23 contractions	Panel regressions of consumption functions (structural solved out specification)
Hjelm (2002b)	19 OECD countries, 1970-1997	Size and persistence (ex ante): Any period when the cyclically adjusted primary deficit as a percentage of potential GDP had a cumulative change of 3 to 5%, depending on the number of years. Initial conditions: Splits fiscal contractions with respect to debt to GDP ratio of the preceding year, total growth in the debt ratio during the preceding two years and the preceding exchange rate movement (depreciation or appreciation).	55	Panel regressions of consumption functions (structural solved out specification)
van Aarle and Garretsen (2003)	14 EU countries, 1990-1998	Size and persistence (ex ante): Any period when the cyclically adjusted primary deficit as a percentage of potential GDP had a cumulative change of 3 to 5%, depending on the number of years. Initial conditions: Splits fiscal contractions with respect to debt to GDP ratio of the preceding year, total growth in the debt ratio during the preceding two years and the preceding exchange rate movement (depreciation or appreciation).	29	Panel regressions of consumption functions (error correction specification)
Jönsson (2004)	19 OECD countries, 1960-2000	Size and persistence (ex ante): Any period when the cyclically adjusted primary deficit as a percentage of potential GDP had a cumulative change of 3 to 5%, depending on the number of years.	23 expansions, 25 contractions	Panel regressions of consumption functions (error correction specification)
Giavazzi et al. (2000)	101 developing countries, 1970-1994	Size and persistence (ex ante): a large and persistent fiscal impulse when current surplus (as a percent of potential output) changes by at least 1.5 percentage points per year over a two-year period. Initial conditions: gross public debt exceeds 70% of potential output in previous year and growth rate of the ratio of (cyclically adjusted) gross public debt to trend GDP exceeds 4% for two consecutive years.	259 expansions, 270 contractions	Panel regressions of national savings rates

Table 1: Cross-section Studies of Fiscal Policy (*continued*)

Study	Main Evidence of Expansionary Contractions	Channels	Characteristics
Giavazzi and Pagano (1996)	For large/persistent consolidations, \$1 increase in taxes (cut in transfers) raises private consumption by 15-20c in long run.	Private sector consumption	Size and persistence most important, clearer effects for government spending but also for taxes and transfers.
Perotti (1999)	Expenditure shocks have Keynesian effects with low debt or deficit, but non-Keynesian effects with high debt or deficits; evidence on a similar switch with tax shocks is less strong.	Private sector consumption	Initial fiscal conditions are crucial; composition also important.
Giavazzi et al. (2000)	Non-linear responses by private sector more likely when fiscal impulses are large and persistent. No evidence of non-Keynesian effects.	Private sector consumption/saving	Size and persistence most important, initial fiscal conditions not important. Non-Keynesian effects larger for changes in taxes than spending, and for contractions rather than expansions.
Hjelm (2002a)	No evidence of non-Keynesian effects.	Private sector consumption	Initial conditions: contractions preceded by real depreciations improve consumption growth compared to contractions preceded by real appreciations.
Hjelm (2002b)	No evidence of non-Keynesian effects.	Private sector consumption	Size and persistence is important: private consumption growth is lower during contractions compared to normal periods, no difference between expansions and normal periods. Composition not important. Initial conditions: consumption growth higher during contractions preceded by depreciations rather than appreciations; initial level of debt and deficits not important.
van Aarle and Garretsen (2003)	No evidence of non-Keynesian effects.	Private sector consumption/investment	Size and persistence not important. Initial conditions: initial level of debt not important. Clearer Keynesian effects for public transfers than government spending and taxes.
Jönsson (2004)	Non-Keynesian responses only for transfers and when fiscal impulses are large and persistent.	Private sector consumption	Size and persistence important, non-Keynesian effects only for public transfers during contractions; larger effects during contractions than expansions.
Giavazzi et al. (2000)	Non-Keynesian responses only for tax changes when fiscal impulses are large and persistent and preceded by rapid debt growth.	Private sector consumption/saving	Size and persistence most important, initial fiscal conditions only important for debt growth. Non-Keynesian effects larger for changes in taxes than spending, symmetry between expansions and contractions.

due to a fiscal shock in period 1. Further, the response of the fiscal policy in period 2 will depend on the fiscal shock in period 1. Therefore, fiscal policy shocks will have wealth effects from anticipated future responses of fiscal policy for unconstrained individuals. Conversely, constrained individuals will have no wealth effects and their change in consumption between periods 0 and 1 will be completely determined by their current income, which in turn is affected by the fiscal shock.

Further,  $L_t$  is the PDV of the financing needs of the government, which is determined by the intertemporal government budget constraint. Moreover,  $p$  is the probability that the policy-maker currently in charge of the government stay in office in the next period. The case when  $L_t$  is low or  $p$  is high is denominated good times, and the opposite situation is called bad times. According to this model, government consumption shocks have positive effects on private consumption at low levels of  $L_0$ , the PDV of the financing needs from the perspective of time 0, and negative effects at high levels of it. Similarly, government consumption shocks have positive effects at high levels of  $p$  and negative effects at low levels of it. In the case of tax revenue shocks, the model predicts that the tax shocks have the opposite effects on private consumption than the government consumption shocks. Therefore, tax shocks have negative effects at low levels of  $L_0$ , or high levels of  $p$ , and positive effects at high levels of  $L_0$ , or low levels of  $p$ . These predictions of the model will be the null hypothesis that we will empirically test. Further, the empirical model for testing the null hypothesis will be presented in the next section.

## 4 Specification and Estimation Methodology

The empirical model that we will estimate is a two-step econometric model. In the first step we will estimate the fiscal policy innovations and the expected change in disposable income for each country at the time. Then we will use the generated regressors to estimate the structural equation, which is the model we are interested in, through panel data estimation. We will have two structural equations or second-step models, the first that reflects the fiscal policy effects on consumption for both constrained and unconstrained individuals, and the second that only reflects the effects on unconstrained individuals. The first structural equation or second-step model is

$$\Delta C_{it} = \gamma_1 \hat{\epsilon}_{it}^G + \tilde{\gamma}_1 D_{it} \hat{\epsilon}_{it}^G + \gamma_2 \hat{\epsilon}_{it}^T + \tilde{\gamma}_2 D_{it} \hat{\epsilon}_{it}^T + \mu \Delta \hat{Y}_{it/t-1} + \omega_{it} \quad (1)$$

where  $\Delta C_{it}$  is the change in private consumption for country  $i$  at time  $t$ ,  $\hat{\epsilon}_{it}^G$  is the estimated government consumption shock,  $\hat{\epsilon}_{it}^T$  is the estimated tax revenues shock,  $D_{it}$  is a dummy variable, which will take the value 0 in good times and the value 1 in bad times,  $\Delta \hat{Y}_{it/t-1}$  is the estimated change in disposable income using information at time  $t - 1$ , and  $\omega_{it}$  is the error term.

The coefficient  $\gamma_1$  measures the effects of government consumption shocks on the consumption of both constrained and unconstrained individuals. The case when  $\gamma_1 > 0$  is referred as Keynesian effects of government consumption shocks

on private consumption because a positive government consumption shock has a positive effect on private consumption. Conversely, when  $\gamma_1 < 0$  we say that government consumption shocks have non-Keynesian effects on private consumption.  $\tilde{\gamma}_1$  represents the difference in the effects of government consumption between bad and good times. Therefore, if  $\tilde{\gamma}_1$  is negative and larger, in absolute value, than  $\gamma_1$ , we have non-Keynesian effects in bad times. Regarding the tax shocks, when  $\gamma_2$  has a negative sign it means that a tax shock has a negative effect on private consumption. In this case,  $\gamma_2 < 0$  is referred as Keynesian effects and  $\gamma_2 > 0$  as non-Keynesian effect on private consumption.  $\tilde{\gamma}_2$  measure the difference in the effects of tax shocks between good and bad times. Therefore, if the sum of  $\gamma_2$  and  $\tilde{\gamma}_2$  is positive, tax shocks have non-Keynesian effects on private consumption in bad times. Clearly, the expansionary effects of fiscal consolidations occur when  $\gamma_1 + \tilde{\gamma}_1 < 0$  and/or  $\gamma_2 + \tilde{\gamma}_2 > 0$ . Note that if both  $\gamma_1$  and  $\tilde{\gamma}_1$  are positive and/or both  $\gamma_2$  and  $\tilde{\gamma}_2$  are negative, we have Keynesian effects both in good and bad times. In addition, according to the theoretical model,  $\mu$  reflects the share of credit constrained individuals (Perotti, 1999).

Under the null hypothesis  $\gamma_1 > 0$ ,  $\tilde{\gamma}_1 < 0$ ,  $\gamma_2 < 0$ , and  $\tilde{\gamma}_2 > 0$ . Therefore, the null hypothesis states that fiscal policy innovations have normally Keynesian effects on private consumption ( $\gamma_1 > 0$  and/or  $\gamma_2 < 0$ ), but that the Keynesian effects are reduced in bad times ( $\tilde{\gamma}_1 < 0$  and/or  $\tilde{\gamma}_2 > 0$ ). Moreover, in the case that  $\gamma_1 + \tilde{\gamma}_1 < 0$  and/or  $\gamma_2 + \tilde{\gamma}_2 > 0$ , the Keynesian effects are completely reverted in bad times and therefore fiscal policy shocks have non-Keynesian effects, i.e. the expansionary effects of fiscal consolidations.

The second structural equation, which reflects the fiscal policy effects on consumption but only for unconstrained individuals, is

$$\Delta C_{it} = \gamma_1^u \hat{\epsilon}_{it}^G + \tilde{\gamma}_1^u D_t \hat{\epsilon}_{it}^G + \gamma_2^u \hat{\epsilon}_{it}^T + \tilde{\gamma}_2^u D_t \hat{\epsilon}_{it}^T + \mu \Delta \hat{Y}_{it/t} + \tilde{\omega}_{it} \quad (2)$$

where  $\Delta \hat{Y}_{it/t}$  is the forecasted change in disposable income for country  $i$  using information at time  $t$ . Also the superscript  $u$  reflects the fact that we are only analyzing the effects of fiscal policy shocks on credit unconstrained individuals. Therefore, this alternative approach permits us study the wealth effects of unconstrained individuals which is the source of the non-Keynesian effects of fiscal policy. Note that the difference between equations (1) and (2) is that the first use  $\Delta \hat{Y}_{it/t-1}$  while the second use  $\Delta \hat{Y}_{it/t}$ . As will become clearer in section 5, the difference between  $\Delta \hat{Y}_{it/t-1}$  and  $\Delta \hat{Y}_{it/t}$  is that the later use both lagged information on disposable income *and* the contemporaneous estimated fiscal policy innovations. Therefore,  $\Delta \hat{Y}_{it/t}$  incorporates the effects of fiscal shocks on the disposable income of credit constrained individuals, and thus the coefficients of the fiscal innovations in equation (2) reflects only the wealth effects on consumption for unconstrained individuals.<sup>3</sup> The coefficients  $\gamma_1^u$  and  $\gamma_2^u$  measure the effects of government consumption shocks and tax shocks for unconstrained individuals respectively. In addition,  $\tilde{\gamma}_1^u$  and  $\tilde{\gamma}_2^u$  measure the difference in the effects of government consumption shocks and tax shocks between good and bad times respectively.

<sup>3</sup>See Perotti (1999) page 1414 for the formal demonstration.

Under the null hypothesis  $\gamma_1^u < \gamma_1$ ,  $\tilde{\gamma}_1^u = \tilde{\gamma}_1 < 0$ ,  $\gamma_2^u > 0 > \gamma_2$ , and  $\tilde{\gamma}_2^u > \tilde{\gamma}_2 > 0$ . The null hypothesis states that during normal times a government consumption shock will have a milder effect on the consumption of unconstrained individuals than when taking into account both kinds of individuals ( $\gamma_1^u < \gamma_1$ ).<sup>4</sup> The reason is that unconstrained individuals decide their present consumption taking into account the PDV of income, and not only their present income as credit constrained individuals do. Therefore, when government consumption increase, unconstrained individuals also take into account that in the future the tax revenues of the government will have to increase to finance the current increase in government consumption, thus having a negative wealth effect.  $\tilde{\gamma}_1^u$  is equal to  $\tilde{\gamma}_1$  because it is only unconstrained individuals that react differently between bad and good times. Mathematically,  $\tilde{\gamma}_1^c = 0$ , and thus  $\tilde{\gamma}_1 = \tilde{\gamma}_1^u$  because  $\tilde{\gamma}_1 = \tilde{\gamma}_1^c + \tilde{\gamma}_1^u$ . Further, it states that these coefficients are negative, because government consumption shocks have non-Keynesian effects on unconstrained individuals' consumption in bad times. Next, the reason for  $\gamma_2^u$  being positive is that if current taxes rise, future taxation is reduced, at the same time that the expected PDV of taxation is constant. Recalling that the theoretical model assumed that taxes are distortionary, less taxes in the future implies less tax distortions, and thus the wealth of unconstrained individuals increase. Further,  $\tilde{\gamma}_2^u > \tilde{\gamma}_2 > 0$  because  $\tilde{\gamma}_2 = \tilde{\gamma}_2^u + \tilde{\gamma}_2^c$  and  $\tilde{\gamma}_2^c < 0$ .

Both equation (1) and (2) were estimated using two alternative definitions for the dummy variable. In addition, they were estimated for the whole country sample but also for the sub-sample of industrialized countries and the sub-sample of developing countries. The estimation method that was used was the same as in Perotti (1999). Equation (2) was estimated with an IV GMM estimator that allows for serial correlation of order 1 and heteroskedasticity of general form, using the panel equivalent of the Newey-West variance covariance matrix.<sup>5</sup> When using the IV GMM estimator for equation (2),  $\Delta Y_{it}$  was the endogenous regressor that is being instrumented, and  $\Delta \hat{Y}_{it/t}$  was the instrument. Equation (1) was estimated with  $\Delta \hat{Y}_{it/t-1}$  as an exogenous regressor, i.e. it was its own instrument. In all the regressions we included year dummies to account for any time-specific effects, i.e. we had a two-way error component regression model.

As noted earlier,  $\hat{\epsilon}_{it}^G$ ,  $\hat{\epsilon}_{it}^T$ ,  $\Delta \hat{Y}_{it/t-1}$ , and  $\Delta \hat{Y}_{it/t}$  are generated regressors and are obtained from the expectation equations or first-step models presented in section 5 for each country at the time. According to McAleer and McKenzie (1991) the presence of generated regressors results in the covariance matrix of the disturbance term being non-spherical, with both non-zero off-diagonal and non-constant diagonal elements. Obviously, this poses a problem for our panel data estimation methodology, which unfortunately has no easy solution.<sup>6</sup> However,

<sup>4</sup>Note that  $\gamma_1 = \gamma_1^c + \gamma_1^u$ , where  $\gamma_1^c$  is the effect on credit constrained individuals and  $\gamma_1^u$  is the effect on unconstrained individuals.

<sup>5</sup>We used the panel data version of the estimation command "ivreg2" with the "gmm robust bw(2) kernel(bartlett) small" options from the statistical software Stata 8.

<sup>6</sup>See, for example, Pagan (1984), Murphy and Topel (1985), McAleer and McKenzie (1991), and Smith and McAleer (1994).

the estimation procedure that we used provides an efficient estimator (McAleer and McKenzie, 1991).<sup>7</sup> Moreover, as will be clearer when the empirical results are presented, even if we use incorrect standard errors our main results cannot be invalidated.<sup>8</sup>

## 5 Data

The sample used for the estimation of the model consisted of a yearly panel of forty countries, of which nineteen were industrialized countries and twenty one were developing countries.<sup>9</sup> The election of the industrialized countries was made in order to compare the results of this study with prior studies, such as Perotti (1999). In the case of developing countries, the election of countries obeyed to the practical limitation of availability of data. The main source of the data for the different variables is the World Development Indicators database from the World Bank.<sup>10</sup> A detailed description of the different variables employed and sources for the data is presented in table 2. Further, the data spans from 1970 to 2000, i.e. there are 31 observations for each country. However, the bellow mentioned transformations of the data and estimation procedures reduced the span of the sample with four observations. Accordingly, the final panel used for estimating structural equations (1) and (2) consisted of a cross-section of 40 countries over 27 time periods, i.e. 1080 observations. In the case of the sub-sample for industrial countries our panel consisted of 513 observations. For developing countries, the sub-sample size was 567 observations.

All variables are scaled by the lagged value of disposable income. The reason for not using the standard scaling procedure, which uses the log value of the variable, is that there are large differences in government consumption-to-GDP and tax-to-GDP ratios across countries and over time. Obviously a change in government consumption will not have the same effects on private consumption

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<sup>7</sup>There are two broad procedures to correct the standard errors for the "generated regressor" problem. The first procedure implies applying a joint estimation method, such as full information maximum likelihood (FIML). The other alternative, which is the one employed in this study, is to use a two-step estimator. In this case, the standard errors from the second step need to be corrected. In this study, we have corrected the standard errors by allowing them to be serially correlated of order 1 and heteroskedastic.

<sup>8</sup>As Murphy and Topel (1985) show, the correct covariance matrix for the second-step estimators exceeds the unadjusted covariance matrix by a positive-definite matrix. Therefore, unadjusted standard errors are understated. In our case, and because in most cases we cannot reject the null of insignificant coefficients, this would imply that most of our coefficient would become even more insignificant.

<sup>9</sup>The industrialized economies are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom, and United States. Note that this is the same country sample used in Perotti (1999). The developing countries are Chile, Colombia, Costa Rica, Dominican Republic, Fiji, India, Malaysia, Malta, Mexico, Morocco, Pakistan, Panama, Paraguay, Philippines, South Africa, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, and Venezuela.

<sup>10</sup>While not as accurate and complete as data from the OECD Economic Outlook, using the WDI data for industrial countries allow us to compare better the results between industrial and developing countries.

Table 2: Variables and Sources

Variable	Series	Source
Private consumption	Household Final Consumption Expenditure	WDI
Government consumption	General Government Final Consumption Expenditure	WDI
Total tax revenue	Taxes on Income, Profits and Capital Gains + Social Security Taxes + Net Taxes on Products	WDI
Households disposable income	GNI	WDI
Gross domestic product	GDP	WDI
Disposable income deflator	GDP Deflator	WDI
Population	Population, total	WDI
Government external debt	External debt, total - Private nonguaranteed debt	WDI
Exchange rate	DEC alternative conversion factor	WDI
Government debt	Gross Government Debt	OECD
Fiscal deficit	Deficit (-) or surplus	IFS
Potential output	Potential GDP	OECD

WDI refers to the World Development Indicators 2002. IFS refers to the International Financial Statistics 2002. OECD refers to the OECD Economic Outlook 2002. For industrial countries, we used government debt, and for developing countries we used government external debt. For some countries Taxes on Goods and Services (WDI 2002) was used instead of Net Taxes on Products. All the series are expressed in local currency units.

if the government consumption-to-GDP ratio is 10% as when it is 30%. Therefore just scaling by the log difference is not appropriate in this case and all the variables are transformed using the following formula

$$\Delta X_t = [(X_t/N_t P_t) - (X_{t-1}/N_{t-1} P_{t-1})]/(Y_{t-1}/N_{t-1} P_{t-1})$$

where  $N_t$  is each countries' total population,  $P_t$  is the disposable income deflator, and  $Y_t$  is households disposable income.  $\Delta X_t$  represents the change in the real per capita value of the variable  $X_t$ , divided by lagged real per capita disposable income  $Y_{t-1}$ .

As mentioned in section 4, the fiscal policy innovations  $\hat{\epsilon}_{it}^G$  and  $\hat{\epsilon}_{it}^T$  are not readily available and had to be estimated, i.e. they are generated regressors. We used a similar estimation method as the one employed by Perotti (1999). The fiscal policy shocks for each country were obtained from the following near VAR with government consumption, total tax revenue and GDP as the endogenous variables

$$\begin{aligned}
\Delta G_t &= \alpha_{1,0} + \alpha_{1,1} \Delta G_{t-1} + \alpha_{1,2} \Delta T_{t-1} + \alpha_{1,3} \Delta Q_{t-1} + \epsilon_t^G \\
\Delta T_t &= \alpha_{2,0} + \alpha_{2,1} \Delta G_{t-1} + \alpha_{2,2} \Delta T_{t-1} + \alpha_{2,3} \Delta Q_{t-1} + \epsilon_t^T \\
\Delta Q_t &= \alpha_{3,0} + \alpha_{3,1} \Delta G_{t-1} + \alpha_{3,2} \Delta T_{t-1} + \alpha_{3,3} \Delta Q_{t-1} + \alpha_{3,4} \Delta Q_{t-2} + \epsilon_t^Q
\end{aligned} \tag{3}$$

For each country we estimated the system of equations (3) and obtained the fiscal innovations from the residuals of each variable. However, we used a SUR estimation procedure that allowed for a non-common lag length structure. Accordingly, in order to obtain the lag structure for the SUR we added to the benchmark case two alternative lag structures. The first alternative specifica-

tion added to the benchmark case  $\Delta G_{t-2}$  to the list of regressors of the government consumption equation, and  $\Delta T_{t-2}$  to the list of regressors of the tax equation. The second alternative specification added  $\Delta Q_{t-2}$  to the first alternative specification for both the consumption and tax equations. Next, the highest adjusted R-square was used to identify the best lag structure for each variable (or equation of the SUR). Once we had identified the best lag structure for each variable from the three specifications, we constructed a new SUR where each equation had the best lag structure for each variable. In other words, the final system of equations was chosen so that for each equation the lag structure with the best specification was used.

The tax revenue shocks were cyclically adjusted following the methodology used by Perotti (1999). The cyclically adjusted tax innovations were computed as  $\hat{\epsilon}_{it}^T - \phi_{it}\hat{\epsilon}_{it}^Q T_{it}$ , where  $\phi_{it}$  is the GDP-elasticity of taxes for each country and  $T_{it}$  is total tax revenues to previous year's per capita disposable income. Specifically, the elasticity  $\phi_{it}$  is a weighted average of the elasticities of each component of total tax revenues,  $T_{it}$ .<sup>11</sup> The reason for cyclically adjusting the tax innovations is that we are only interested in the discretionary variations of the tax innovations and not the variations due to the business cycle. Further, the tax elasticities for industrial countries were taken from the OECD and are available in van den Noord (2000).<sup>12</sup> In the case of developing countries, there are no available GDP-elasticities of taxes. Therefore, for developing countries we used some pre-established elasticities for the different tax categories. These elasticities are taken from Chouraqui et al. (1990) and are the same that the OECD have used for those countries which lacked simulation-based elasticities. The elasticity values are 2.5 for corporate income taxes, 1.2 for personal income taxes, 1 for indirect taxes, and 0.5 for social security contributions. In section 7 we will change the assumed tax elasticity values and check whether the results from the benchmark case change. Specifically, we will have three alternative elasticity scenarios for developing countries. In the case of government consumption shocks, we have not cyclically adjusted them. The reason for not adjusting them is that generally there are no automatic feedback from economic activity to government purchases of goods and services.<sup>13</sup>

<sup>11</sup> $\phi_{it}$  changes for each year because the tax elasticity for each tax changes but also because the proportion of each tax relative to total tax revenues changes each year. In addition, the variable for direct taxes that we use (Taxes on income, profits and capital gains) include both corporate and personal income taxes. Therefore, for both industrialized and developing countries it was necessary to calculate the proportion of these two tax categories. The proportion for each year was taken from the Government Finance Statistics of the IMF.

<sup>12</sup>Note that these elasticities are not regression based elasticities, but are obtained from simulations that take into account the structure of the tax system of each country and on its distribution of earnings. Therefore, the cyclical component of the change in taxation is not a generated regressor. Furthermore, as pointed out by van den Noord (2000), it is not advisable to use elasticities obtained from regressions because they will internalize policy-induced effects on the budget, which could therefore be misleading.

<sup>13</sup>The only component of government *expenditure* that should be cyclically adjusted is unemployment benefit expenditures. However, this component is a relatively small component of government expenditures (Giorno et al., 1995), and it is not even included in the definition of government *consumption*. Furthermore, most developing countries do not even have

From section 4 it was clear that we needed to estimate both  $\Delta\hat{Y}_{it/t-1}$  and  $\Delta\hat{Y}_{it/t}$  to be used in equations (1) and (2) respectively. The difference between these forecasts is that  $\Delta\hat{Y}_{it/t}$  do not only use lagged but also contemporaneous information. Consequently,  $\Delta\hat{Y}_{t/t}$  was forecasted for each country at the time by using the following equation

$$\Delta Y_t = \beta_0 + \beta_1 \Delta Y_{t-1} + \beta_2 \hat{\epsilon}_t^G + \beta_3 \hat{\epsilon}_t^T + \varepsilon_t. \quad (4)$$

Similarly,  $\Delta\hat{Y}_{t/t-1}$  was forecasted by estimating equation (4) but without the contemporaneous fiscal policy shocks. When estimating equation (4) for each country of the sample, we followed a Box-Jenkins strategy. We used the Schwarz criterion (SBC) to determine the correct model, i.e. the preferred lag structure was the one with the lowest SBC value. The diagnostic tests that were made are: a) serial correlation of residuals with correlogram - Q-statistics and LM test, b) normality of disturbances with Jarque-Bera, and c) heteroskedasticity with White test (cross terms).<sup>14</sup>

In the case of the empirical construction of the regime dummy variable,  $D_{it}$  take the value 0 in good times and the value 1 in bad times. Further, as in the theoretical model in section 3, we used two different definitions of bad times.  $D1_t$  was used as proxy for  $L_0$  (the PDV of the financing needs of the government) and  $D2_t$  for  $p$  (the probability that the policy-maker be reelected), and we defined these variables as Perotti (1999). In the first definition,  $D1_t$ , we use the sum of government debt at time  $t-1$  and the PDV of future government expenditure as a share of potential output to define bad times.<sup>15</sup> Specifically, a given country-year  $t$  belongs to the bad time regime if the ratio is greater than a certain cutoff value  $x$ . For the benchmark case, we will define the cutoff value  $x$  as the eightieth percentile of the ratio's distribution, generating  $D1_t(.80)$ . As will be seen in section 7, we will have two alternative definitions for  $D1_t$ , one with a threshold value given by the ninetieth and seventieth percentile, generating  $D1_t(.90)$  and  $D1_t(.70)$  respectively.

In the second definition of bad times,  $D2_t$ , we use the fiscal deficit as a proxy for the reelection probability. As Perotti (1999) stresses, the reason for using

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unemployment benefit schemes.

<sup>14</sup>For some countries we had to exclude some outlier observations, due to wars or deep economic crises, in order to estimate the corresponding model. These outliers were detected because the normality test failed. In these cases only AR models could be tested because Eviews cannot estimate MA terms when there are missing observations within the sample. After estimation we included the excluded observations and therefore we could make one step forecasts for the whole sample, including the years that had been excluded. The countries were Malaysia (1998), Panama (1988), Philippines (1984), Greece (1974), Tunisia (1971-72), and Thailand (1998).

<sup>15</sup>We cyclically adjust government debt by subtracting the cyclical change in taxation relative to the previous year, as measured by the lagged percentage change in real GDP times the average GDP elasticity of taxes,  $\hat{B}_t = B_t - T_t \% \Delta GDP_{t-1} \phi_t$ . The PDV of future government expenditure was calculated recursively from a near VAR similar to the system of equations (3) using an out-of-sample prediction of five years and a discount rate of 5%. For some developing countries, we used current GDP instead of potential output and Total government external debt due to data availability.

the fiscal deficit is that it captures the extent of the departure from perfect tax-smoothing. It is expected, due to political economy reasons, that a lower probability of reelection will induce the policy maker to follow a less responsible fiscal policy, i.e. a larger fiscal deficit. Therefore, a given country-year  $t$  belongs to the bad time regime if the "cyclically adjusted" deficit as a ratio of potential output exceeds a certain value  $x$  in the two previous years  $t-1$  and  $t-2$ .<sup>16</sup> For the  $D2_t$  variable we will have the following values 4%, 6%, and 8%, i.e.  $D2_t(.04)$ ,  $D2_t(.06)$ , and  $D2_t(.08)$  respectively.  $D2_t(.06)$  is the benchmark case. In table 3, a list of the country-years that belong to the bad time regime according to the definitions of  $D1_t(.90)$ ,  $D1_t(.80)$ ,  $D2_t(.06)$ , and  $D2_t(.04)$  are presented.

## 6 Estimation Results

### 6.1 All the Countries in the Panel

Table 4 shows the estimates of equation (1) in columns (1) and (2), and of equation (2) in columns (3) and (4) for all the countries in the sample. Thus, the estimated coefficients are the  $\gamma_i$ 's and  $\tilde{\gamma}_i$ 's in columns (1) and (2) and  $\gamma_i^u$ 's and  $\tilde{\gamma}_i^u$ 's in columns (3) and (4). The difference between columns (1) and (2) is that the dummy variable used is  $D1_t(.80)$  and  $D2_t(.06)$  respectively. The same apply to columns (3) and (4).

In columns (1) and (2) under the null hypothesis  $\gamma_1 > 0$ ,  $\tilde{\gamma}_1 < 0$ ,  $\gamma_2 < 0$ , and  $\tilde{\gamma}_2 > 0$ . From column (1) we see that all coefficients but  $\gamma_1$  are not consistent with the null hypothesis when we use the first definition of bad times,  $D1_t(.80)$ . The coefficient for government consumption is 0.713 and significantly different from zero at the 1% level. Therefore, government consumption innovations have Keynesian effects on private consumption in good times. In addition,  $\tilde{\gamma}_1$  is insignificantly different from zero and inconsistent with the null hypothesis. Thus, there are no difference in the Keynesian effects between good and bad times. In the case of the tax revenue shock, the coefficient is also insignificantly different from zero, which is not consistent with the null hypothesis. Moreover,  $\tilde{\gamma}_2$  is also insignificant and therefore not according to the null hypothesis. Consequently, tax revenue innovations have no effects on private consumption in good times as well as in bad times.

When we use the second definition of bad times,  $D2_t(.06)$ , (column (2)), the coefficient for government consumption is significant and equal to 0.730. In addition,  $\tilde{\gamma}_1$  is insignificantly different from zero. Thus, government consumption has Keynesian effects both in good and bad times. In the case of the tax variables, these are insignificant and not consistent with the null hypothesis.

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<sup>16</sup>Note that for the industrial countries the cyclically adjusted deficit is measured as the first difference in the cyclically adjusted government debt. In the case of the developing countries, we used the cyclically adjusted fiscal deficit. It was obtained by the following formula  $\bar{F}D_t = FD_t - T_t\% \Delta GDP_{t-1}\phi_t + T_{t-1}\% \Delta GDP_{t-2}\phi_{t-1}$ . The reason for not using the debt variable is that for developing countries it just incorporates the external debt, and is thus not a good approximation for the public fiscal deficit.

Table 3: Bad Times

	(1) <i>D1</i> (.90)	(2) <i>D1</i> (.80)	(3) <i>D2</i> (.06)	(4) <i>D2</i> (.04)
Australia				
Austria		1994-2000	1977, 1995-1996	1977-1980, 1983-1989, 1995-1996
Belgium	1981-2000	1974-2000	1977, 1980-1989, 1992-1994	1975-1995
Canada	1991-2000	1985-2000	1983-1988, 1993-1994	1976-1979, 1982-1996
Chile		1987		1975-2000
Colombia				
Costa Rica			1981	1981, 1996
Denmark	1983-1987, 1989-2000	1982-2000	1980-1985	1980-1985, 1993-1995
Dominican Republic				
Fiji			1998	1978, 1983-1984, 1993-1995, 1998-1999
Finland		1996-2000	1993-1996	1993-1997
France		1994-2000	1994	1994-1997
Germany				1977, 1983, 1994, 1997
Greece	1997	1993-2000	1983-1998	1982-2000
India			1985-1991	1981, 1984-2000
Ireland	1984-1989, 1991-1992	1977, 1979-1995		1976-1989, 1992-1993
Italy	1989-2000	1986-2000	1975-1996	1975-1998
Japan	1999-2000	1997-2000	1977-1985, 1997-2000	1977-1987, 1994-2000
Malaysia		1987-1989	1977, 1983-1984, 1988	1975-1979, 1982-1988
Malta			1998	1992, 1998-2000
Mexico			1982-1987	1975, 1981-1988
Morocco	1989-1991	1984-1986, 1988-1991, 1993-2000	1977-1983, 1986-1987	1977-1989
Netherlands	1985-1998	1974-2000	1983-1984	1977, 1980-1986
Norway		1978-1981, 1994-1995	1977-1979	1977-1979, 1987, 1994
Pakistan			1977-1980, 1985-1990, 1993-2000	1975-2000
Panama		1989-1990	1975-1977, 1980, 1983-1985	1975-1985
Paraguay				
Philippines				1983

Table 3: Bad Times (*continued*)

	(1) <i>D1</i> (.90)	(2) <i>D1</i> (.80)	(3) <i>D2</i> (.06)	(4) <i>D2</i> (.04)
Portugal			1977, 1982- 1992, 1995	1977-1979, 1982-1992, 1995-1996
South Africa			1994-1995	1977-1979, 1985, 1993- 1995
Spain			1984-1986	1983-1988, 1995-1997
Sri Lanka		1990	1977, 1980- 1992, 1995- 1997, 2000	1977-2000
Sweden	1982-1989, 1993-2000	1979-2000	1980-1986, 1994-1995	1979-1987, 1993-1995
Thailand				2000
Tunisia				1976-1978, 1982-1986
Turkey			1998-2000	1986, 1994, 1997-2000
United Kingdom		1974-1978	1976-1978, 1982, 1994	1997-2000 1975-1982, 1986, 1994
United States			1985-1987, 1993	1977, 1982- 1994
Uruguay				1984-1985
Venezuela				1996
No. bad times	103	208	215	382

In the first definition of bad times, *D1*, a given country-year  $t$  belongs to the bad time regime if the sum of the "cyclically adjusted" government debt at time  $t - 1$  and the PDV of future government expenditure as a share of potential output is greater than a certain cutoff value  $x$ . In column (1) the cutoff value is given by ninetieth percentile of the distribution (*D1*(.90)) and in column (2) it is given by the eightieth percentile (*D1*(.80)). In the second definition of bad times, *D2*, a given country-year  $t$  belongs to the bad time regime if the "cyclically adjusted" deficit as a ratio of potential output exceeds a certain value  $x$  in the two previous years  $t - 1$  and  $t - 2$ . In column (3) the threshold is 6% (*D2*(.06)) and in column (4) it is 4% (*D1*(.04)). See section 5 for a detailed discussion of the definitions of bad times.

Therefore, tax revenue shocks have no effects on private consumption in good times as well as in bad times.

In the case of columns (3) and (4) the null hypothesis states that  $\gamma_1^u < \gamma_1$ ,  $\tilde{\gamma}_1^u = \tilde{\gamma}_1 < 0$ ,  $\gamma_2^u > 0 > \gamma_2$ , and  $\tilde{\gamma}_2^u > \tilde{\gamma}_2 > 0$ . Note that now the coefficients of fiscal shocks depict only the effects on unconstrained individuals. The reason is that the effects on constrained individuals is captured by  $\Delta\hat{Y}_{t/t}$  as explained in section 4. In column (3) we see that only  $\gamma_1^u$  of the fiscal variables is consistent with the null hypothesis. Although the coefficient for government consumption is insignificantly different from zero, it is lower than the value of  $\gamma_1$ . Further, the coefficient for the difference between good times and bad times is not significant and not consistent with the null. In the case of the tax coefficients the results are not consistent with the null hypothesis. Both  $\gamma_2^u$  and  $\tilde{\gamma}_2^u$  are not significantly different from zero. The results from column (4) are similar to those in column (3).

In summary, the results when using the whole panel seem not to be consistent with the null hypothesis. Specifically, government consumption shocks have Keynesian effects but there are no differences on its effects in bad times. In addition, tax revenue shocks seem not have any effects on private consumption irrespective of the initial conditions. In addition, when analyzing the results for unconstrained individuals, fiscal policy seem not to affect the consumption of these individuals. Moreover, there is no evidence that favor the hypothesis of expansionary fiscal consolidations.

Table 4: Estimates All Countries

Var.	Coeff.	(1)	(2)	Coeff.	(3)	(4)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.713 (0.208)***	0.730 (0.221)***	$\gamma_1^u$	0.136 (0.206)	0.127 (0.222)
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.081 (0.417)	-0.128 (0.378)	$\tilde{\gamma}_1^u$	0.150 (0.375)	0.121 (0.293)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.149 (0.105)	-0.165 (0.108)	$\gamma_2^u$	-0.106 (0.102)	-0.116 (0.104)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.037 (0.147)	0.125 (0.157)	$\tilde{\gamma}_2^u$	0.023 (0.128)	0.069 (0.155)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.445 (0.051)***	0.447 (0.052)***			
$\Delta \hat{Y}_{t/t}$				$\mu$	0.496 (0.052)***	0.494 (0.052)***
Sample		All	All		All	All
No. obser.		1080	1080		1080	1080
No. countries		40	40		40	40
$R_c^2$ first stage		0.164	0.164		0.477	0.478
Def. bad times		$D1_t(.80)$	$D2_t(.06)$		$D1_t(.80)$	$D2_t(.06)$
No. bad times		208	215		208	215

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) and (2) display estimates of equation (1). Columns (3) and (4) display estimates of equation (2). In columns (1) and (3) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (4) bad time dummy variable is  $D2_t(.06)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

## 6.2 Industrialized Countries

Table 5 shows the estimates of equations (1) and (2) for industrialized countries. We see from column (1) that only the coefficient for government consumption innovations is significantly different from zero with a positive value of 0.587. All the other coefficients are insignificantly different from zero and therefore not consistent with the null hypothesis. Note, however, that  $\tilde{\gamma}_1$  is significant at the 10% level with a negative value of -0.553.<sup>17</sup> In the case of column (2), when

<sup>17</sup>Due to the generated regressors issue described in section 4, we have decided to impose the 5% level as the cutting threshold for significance. Further, even in the case of considering

using the dummy variable  $D2_t(.06)$ , the results are equivalent to the results of column (1). The coefficient for government consumption innovations is the only one that is significantly different from zero, with a positive value of 0.621.

When only considering the effects of fiscal policy innovations for unconstrained individuals and using dummy variable  $D1_t(.80)$  (column (3)), all the coefficients are insignificantly different from zero. Therefore, only  $\gamma_1$  is consistent with the null hypothesis, which for this coefficient is  $\gamma_1^u < \gamma_1$ . When considering unconstrained individuals and dummy variable  $D2_t(.06)$  (column (4)), we corroborate the results of inconsistency with the null hypothesis of column (3). Note, however, that in this case,  $\gamma_1^u$  is significant at the 5% level, with a coefficient value of 0.424, which is less than the value of  $\gamma_1$  and consistent with the null hypothesis.

In summary, for industrial countries the estimation results seem not to favor the null hypothesis. In the case of government consumption shocks, they seem to have Keynesian effects, which is consistent with the null hypothesis. However, these Keynesian effects are not reverted in bad times, which is inconsistent with the null hypothesis. Moreover, in the case of tax shocks there seems not to be any effects on private consumption, which is inconsistent with the null hypothesis. In addition, when analyzing the results for unconstrained individuals, there is some evidence that government consumption shocks have a positive effect on their consumption. Thus, for industrial countries there is no evidence that support the hypothesis of expansionary fiscal consolidations.

These results are in stark contrast to the results of Perotti (1999), who for the same sample of industrial countries finds evidence that support the hypothesis of expansionary fiscal consolidations. Among the possible reasons for the discrepancy, the following two possibilities arise: a) different data source for some of the variables<sup>18</sup>, and b) different year sample.<sup>19</sup> Note that we have used the same industrial country sample, the same estimation methodology and the same dummy variable definitions.<sup>20</sup> Of these two alternatives, we favor the year sample explanation. The reason is that the WDI variables and the OECD Economic Outlook variables have a very high degree of correlation, which is indication that their evolution is very similar. For example, the household consumption, government consumption, direct taxes, indirect taxes variables have a correlation factor of between 1 and 0.9967, 1 and 0.7857, 0.9983 and 0.9362, and 0.9997 and 0.9384 respectively.<sup>21</sup>

this coefficient as significant, it is not greater, in absolute terms, than  $\gamma_1$ , which is evidence against the hypothesis of expansionary fiscal consolidations.

<sup>18</sup>We used WDI data, instead of OECD Economic Outlook data as in Perotti (1999), in order to include developing countries.

<sup>19</sup>Our data sample spans between 1970 and 2000, instead Perotti (1999)'s data sample spans between 1965 and 1994.

<sup>20</sup>Note that, in the case of the dummy variable definitions, table 3 displays the country-years for the two definitions of bad times. Further, most of the bad times years identified by Perotti (1999) are also present in this table. Moreover, we were able to replicate the results of Perotti (1999) when using the same data source for the different variables and the same year sample. These results are available upon request from the author.

<sup>21</sup>The results for all industrial countries and variables are available upon request from the author.

Table 5: Estimates Industrial Countries

Var.	Coeff.	(1)	(2)	Coeff.	(3)	(4)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.587 (0.195)***	0.621 (0.231)***	$\gamma_1^u$	0.321 (0.177)*	0.424 (0.204)**
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.553 (0.328)*	-0.411 (0.300)	$\tilde{\gamma}_1^u$	-0.355 (0.270)	-0.508 (0.260)*
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.037 (0.061)	0.007 (0.074)	$\gamma_2^u$	-0.034 (0.057)	0.001 (0.068)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.082 (0.122)	-0.070 (0.107)	$\tilde{\gamma}_2^u$	0.064 (0.114)	-0.055 (0.106)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.336 (0.060)***	0.342 (0.060)***			
$\Delta \hat{Y}_{t/t}$				$\mu$	0.360 (0.037)***	0.368 (0.038)***
Sample		Indust	Indust		Indust	Indust
No. obser.		513	513		513	513
No. countries		19	19		19	19
$R_c^2$ first stage		0.257	0.256		0.561	0.563
Def. bad times		$D1_t(.80)$	$D2_t(.06)$		$D1_t(.80)$	$D2_t(.06)$
No. bad times		97	138		97	138

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) and (2) display estimates of equation (1). Columns (3) and (4) display estimates of equation (2). In columns (1) and (3) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (4) bad time dummy variable is  $D2_t(.06)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

### 6.3 Developing countries

In table 6 we see the results from estimating equations (1) and (2) for developing countries. In this case, column (1) shows that government consumption has a significant positive effect on private consumption with a value of 0.867 for  $\gamma_1$ . In the case of  $\tilde{\gamma}_1$ , it is insignificant showing that for developing countries there are no differences between good and bad times. In the case of the tax variable  $\gamma_2$ , it assumes a significant value at the 5 percent level of -0.296. In addition, the difference between good and bad times in the effects of tax revenues is insignificantly different from zero.

In the case when using the second definition of bad times,  $D2_t(.06)$ , the results are very similar to those in column (1). The coefficient  $\gamma_1$  has a value of 0.867 and is consistent with the null hypothesis. Further, there are no differences between good and bad times. In addition, the estimate of the tax variable coefficient,  $\gamma_2$ , is significant at the 5 percent level with a value equal to -0.290. However,  $\tilde{\gamma}_2$  is insignificantly different from zero.

When analyzing the wealth effects for unconstrained individuals in columns (3) and (4), none of the coefficients are significant. Therefore, only the results for  $\gamma_1^u$  are consistent with the null hypothesis. Thus, for unconstrained individuals fiscal policy has no effect on their consumption.

Concluding, the estimates for developing countries do not favor the null hy-

pothesis. The innovations in government consumption have Keynesian effects on private consumption. Moreover, there are no differences on their effects between good and bad times. In the case of tax shocks, they also have Keynesian effects irrespective of the initial conditions. In addition, the estimation results for unconstrained individuals imply that they are not affected by fiscal policy shocks. Furthermore, there is no evidence that favor the hypothesis of expansionary fiscal contractions or non-Keynesian effects.

Comparing the results for industrial and developing countries, two interesting differences arise. First, the government consumption coefficient for developing countries is larger than that for industrial countries, meaning that government consumption shocks have larger Keynesian effects in developing countries. Second, for developing countries there is evidence of Keynesian effects for tax shocks, while there is none for industrial countries. Thus, in developing countries, governments can use an active tax policy to affect private consumption. A possible explanation for these two differences, which is consistent with the theoretical model of Perotti (1999), is that in developing countries there is a larger proportion of credit constrained individuals. The argument for this hypothesis can be seen when comparing the values for  $\mu$  in tables 5 and 6. Clearly, the  $\mu$  coefficient, which measures the proportion of constrained individuals, is greater in developing countries. Therefore, it is expected that  $\gamma_1$  will assume a larger value in developing countries because  $\gamma_1$  is a positive function of  $\mu$  in the theoretical model. Conversely,  $\gamma_2$  is a negative function of  $\mu$ , and thus it is expected that  $\gamma_2$  will be more negative in developing countries.<sup>22</sup>

## 7 Consistency Tests

In order to be sure that the results we obtained in section 6 are robust to the different underlying assumptions that were made, we carried out several consistency tests. The first consistency check that was made was to estimate both equation (1) and equation (2) using alternative threshold values for the definitions of bad times. For the  $D1_t$  dummy variable, we used the threshold values from the ninetieth and seventieth percentile to define bad times ( $D1_t(.90)$  and  $D1_t(.70)$ ). In the case of the budget deficit dummy variable,  $D2_t$ , we defined bad times using two alternative definitions. One with a threshold value of 8% and another with a 4% value ( $D1_t(.08)$  and  $D1_t(.04)$ ).

The second robustness check was to define two alternative definitions for the bad time dummy variables. Specifically, the first alternative definition defined bad times when the government debt-to-potential output ratio exceeded 80% ( $D3_t(.80)$ ).<sup>23</sup> The second alternative dummy variable definition used the fiscal

<sup>22</sup>The larger the share of constrained individuals, the smaller the weight of the negative wealth effect of expenditure shocks and of the positive wealth effect of tax shocks in the aggregate effect.

<sup>23</sup>Note again that in the case of developing countries we used external government debt instead of total government debt, and GDP, instead of potential output.

Table 6: Estimates Developing Countries

Var.	Coeff.	(1)	(2)	Coeff.	(3)	(4)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.867 (0.265)***	0.801 (0.257)***	$\gamma_1^u$	0.227 (0.264)	0.108 (0.268)
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.283 (0.472)	0.077 (0.486)	$\tilde{\gamma}_1^u$	-0.247 (0.482)	0.416 (0.364)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.296 (0.141)**	-0.290 (0.142)**	$\gamma_2^u$	-0.165 (0.141)	-0.179 (0.141)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.140 (0.407)	0.114 (0.374)	$\tilde{\gamma}_2^u$	-0.139 (0.406)	0.084 (0.378)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.465 (0.063)***	0.465 (0.063)***			
$\Delta \hat{Y}_{t/t}$				$\mu$	0.513 (0.064)***	0.513 (0.064)***
Sample		Dev	Dev		Dev	Dev
No. obser.		567	567		567	567
No. countries		21	21		21	21
$R_c^2$ first stage		0.199	0.199		0.501	0.500
Def. bad times		$D1_t(.80)$	$D2_t(.06)$		$D1_t(.80)$	$D2_t(.06)$
No. bad times		107	77		107	77

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) and (2) display estimates of equation (1). Columns (3) and (4) display estimates of equation (2). In columns (1) and (3) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (4) bad time dummy variable is  $D2_t(.06)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

deficit as a ratio of potential output to determine bad times.<sup>24</sup> Specifically, a certain year  $t$  is defined as bad times if fiscal deficit-to-potential output ratio exceeds 6% in the two previous years  $t - 1$  and  $t - 2$  ( $D4_t(.06)$ ).

Another consistency check that was made, was to obtain the fiscal policy shocks from a VAR methodology instead of the SUR methodology. Remember from section 5 that, using the same procedure as in Perotti (1999), the fiscal policy shocks were estimated as the residuals from the system of equations (3). Note that it is not only the estimated values of the fiscal policy shocks that change but also the estimated values of  $\Delta \hat{Y}_{t/t}$  as the fiscal policy shocks are used in equation (4). Specifically, we checked if the results of the benchmark case changed if we use the estimation method suggested by Glick and Hutchison (1990). They suggest using a strictly VAR procedure to estimate the system of equations (3), where a common lag length structure is used for the three exogenous variables. Glick and Hutchison (1990) claim that the advantage of this procedure over the SUR procedure is that the results from the SUR procedure will in general depend on the particular order of variables in the sequence considered. The disadvantage is, however, that sometimes insignificant lags are included in the equation, which gives unbiased but less efficient estimators. In our case, common lag lengths between one and three were estimated for each

<sup>24</sup>For both industrial and developing countries we used the fiscal deficit variable from the IFS, i.e. we did not define the fiscal deficit as the difference in government debt in two periods.

country. Further, the VAR with the lowest value of the SBC criterion was chosen to estimate the fiscal policy shocks.

The fourth consistency check that was performed was to investigate whether the estimation results of equations (1) and (2) depended on the assumed tax elasticity values for non-OECD countries. Remember from section 5 that due to the lack of available tax elasticities for non-OECD countries, we assumed that non-OECD countries had some common tax elasticity values to calculate the cyclically adjusted tax revenue shocks. These elasticity values are the same that the OECD have used in their reports for those OECD countries that lack non-regression based elasticities. For this consistency test, we assumed three alternative scenarios for the tax elasticities of non-OECD countries. For the first alternative tax elasticity scenario, we assumed that non-OECD countries had an elasticity structure equal to the average elasticity values of Greece, Ireland, Portugal, and Spain, taken from van den Noord (2000). The average values are 1.1 for corporate taxes, 1.4 for personal income taxes, 0.8 for indirect taxes and 0.9 for social security contributions. The second alternative scenario assumed that non-OECD countries undertook, for each tax group, the highest elasticity value of Greece, Ireland, Portugal, or Spain (van den Noord, 2000). It assumed the following values: a) corporate taxes : 1.4 (Portugal); b) personal income taxes: 2.2 (Greece); c) indirect taxes: 1.2 (Spain); d) Social security contributions: 1.1 (Greece). The third alternative tax elasticity scenario adopted the highest tax elasticity value among all OECD countries from van den Noord (2000). It assumed the following values: a) corporate taxes: 2.1 (Japan); b) personal income taxes: 2.2 (Greece); c) Indirect taxes: 1.6 (Denmark); d) social security contributions: 1.2 (UK).

The last consistency check performed on the results of the benchmark case consisted in investigating whether any particular country had any disproportionate impact on the estimation results. The employed procedure was to compare the results of the benchmark case with the results of the same benchmark regression but excluding each country at the time. This estimation was carried out for both equations (1) and (2), and for both definitions of bad times. Further, it implied making as many regressions as countries existed in the benchmark sample, i.e. one regression for each excluded country.

None of the five consistency tests gave us substantial arguments to question the conclusions from the benchmark results of section 6. Tables 7 to 12 present the results for the first and second consistency tests for the three different country samples.<sup>25</sup> Interestingly, in the case of the first consistency test for the sample of all countries (table 7), the  $\tilde{\gamma}_1$  coefficient in columns (2) and (5) becomes significant at the 5% and 1% level respectively. Both coefficients are larger in absolute terms than the  $\gamma_1$  coefficient, and thus evidence of non-Keynesian effects. It is to be noted, however, that both  $\gamma_1^u$  and  $\tilde{\gamma}_1^u$ , which should be capturing the non-Keynesian effects are insignificantly different from zero. Further, when using the VAR methodology and the  $D1_t(.90)$  dummy variable,  $\tilde{\gamma}_1$  becomes insignificant. In addition, for the  $D1_t(.90)$  dummy variable,  $\tilde{\gamma}_1$  be-

<sup>25</sup>Tables for the other consistency tests are available upon request from the author.

comes insignificant when excluding Belgium, Mexico, Panama, Sweden, Turkey, and Venezuela from the sample (consistency test five).

Regarding the consistency tests for industrial countries, it is to be noted that when using the VAR methodology and for the  $D1_t(.80)$  dummy variable,  $\tilde{\gamma}_1$  becomes significant at the 5% level with a negative value of -0.645 (this table is not shown). This value is, however, not larger than the  $\gamma_1$  coefficient, which has a value of 0.669 and is significant at the 1% level. Further,  $\tilde{\gamma}_1$  (also for  $D1_t(.80)$ ) becomes significant at the 5%, but not larger in absolute value than  $\gamma_1$ , when excluding Denmark.

When considering developing countries, from table 9 and for  $D2_t(.08)$  (column (5)), we see that  $\tilde{\gamma}_1$  becomes significant at the 5% level with a negative value of -1.065, larger than that for  $\gamma_1$  (0.882). However, when performing consistency test 5 and considering  $D2_t(.08)$ , this coefficient becomes only significant at the 10% level when we exclude Venezuela. Further, both  $\gamma_1^u$  and  $\tilde{\gamma}_1^u$ , which should be capturing the non-Keynesian effects are insignificantly different from zero. Another minor difference with the benchmark case is that  $\gamma_2$  becomes only significant at the 10% level when using dummy definitions  $D1_t(.90)$  (table 9),  $D3_t(.80)$  (table 12), when excluding South Africa and Sri Lanka from the sample for  $D1_t(.90)$  (consistency test five), and when excluding Costa Rica, Pakistan, Paraguay, Philippines, Sri Lanka, and Venezuela for  $D2_t(.06)$ . Further, this coefficient becomes insignificant when considering the first alternative elasticity scenario both for the case of dummy variable  $D1_t(.80)$  and  $D2_t(.06)$ .

## 8 Conclusions

The results from the estimations indicate that government consumption shocks have Keynesian effects on private consumption in industrial and developing countries. In addition, these Keynesian effects are not reverted in bad times. In the case of the tax shocks, the evidence suggest that they do not have any effects on private consumption either in good times or bad times for industrial countries. However, for developing countries, we find that tax shocks have Keynesian effects on private consumption. Accordingly, we show that for industrial countries the composition of fiscal policy shocks is crucial for stimulating private consumption. Contrary to the common belief that expenditure cuts, instead of tax increases, is crucial for a favorable macroeconomic outcome, we claim that the opposite is true. Further, we do not find that initial conditions are important in determining the outcome of fiscal policy. Thus, there is no evidence that favor the expansionary fiscal consolidation hypothesis (non-Keynesian effects). Finally, we find that government consumption shocks have a larger Keynesian effect on private consumption in developing countries than in industrial countries. This result is intuitive, and is consistent with the theoretical model introduced in section 3, if we consider that there is a larger proportion of credit constrained individuals in developing countries.

When comparing our results for industrial countries with Perotti (1999), we find markedly differences. He finds that the shocks in government consumption

Table 7: Alternative Threshold Values for Bad Times for All Countries

Var.	Coeff.	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.713 (0.208)***	0.728 (0.198)***	0.674 (0.221)***	0.730 (0.221)***	0.788 (0.208)***	0.758 (0.241)***
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.081 (0.417)	-0.759 (0.362)**	0.213 (0.371)	-0.128 (0.378)	-0.937 (0.300)***	-0.180 (0.355)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.149 (0.105)	-0.151 (0.097)	-0.156 (0.115)	-0.165 (0.108)	-0.156 (0.103)	-0.204 (0.118)*
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.037 (0.147)	0.101 (0.153)	0.065 (0.149)	0.125 (0.157)	0.080 (0.162)	0.221 (0.156)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.445 (0.051)***	0.446 (0.051)***	0.447 (0.051)***	0.447 (0.052)***	0.447 (0.051)***	0.449 (0.051)***
Sample		All	All	All	All	All	All
No. obser.		1080	1080	1080	1080	1080	1080
No. countries		40	40	40	40	40	40
$R_c^2$ first stage		0.164	0.165	0.164	0.164	0.168	0.166
Def. bad times		$D1_t(.80)$	$D1_t(.90)$	$D1_t(.70)$	$D2_t(.06)$	$D2_t(.08)$	$D2_t(.04)$
No. bad times		208	103	312	215	111	382

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) to (6) display estimates of equation (1). In columns (1), (2) and (3) bad time dummy variables are  $D1_t(.80)$ ,  $D1_t(.90)$ , and  $D1_t(.70)$  respectively. In columns (4), (5) and (6) bad time dummy variables are  $D2_t(.06)$ ,  $D2_t(.08)$ , and  $D2_t(.04)$  respectively. Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 8: Alternative Threshold Values for Bad Times for Industrial Countries

Var.	Coeff.	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.587 (0.195)***	0.524 (0.181)***	0.658 (0.220)***	0.621 (0.231)***	0.578 (0.210)***	0.615 (0.261)**
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.553 (0.328)*	-0.608 (0.320)*	-0.559 (0.298)*	-0.411 (0.300)	-0.440 (0.316)	-0.316 (0.325)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.037 (0.061)	-0.019 (0.059)	-0.029 (0.070)	0.007 (0.074)	0.011 (0.067)	-0.038 (0.080)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.082 (0.122)	-0.013 (0.121)	0.021 (0.100)	-0.070 (0.107)	-0.106 (0.110)	0.043 (0.108)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.336 (0.060)***	0.335 (0.060)***	0.341 (0.060)***	0.342 (0.060)***	0.337 (0.059)***	0.339 (0.060)***
Sample		Indust	Indust	Indust	Indust	Indust	Indust
No. obser.		513	513	513	513	513	513
No. countries		19	19	19	19	19	19
$R_c^2$ first stage		0.257	0.254	0.258	0.256	0.257	0.254
Def. bad times		$D1_t(.80)$	$D1_t(.90)$	$D1_t(.70)$	$D2_t(.06)$	$D2_t(.08)$	$D2_t(.04)$
No. bad times		97	48	145	138	82	227

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) to (6) display estimates of equation (1). In columns (1), (2) and (3) bad time dummy variables are  $D1_t(.80)$ ,  $D1_t(.90)$ , and  $D1_t(.70)$  respectively. In columns (4), (5) and (6) bad time dummy variables are  $D2_t(.06)$ ,  $D2_t(.08)$ , and  $D2_t(.04)$  respectively. Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 9: Alternative Threshold Values for Bad Times for Developing Countries

Var.	Coeff.	(1)	(2)	(3)	(4)	(5)	(6)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.867 (0.265)***	0.727 (0.246)***	0.976 (0.301)***	0.801 (0.257)***	0.882 (0.243)***	0.830 (0.280)***
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.283 (0.472)	0.953 (0.585)	-0.510 (0.402)	0.077 (0.486)	-1.065 (0.432)**	-0.063 (0.435)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.296 (0.141)**	-0.265 (0.140)*	-0.369 (0.150)**	-0.290 (0.142)**	-0.290 (0.137)**	-0.313 (0.148)**
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.140 (0.407)	-0.265 (0.482)	0.374 (0.276)	0.114 (0.374)	0.034 (0.487)	0.208 (0.292)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.465 (0.063)***	0.469 (0.061)***	0.466 (0.063)***	0.465 (0.063)***	0.467 (0.062)***	0.467 (0.062)***
Sample		Develop	Develop	Develop	Develop	Develop	Develop
No. obser.		567	567	567	567	567	567
No. countries		21	21	21	21	21	21
$R_c^2$ first stage		0.199	0.203	0.205	0.199	0.203	0.199
Def. bad times		$D1_t(.80)$	$D1_t(.90)$	$D1_t(.70)$	$D2_t(.06)$	$D2_t(.08)$	$D2_t(.04)$
No. bad times		107	52	161	77	29	155

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) to (6) display estimates of equation (1). In columns (1), (2) and (3) bad time dummy variables are  $D1_t(.80)$ ,  $D1_t(.90)$ , and  $D1_t(.70)$  respectively. In columns (4), (5) and (6) bad time dummy variables are  $D2_t(.06)$ ,  $D2_t(.08)$ , and  $D2_t(.04)$  respectively. Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 10: Alternative Definitions for Bad Times for All Countries

Var.	Coeff.	(1)	(2)	(3)	(4)	Coeff.	(5)	(6)	(7)	(8)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.713 (0.208)***	0.715 (0.204)***	0.730 (0.221)***	0.789 (0.214)***	$\gamma_1^u$	0.136 (0.206)	0.128 (0.204)	0.127 (0.222)	0.198 (0.206)
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.081 (0.417)	-0.190 (0.346)	-0.128 (0.378)	-0.435 (0.439)	$\tilde{\gamma}_1^u$	0.150 (0.375)	0.280 (0.329)	0.121 (0.293)	-0.243 (0.345)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.149 (0.105)	-0.132 (0.097)	-0.165 (0.108)	-0.178 (0.104)*	$\gamma_2^u$	-0.106 (0.102)	-0.094 (0.094)	-0.116 (0.104)	-0.135 (0.098)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.037 (0.147)	-0.167 (0.226)	0.125 (0.157)	0.196 (0.182)	$\tilde{\gamma}_2^u$	0.023 (0.128)	-0.146 (0.181)	0.069 (0.155)	0.178 (0.178)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.445 (0.051)***	0.447 (0.052)***	0.447 (0.052)***	0.449 (0.052)***					
$\Delta \hat{Y}_{t/t}$						$\mu$	0.496 (0.052)***	0.497 (0.053)***	0.494 (0.052)***	0.495 (0.052)***
Sample		All	All	All	All		All	All	All	All
No. obser.		1080	1080	1080	1080		1080	1080	1080	1080
No. countries		40	40	40	40		40	40	40	40
$R_c^2$ first stage		0.164	0.164	0.164	0.166		0.477	0.477	0.478	0.478
Def. bad times		$D1_t(.80)$	$D3_t(.80)$	$D2_t(.06)$	$D4_t(.06)$		$D1_t(.80)$	$D3_t(.80)$	$D2_t(.06)$	$D4_t(.06)$
No. bad times		208	104	215	181		208	104	215	181

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) to (4) display estimates of equation (1). Columns (5) to (8) display estimates of equation (2). In columns (1) and (5) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (6) bad time dummy variable is  $D3_t(.80)$ . In columns (3) and (7) bad time dummy variable is  $D2_t(.06)$ . In columns (4) and (8) bad time dummy variable is  $D4_t(.06)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 11: Alternative Definitions for Bad Times for Industrial Countries

Var.	Coef.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.587 (0.195)***	0.526 (0.191)***	0.621 (0.231)***	0.599 (0.213)***	0.321 (0.177)*	0.299 (0.170)*	0.424 (0.204)**	0.387 (0.191)**
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.553 (0.328)*	-0.372 (0.289)	-0.411 (0.300)	-0.435 (0.318)	-0.355 (0.270)	-0.369 (0.243)	-0.508 (0.260)*	-0.499 (0.277)*
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.037 (0.061)	-0.027 (0.058)	0.007 (0.074)	-0.001 (0.068)	-0.034 (0.057)	-0.025 (0.054)	0.001 (0.068)	-0.014 (0.062)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.082 (0.122)	0.072 (0.113)	-0.070 (0.107)	-0.057 (0.111)	0.064 (0.114)	0.044 (0.111)	-0.055 (0.106)	-0.020 (0.111)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.336 (0.060)***	0.337 (0.059)***	0.342 (0.060)***	0.341 (0.059)***				
$\Delta \hat{Y}_{t/t}$	$\mu$					0.360 (0.037)***	0.363 (0.037)***	0.368 (0.038)***	0.368 (0.038)***
Sample						Indust	Indust	Indust	Indust
No. obser.		513	513	513	513	513	513	513	513
No. countries		19	19	19	19	19	19	19	19
$R_c^2$ first stage		0.257	0.253	0.256	0.256	0.561	0.562	0.563	0.562
Def. bad times		$D1_t(.80)$	$D3_t(.80)$	$D2_t(.06)$	$D4_t(.06)$	$D1_t(.80)$	$D3_t(.80)$	$D2_t(.06)$	$D4_t(.06)$
No. bad times		97	67	138	100	97	67	138	100

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) to (4) display estimates of equation (1). Columns (5) to (8) display estimates of equation (2). In columns (1) and (5) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (6) bad time dummy variable is  $D3_t(.80)$ . In columns (3) and (7) bad time dummy variable is  $D2_t(.06)$ . In columns (4) and (8) bad time dummy variable is  $D4_t(.06)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 12: Alternative Definitions for Bad Times for Developing Countries

Var.	Coeff.	(1)	(2)	Coeff.	(3)	(4)
$\hat{\epsilon}_t^G$	$\gamma_1$	0.867 (0.265)***	0.811 (0.240)***	$\gamma_1^u$	0.227 (0.264)	0.134 (0.251)
$D_t * \hat{\epsilon}_t^G$	$\tilde{\gamma}_1$	-0.283 (0.472)	-0.032 (0.495)	$\tilde{\gamma}_1^u$	-0.247 (0.482)	0.592 (0.462)
$\hat{\epsilon}_t^T$	$\gamma_2$	-0.296 (0.141)**	-0.258 (0.139)*	$\gamma_2^u$	-0.165 (0.141)	-0.153 (0.139)
$D_t * \hat{\epsilon}_t^T$	$\tilde{\gamma}_2$	0.140 (0.407)	-0.557 (0.407)	$\tilde{\gamma}_2^u$	-0.139 (0.406)	-0.452 (0.311)
$\Delta \hat{Y}_{t/t-1}$	$\mu$	0.465 (0.063)***	0.471 (0.063)***			
$\Delta \hat{Y}_{t/t}$				$\mu$	0.513 (0.064)***	0.522 (0.065)***
Sample		Dev	Dev		Dev	Dev
No. obser.		567	567		567	567
No. countries		21	21		21	21
$R_c^2$ first stage		0.199	0.200		0.501	0.499
Def. bad times		$D1_t(.80)$	$D3_t(.80)$		$D1_t(.80)$	$D3_t(.80)$
No. bad times		107	37		107	37

Dependent variable change in real, per capita private consumption, scaled by previous year real per capita disposable income. All regressions include year and country dummies to account for any time and country specific effects. Columns (1) and (2) display estimates of equation (1). Columns (3) and (4) display estimates of equation (2). In columns (1) and (3) bad time dummy variable is  $D1_t(.80)$ . In columns (2) and (4) bad time dummy variable is  $D3_t(.80)$ . Standard errors in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

and taxes have Keynesian effects during good times, but non-Keynesian effects during bad times. However, he also finds that the composition of fiscal policy is important. With regards to the other surveyed papers, our results are in line with Giavazzi et al. (2000), Hjelm (2002b) and van Aarle and Garretsen (2003) in the sense that initial conditions, with the exception of preceding depreciations, are not important. Moreover, our results regarding the rejection of the expansionary fiscal consolidation hypothesis are in line with Hjelm (2002a), Hjelm (2002b), and van Aarle and Garretsen (2003).

In addition, when comparing our results for developing countries with those obtained by Giavazzi et al. (2000), we do not reach completely to the same conclusions. It is to be noted, however, that they study the effects of fiscal policy on national saving and not private consumption as in our study. They conclude that during normal times both government spending and net taxes have Keynesian effects on national saving. However, during bad times the Keynesian effects of fiscal policy become milder, i.e. there are differences between good and bad times. Further, they find evidence of non-Keynesian effects for net taxes in bad times when using the deficit dummy variable.

## References

- Chouraqui, J., Hagemann, R. P., and Sartor, N. (1990). Indicators of fiscal policy: A re-examination. OECD Department of Economics and Statistics Working Paper No. 78, April 1990.
- Gavin, M. and Perotti, R. (1997). Fiscal policy in latin america. *NBER Macroeconomics Annual*, 12:11–62.
- Giavazzi, F., Jappelli, T., and Pagano, M. (2000). Searching for non-linear effects of fiscal policy: Evidence from industrial and developing countries. *European Economic Review*, 44:1259–1289.
- Giavazzi, F. and Pagano, M. (1990). Can severe fiscal contractions be expansionary? tales of two small european countries. *NBER Macroeconomic Annual*, 5:75–110.
- Giavazzi, F. and Pagano, M. (1996). Non-keynesian effects of fiscal policy changes: International evidence and the swedish experience. *Swedish Economic Policy Review*, 3:67–103.
- Giorno, C., Richardson, P., Roseveare, D., and van den Noord, P. (1995). Estimating potential output, output gaps and structural budget balances. OECD Economics Department Working Paper No. 152, 1995.
- Glick, R. and Hutchison, M. (1990). New results in support of the fiscal policy ineffectiveness proposition. *Journal of Money, Credit and Banking*, 22:288–304.
- Hemming, R., Kell, M., and Mahfouz, S. (2002). The effectiveness of fiscal policy in stimulating economic activity - a review of the literature. IMF Working Paper No. 02/208, December 2002.
- Hjelm, G. (2002a). Effects of fiscal contractions: The importance of preceding exchange rate movements. *Scandinavian Journal of Economics*, 104(3):423–441.
- Hjelm, G. (2002b). Is private consumption growth higher (lower) during periods of fiscal contractions (expansions)? *Journal of Macroeconomics*, 24:17–39.
- Jönsson, K. (2004). Fiscal policy regimes and household consumption. Working Papers No. 2004:12, Department of Economics, Lund University, 2004.
- McAleer, M. and McKenzie, C. R. (1991). When are two step estimators efficient? *Econometric Reviews*, 10:235–252.
- Murphy, K. M. and Topel, R. H. (1985). Estimation and inference in two-step econometric models. *Journal of Business & Economic Statistics*, 3:370–379.
- Pagan, A. (1984). Econometric issues in the analysis of regressions with generated regressors. *International Economic Review*, 25:221–247.

- Perotti, R. (1999). Fiscal policy in good times and bad. *The Quarterly Journal of Economics*, 114:1399–1436.
- Smith, J. and McAleer, M. (1994). Newey-west covariance matrix estimates for models with generated regressors. *Applied Economics*, 26:635–640.
- van Aarle, B. and Garretsen, H. (2003). Keynesian, non-keynesian or no effects of fiscal policy changes? the emu case. *Journal of Macroeconomics*, 25:213–240.
- van den Noord, P. (2000). The size and role of automatic fiscal stabilizers in the 1990s and beyond. OECD Economics Department Working Paper No. 230, January 2000.