Consumption Response to Public Spending Shocks

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Very preliminary and incomplete

Abstract

For any member of a fiscal union redistribution implies that the amount of taxes paid differs from the amount of public expenditure received. This mismatch is helpful to investigate the effects of changes in government purchases. For Italy since 1965 I show that, controlling for aggregate variations, local expenditure shock stimulates consumption, the contemporaneous (relative or local) multiplier being about 0.5. The corresponding output multiplier is 1.5. Much lower values are however estimated if the nationwide changes in consumption are taken into account. In particular, mainly during years of expansions different multiplier estimates emerge according to the tax-expenditure difference.

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1 Introduction

Recent evidence on the effect of government spending shows output multiplier at local level at least twice as large as the aggregate multiplier. A relevant issue follows regarding how this discrepancy can be explained. In this paper, I look at the household consumption response to government spending for a fiscal and monetary union to shed light on this issue. Since local and aggregate multipliers are estimated within the same empirical framework, the risk of misinterpreting their difference is minimized. Netting out nation-wide effects of fiscal policy, I found that more government spending by 1 per cent of local GDP determines more consumption in the range 0.4-0.5 percent, averaging between expansions and recessions. The corresponding output multiplier is around 1.5 in line with recent evidence. At the same time, I estimated effects of deficit-financed government expenditure that vary according to the redistribution of fiscal resources, finding much lower consumption multiplier for those receiving less spending than the amount they will eventually pay for.

Evidence on consumption may provide valuable information to discriminate between competing trasmission mechanisms of fiscal policy (Blanchard and Perotti, 2002; Galí, López-Salido, and Vallés, 2007; Ramey, 2011b). The most striking case regards the comparison of traditional Keynesian and neoclassical models, which provide opposite qualitative predictions regarding the consumption effect of a government spending shock. In a closed economy with flexible prices the basic neoclassical mechanism implies that private consumption decreases after an increase in government expenditure, as forward looking agents anticipate the negative wealth effect created by the additional taxes needed to finance the spending. Conversely, the traditional Keynesian framework, by stressing sticky prices and the relevance of current disposable income for household decisions, suggests a stimulative effect on consumption of deficit-financed spending shock.

If prices or wages are sticky, monetary policy affects real activity, and so the consequences of an increase in government purchases depend on the monetary policy response. New Keynesian models indeed highlight the possibility that larger government expenditure might induce more consumption even in a framework characterized by intertemporal optimization. Consumption may be crowded out when a strong countercyclical monetary policy is set, but stimulated when monetary policy is constrained by the zero lower bound (Christiano, Eichenbaum, and Rebelo, 2011). In general not definite conclusions may however be assessed.[1] Recent work is characterized by the need to put forward models with transmission mechanisms that coexist with the neoclassical wealth effect but inducing a positive correlation between private consumption and public spending, on the premise that empirical evidence suggests such positive correlation. Among other features, such models are characterized by countercyclical movements in equilibrium markup of price over marginal cost, relative high complementarity between hours and consumption, credit constraints inducing some agents to behave like myopic consumers, and so on.

Sub-national data may be well informative to investigate the effects of spending shocks. By exploiting institutional information one can clearly set the economic and policy environments which characterize the identified shocks. In this paper I look at the effects of two different types of government spending variation, interpretable as windfall-financed shock or deficit-financed shock. Empirical evidence comes from a panel of Italian regions since 1965. Being such regions part of a monetary and fiscal union has two important implications. First, monetary policy can only be determined at aggregate level, and thus cannot track the cross-sectional variations of the government spending. Hence monetary policy cannot counteract local spending shock, for instance through a local increase of the interest rate being it constant across regions. Second, due to the feature of the fiscal union in force in Italy mainly from the 1970 up to 2000, the spending variations considered are entirely, or to a large extent financed through tax collection by the central government. The key issue now is that the regional distribution of the total tax burden is independent from the spending distribution: for any region taxes reflect the average regional spending in Italy instead of the local one. This allows to abstract from potential issues arising from the omission of local taxes from the empirical model.

[1] In this class of models the response of consumption depends on the monetary policy reaction to fiscal shock and the values of some key parametes. The Frisch elasticity of labor supply, the degree of complementarity between consumption and labor, and the share of non-Ricardian consumption may be crucial (Galí, López-Salido, and Vallés, 2007; Hall, 2009; Woodford, 2011; Corsetti, Kuester, and Müller, 2011).

When the wealth effect—as well as other nationwide effects—of fiscal policy are controlled for, through year-specific fixed components, estimates are interpreted as measuring the impact of a windfall-financed expenditure shock. A positive consumption response would be necessary, although not sufficient, to credibly support transmission mechanisms of fiscal policy advocated by Keynesian or New Keynesian models. Such evidence would support the use of fiscal policy to counteract local economic shock through redistribution of resources within the national government budget. Alternatively, by comparing consumption response of those benefiting of less spending than the amount they pay for with that of other consumers in the country—not differencing out the potential effect of change in taxes—I infer on the relevance of the wealth effect. Regarding the former, a shock by 1 per cent of local GDP determines more consumption by 0.5 per cent. This effect holds for a given nominal interest rate and controlling for current and prospective taxes. The corresponding redistributive (local) output multiplier is about 1.5. Deficit-financed expenditure increase tends instead to crowd out consumption mainly outside periods of recessions, the multiplier being -0.2. This is at odds with old-fashioned models that take little account of the role of intertemporal optimization and expectations in modelling consumers decisions. Taken toghether these results help to interpret recent and ongoing evidence on the role of fiscal policy in the determination of local and aggregate economic activity.

The present study follows a number of recent works that have exploited sub-national data mainly to estimate the local output multiplier.[2] Scarce evidence instead is available regarding the consumption response to government spending. Using household-level data Giavazzi and McMahon (2012) suggest that shifts in spending could have important distributional effects that are lost when estimating an aggregate multiplier. Results in the present paper support the conclusion that government spending may be useful to counteract local economic shock and suggest that output multiplier estimates greater than 1 are mainly due to the consumption sensitiveness to government expenditure.

Regarding nationwide studies, evidence on the consumption response is mixed: significant positive (Fatás and Mihov, 2001; Galí, López-Salido, and Vallés, 2007; Ravn, Schmitt-Grohé, and Uribe, 2012) or negative (Edelberg, Eichenbaum, and Fisher, 1999; Giavazzi and Pagano, 1990; Perotti, 1999; Cogan, Cwik, Taylor, and Wieland, 2010; Barro and Redlick, 2011) responses are found. Results in this paper suggets that during expansions larger government expenditure may crowd out consumption.

The rest of the paper is organized as follows.

2 Fiscal policy in a monetary and fiscal union

Let assume government expenditure does not affect household utility. In general, the unconditional consumption response to a deficit-financed expenditure shock should depend on potential effects due to variations in labor income, prospective taxes and real interest rate. Under the flexible price assumption the standard neoclassical argument implies that government purchases financed through lump-sum taxation determines unambiguously a reduction of non-durable consumer expenditure (e.g. Barro and King, 1984; Baxter and King, 1993; Christiano and Eichenbaum, 1992). Arguably, since the larger tax burden in the future increases current savings because of the negative wealth effect—and the intra-temporal substitution effect driven by change in the wage rate would reinforce the incentive to save more—consumption is necessarily crowded out, at least partially. When taxes will be effectively raised is irrelevant. If prices are sticky as New Keynesian models usually posit the conclusion may

[2] Acconcia, Corsetti, and Simonelli (2011) exploit the large and unanticipated cuts in public investment due to compulsory administration by external commissioners, after the dismissal of elected officials because of relationships with local mafia. The output multiplier is 1.5 on impact and 1.9 including dynamic effects over two years. Looking at state-level relative to national military spending in the US, Nakamura and Steinsson (2011) estimate output multipliers in the range 1.4-1.9. Shoag (2013) exploits the idiosyncratic component of the returns on defined-benefit pension plans managed by US states and estimates an output multiplier during 2008-09 of 1.43. Serrato and Wingender (2010) use fund reallocation across U.S. counties, due to changes in the methodology underlying estimates of local populations, and find a multiplier as high as 1.88 in the baseline specification. Multiplier is nonetheless found less than 1 by Clemens and Miran (2012). Over 1967-2008, added state spending driven by state's enhanced political power led to declines in investment and employment by corporations headquartered in state. Also found declines in overall state real GDP and employment. Hence, estimated state spending multipliers were negative. Moreover, Cohen, Coval, and Malloy (2011) provide evidence that in an economy experiencing full employment distortionary consequences of public spending may be nontrivial even in a setting in which the spending is "free".

be different under particular circumstances. In this case, monetary policy affects real activity, and so the consequences of an increase in government purchases depend on the monetary policy response (Woodford, 2011). For instance, when nominal interest rates react little to the fiscal stimulus then real interest rates should fall because of higher expected inflation, thus stimulating consumption. This possibility seems to be realistic when the monetary policy is constrained by the zero lower bound (Christiano, Eichenbaum, and Rebelo, 2011). One implication of this argument is that the response of consumption conditional to the wealth effect and the monetary policy might inform about the relevance of this transmission mechanism. Further, since optimizing agents also take into account the future path of fiscal policy then private expenditure might be stimulated if a short-run increase in government purchases will imply subsequent period of spending restraint (Corsetti, Meier, and Müller, 2012). With fixed prices, a stimulative effect of larger government expenditure also applies within the traditional Keynesian framework. In this case consumers base their decisions on current income which increases because of the spending shock.

The key features of a fiscal and monetary union are helpful to investigate on the relevance of the alternative trasmission mechanisms of fiscal policy. In a fiscal union local government expenditure is often higher or lower than taxes levied on households and firms. Different from spending, whose distribution tends to change over time, an economy-wide rise in tax liabilities is spread almost equally across union members. At the same time, in a monetary union the nominal interest and exchange rates are common across members of the union. These features imply that the cross-sectional distribution of government spending can lead neither to regional differences in the thoughness of monetary policy nor to differences in the tax burden. The evolution of such distribution can be exploited to assess whether larger government expenditure tends to stimulate or crowd out private expenditure.

Let consider for simplicity a two-region country and denote with β_i the consumption response to a government expenditure shock in region i. If government spending and taxes are uniformly distributed across regions than coeteris paribus β_i should be equal for the two regions, the sign of the coeffcient depending on the total effect of government spending. Moreover, the equality would also apply for not uniform spending distribution if the crowding out effect of the shock is irrelevant. Different values of β_i would emerge when it happens a mismatch between local expenditure and paid taxes. For instance, let β_{below} and β_{above} refer to the consumption multiplier when the net spending—that is the difference between expenditure and taxes—is negative or positive, respectively. When net spending is negative, larger government expenditure signals that an extra amount of tax liabilities has to be paid beyond and the above that nedded to finance the received amount of expenditure. At the uttermost, increasing aggregate government expenditure would imply windfall-throw taxes for the region with negative net spending. Hence, it follows $\beta_{below} < \beta_{above}$.

2.1 Government expenditure in Italy since 1965

Italian regions provide a unique framework to assess the impact of government spending shock. Mainly from the 1971 up to the 2000, Italy shared both fiscal and monetary union characteristics. In particular, by the institutions of the Italian fiscal federalism the public resources channelled by the central government into local spending are not matched by equal variations in the tax burden of the local residents. According to two basis laws—that is Law No. 281/1970 and Law No. 382/1975—government expenditure are entirely financed through tax revenue raised by the central government, who had the power to budget the overall flow of resources accruing to local governments.

Figure 1 shows the evolution of aggregate current (per capita) government expenditure changes—expressed as percentage of lagged GDP. The sample years may be divided in three groups according to the evolution of spending. The first one, covering the 1970s and most of the 1980s, is characterized by large fluctuations around a positive growth rate which implies spending variations about 0.5% of GDP. During the period from 1988 to 1995 spending changes trace a decreasing trend, while the converse applies afterward. Throughout the investigated period expenditure increased evermore, the main exceptions being during 1994-1995. This period was characterized by severe fiscal consolidation due to *exogenous* constraints imposed to Italy by the Maastricht Treaty to join the Euro currency area.[3]

[3] The Maastricht Treaty determined upper bounds to the deficit-GDP and debt-GDP ratios for any country to become

Summary statistics reported in Table 1 document that, year by year, large cross-sectional spending variability also holds, despite the almost uniform distribution of the tax burden. Measured at local level, spending changes roughly range between -1.5% and 2% of local GDP with an average value about 0.5%. If I split, for each year, the 20 regional observations with respect to their mean, it follows that the overall subset of observations containing all spending variations below the corresponding means is characterized by an average value which is about two fifth that of spending variations above the means. However, the two subset overlaps for a large number of observations, as 803 out of 920 observations are in the range between -0.5 (the minimum value of the "Above Average" subset) and 1.026 (the maximum value of the "Below Average" subset).

There are two main explanations for the growing amount of government expenditure through time as well as for its fluctuations. The first one is related to the unique Italian institutional framework. Not surprisingly, since during the sample years local governments were not responsible for raising tax revenues locally against their spending plans, they lobbied strongly for public funds from the central government, determining ongoing increments in local expenditure and *aggregate* tax liabilities (Cassese, 1983).The second main explanation for the spending pattern is due to the need for any central government to counteract local economic shocks. The inability to change taxes across regions heterogeneously has induced the government to rely heavily on government spending to fulfill this goal. These two reasons together have determined large fluctuations in local spending.

Part of the regional differences in government expenditure is systematic and not due to short run reasons. A formal evidence is shown in Table 2: Those regions hystorically characterized by a relative low level of per capita GDP have been receiving larger amounts of spending than the rest of the country. As the table shows, by pooling the data for regions and years the change of regional government expenditure turns out to be negatively correlated with the regional per capita GDP level, measured relative to the national counterpart. On average, 10% more GDP, respect to the overall country, implies 3% less of government spending change (see results in the first column). However, this negative relationship disappears if I control for region-specific characteristics through regional dummies.

3 Empirical Findings

To carry out this study, I have assembled a dataset on private and government consumption in each region of Italy over the forty-five years between 1965 and 2010, the longest available period over which I could obtain series at region level. During this period, there were 20 regions in Italy; hence, I have 900 annual observations.

For each region i, let denote with $y_{i,t}$, $c_{i,t}$, and $g_{i,t}$, respectively, the real per capita GDP, household consumption and current government purchases at time t. The variable $C_{i,t}$ denotes the year-on-year change of consumption as a ratio of lagged GDP, $C_{i,t} = \frac{c_{i,t}-c_{i,t-1}}{y_{i,t-1}}$. Similarly, $G_{i,t}$ denotes the year-on-year change of government purchases defined as $G_{i,t} = \frac{g_{i,t}-g_{i,t-1}}{y_{i,t-1}}$. In line with recent literature (see e.g. Barro and Redlick 2011), I estimate the spending multiplier relating the change of per-capita consumption in a region ($C_{i,t}$) to the change in per-capita spending on government purchases in the same region ($G_{i,t}$). The basic specification is:

$$C_{i,t} = \varsigma_i + \beta G_{i,t} + v_{i,t} \tag{1}$$

where ς_i is a region-specific effect, while $v_{i,t}$ captures all sources of fluctuations in consumption other than government spending. If $E\left[G_{i,t}v_{i,t}\right] = 0$ then the coefficient β measures the contemporaneous one-year government spending multiplier, that is the euro change in consumption caused by an euro of more or less government expenditure.

Through region-specific fixed effects I address potential endogeneity issues raised by the possibility that province-specific characteristics may be correlated with spending allocation criteria. Evidence

a member of the Euro currency. The drops in spending to fulfil the budgetary targets were part of the so called Maastricht-package, set by the Amato administration, which severely affected the evolution of the public spending. A further side effect of the need for fiscal consolidation was the strong devaluation of the Italian Lira, mainly against the German Mark, set in September 1992, followed by a further depreciation in the first half of the 1993.

presented in Table 2 suggests that region-specific characteristics are correlated with the regional distribution of government spending. During the sample years the central government systematically allocated more funds in regions characterized by levels of income per capita persistently below the national one, perhaps in an effort to sustain local welfare. Not controlling for this allocation criterion, estimates of β would be biased downward if on average consumption growth be negatively correlated with income level.

In the following I will investigate two different specifications of equation (1) that differ in terms of the way the time series variations of the data are exploited. First, I will recognize as part of the error term an year-specific fixed effect. This corresponds to filter out nationwide variations of the data before the multiplier is estimated. In this case β identifies the consumption multiplier of government purchases conditional on the wealth effect—for any given nominal interest rate. Its estimate sheds light on an experiment where one small region is stimulated at the tax-expense of another large one (Ramey, 2011a). As anticipated, for this experiment Keynesian and new Keynesian arguments both suggest $\beta > 0$.

Second, when the time series variations of the data are fully exploited—*not* allowing for the year-specific component—then the stronger the neoclassical wealth effect is the lower the consumption multiplier should be. With forward looking agents, a strong enough wealth effect implies $\beta < 0$. The main challenge to identify this effect is that, however, without the time-specific component the orthogonality assumption between G and v may be questionable. The availability of a panel data set for a fiscal and monetary union allows to get around this concern and to shed light on the relevance of such effect. By comparing estimates of β_{below} and β_{above} evidence on the relevance of the wealth effect would emerge, though an unbiased estimate of the aggregate multiplier is not guaranteed due to the likely endogeneity at aggregate level.

As it is well known, inference in panel estimation can be highly misleading if there is serial correlation (see, e.g., Bertrand et al. 2004). I deal with this issue in two different ways, that is by including the lagged dependent variable among the controls—together with heteroskedasticity consistent standard errors—or by using Newey-West standard errors which are robust to serial correlation and heteroskedasticity.

3.1 Redistributive multiplier

To start, I look at the redistributive or local consumption multiplier identified as the response to government expenditure controlling for the aggregate wealth effect. In doing so I estimate a version of equation (1) which is characterized by the year-specific fixed effect λ_t:

$$C_{i,t} = \varsigma_i + \lambda_t + \beta G_{i,t} + \varepsilon_{i,t}. \tag{2}$$

Beyond and above the interest for this type of evidence recently reported by many authors, result provides a benchmark for the rest of the analysis. From a policy perspective evidence on local multiplier allows to answer the following question: Is efficacy a policy that attempts to help any region of a fiscal union when it suffers a region-specific shock?

The inclusion of λ_t in equation (1) serves two main purposes. First, it controls for any unobserved nationwide factor affecting public and private spending as well as for aggregate variations in government purchases endogenous to cyclical developments. Under both circumstances spurious estimates of the multiplier would be obtained. Second, the year fixed effects estimator allows to control for monetary and fiscal policy at the national level. As is well understood, the transmission of fiscal stimulus or contraction is bound to be crucially affected by the monetary stance, as well as by the anticipation of fiscal measures (spending cuts or tax hikes) dictated by the need to stabilize public debt in the medium and long term (see e.g. Christiano et al. 2011; Corsetti et al. 2012b; and Woodford 2011). Failure to control for these factors means that the estimated multipliers conflate the effects of fiscal shocks with those of the monetary and budget policy that is anticipated to prevail over both short- and long-term horizons. With data from a fiscal union, time effects are fully successful in adjusting for taxes and other confounding forces at aggregate level.

Two fairly serious outliers characterize the data. Since it would be of considerable concern if result be greatly driven by them I also add two intervention dummies to the baseline specification. One

picks the exploitation of new oil fields in Basilicata that was licensed in 1975. Another one takes into account the very high transfer—20 billions of Italian Lira—the Valle d'Aosta received in 1980 from the federal government for public works and to maintain the cultural heritage (Law n. 21, 11 February 1980).

Let start by looking at first column of Table 3. The coefficient β is estimated positive and strongly statistically different from zero (p-value less than 0.001). It implies that 1 euro more of government expenditure in a small region—financed with less spending in other regions or more taxes for all taxpayers in the country—determines more consumption locally by about 40 cents. A similar effect is found by Jappelli and Padula (2012).

The second and third columns of Table 3 show results obtained by adding the first-year lags of GDP and government purchases to the baseline specification. By enlarging the set of controls in this way I take into account two potential concerns that may be raised to previous conclusion. The local component of government spending may be determined on the base of forecasts of local GDP in the near future. Equivalently, if the latter is serially correlated, then more spending in response to a negative shock will also be correlated with future economic growth. The inclusion of the lagged GDP growth among the regressors should control for this possibility (Kraay, 2012). The lag of $G_{i,t}$ among the regressor instead controls for the potential bias induced by the possibility of serial correlation in public spending together with its lagged effect on consumption. As shown the presence of lagged GDP and government expenditure changes do not affect previous conclusion. The estimate of the multiplier is virtually the same as before. The coeffcients attached to the lagged variables are insignificantly different from zero.

Private agents tend to react not only to effective changes in fiscal policy but also to news about them. For the U.S. Ramey (2011b) shows that investment falls and consumption increases when the anticipated increase in government spending eventually occurs, while the opposite emerges if one looks at the immediate impact effect of the spending announcement. For instance, anticipation effects may affect consumption response estimates for durable goods. This is because spending decisions for a given year are public information after the "*Legge Finanziaria*" which is issued during the fourth quarter (usually at November) of the year before. Hence, part of the response to spending variations which occurs at time t might have been realized at the end of $t-1$. This may be the case for durable goods consumption which picks during Christmas time in numerous countries. However, since the potential bias in the consumption response is mainly due to the neoclassical wealth effect this concern does not apply in estimating the redistributive multiplier.[4] Anyway, a simple way to assess the importance of anticipation effects is by looking at the effects of including the lagged consumption among the regressors. More in general, this variable allows to control for serial correlation in the error term.[5] Again, however, the estimate of β is unaffected—see the column (4) of Table 3.

The regions in Itay have different size. In particular three regions are much lower in size than others, namely Valle d'Aosta, Trentino Alto Adige and Molise. To account for this heterogeneity, I re-estimate the multiplier either dropping them the sample or weighting the regression by region-level population. The main evidence is robust to these modifications in the empirical strategy. The point estimate of β tends to increase up to 0.49.

As a final evidence, the last column of Table 3 shows that my estimate of the consumption response to change in government purchases is remarkable even if region-specific time trends are added and/or the sample period is restricted to 1971-2000, when the fiscal union was fully in force.

Table 4 reports estimates for the redistributive output multiplier of government purchses. Clealrly these are always greater than one. In particular, when the weighted regression is considered the multiplier is about 1.5, a value which is very close to recent estimates for the U.S. and Italy itself.

[4] The wealth effect would set in motion when the news is realized, while by the time the spending occurs investment and consumption are going back to their steady-state levels. This explains why multipliers are biased downward if anticipation effects are not controlled for. Biased multipliers might be estimated at local level too if one exploit variations in public investments. Since they are usually planned some years before they actually take place and may lead to a rise in the expected return to capital when announced, then they may trigger a rise in private expenditure well before the public spending will occur. However, by dealing with government consumption this concern is greatly attenuated, too.

[5] In general, enlarging the set of controls in this way reduces the potential for mis-specification although, in relatively small samples, this gain may come at the cost of some bias in the point estimate due to the presence of the fixed effects.

Taken together with evidence on consumption this reesult suggests that local output multipliers of government spending greater than 1 are mainly driven by the crowding in of consumption.

3.2 Aggregate multiplier

Estimates shown in the previous section cannot be compared with those relative to the aggregate multiplier. In general, there are at least three reasons potentially responsible for difference between aggregate and local multiplier: monetary policy, spillovers and trade across regions, neoclassical wealth effect and crowding out. In particular, the aggregate negative wealth effect—as well as other nation-wide effects—associated with a shift in spending is differenced out from the estimates since it is absorbed by the year fixed effects. Thus, the positive impact of government spending on private consumption estimated above is consistent even with a negative consumption multiplier once this effect is taken into account.

To investigate on this issue I look at estimates of the difference between β_{below} and β_{above}—not controlling for the year-fixed effect. Under the assumption that monetary policy variations, as well as other aggregate variations correlated with the expenditure fluctuations, have neutral effect across regions, a negative difference would reveal that the wealth effect is at work.[6] In principle, the proposed identification strategy does not need that the aggregate multiplier is estimated consistently. It is enough that the potential bias is roughly the same for β_{below} and β_{above}, arguably a requirement not restrictive.[7]

For any t, let G_t be the average across regions of $G_{i,t}$. In a fiscal union G_t measures the tax burden any region faces because of the government expenditure shock. With a number of regions greater than two, the consumption multiplier related to the shock should vary according to the difference $G_{i,t} - G_t$: the lower this difference is the lower the multiplier should be. Given that, the new baseline specification is characterized by the interaction term $G_{i,t}^{Dev} G_{i,t}$, where $G_{i,t}^{Dev} = G_{i,t} - G_t$, and a set of controls X:

$$C_{i,t} = \varsigma_i + \beta G_{i,t} + \sigma \left(G_{i,t}^{Dev} G_{i,t} \right) + \theta X_{i,t} + \omega_{i,t}. \tag{3}$$

The estimate of β provides a measure of the aggregate multiplier which is identified as the multiplier which holds for a representative region where change in taxes equal change in government expenditure, that is $G_{i,t}^{Dev} = 0$. The coefficient $\sigma > 0$ adjusts the estimate of the consumption response for the impact of redistribution. For instance, when the spending shock $G_{i,t}$ is relatively small in terms of G_t, such that $G_{i,t}^{Dev} < 0$, then taxes to be paid by consumers in region i are larger than those suggested by the shock. Thus, the consumption response of these consumers should be lower than that of consumers of the representative region, given the same size of the local spending shock.

I also estimate the following alternative specification

$$C_{i,t} = \varsigma_i + \rho_1 G_{i,t} + \rho_2 G_{i,t}^{below} + \theta X_{i,t} + \omega_{i,t} \tag{4}$$

where $G_{i,t}^{below}$ equals $G_{i,t}$ if $G_{i,t}^{Dev} < 0$ and 0 otherwise. When more than two regions are considered, this is the most simple way to exploit the proposed strategy. In this case the coefficient ρ_2 identifies the difference $\beta_{below} - \beta_{above}$ while ρ_1 would be a measure of β_{above} interpretable as the average consumption response of those benefiting from fiscal redistribution.

Without the year-fixed component the possibility of a biased estimate of β becomes a relevant issue. As regards the vector of controls $X_{i,t}$ I include a time trend (or region-specific trends), the first difference of the aggregate tax revenue relative to GDP, and an indicator of aggregate monetary policy,

[6] Note that the standard approach of controlling for aggregate shocks through time dummies is valid under the assumption that aggregate shocks other than the public expenditure ones have a neutral effects across regions. When I compare results for β_{below} and β_{above} identification of the wealth effect hinges on the same assumption: any difference cannot be driven by variations in the monetary policy.

[7] Reliable estimates of the aggregate multiplier might be obtained by using an instrumental variable approach which exploits exogenous variations in public spending, for instance changes in military purchases (Barro and Redlick, 2011; Ramey, 2011b). However, since the bulk of evidence with such an approach comes from episodes of wars—in particular, the World War II and the Korean War—results might be not relevant to today's market economy (Hall, 2009).

namely the first difference of the Bank of Italy nominal interest rate until 1998 and of the European Central Bank interest rate afterwards.[8]

Because of reverse causation—spending reacting to the state of the economy—there is usually the suspicious that estimates of government-spending multipliers are biased. In particular, being government purchases procyclical, going up in booms and down in recessions, the main concern dealing with this type of public spending is that one tends easily to get over-estimate of the multiplier.[9] Barro and Redlick (2011), for instance, provide evidence in this direction for the US. As my aggregate multiplier estimates are obtained without the year-specific fixed effects this may be fairly the case.[10] A related problem is the common effect on private and public spending of a third factor. Since the aggregate multiplier is estimated lower than the local multiplier, this raises however the possibility that such difference is due a downward bias affecting the former estimate instead of being induced by the wealth effect of spending shocks. Arguably, the main possibility refers to foreign events implying a recession in Italy—GDP and consumption drop—toghether with the reaction of the government aimed at stabilizing the economy through larger spending. In this respect, there are two well known episodes during the sample: the strong rise of the oil price in 1974 and the financial collapse in the 2008 determining the recent worldwide economic crises. How these two episodes may affect the estimates of the multiplier is difficult to assess a priori. Since after both the oil shock and the financial crash a large drop in GDP and consumption realized one possiblity is that these episodes tend to bias upward the multiplier if the GDP drop induced a public spending drop, too. Alternatively, one may argue however that the need to stabilize the economy induced the governments to increase public spending after these events, that is, coeteris paribus, public spending was countercyclical (Giarda, 2012). In this case reverse causality would induce a downward bias if not taken into account. Finally, it cannot be dismissed the possibility that in principle these episodes would provide valuable information to estimate the multiplier in recessions. This relates to nonlinearity in the effect of fiscal policy. Recent evidence points out at sensitiveness of multipliers to the state of the business cycle: differently from expansions, very large output multipliers of government spending would hold in recessions (Auerbach and Gorodnichenko, 2012).[11]

Since in my sample recessions characterize just two years, investigating nonlinearity effects of fiscal policy is unreliable. Thus I opt for a prudential strategy aimed at minimizing the risk of biased estimates. Namely, I consider two dummies picking the 1974 and the 2008 and add them contemporaneusly and lagged one year to the set of controls. Moreover as a further way to control for spurious variations in public and private spending induced by the open-economy nature of Italy I also add to the vector $X_{i,t}$ the log-difference of the exchange rate between the Italian Lira and the Deutsche Mark (which is zero since 1999).

Without the interaction $G_{i,t}^{Dev}G_{i,t}$, the consumption response to a spending shock is virtually zero—that is much lower than that estimated conditional on the year-specific effects—consistent with the hypothesis that the year-specific component absorbed the negative impact of prospective taxes (see the first column of Table 5). This conclusion is strongly supported by estimates of the specifications

[8] As shown in Figure 1, the evolution of nationwide public spending traces a downward sloping trend during the first half of the 1990s and an upward trend afterward. If these trends cannot be identified as due to exogenous variations, then they likely produce biased estimate of the aggregate consumption multiplier. Actually, without regional trends and not controlling for year-specific effect the aggregate consumption multiplier is estimated to be about 0.5 . Regarding the tax variable, while the magnitude of the tax multiplier—relating output to marginal income-tax rates or tax revenues—is controversial, recent empirical literature provides evidence that tax changes have a non-negligible negative effect on output—see, for instance, Barro and Redlick (2011) and Romer and Romer (2010). The latter contribution emphasizes that aggregate spending and tax changes may occasionally become strongly correlated, reflecting emerging political concerns with the ongoing government deficit. To the extent that tax changes can have a negative impact on output, theses authors argue that the omission of this variable induces a downward bias in the estimate of the spending multiplier.

[9] A different case is that of welfare-related transfers whose effects tend instead to be under estimated, as transfers are usually counter-cyclical.

[10] A second concern regards the effect on estimated multipliers of lags between planned and realized public spending. As for reverse causation, recent evidence suggests that when public spending changes are anticipated estimates of the multiplier tends to be bias upward (Ramey, 2011a).

[11] Mixed results are reported by Owyang, Ramey and Zubairy (2013) who provide evidence of state dependence for Canada and simmetric effects for the U.S.

with the interaction terms. When equation (3) is considered, the aggregate multiplier is estimated to be -0.150, insignificantly different fro zero. The coefficient σ is instead 0.405 with a p-value of 0.004. By using these estimates together with sample averages of spending changes calculated for positive or negative $G_{i,t} - G_t$ values, as reported in Table 1, one may calculate the effects that fluctuations in government expenditure and redistribution of fiscal resources determine on consumption. A spending shock of 0.25% of GDP, given an average spending variations of 0.43%, implies lower consumption by 0.056, that is a multiplier of -0.22 if I normalize the size of the shock to 1%. Conversely, a spending shock 0.20% greater than the average implies a multiplier of -0.07. Therefore, the estimated difference $\beta_{below} - \beta_{above}$ is -0.151. These numbers are very similar to those implied by estimates of ρ_1 and ρ_2, respectively -0.327 and 0.081. Their difference is -0.408 while the corresponding p-value is 0.023 (see the third column of Table 5). Hence, although point estimate of the aggregate multiplier should be taken with care, results suggest that those receiving less spending than the amount of paid taxes on average match the basic neoclassical prediction, as they cut consumption analogously to an agent who realizes that she will eventually have to pay for the government spending. In contrast, when evaluated at the sample average the response to a spending shock which is in part window-financed is not statistically different from zero.[12]

The negative neoclassical wealth effect should hold for increases and cuts in public spending. There are however good reasons to argue that the stimulative effect of spending cuts is less strong then the depressive effect of more spending. Empirical investigation does not provide reliable guide in this direction. Giavazzi and Pagano (1990) report two episode of non keynesian effects of fiscal consolidation. However more recent evidence by Perotti (2011) questions that finding in the short-run. During the forty-five years analyzed there are only two years characterized by strong retrenchments in government purchases. Although this does not allow to deeply investigate whether the drop in spending is intended as a promise of less taxes in the future thus stimulating consumption, I look at the impact on the estimate of the aggregate multiplier of dropping observations for this couple of years. As Table 5 shows this has non-negligible impact on my estimates. The aggregate multiplier is estimated much larger in absolute value and its precision is strongly improved, too. This provides indirect evidence that the short-run effect of fiscal consolidation through less government purchases is not without pains, consistent with Perotti (2011) and Acconcia, Corsetti, and Simonelli (2011).[13]

Redistribution of resources within the national budget is particularly evident if I restrict to a subset of regions until the mid of the 1990s. Actually, for about thirty years government expenditure allocated in some Northern regions, mainly Piedmont, Lombardy, and Veneto increased at rates systematically lower than the national average. The opposite was true mainly regarding two Southern regions, that is Campania and Calabria. After the 1995 this regularity disappeared as increments higher and lower than the average alternated for both groups of regions. Strikingly enough, as suggested by previous estimates consumption share (in terms of GDP) of the three Northern regions relative to that of the two Southern ones reduced steadily up to the 1996, from about 0.9 to 0.75 (see Figure 2). Afterward an increasing pattern realized.

Italian regions are akin to small open economies trading among them and with the rest of the world. Hence, variation in spending in one region might affect economic activity in neighboring regions as well as abroad. Therefore, it is not necessary the case that any change in local private consumption implies an equivalent variation in local output. If, for instance, a drop in local consumption only affects demand for imported goods then this drop does not depress local activity. In this respect, coeteris paribus the contraction in consumption represents the maximum possible amount of output drop due to the neoclassical wealth effect. Of course, however, spillover effects of public spending, if any, can have a vastly different nature. On the one hand, some of the government expenditure change in one region may "leak" into nearby areas, driving economic activity simultaneously within and outside the region where spending is changed. Demand spillovers would induce a positive correlation in the

[12] Without controlling for tax revenues the coefficient of G would be negative and statistically significant at 5% confidence level. Similarly, estimates of β_{below} and β_{above} decrease, their difference however remains virtually the same.

[13] Excluding the two years of large aggregate spending drops implies that the rest of the sample may be splitted in two groups according to whether aggregate spending is large or near zero. Of couse I expect that large spending variations drive previous evidence. Results not reported show that this is indeed the case. Restricting to the years characterized by large positive shocks in aggregate spending produces virtually the same estimate of the multiplier.

response of output across regions. On the other hand, in response to a localized spending shock, it is possible that production factors relocate, moving across the borders of the region hit by the fiscal shock. With this second type of spillovers, the increase in local economic activity in one region would correspond to a fall in economic activity in the nearby areas, inducing a negative correlation in the response of regional output across borders.

Table 6 reports estimates of the output multiplier of of government expenditure that complement evidence on consumption. Overall, results are fully consistent with previous conclusion. My measure of the aggregate multiplier is positive, statistically significant at 5% level, and less than 1. Depending on the specification adopted the multiplier is in the range 0.5-0.7. The value raises up to 1 for those who benefit from redistribution—and not cut consumption after the spending shock—while drops to about 0.4 for the rest of the country. As for the consumption response, also in the case of the output multiplier lower values are estimated when the years of fiscal consolidation are dropped from the sample.

3.2.1 Recessions and countercyclical fiscal policy

Previous results are obtained after controlling for the two main recessions in Italy since the WWII. This reassures about the possibility that the low value of the aggregate multiplier is due to spending reaction by the government aimed at stimulating the economy during these strong downturns. Two further recessions characterized however the Italian economy in the second half of the last century: during 1982-83 and 1992-93. Differently from the two recessions mentioned above, these are more related to internal factors. According to Giarda (2012) these years are characterized overall by countercyclical fiscal policy.[14] Controlling also for these episodes through a dummy does not change at all multiplier estimates. Alternatively, by restricting to expansions my estimate of the aggregate multiplier is -0.322, while the positive value of σ implies that $\beta_{below} < \beta_{above}$.

The low numer of years caharacterized by recessions—and the closeness of the 1992-93 recession with the consolidation episode during 1994-95—does not allow to investigate whether aggregate effects of fiscal policy depend on the state of the economy, as suggested by Auerbach and Gorodnichenko (2012). Actually, controlling for recessions reduce the estimate of the aggregate multiplier, though it does not affect the difference $\beta_{below} - \beta_{above}$. Such evidence is consistent with either reverse causality or strong efficacy of fiscal policy during recessions.

To provide some evidence on the differential effects of fiscal policy between expansions and recessions I look again at the local multiplier. The identifying assumption is that since the investigated recessions affected the entire economy any bias due to reverse causality is absorbed by the year dummies. Table 8 provides some evidence that during recessions the effect of fiscal policy is stronger, though not a conclusive one. By aggregating years of recessions with those of consolidation it follows a point estimate of the consumption multiplier as high as 0.820—while in the rest of the sample it reduces to 0.323. However if I drop the two years of fiscal conslidation the consumption multiplier reduces, though it remains above the value for the entire sample. Evidence about state dependence of fiscal policy is less clear-cut by looking at GDP. If any, evidence on output multiplier suggests more that a strong fiscal consolidation tends to depress the economy in the short run than supporting the state-dependence hypothesis of fiscal policy. In fact, with or without observations related to fiscal consolidation the multiplier is, respectively, 2.320 and 1.649, the latter very colse to the estimate relative to expansion. Taken together these results confirm that at least during expansions controlling or not for the neoclassical wealth effect makes the difference between aggregate and local consumption multiplier estimates.

[14] The difference between my set of recessionary years and that of Giarda (2012) relates to the 1977. Giarda (2012) considers this year as characterized by recession and countercyclical public spending. According to my data in this year the *local* distribution of the government purchase change was strongly negatively correlated with that of the lagged GDP growth.

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Table 1: Public Expenditure

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Total	0.426	0.486	-1.485	2.288	920
Below Average	0.252	0.394	-1.485	1.026	493
Above Average	0.626	0.504	-0.5	2.288	427

Table 2: Public Spending and Redistribution

	(1)	(2)	(3)
	Pooling	Region-Effect	Region-Effect
Relative GDP	-0.362*	-0.654	-0.154
	[-2.85]	[-0.91]	[-0.13]
N	920	920	580

Table 3: Local Multiplier: Consumption

	(1)	(2)	(3)	(4)	(5)
G	0.405***	0.401***	0.395***	0.494***	0.556***
	[4.29]	[4.25]	[4.40]	[4.76]	[3.82]
L.G		0.041	-0.013	0.057	-0.068
		[0.44]	[-0.14]	[0.53]	[-0.45]
L.GDP		0.008	-0.004	-0.014	-0.017
		[0.62]	[-0.34]	[-1.10]	[-1.15]
L.C			0.190***	0.191***	0.179***
			[4.83]	[5.04]	[3.78]
Observations	900	900	900	900	600

Table 4: Local Multiplier: GDP

	(1)	(2)	(3)	(4)	(5)
G	1.217***	1.306***	1.161***	1.488***	1.781***
	[4.72]	[4.80]	[4.54]	[7.39]	[5.19]
L.G		-0.479	-0.200	-0.209	-0.240
		[-1.85]	[-0.83]	[-0.86]	[-0.64]
L.GDP			-0.213***	-0.268***	-0.321***
			[-4.44]	[-5.51]	[-5.21]
Observations	900	900	900	900	600

Table 5: Aggregate Multiplier: Consumption

	(1)	(2)	(3)	(4)	(5)	(6)
G	-0.134	-0.162	0.113	-0.286*	-0.345*	-0.019
	[-1.10]	[-1.19]	[0.93]	[-2.13]	[-2.58]	[-0.16]
G*G-Deviation	0.394*	0.409*		0.447*	0.480*	
	[2.24]	[2.24]		[2.44]	[2.48]	
G, Below National Average			-0.473**			-0.562***
			[-3.13]			[-3.80]
L.G		0.083	0.076		0.199	0.188
		[0.67]	[0.65]		[1.56]	[1.63]
L.C	0.190***	0.190***	0.191***	0.193***	0.193***	0.194***
	[5.28]	[5.26]	[5.27]	[5.29]	[5.26]	[5.27]
Observations	900	900	900	860	860	860

Table 6: Aggregate Multiplier: GDP

	(1)	(2)	(3)	(4)	(5)	(6)
G	0.566**	0.700***	1.225***	0.426*	0.493*	1.091***
	[2.85]	[3.32]	[5.38]	[1.99]	[2.22]	[4.62]
G*G-Deviation	1.073***	1.001***		1.099***	1.060***	
	[3.70]	[3.49]		[3.71]	[3.57]	
G, Below National Average			-0.670			-0.777*
			[-1.95]			[-2.22]
L.G		-0.398	-0.448*		-0.238	-0.293
		[-1.83]	[-2.16]		[-1.03]	[-1.36]
L.GDP	-0.138***	-0.131***	-0.128***	-0.143***	-0.139***	-0.136***
	[-3.64]	[-3.42]	[-3.34]	[-3.72]	[-3.60]	[-3.53]
Observations	900	900	900	860	860	860

Table 7: Aggregate Multiplier in Expansions

	(1)	(2)	(3)	(4)
G	-0.326*	0.019	0.366	1.004***
	[-2.38]	[0.16]	[1.66]	[4.24]
G*G-Deviation	0.523**		1.171***	
	[2.77]		[4.12]	
G, Below National Average		-0.569***		-0.780*
		[-3.91]		[-2.27]
L.G	0.085	0.074	-0.380	-0.440*
	[0.69]	[0.64]	[-1.77]	[-2.14]
L.C	0.138***	0.139***		
	[3.91]	[3.92]		
L.GDP			-0.156***	-0.149***
			[-3.87]	[-3.69]
Observations	900	900	900	900

Table 8: Local Multiplier and Business Cycle

	(1)	(2)	(3)	(4)	(5)	(6)
G	0.323**	0.820**	0.698**	1.309***	2.320***	1.649**
	[3.11]	[3.32]	[2.88]	[5.98]	[4.27]	[3.16]
L.G	0.099	-0.322	0.250	-0.019	-0.917	-0.380
	[0.93]	[-1.10]	[0.97]	[-0.08]	[-1.52]	[-0.44]
L.GDP				-0.302***	-0.129	-0.261*
				[-5.54]	[-1.18]	[-2.08]
L.C	0.220***	0.135*	0.117			
	[4.71]	[2.00]	[1.52]			
Observations	680	220	180	680	220	180

Figure 1: Evolution of Public Expenditure in Italy

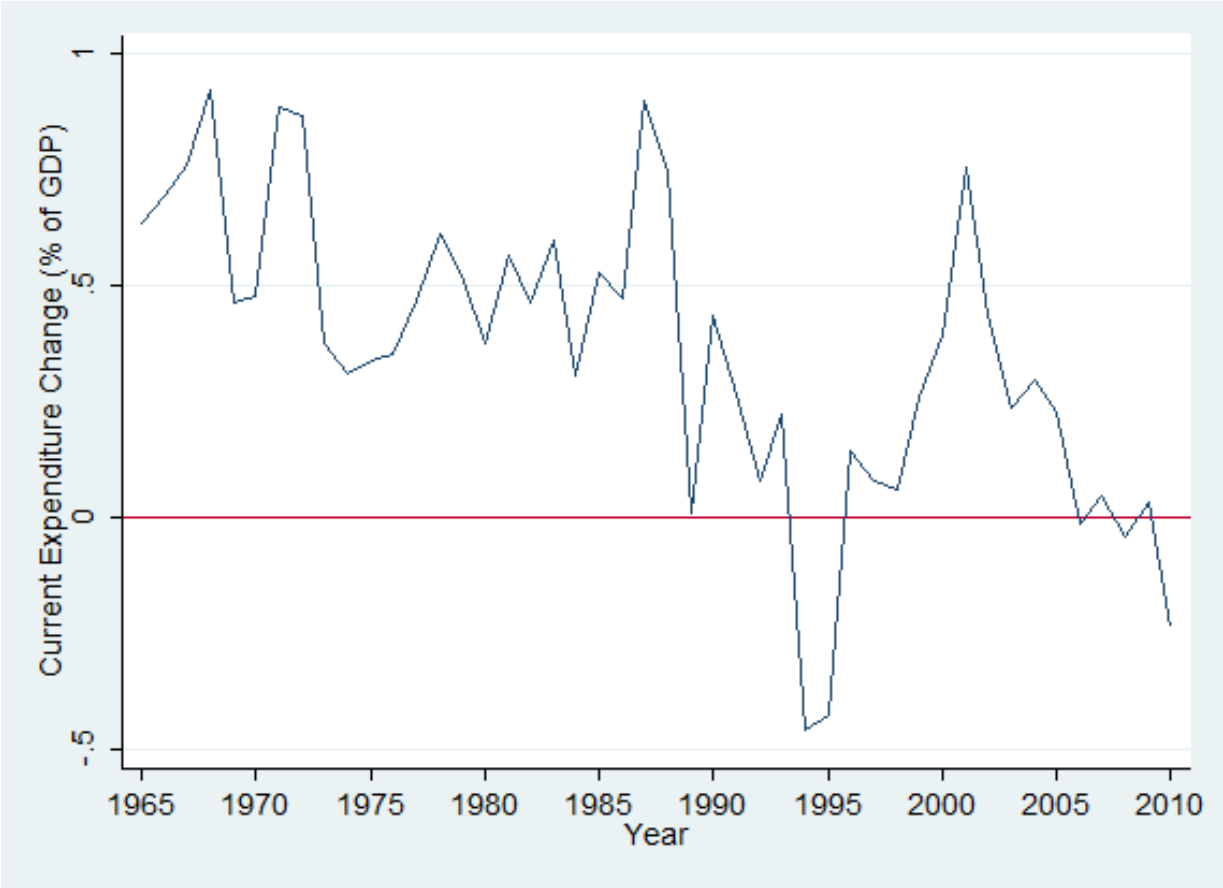

Figure 2: Evolution of Consumption