BANCA D'ITALIA

EUROSISTEMA

Temi di discussione

(Working papers)

Cyclical asymmetry in fiscal variables

by Fabrizio Balassone, Maura Francese and Stefania Zotteri

June 2008

Number 671

The purpose of the Temi di discussione *series is to promote the circulation of working papers prepared within the Bank of Italy or presented in Bank seminars by outside economists with the aim of stimulating comments and suggestions.*

The views expressed in the articles are those of the authors and do not involve the responsibility of the Bank.

CYCLICAL ASYMMETRY IN FISCAL VARIABLES

by Fabrizio Balassone*, Maura Francese* and Stefania Zotteri*

Abstract

In a stylised framework of fiscal policy determination that considers both structural targets and cyclical factors, we find significant cyclical asymmetry in the behaviour of fiscal variables in a sample of fourteen EU countries from 1970 to 2004, with budgetary balances (both overall and primary) deteriorating in contractions but not improving correspondingly in expansions. Analysis of budget components reveals that the asymmetry is due to expenditure, in particular transfers in cash. We find no evidence that the fiscal rules introduced in 1992 with the Treaty of Maastricht affected the cyclical behaviour of the variables examined. Numerical simulations show that cyclical asymmetry inflated average deficit levels, contributing significantly to the accumulation of debt.

JEL Classification: E62, H6.
Keywords: fiscal stabilisation, government expenditure, government debt, fiscal rules.

Contents

* Bank of Italy, Economics, Research and International Relations.
E-mail: fabrizio.balassone@bancaditalia.it; maura.francese@bancaditalia.it; stefania.zotteri@bancaditalia.it.

The views expressed in this paper are those of the authors and do not necessarily reflect those of the Banca d'Italia. We gratefully acknowledge helpful comments from Alan Auerbach, Riccardo Faini, Elena Gennari, Roberto Golinelli, Martin Larch, Bernard Manzke, Carlos Martinez Mongay, Sandro Momigliano, Patrizio Pagano, Roberto Perotti, Stefano Siviero, two anonymous referees and participants in seminars held at the Banca d'Italia and the IMF, as well as in a number of conferences where previous versions of this paper were presented.

1. Introduction

Although there continues to be some debate on the feasibility and effectiveness of fiscal policy in stabilizing output fluctuations, there is little disagreement that – as a rule – policy should not be procyclical. Procyclical policies can sometimes be warranted by the need to preserve the sustainability of public finances, yet there is no room for complacency regarding chronic procyclicality. If stabilization policy is to be consistent with fiscal sustainability then cyclical behaviour of fiscal variables should be symmetric, so that the extra deficit accumulated in bad times is compensated for in good times.

However, there is growing evidence that fiscal variables react asymmetrically to positive and negative cyclical conditions. It has often been remarked that during 1970-2000 in European Union (EU) countries, deficits increased in downturns, but did not fall in periods of high growth, with countries offsetting the effects of automatic stabilizers via tax cuts and/or expenditure increases. The procyclicality of fiscal policy in good times is also a stylized fact in emerging markets.

Buti and Sapir (1998) note that for the average of EU countries, "when there is a moderately negative output gap […] the actual deficit gradually increases," while "when there is a moderately positive output gap […] the actual deficit remains stable," and it is only "when there is a strongly positive output gap [that] the actual deficit improves" (pp. 87-88). Some evidence of asymmetric behaviour is provided by Buti *et al.* (1998) for high-debt EU countries where, between 1970 and 1990, deficit-to-GDP ratios are around 6 per cent of GDP when output is close to or above its trend value, while the imbalance increases up to 8 per cent when output falls below its trend level. A previous version of this paper (Balassone and Francese, 2004) found evidence of a significant difference in the elasticity of the overall balance to positive and negative output gaps in a sample of sixteen OECD countries over 1969-2002.[1]

Concerning developing countries, Gavin and Perotti (1997) provide evidence of fiscal expansions in good times and contractions in bad times in Latin America. Talvi and Végh (2000) point out that fiscal procyclicality seems to be the norm in the developing world, not just in Latin America. Kumar and Ter-Minassian (2007) extend the analysis in Balassone and Francese (2004) to developing countries and finds that the overall balance deteriorates in contractions without improving in expansions.

[1] The estimated elasticity (strictly speaking, semi-elasticity) is 0.4 for negative output gaps and zero for positive ones.

Available evidence suggests that expenditure play a predominant role in determining the observed cyclical asymmetry of the overall fiscal balance. For instance, Kaminsky *et al.* (2004) show that in a sample of eighty-three developing countries real government spending tends to increase much more in good times than in bad times. Hercowitz and Strawczynski (2004) use a panel of twenty-two OECD countries and find that "the prolonged rise in the spending/GDP ratio [over 1975-1998] is partially explained by cyclical upward ratcheting due to asymmetric fiscal behaviour: the ratio increases during recessions and is only partially reduced in expansions" (p. 353).

While the cyclical behaviour of fiscal balances is usually analyzed with reference to positive and negative output gaps, the cyclicality of spending is generally measured with respect to GDP growth rates. For instance, both Kaminsky *et al.* (2004) and Hercowitz and Strawczynski (2004) define good and bad times as periods in which real GDP growth is, respectively, higher and lower than "normal" (with the norm defined as the sample average or median). Since periods in which real output growth is above/below an "average" value do not always correspond to periods in which the output gap is positive or negative, the available evidence on the cyclicality of spending and fiscal balances is not necessarily fully consistent.[2]

In order to provide comparable evidence on the cyclical behaviour of fiscal balances and public expenditure, we expand the stylised framework used in Balassone and Francese (2004) – which uses the output gap to define cyclical conditions – to allow for the analysis of the primary balance and individual budget components. We use data from a sample of fourteen EU member states over the period 1970-2004.

We find significant cyclical asymmetry in fiscal variables, with the primary (and overall) budget balance deteriorating in contractions without correspondingly improving in expansions. Analysis of budget components reveals that the asymmetry comes from expenditure, in particular from transfers in cash. We find no evidence that fiscal rules introduced in 1992 affected the cyclical behaviour of fiscal variables. Numerical simulations show that cyclical asymmetry inflated average deficit levels, contributing significantly to debt accumulation.

[2] Kumar and Ter-Minassian (2007) report regression results indicating an asymmetric reaction of the expenditure-to-GDP ratio to positive and negative output gaps.

The stylised framework underlying the analysis is described in Section 2. Section 3 reports regression results on cyclical asymmetry in fiscal variables. The extent to which cyclical asymmetry affects deficit and debt levels is discussed in Section 4. Section 5 summarizes and concludes.

2. The stylised framework

The stylized description of the dynamics of the overall fiscal balance in this Section is based on Balassone and Francese (2004), which in turn owes significantly to Hercowitz and Strawczynski (2004).

We split the ratio of the budget balance to GDP (b_t, with $b_t>0$ indicating a deficit in period t) into a long-run component (b^l_t) and a cyclical component (b^c_t):

$$(1) \qquad b_t = b_t^l + b_t^c$$

We assume that the long-run component is determined by a linear adjustment process towards the government's preferred balance and debt ratios to GDP, b^* and d^*,[3]

$$(2) \qquad b_t^l = b_{t-1} + \alpha(b^* - b_{t-1}) + \beta(d^* - d_{t-1}) \qquad \alpha, \beta > 0$$

Note that in the long run $d^*=b^*/g$, where g is the long-run nominal GDP growth.

The cyclical component, instead, is proportional to the difference between actual and trend GDP (i.e. the output gap, ω_t). To allow for cyclical asymmetry, the coefficient of proportionality is different ($\eta=\eta^P$, η^N; $\eta^P \neq \eta^N$) depending on whether the output gap is positive ($\omega_t=\omega^P_t$) or negative ($\omega_t=\omega^N_t$):

$$(3) \qquad b_t^c = \eta^P \omega_t^P + \eta^N \omega_t^N$$

[3] These can be thought of as the result of the optimisation of an objective function linking electoral support – or consistency with one's "ideology", or both – to a number of macroeconomic variables, subject to constraints defined by one's preferred model of the economy (along the lines of the literature on the political business cycle; see, e.g., Nordhaus, 1975; and Alesina, 1987). Alternatively, b^* and d^* may be seen as the government's preferred solution to the present value budget constraint (Blanchard *et al.*, 1990). Artis and Marcellino (1998) provide a review of studies testing the hypothesis that governments actually behave so as to satisfy the present value budget constraint. Finally, a debt stabilisation motive in modelling budgetary decisions has been adopted in empirical analyses by several authors defining "simple" fiscal rules in analogy to the Taylor rule for monetary policy (see, e.g., Bohn, 1998; Ballabriga and Martinez-Mongay, 2002; Galì and Perotti, 2003).

The η coefficients in (3) include both the automatic reaction of the budget to cyclical conditions (i.e. what is usually called the budget elasticity to the cycle) and the discretionary action undertaken by fiscal authorities in response to such conditions.

Combining (2) and (3) gives

(4) $$b_t = (\alpha b^* + \beta d^*) + (1-\alpha) b_{t-1} - \beta d_{t-1} + \eta^P \omega_t^P + \eta^N \omega_t^N$$

which provides the basis for our empirical analysis.[4]

Countercyclical movements of the overall balance would require η^P, η^N <0, i.e. a GDP below its potential level (ω_t<0) determines a worsening of the budget while economic activity above trend (ω_t>0) determines an improvement. From (4) we define an asymmetry index as follows:

(5) $$\phi = \eta^P - \eta^N$$

If ϕ=0 (η^P=η^N), then fiscal policy is symmetric with respect to the cycle, while if ϕ>0 the worsening of the budget balance due to a negative output gap is higher than the improvement in the balance experienced when GDP is above potential.

Since equation (4) can only be estimated using ex-post evaluations of the output gap (as opposed to expected values), in empirical applications it must be interpreted as an instrument for assessing

---

[4] A different specification is often used where the cyclically-adjusted balance is regressed against its lagged value, the lagged value of debt and the output gap (plus, possibly, other control variables; see, e.g., Golinelli and Momigliano, 2007):

(a) $$cab_t = \phi_0 + \phi_1 cab_{t-1} + \phi_2 d_{t-1} + \phi_3 \omega_t$$

Neither (4) in the main text, nor (a) above have micro-foundations. Thus, when choosing between the two models one can only rely on how they fit the data. From (4), using the identity $b_t = cab_t + \gamma\omega_t$ (where the budget balance is split into its cyclically-adjusted component – cab_t – and the automatic reaction to the output gap – $\gamma\omega_t$) and dropping the distinction between positive and negative output gaps to economize in notation, we get:

(b) $$cab_t = \alpha_0 + \alpha_1 cab_{t-1} + \alpha_1' \omega_{t-1} + \alpha_2 d_{t-1} + (\eta - \gamma)\ \omega_t$$

Where $\alpha_0 = \alpha b^* + \beta d^*$; $\alpha_1 = 1-\alpha$, and $\alpha'_1 = \alpha_1 \gamma$. Comparison of (a) and (b) shows that the two specifications are equivalent if: *(i)* $\alpha'_1 = 0$ (that is, if current policy, as measured by cab_t, is not affected by past cyclical conditions); or *(ii)* if the output gap is so persistent that it can be safely assumed that $\omega_t = \omega_{t-1}$. With our sample, in regressions not reported here, we consistently find $\alpha'_1 \neq 0$. Moreover, the correlation coefficient between ω_t and ω_{t-1} is about 0.5. Hence we retain (4) as our preferred specification.

whether *de facto* budgetary movements have been pro/counter-cyclical and symmetric/asymmetric with respect to the cycle, regardless of the government's intention in that respect. It cannot be used to infer the policy intentions of fiscal authorities.[5]

2.1 The primary balance

While the framework described above focuses on the overall balance, the policy variable of fiscal authorities is the primary balance. From (2), by decomposing b_t into its interest (i_t) and primary balance (p_t) components, since $b^l_t=p^l_t+ i_t$ and $b_t=p_t+i_t$, we have:

$$(6) \qquad p^l_t = p_{t-1} - (i_t - i_{t-1}) + \alpha(b^* - p_{t-1} - i_{t-1}) + \beta(d^* - d_{t-1})$$

Equation (6) shows that by ignoring the composition of the overall balance, equation (2) implicitly assumes that: (i) changes in interest expenditure (i_t-i_{t-1}) are compensated one-for-one by the primary balance; and (ii) differences between b^* and b_{t-1} have the same impact on p^l_t (as measured by α) regardless of whether they originate from p_{t-1} or i_{t-1}.

Since there is no reason to maintain a priori either assumption, we modify (6) to allow for partial compensation of changes in interest outlays by the primary balance and for a differential impact of the lagged primary balance and interest payments on the policy variable (p^l_t):

$$(7) \qquad p^l_t = p_{t-1} - \xi(i_t - i_{t-1}) + \alpha'(b^* - p_{t-1} - \theta i_{t-1}) + \beta'(d^* - d_{t-1}) \qquad \xi \neq 1; \theta \neq 1$$

Note that once we allow coefficients ξ and θ to be different from 1 and move from equation (6) to equation (7), we cannot assume that the other coefficients in equation (7) are the same as those in equation (2), hence the dash sign on α and β.

[5] Otherwise we would be assuming perfect forecast on the part of the government, which is clearly too restrictive an assumption. When the purpose of the analysis is the assessment of policy intentions, two options can be considered: *(i)* the use of published government forecasts; and *(ii)* the use of forecasts produced by international organisations. In both cases data availability is limited. Moreover, official government forecasts may suffer from systematic biases (see Larch and Salto, 2003, for evidence of a systematic tendency to overestimate growth, especially during slowdowns), while forecasts by international organizations do not necessarily reflect government's expectations (even assuming that they share the same information set). The informational problems associated with the analysis of policy rules have been thoroughly analysed in the context of monetary policy (see, e.g., Orphanides, 2001), but have received much less attention with reference to fiscal policy. See Golinelli and Momigliano (2006) for an analysis of fiscal policy reaction functions using real-time indicators.

Concerning the cyclical component of the primary balance, we assume that it is determined in the same way as the cyclical component of the overall balance. Hence, by analogy with (3), we have:

$$(8) \qquad p_t^c = \eta'^P \omega_t^P + \eta'^N \omega_t^N$$

Note again the dash sign accompanying the η coefficients, marking that they are different from their counterparts in (3) since they do not pick up the cyclical behaviour of interest expenditure.[6]

Summing up (7) and (8) we obtain the equation governing the primary balance:

$$(9) \qquad p_t = (\alpha' b^* + \beta' d^*) + (1-\alpha') p_{t-1} - \beta' d_{t-1} - \xi(i_t - i_{t-1}) - \alpha' \theta i_{t-1} + \eta'^P \omega_t^P + \eta'^N \omega_t^N$$

Resulting in the following estimating equation :

$$(9b) \qquad p_t = \alpha'_0 + \alpha'_1 p_{t-1} + \alpha'_2 d_{t-1} + \alpha_3 \Delta i_t + \alpha_4 i_{t-1} + \eta'^P \omega_t^P + \eta'^N \omega_t^N$$

Comparison of (4) and (9) indicates that an estimating equation for the primary balance should not be obtained by simple analogy with the one used for the overall balance without checking whether interest spending is a significant explanatory variable. Moreover, the inclusion of interest spending among regressors allows to control – albeit approximately – for possible interactions between fiscal and monetary policy.[7]

From estimates of parameters in (9b) we can recover the underlying value of b^*. In the long-run equilibrium we have $\omega=0$, $b=b^*$ and $d=d^*=(b^*/g)$. Therefore, $i_t = \rho\,(b^*/g)$, $\Delta i_t=0$, and $p_t=b^*-\rho(b^*/g)$ (where ρ is the long-run nominal interest rate). Substituting in (9b) it follows

[6] Interest spending is not directly related to the output gap, but its ratio to GDP is affected by cyclical fluctuations in output.

[7] To this end Galì and Perotti (2003) use a different approach. In their estimating equation the dependent variable is the cyclically-adjusted primary balance, which is regressed against its lagged value, the lagged value of debt and a set of control variables, including the deviation of the interest rate from a predetermined Taylor rule. Specifically, they compute the average absolute deviation between each country's short-term interest rate and the rate generated by the following Taylor rule: $r_t = 4.0 + 1.5\,(\pi - 2.0) + 0.5\,x_t$, where r is the short-term nominal interest rate and x is a vector of control variables. They argue that this rule is generally viewed as a good first approximation of the behaviour of central banks that have been successful in stabilising inflation and the output gap and such a rule has been shown to have desirable properties when embedded in a dynamic optimizing model with realistic frictions.

$$(10) \quad b^* = \frac{\alpha'_0}{(1-\alpha'_1) - \frac{\alpha'_2}{g} - (1-\alpha'_1+\alpha_4)\frac{\rho}{g}}$$

2.2 Expenditure and revenue

In order to analyze the cyclical behaviour of different budget components, we use the following definition of the primary balance:

$$(11) \quad p_t = \sum_{s=1}^{n} e_t^s - \sum_{s=n+1}^{m} r_t^s$$

where e^s_t ($s=1,\ldots,n$) are primary expenditure items and r^s_t ($s=n+1,\ldots,m$) are revenue items.

For each budget item we write an equation similar to (9b). We assume that each budget item x_t^s depends on the lagged primary balance (thus allowing each budgetary item to be influenced by the level of all the other budget components), the change in interest spending and its lagged level, lagged debt, and the output gap:

$$(12) \quad x_t^s = \alpha_0^s + \alpha_1^s p_{t-1}^s + \alpha_2^s d_{t-1} + \alpha_3^s \Delta i_t + \alpha_4^s i_{t-1} + \eta_s^P \omega_t^P + \eta_s^N \omega_t^N$$

$$x_t^s = \begin{cases} e_t^s & \text{for s} = 1,\ldots,\text{n} \\ -r_t^s & \text{for s} = \text{n}+1,\ldots,\text{m} \end{cases}$$

The sum over s of the estimates of η_s^P and η^N_s in the m equations defined in (12) is equal to the estimate of η'^P and η'^N in (9b).

For each budgetary item we can therefore define an asymmetry index as follows:

$$(13) \quad \phi_s = \eta_s^P - \eta_s^N$$

and the index of asymmetry for the primary balance can also be written as:

$$(14) \qquad \phi' = \sum_{s=1}^{m} \phi_s = \sum_{s=1}^{n} \phi_{e_s} - \sum_{s=n+1}^{m} \phi_{r_s}$$

3. The empirical analysis

We apply the stylized framework described above to a sample of fourteen EU countries (those belonging to the EU before May 2004, excluding Luxembourg) over the period 1970-2004. The data source is the AMECO database published by the European Commission[8]. Data are annual. Fiscal variables are expressed in percent of GDP and display significant variation both over time and across countries. Output gaps are computed using the Hodrick-Prescott filter.[9] The sample is unbalanced.

The average net borrowing of the sample countries was 0.9 per cent of GDP in the seventies, rising to 4.8 per cent in the eighties and then declining to 3.9 per cent in the nineties and to 0.9 per cent over 2000-04 (Table 1a). The average debt-to-GDP ratio rose from 32.5 per cent in the seventies to 56.2 per cent in the eighties and 71.7 per cent in the nineties; as a result of the reduction in government deficits, it declined to 64.0 per cent over 2000-04.

Revenue grew from an average of almost 42 percent of GDP in the seventies, to 45 per cent in the eighties and rose above 47 from the nineties. The primary expenditure-to-GDP ratio, averaging at 41 per cent in the seventies, rose above 44 per cent form the eighties. The share of transfers in cash increased over most of the sample period while that of wages declined throughout and other expenditure followed a U-shaped pattern (Table 1b).

[8] Specifically, the data used in this paper are those of the Spring 2005 release of the AMECO dataset.

[9] To avoid end-point bias the Hodrick-Prescott filter is applied to GDP series longer then the regression sample (1960-2006 as opposed to 1970-2004; we used Commission forecasts for the last two years). By definition, there are about as many positive as negative gaps in the sample. We tried different values for the smoothing parameter λ and found that econometric results are robust to different choices. For regressions reported in the paper we used output gap estimates obtained by setting λ=30. See Bouthevillain *et al.* (2001) for a discussion of the issues involved in the use of the Hodrick-Prescott filter.

3.1 The overall balance

We start off by estimating equation (4) including time dummies to check for breaks in fiscal policy. Each time dummy covers a decade in the sample (1980s, 1990s and 2000s). The equation is estimated both using fixed effects (FE) and – to take into account the dynamic structure of the estimating equation – Arellano-Bond (AB) techniques (Table 2, Columns A and B).

The results indicate the presence of cyclical asymmetry. The coefficient for the negative output gap is relatively large (-0.46 using FE; -0.39 with AB) and statistically significant at the 1 percent confidence level. The coefficient for the positive output gap is much smaller (-0.03 with FE; -0.13 with AB) and not significant at the 5 percent confidence level. The asymmetry index ϕ is significantly different from zero both with FE and AB (respectively, at the 5 and 1 percent significance level).[10]

The coefficient of the lagged dependent variable is lower than one and the coefficient of lagged debt is negative, so that convergence of the equation is ensured.

Importantly, the exclusion of time dummies does not affect the results concerning cyclical asymmetry (Table 2, Columns C and D).[11]

The coefficients of time dummies estimated using FE suggest that there might be a break at the beginning of the nineties. The coefficients are not jointly significant, but those for the 1990s and 2000s dummies are individually significant and they are not statistically different.[12] Given that the Maastricht Treaty was signed in 1992, introducing constraints on deficit and debt for EU countries, we choose to account for the early nineties break with a 1992 dummy.[13] We use a general-to-specific estimation strategy. First we interact a dummy variable for 1992 with all covariates (Table 2, Column E); then we drop terms with non-significant coefficients (Table 2, Columns F and G, for FE and AB estimates respectively).

---

[10] We used different partitions of our data set to check that results do not depend on strong responses of a handful of countries. Results were robust across regressions run on subsamples selected according to the average size of countries' deficit, debt and social security spending.

[11] The same result is obtained when using time dummies defined over five-years periods. Annual dummies unsurprisingly interfere with our cyclical variables.

[12] This pattern is supported also by estimation using time dummies covering five-years periods.

[13] In 1997 the Stability and Growth Pact supplemented the fiscal rules introduced by the 1992 Treaty establishing a medium-term objective of a budgetary position "close to balance or in surplus". We cannot test for a structural break related to the Stability and Growth Pact given the smaller number of observations after 1997.

We find no evidence that the asymmetry index is different before 1992 and after 1992, but we do find a break in 1992 concerning the reaction of the balance to debt. The negative coefficient of lagged debt becomes much larger and statistically significant at the 1 percent level after 1992 (it goes from less than -0.01 to more than -0.034), consistent with the notion that Maastricht fiscal rules increased the relevance of the debt level in determining fiscal adjustment.[14]

Overall these results confirm those in Balassone and Francese (2004; Table 2, Column H).

3.2 The primary balance

The specification used for the primary balance equation is the one indicated in (9b). Therefore, lagged interest spending and the variation in interest expenditure are included among regressors. As with the overall balance, also with the primary balance we follow a general-to-specific approach when testing for the 1992 break. Similarly to the overall balance equation, the 1992 dummy turns out to be significant only when interacted with the debt and the intercept term (Table 3, Columns A and B).

We find that interest spending is a significant explanatory variable in levels, though not in changes, regardless of the estimation method (Table 3). This confirms the discussion in Section 2.1 that an estimating equation for the primary balance should not be derived by simple analogy with the equation for the overall balance.

We find evidence of cyclical asymmetry also for the primary balance. The elasticity to negative output gap is again large (about -0.41) and statistically different from zero at the 1 percent confidence level. The elasticity to positive gaps, instead, is smaller (less than -0.17) and statistically

[14] Our results are in line with evidence suggesting that fiscal rules can be effective in promoting fiscal discipline (on this issue see Kopits and Symansky, 1998). Numerous empirical studies suggest that this is the case for the balanced-budget provisions in the USA (see the references in Balassone, Franco and Zotteri, 2007) and in Swiss cantons (Feld and Kirchgässner, 2005). Concerning specifically the Maastricht deficit and debt limits, evidence concerning their positive impact on fiscal performance is provided, for instance, by von Hagen, Hughes-Hallett, and Strauch (2000). Concerning the effect of fiscal rules on the cyclicality of fiscal policy, our results (in line with Galì and Perotti, 2003) do not support a popular view in the recent policy debate according to which EU fiscal rules have reduced the ability of governments to conduct stabilisation policy. The argument is that during economic expansions, thanks to buoyant revenue, it may be easy to comply with nominal deficit limits even while increasing outlays and this in turn may require the adoption of contractionary fiscal policy during downturns (see the references in Von Hagen, 2002, and Galì and Perotti, 2003). Similar concerns have also been voiced with reference to balanced-budget provisions in the USA, where there is evidence that the majority of States appears to fail accumulating sufficient reserves during good times, resulting in procyclical policy in downturns to comply with balanced-budget rules (Sobel and Randall, 1996; Levinson, 1998; and Lav and Berube, 1999).

significant only at lower confidence levels (5 and 10 percent for AB and FE, respectively). The asymmetry index is about 0.25, lower than the one for the overall balance, reflecting the non-zero estimate for the coefficient of positive output gaps. The asymmetry index is statistically different from zero at the 1 percent significance level when the equation is estimated using AB.

Using equation (10) we compute the long-run levels of overall balance (b^*) and debt (d^*) consistent with estimates in Table 3 (Column B). Given the break in 1992, we compute two sets of long-run values: one based on the dynamics characterising the period before 1992 and the other for the period beginning in 1992. For the euro-area average, the long-run deficit and debt levels decrease from 2.8 and 56.8 percent of GDP to, respectively, 2.6 and 52.3 percent respectively (Table 4). This result reflects large reductions in long-run deficit and debt levels in countries that were characterised by long-run deficits and debts higher than, respectively, 3 and 60 per cent of GDP before 1992 (Belgium, Greece, Italy and Portugal).

3.3 Expenditure and revenue

As a first step to analyze the source of cyclical asymmetry "within the budget" based on (12), we estimate two equations separating the primary balance into its expenditure and revenue components. In order to preserve comparability of results with those obtained for the primary balance as a whole, the equations are specified in the same way as the primary balance equation in Table 3, Columns B and C.

Results highlight that most of the cyclical asymmetry detected in the primary balance comes from the expenditure side of the budget (Table 5, columns A and B). The elasticity of revenue to both positive and negative output gaps is not significantly different from zero. On the contrary, primary expenditure have a cyclical behaviour similar to the primary balance (even though the asymmetry index is not statistically different from zero). In fact, the estimated coefficient for positive output gaps is not statistically different from zero (though the point estimate, -0.16, is not negligible), while we find a large (almost -0.6) elasticity to negative output gaps, which is also significantly different from zero at the 1 percent confidence level. Taking the difference of the two equations we get results very close to those obtained from direct estimation of the primary balance equation (Table 3, Columns C).

To further investigate the role played by expenditure in determining fiscal asymmetry over the cycle, we break primary expenditure into three components: transfers in cash, wages, and other primary expenditures. Results, reported in Table 6, suggest that most of the cyclical asymmetry comes from transfers in cash. Wages and other primary expenditure behave like revenues: they do not significantly react to either positive or negative gaps. On the contrary, the elasticity of transfers in cash to negative output gaps is large (-0.28) and different from zero at the 5 percent confidence level, while their elasticity to positive output gaps is small (-0.06) and not significantly different form zero (however, the asymmetry index is again not significant). Summing up the three expenditure equations and subtracting the revenue equation we once again get results close to those from direct estimation of the equation for the primary balance (Table 6, Column E).

To check the robustness of these results, we also estimate our equations as a system, by the seemingly unrelated regression method. More specifically, we first estimate a system of two equations (one for revenue, the other for primary expenditure) and then a system of four equations (revenue, transfers in cash, wages and other primary expenditure). In both cases, results are in line with those presented above: asymmetry comes from the expenditure side of the budget and it mainly reflects the behaviour of transfers in cash (Tables 7 and 8).

4. The effects of cyclical asymmetry

To assess the magnitude of the impact of cyclical asymmetry on debt accumulation we compare two simulations of debt dynamics for each country: one based on the asymmetric values of the ηs estimated from the primary balance equation in Table 3 (Column B); the other assuming symmetry.

Symmetric fiscal reactions over the cycle require $\eta^P = \eta^N = c$, with c a given constant. In our simulations we assume that $\eta^P = \eta^N = 0$, i.e. fiscal variables do not react to cyclical developments. Setting *c=0* allows to shield the results from the influence of the particular cyclical position of each country in the final year considered in the simulation.[15] The simulation exercise also assumes that all other coefficients are invariant to the value of the ηs.

Both simulations are computed recursively based on the following equation:

$$d_t = (1 + \rho_t) d_{t-1} + p_t + s_t \qquad (15)$$

[15] We run simulations assuming other plausible values for *c* (ranging between -1 and +1): asymmetry always determines excess debt accumulation and is positively correlated with the size of the budget elasticity to the output gap.

where p_t is the primary balance simulated on the basis of coefficients in Table 3 (column B) and ρ_t and s_t are actual values of average debt cost and stock-flow adjustment recorded in each year.[16] In this way, for each of the two scenarios, we end up with a predicted value of debt in the final year (i.e. in 2004).

Table 9 reports the debt variation actually observed in the sample (first column) and the accumulation due to cyclical asymmetry in fiscal variables (second column), measured as the difference between debt accumulation in the two simulations based on asymmetric and symmetric ηs as described above. For EU countries, on average, debt accumulation due to asymmetric fiscal policy amounts to about one third of debt variation observed over the simulation period (one fourth for the euro area). The impact is relevant in all countries.

The impact of cyclical asymmetry in fiscal variables can also be gauged by estimating by how much the average deficit is inflated by asymmetry compared to a baseline where the cyclicality of fiscal variables is symmetric. The third column in Table 9 summarizes the results of such an exercise: over the period considered the average balance, both in the euro area and in the EU, is estimated to have been almost 0.3 percentage points of GDP worse every year because of cyclical asymmetry.

5. Conclusions

This paper set out to verify the presence of asymmetry in the reaction of fiscal balances to positive and negative cyclical conditions and identify which budgetary items account for it. To this end, we derived estimating equations for the primary balance and for selected budget components from a modified version of the stylised framework developed in Balassone and Francese (2004). The framework was put to test on a sample of fourteen EU member states over 1970-2004.

We found significant cyclical asymmetry in fiscal variables. The primary balance deteriorates in bad times without a corresponding offsetting improvement in good times: the elasticity to negative and positive output gaps is estimated at -0.41 and -0.17, respectively. Unless – contrary to what is usually assumed – automatic stabilizers are not symmetric, this asymmetry must come from discretionary policy. In this case, and provided our regressions control satisfactorily for other

[16] The stock-flow adjustment includes the impact of nominal GDP growth on the debt-to-GDP ratio, as well as differences between the change in debt and the deficit arising within the Maastricht statistical framework (these are due to different accounting criteria, valuation effects and transactions coverage).

factors affecting fiscal balances, discretionary policy would appear to be offsetting a significant share of the working of automatic stabilizers.[17]

Numerical simulations show that, over the period considered, cyclical asymmetry inflated average deficit levels and contributed significantly to debt accumulation. The average primary balance of EU countries over 1970-2004 is estimated to have been 0.3 percent of GDP worse in each year than it would have been under symmetry. This accounts for about one third of debt accumulation observed over the same period.

We find no evidence that European deficit and debt rules affected the cyclical behaviour of fiscal variables. However, the introduction of such rules is found to be correlated with a sizeable reduction in long-term deficit and debt levels for countries with significant imbalances before 1992.

Our estimates suggest that cyclical asymmetry comes from the expenditure side of the budget, mostly reflecting the behaviour of transfers in cash. This is a composite spending category. It includes rigid components, not expected to react to cyclical conditions, such as pensions. But it also includes spending programs specifically designed to react to the economic cycle, such as unemployment benefits. Finally, it includes items which can be manoeuvred discretionally, though to different extents. It may be the case that this discretionary spending increases in bad times to provide shelter against recessions, but the new outlays become entrenched thereafter and therefore are not reduced with the following expansion. Alternatively, it may be the case that discretionary spending substitutes for automatic stabilizers as cyclical conditions switch from negative to positive. Finally, the possibility that automatic stabilizers themselves are not symmetric could be explored. Whether asymmetry arises out of political economy reasons, genuine mistakes in assessing cyclical conditions or because of, say, unemployment persistence is open to debate.[18]

---

[17] Estimates by international organisations of automatic budgetary elasticity to the cycle average about 0.5 for EU countries. See Bouthevillain *et al.* (2001).

[18] A variety of economic, financial and political economy factors can lead to fiscal policy being procyclical and asymmetric. According to one view, the roots of procyclicality lie in policy discretion and in the importance of competing electoral constituencies. A key argument is that constituencies and lobbies compete for their share of public resources, and a "common pool" problem arises. Since budgetary competition increases in good times, spending grows more than proportionally relative to the increase in revenue (Lane and Tornell, 1999). Another explanation of procyclicality stems from the premise that, while the government has the means to engage in countercyclical policy, it ends up not doing so due to an inaccurate assessment of the economic cycle. Indeed, analyses of the cyclicality of fiscal policy based on real-time macroeconomic data usually do not find strong evidence of cyclical asymmetry (see, e.g., Golinelli and Momigliano, 2006). However, difficulties in assessing macroeconomic conditions cannot explain why procyclicality tends to be asymmetric. Moreover, the evidence of systematic bias towards optimism in official forecasts of output growth is at odds with the notion that overspending in good times arises from inadequate information about the state of the cycle (Danninger *et al.*, 2004).

Whatever the sources of cyclical asymmetry, our results lend some support to the introduction of expenditure rules. Committing to a predetermined rate of growth of expenditure can reduce the risk of procyclical spending in good times while leaving the automatic stabilizers on the revenue side free to operate. An expenditure rule of this type can be relatively easily disseminated to the public and monitored, provided that the control aggregates are clearly specified.[19] Expenditure targeting – whether formally incorporated in a rule or not – has been playing a role in the fiscal framework of an increasing number of countries.[20]

It is important to ensure that the procyclical bias is not transferred to the revenue side of the budget and that there is a long-term anchor to fiscal policy. During boom periods for instance, governments might be tempted to cut taxes or increase tax expenditures, even while sticking to expenditure rules (this occurred for instance in a number of EU countries over 1999-2001). This suggests that expenditure ceilings cannot be set in isolation from provisions regarding revenue policy. More generally, expenditure targeting *per se* does not correct a structural tendency towards excessive deficits. A constant rate of growth of expenditure can be consistent with a gradual deterioration of the fiscal balance if revenues do not keep the same pace as expenditure. An anchor in terms of budget balance is therefore essential.

[19] A variety of issues arise in the implementation of expenditure rules. These include the choice of the expenditure aggregate to be targeted (items included, institutional coverage, level of disaggregation), the time horizon, the underlying macroeconomic assumptions and the valuation criteria. See, for instance, the discussion in Kumar and Ter-Minassian (2007) and the references therein.

[20] Expenditure rules are used, among others, in Finland, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States.

References

Alesina A. Macroeconomic Policy in a Two-Party System as a Repeated Game. Quarterly Journal of Economics, 1987; 102; 651-78.

Artis M, Marcellino M. Fiscal Solvency and Fiscal Forecasting in Europe. CEPR Discussion Papers; 1998; 1836.

Balassone F, Franco D, Zotteri S. Rainy Day Funds: Can They Make a Difference in Europe? Banca d'Italia, Occasional Paper 2007:11.

Balassone F, Francese M. Cyclical Asymmetry in Fiscal Policy, Debt Accumulation and the Treaty of Maastricht. Banca d'Italia Temi di Discussione 2004.

Ballabriga F, Martinez-Mongay C. Has EMU Shifted Policy?. European Commission, Directorate General for Economic and Financial Affairs, Economic Papers 2002; 166.

Blanchard O, Chouraqui JQ, Hagemann RP, Sartor N. The Sustainability of Fiscal Policy: New Answers to an Old Question. OECD Economic Studies 1990; 15; 7-36.

Bohn H. The Behaviour of US Public Debt and Deficits. Quarterly Journal of Economics1998; 113; 949-63.

Bouthevillain C, P Cour-Thimann, G Van den Dool, P Hernandez de Cos, G Langenus, M Mohr, S Momigliano and Tujula M., "Cyclically Adjusted Budget Balances: an Alternative Approach" 2001; ECB Working Paper; 77.

Buti M, Sapir A. Economic Policy in EMU: a Study by the European Commission Services. Clarendon Press: Oxford; 1998.

Buti M, D Franco, Ongena H., Fiscal Discipline and Flexibility in EMU: the Implementation of the Stability and Growth Pact. Oxford Review of Economic Policy 1998; 14; 81-97.

Danninger S, M Cangiano, Kyobe A. The Political Economy of Revenue-Forecasting Experience from Low Income Countries. IMF Working Paper 2004; 05/02.

Feld PL, Kirchgässner G. On the Effectiveness of Debt Brakes: The Swiss Experience. Paper presented at the Annual Meeting of the European Public Choice Society, Durham, England; 2005.

Galì J, Perotti R. Fiscal Policy and Monetary Integration in Europe. Economic Policy 2003; 37; 535-72.

Gavin M, Perotti R. 1997. Fiscal Policy in Latin America. In: NBER Macroeconomics Annual. MIT Press: Cambridge, Massachusetts; 1997. p. 11-61.

Golinelli R, Momigliano S. Real-time determinants of fiscal policies in the euro area, Journal of Policy Modelling 2006; 28; 943-964.

_____ The cyclical response of fiscal policies in the Euro area. Why results of empirical research differ so strongly?; mimeo 2007.

Hercowitz Z, Strawczynski M. Cyclical Ratcheting in Government Spending: Evidence from the OECD. Review of Economics and Statistics 2004; 86; 353-361.

Kaminsky GL, C Reinhart, Végh C. When it Rains, it Pours: Procyclical Capital Flows and Macroeconomic Policies, NBER Working Paper 2004; 10780.

Kopits G, Symansky S. Fiscal Policy Rules. IMF Occasional Paper 1998: 162. Washington: International Monetary Fund.

Kumar M, Ter-Minassian T. (eds.) Promoting Fiscal Discipline 2007. Washington: International Monetary Fund

Lane A, Tornell P. The Voracity Effect. The American Economic Review 1999; 89; 22-46.

Larch M, Salto M. Fiscal Rules, Inertia and Discretionary Fiscal Policy, European Commission, Directorate General for Economic and Financial Affairs Economic Papers 2003; 194.

Lav IJ, Berube A. When It Rains It Pours, Center on Budget and Policy Priorities Report: 1999.

Levinson A. Balanced Budgets and Business Cycle: Evidence from the States. National Tax Journal: 1998: 51: 715-732.

Orphanides A. Monetary Policy Rules Based on Real-Time Data, American Economic Review 2001; 91; 964-85.

Nordhaus WD. The Political Business Cycle, Review of Economic Studies 1975; 130; 169-90.

Sobel RS, Randall H. The Impact of State Rainy Day Funds in Easing State Fiscal Crises During the 1990-1991 Recession. Public Budgeting & Finance. 1996: Fall, 28-48.

Talvi E, Végh C. Tax Base Variability and Procyclicality of Fiscal Policy NBER Working Paper 2000; 7499.

von Hagen J. More Growth for Stability – Reflections on Fiscal Policy in Euroland. Mimeo:2002.

von Hagen J, A Hughes-Hallett, Strauch R. Budgetary Consolidation in EMU. European Economy: Reports and Studies 2000:148. Brussels: European Commission.

Tables and figures

Table 1a - Descriptive Statistics: main fiscal variables

(as a percentage of GDP; average values over the indicated period)

		Debt				Overall balance (1)				Primary balance (1)				Primary expenditure				Revenue			
		1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004
Belgium	1970-2004	63.0	114.7	128.9	103.6	4.8	10.7	4.6	-0.3	0.6	0.8	-5.0	-6.1	43.9	49.0	43.4	44.0	43.2	48.2	48.4	50.1
Germany	1970-2004	22.6	38.9	52.2	63.9	1.7	2.0	2.6	2.7	0.4	-0.7	-0.7	-0.5	42.2	43.6	45.1	44.3	41.8	44.2	45.8	44.8
Greece	1988-2004	21.3	48.5	102.6	111.4		12.6	9.4	4.6		5.2	-1.7	-1.7		37.3	38.1	43.2		32.1	40.4	45.1
Spain	1970-2004	13.5	34.3	58.1	52.1	0.2	4.4	4.4	0.2	-0.1	2.3	-0.0	-2.4	23.9	35.9	39.2	37.5	24.0	33.8	39.2	39.9
France	1979-2004	20.8	28.6	49.3	62.2	0.1	2.3	3.7	2.9	-1.2	-0.1	0.3	-0.1	44.0	48.7	50.4	50.8	44.3	48.8	50.1	50.9
Ireland	1985-2004	55.1	96.2	79.0	32.6		7.5	0.9	-0.8		-1.5	-4.6	-2.1		41.2	35.6	32.6		42.7	40.1	34.7
Italy	1980-2004	52.5	77.7	115.0	107.7		11.0	7.6	2.9		3.2	-3.1	-2.7		41.5	42.8	42.8		38.2	45.9	45.4
Netherlands	1975-2004	41.2	64.9	73.9	55.3	1.4	4.8	2.6	1.3	-1.6	-0.8	-3.1	-1.8	45.6	52.1	46.2	44.6	47.2	52.8	49.3	46.4
Austria	1976-2004	23.5	48.1	62.2	64.8	2.7	3.2	3.2	1.1	0.8	-0.2	-0.6	-2.1	48.2	50.5	50.3	47.0	47.4	50.6	51.0	49.0
Portugal	1977-2004	25.1	51.5	59.0	60.6	5.7	6.6	5.5	3.6	3.6	0.8	-0.8	0.6	30.3	33.0	38.9	43.7	26.7	32.2	39.8	43.1
Finland	1975-2004	8.9	15.2	45.5	44.2	-5.4	-3.8	1.8	-3.5	-6.1	-5.3	-1.5	-5.6	39.9	43.7	54.3	47.8	46.0	49.0	55.9	53.4
Denmark	1971-2004	14.7	65.0	68.3	44.8	-2.0	2.1	0.9	-2.2	-3.6	-5.2	-5.1	-4.9	43.6	49.4	52.6	51.8	47.2	54.6	57.6	56.7
Sweden	1970-2004	28.0	53.9	64.9	51.8	-2.5	1.6	3.1	-1.5	-4.6	-4.6	-2.5	-4.1	46.8	54.4	58.6	54.7	51.1	59.0	61.2	58.8
United Kingdom	1970-2004	64.5	49.8	44.9	40.7	2.5	2.3	3.7	1.4	-1.6	2.3	3.7	1.4	40.6	40.9	39.9	39.9	42.2	43.3	39.5	40.8
Euro-area countries (2)		31.6	56.2	75.1	69.0	1.4	5.6	4.2	1.3	-0.5	0.3	-1.9	-2.2	39.7	43.3	44.0	43.5	40.1	43.0	46.0	45.7
EU countries (2)		32.5	56.2	71.7	64.0	0.9	4.8	3.9	0.9	-1.2	-0.3	-1.8	-2.3	40.8	44.4	45.4	44.6	41.9	45.0	47.4	47.1

(1) Positive values indicate deficits; negative values indicate supluses. - (2) Unweighted average.

Table 1b - Descriptive Statistics: primary expenditure composition
(percentage on primary expenditure; average values over the indicated period)

		Transfers in cash				Wages				Other Primary Expenditure			
		1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004	1970 1979	1980 1989	1990 1999	2000 2004
Belgium	1970-2004	32.6	36.7	38.0	35.8	26.0	26.0	26.9	26.8	41.4	37.3	35.1	37.4
Germany	1970-2004	36.1	37.0	39.1	43.2	23.9	21.8	19.6	17.6	40.0	41.2	41.3	39.1
Greece	1988-2004		39.1	39.5	42.1		31.1	29.7	28.0		29.8	30.8	29.9
Spain	1970-2004	34.4	36.9	36.3	32.6	31.3	27.8	28.5	27.6	34.3	35.3	35.2	39.8
France	1979-2004	34.1	34.9	36.0	35.8	28.7	27.4	26.6	26.8	37.0	37.7	37.4	37.4
Ireland	1985-2004		34.0	32.2	27.3		26.5	28.3	26.1		39.5	39.4	46.6
Italy	1980-2004		35.4	39.0	40.0		28.4	27.4	25.4		36.3	33.6	34.6
Netherlands	1975-2004	34.0	36.3	34.1	26.6	29.9	24.7	23.1	23.5	36.0	39.0	42.8	49.8
Austria	1976-2004	33.7	35.3	36.8	39.3	23.9	24.0	23.6	20.4	42.5	40.7	39.6	40.3
Portugal	1977-2004	21.4	26.6	28.8	32.2	31.3	31.2	34.8	34.0	47.4	42.2	36.3	33.7
Finland	1975-2004	27.4	30.1	37.4	34.9	32.2	32.1	28.6	28.5	40.3	37.8	33.9	36.6
Denmark	1971-2004	29.0	33.5	36.4	34.0	37.0	36.7	33.4	33.9	33.9	29.8	30.2	32.1
Sweden	1970-2004	30.1	33.5	34.5	32.4	35.4	34.1	29.6	29.6	34.6	32.4	36.0	38.0
United Kingdom	1970-2004	24.7	32.9	36.4	33.7	30.6	30.7	27.5	26.1	44.7	36.4	36.1	40.2
Euro-area countries (1)		31.7	34.8	36.1	35.4	28.4	27.4	27.0	25.9	39.9	37.9	36.9	38.7
EU countries (1)		30.7	34.4	36.0	35.0	30.0	28.8	27.7	26.7	39.3	36.8	36.3	38.3

(1) Unweighted average.

Table 2 - Fiscal Reaction Functions for the Overall Balance (1)

		A - 4 with ten-years dummy variables	B - 4 with ten-years dummy variables	C - 4	D - 4	E - 4 with dummy92 all variables	F - 4 with dummy92 constant and debt	G - 4 with dummy92 constant and debt	H - BF (2004) (2)
		Fixed effect	Arellano bond	Fixed effect	Arellano bond	Fixed effect	Fixed effect	Arellano bond	Arellano bond
a	Constant	1.597 *** (0.318)	-0.158 *** (0.027)	1.623 *** (0.305)	0.005 (0.017)	1.113 *** (0.318)	1.077 *** (0.311)	-0.006 (0.021)	0.026 (0.016)
a1	Dummy for 1992					1.900 *** (0.477)	1.757 *** (0.457)	1.889 *** (0.639)	
b	Lagged Dependent Variable	0.822 *** (0.033)	0.810 *** (0.028)	0.820 *** (0.029)	0.825 *** (0.033)	0.725 *** (0.045)	0.744 *** (0.032)	0.746 *** (0.036)	0.841 *** (0.028)
b1	Lagged Dependent Variable after 1992					0.018 (0.054)			
c	Lagged Debt	-0.032 *** (0.007)	-0.027 *** (0.009)	-0.024 *** (0.005)	-0.029 *** (0.008)	-0.005 (0.006)	-0.006 (0.006)	-0.009 (0.009)	-0.013 ** (-0.006)
c1	Lagged Debt after 1992					-0.037 *** (0.007)	-0.034 *** (0.007)	-0.034 *** (0.009)	-0.029 *** (0.006)
d	Positive Output Gap	-0.034 (0.097)	-0.131 * (0.071)	-0.033 (0.094)	-0.040 (0.088)	-0.064 (0.108)	-0.081 (0.095)	-0.085 (0.091)	-0.129 (0.791)
d1	Positive Output Gap after 1992					-0.195 (0.210)			
e	Negative Output Gap	-0.458 *** (0.099)	-0.391 *** (0.082)	-0.458 *** (0.099)	-0.457 *** (0.086)	-0.439 *** (0.130)	-0.522 *** (0.099)	-0.511 *** (0.076)	-0.416 *** (0.081)
e1	Negative Output Gap after 1992					-0.143 (0.181)			
f1	Dummy 1980-89	0.426 (0.285)	1.690 *** (0.320)						
f2	Dummy 1990-99	0.735 ** (0.353)	3.463 *** (0.459)						
f3	Dummy 2000-04	0.653 * (0.355)	4.520 *** (0.492)						
g	asymmetry index ϕ=d-e	0.424 ** (0.168)	0.260 *** (0.086)	0.425 ** (0.165)	0.417 *** (0.095)	0.375 * (0.207)	0.440 *** (0.165)	0.426 *** (0.088)	0.287 *** (0.032)
	test joint significance of dummy variables	1.560 (0.199)	94.640 *** (0.000)						
	test dummy 1990-99=dummy 2000-04	0.082 (0,262)							
	Sargan test		426.83 (0.971)		462.03 (0.757)			463.71 (0.739)	445.52 (0.653)
	2nd order autocorrelation		-0.26 (0.795)		-0.23 (0.819)			-0.31 (0.757)	-1.11 (0.269)
	nr. of observations	400	386	400	386	400	400	386	391
	test if cyclical asymmetry is different before and after 1992					0.322 (0.270)			

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

(2) Sample countries: same as in footnote (1). Period: 1970-2000.

Table 3 - Fiscal Reaction Functions for the Primary Balance (1)

	A - 9 with dummy92 all variables	B - 9 with dummy92 constant and debt	C - 9 with dummy92 constant and debt
	Fixed effect	Fixed effect	Arellano bond
a Constant	0.688 **	0.722 **	-0.001
	(0.289)	(0.283)	(0.020)
a1 Dummy for 1992	1.939 ***	1.696 ***	1.718 ***
	(0.453)	(0.428)	(0.439)
b Lagged Dependent Variable	0.622 ***	0.632 ***	0.636 ***
	(0.445)	(0.036)	(0.021)
b1 Lagged Dependent Variable after 1992	-0.043		
	(0.059)		
c Lagged Debt	0.004	-0.008	-0.011
	(0.012)	(0.008)	(0.012)
c1 Lagged Debt after 1992	-0.045 ***	-0.027 ***	-0.027 ***
	(0.013)	(0.006)	(0.007)
d Change in Interest Exp.	0.295	0.243	0.229
	(0.261)	(0.196)	(0.218)
d1 Change in Interest Exp. after 1992	-0.131		
	(0.395)		
e Lagged Interest Exp.	-0.334 ***	-0.216 ***	-0.203 **
	(0.114)	(0.074)	(0.092)
e1 Lagged Interest Exp. after 1992	0.152		
	(0.130)		
f Positive Output Gap	-0.115	-0.158 *	-0.168 **
	(0.095)	(0.089)	(0.070)
f1 Positive Output Gap after 1992	-0.347 *		
	(0.197)		
g Negative Output Gap	-0.298 **	-0.416 ***	-0.406 ***
	(0.143)	(0.103)	(0.075)
g1 Negative Output Gap after 1992	-0.203		
	(0.189)		
h asymmetry index ϕ=f-g	0.183	0.258	0.238 ***
	(0.212)	(0.167)	(0.088)
Sargan test			460.13 (0.776)
2nd order autocorrelation			0.22 (0.825)
nr. of observations	400	400	386
test if cyclical asymmetry is different before and after 1992	0.040		
	(0.269)		

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

Table 4 - Deficit and Debt long-run levels (1)
(as a percentage of GDP)

	Overall balance		diff.	Debt		diff.
	before 1992	after 1992		before 1992	after 1992	
Belgium	5.9	3.7	-2.2	117.2	73.6	-43.6
Germany	1.5	2.1	0.7	29.1	42.6	13.5
Greece	8.5	4.6	-3.9	169.4	92.0	-77.4
Spain	1.8	2.3	0.4	36.7	45.3	8.6
France	1.9	2.3	0.4	38.5	45.9	7.4
Ireland	0.5	1.8	1.3	10.3	35.9	25.7
Italy	7.7	4.3	-3.4	154.7	86.8	-67.9
Netherlands	2.1	2.3	0.3	41.1	46.8	5.7
Austria	1.8	2.2	0.5	35.9	45.0	9.1
Portugal	3.5	2.8	-0.6	69.1	56.7	-12.4
Finland	-3.8	0.3	4.1	-76.5	5.4	81.9
Denmark	-1.2	1.2	2.4	-23.2	24.2	47.4
Sweden	-0.6	1.4	2.0	-11.5	28.3	39.8
United Kingdom	1.7	2.2	0.5	33.3	44.0	10.8
Euro-area countries (2)	2.8	2.6	-0.2	56.8	52.3	-4.5
EU countries (2)	2.2	2.4	0.2	44.6	48.0	3.5

(1) Computed using the estimated coefficients in Table 3 (Column B) and setting the long-run growth rate at 4 per cent and the interest rate on government debt at 5 per cent.
(2) Unweighted average.

Table 5 - Fiscal Reaction Functions for Primary Expenditure, Revenue and the Primary Balance (1)

		A - 12, Primary expenditure	B - 12, Revenue	C - Implied Primary balance fiscal reaction from (A) and (B)
		Fixed effect	Fixed effect	
a	Constant	38.487 ***	37.801 ***	0.685
		(0.699)	(0.621)	
a1	Dummy for 1992	4.459 ***	2.706 ***	1.753
		(0.828)	(0.776)	
b	Lagged Primary Balance	0.542 ***	-0.087	0.629
		(0.076)	(0.067)	
c	Lagged Debt	0.115	0.123 ***	-0.008
		(0.017)	(0.016)	
c1	Lagged Debt after 1992	-0.054 ***	-0.027 **	-0.028
		(0.013)	(0.013)	
d	Change in Interest Exp.	0.210	-0.103	0.314
		(0.363)	(0.283)	
e	Lagged Interest Exp.	-0.089	0.124	-0.213
		(0.142)	(0.132)	
f	Positive Output Gap	-0.162	-0.013	-0.149
		(0.196)	(0.174)	
g	Negative Output Gap	-0.589 ***	-0.183	-0.406
		(0.222)	(0.185)	
h	asymmetry index ϕ=f-g	0.427	0.170	0.257
		(0.355)	(0.299)	
	nr. of observations	400	400	

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

Table 6 - Fiscal Reaction Functions for the Primary Expenditure Components, Revenue and the Primary Balance (1)

		A - 12, Transfers in cash	B - 12, Wages	C - 12, Other primary expenditure	D - 12, Revenue	E - Implied Primary balance fiscal reaction from (A), (B), (C) and (D)
		Fixed effect	Fixed effect	Fixed effect	Fixed effect	
a	Constant	11.540	11.780 ***	15.166 ***	37.801 ***	0.685
		(0.355)	(0.235)	(0.326)	(0.621)	
a1	Dummy for 1992	2.337 ***	-0.170	2.293 ***	2.706 ***	1.753
		(0.446)	(0.314)	(0.393)	(0.776)	
b	Lagged Primary Balance	0.257 ***	0.093 ***	0.193 ***	-0.087	0.629
		(0.043)	(0.029)	(0.041)	(0.067)	
c	Lagged Debt	0.056 ***	0.011 *	0.048 ***	0.123 ***	-0.008
		(0.011)	(0.006)	(0.009)	(0.016)	
c1	Lagged Debt after 1992	-0.022 ***	-0.002	-0.030 ***	-0.027 **	-0.028
		(0.006)	(0.004)	(0.006)	(0.013)	
d	Change in Interest Exp.	-0.074	0.141	0.144	-0.103	0.314
		(0.171)	(0.127)	(0.166)	(0.283)	
e	Lagged Interest Exp.	0.106	0.077	-0.272 ***	0.124	-0.213
		(0.089)	(0.057)	(0.065)	(0.132)	
f	Positive Output Gap	-0.058	-0.036	-0.068	-0.013	-0.149
		(0.102)	(0.063)	(0.088)	(0.174)	
g	Negative Output Gap	-0.284 **	-0.146	-0.158 *	-0.183	-0.406
		(0.115)	(0.090)	(0.095)	(0.185)	
h	asymmetry index ϕ=f-g	0.227	0.110	0.090	0.170	0.257
		(0.188)	(0.126)	(0.161)	(0.299)	
	nr. of observations	400	400	400	400	

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Robust standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden. Period: 1970-2004.

Table 7 - Fiscal Reaction Functions for Primary Expenditure, Revenue (SUR estimation) and the Primary Balance (1)

	A - 12, Primary expenditure	B - 12, Revenue	C - Implied Primary balance fiscal reaction from (A) and (B)
a Constant	35.522 ***	33.577 ***	1.945
	(1.119)	(1.000)	
a1 Dummy for 1992	2.352 ***	0.875	1.477
	(0.903)	(0.807)	
b Lagged Primary Balance	0.639 ***	-0.028	0.667
	(0.072)	(0.064)	
c Lagged Debt	0.122 ***	0.124 ***	-0.002
	(0.019)	(0.017)	
c1 Lagged Debt after 1992	0.001	0.008	-0.007
	(0.007)	(0.006)	
d Change in Interest Exp.	0.077	-0.145	0.223
	(0.354)	(0.317)	
e Lagged Interest Exp.	-0.220	0.073	-0.293
	(0.156)	(0.140)	
f Positive Output Gap	-0.212	-0.035	-0.178
	(0.170)	(0.152)	
g Negative Output Gap	-0.503 ***	-0.125	-0.379
	(0.187)	(0.167)	
h asymmetry index ϕ=f-g	0.291	0.090	0.201
	(0.302)	(0.270)	
nr. of observations	400	400	

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden.

Table 8 - Fiscal Reaction Functions for the Primary Expenditure Components, Revenue (SUR estimation) and the Primary Balance (1)

		A - 12, Transfers in cash	B - 12, Wages	C - 12, Other primary expenditure	D - 12, Revenue	E - Implied Primary balance fiscal reaction from (A), (B), (C) and (D)
a	Constant	10.045 ***	10.463 ***	15.015 ***	33.577 ***	1.945
		(0.603)	(0.403)	(0.526)	(1.000)	
a1	Dummy for 1992	1.078 **	0.756 **	0.518	0.875	1.477
		(0.487)	(0.325)	(0.424)	(0.807)	
b	Lagged Primary Balance	0.308 ***	0.088 ***	0.244 ***	-0.028	0.667
		(0.039)	(0.026)	(0.034)	(0.064)	
c	Lagged Debt	0.059 ***	0.016 **	0.047 ***	0.124 ***	-0.002
		(0.010)	(0.007)	(0.009)	(0.017)	
c1	Lagged Debt after 1992	0.008 **	-0.007 ***	-0.000	0.008	-0.007
		(0.004)	(0.0002)	(0.003)	(0.006)	
d	Change in Interest Exp.	-0.133	0.087	0.124	-0.145	0.223
		(0.191)	(0.128)	(0.166)	(0.317)	
e	Lagged Interest Exp.	0.046	0.038	-0.303 ***	0.073	-0.293
		(0.084)	(0.056)	(0.074)	(0.140)	
f	Positive Output Gap	-0.082	-0.048	-0.083	-0.035	-0.178
		(0.091)	(0.061)	(0.080)	(0.152)	
g	Negative Output Gap	-0.238 **	-0.159 **	-0.107	-0.125	-0.379
		(0.101)	(0.067)	(0.088)	(0.167)	
h	asymmetry index ϕ=f-g	0.156	0.111	0.024	0.090	0.201
		(0.163)	(0.109)	(0.142)	(0.270)	
	nr. of observations	400	400	400		

(1) *,**, ***=signficance at 10, 5 and 1 percent respectively. Standard errors in brackets. Sample countries: Austria, Belgium, Denmark, Finland, France, Greece, Germany, Ireland, Italy, Portugal, Spain, the Netherlands, the United Kingdom, Sweden.

Table 9 - Asymmetry impact on debt accumulation and overall deficit
(as a percentage of GDP)

		Actual debt variation	Debt variation due to asymmetry (1)	Asymmetry impact on average overall deficit (1)
Belgium	1970-2004	31.8	5.8	0.16
Germany	1970-2004	47.8	6.0	0.17
Greece	1988-2004	42.1	3.9	0.23
Spain	1970-2004	33.9	8.5	0.24
France	1979-2004	44.4	6.0	0.23
Ireland	1985-2004	-71.8	9.9	0.49
Italy	1980-2004	47.6	5.1	0.20
Netherlands	1975-2004	14.9	6.0	0.20
Austria	1976-2004	37.5	4.7	0.16
Portugal	1977-2004	33.1	11.0	0.39
Finland	1975-2004	38.5	15.8	0.53
Denmark	1971-2004	29.5	7.1	0.21
Sweden	1970-2004	23.9	9.2	0.26
United Kingdom	1970-2004	-37.1	8.4	0.24
Euro-area countries (2)		27.3	7.5	0.27
EU countries (2)		22.6	7.7	0.27

(1) Computed using the estimated coefficients in Table 3 (Column B).
(2) Unweighted average.

RECENTLY PUBLISHED "TEMI" (*)

N. 643 – *The producer service sector in Italy: Long-term growth and its local determinants*, by Valter Di Giacinto and Giacinto Micucci (September 2007).
N. 644 – *Aggregazioni bancarie e specializzazione nel credito alle PMI: peculiarità per area geografica*, by Enrico Beretta and Silvia Del Prete (November 2007).
N. 645 – *Costs and benefits of creditor concentration: An empirical approach*, by Amanda Carmignani and Massimo Omiccioli (November 2007).
N. 646 – *Does the underground economy hold back financial deepening? Evidence from the Italian credit market*, by Giorgio Gobbi and Roberta Zizza (November 2007).
N. 647 – *Optimal monetary policy under low trend inflation*, by Guido Ascari and Tiziano Ropele (November 2007).
N. 648 – *Indici di bilancio e rendimenti di borsa: un'analisi per le banche italiane*, by Angela Romagnoli (November 2007).
N. 649 – *Bank profitability and taxation,* by Ugo Albertazzi and Leonardo Gambacorta (November 2007).
N. 650 – *Modelling bank lending in the euro area: A non-linear approach,* by Leonardo Gambacorta and Carlotta Rossi (November 2007).
N. 651 – *Revisiting poverty and welfare dominance,* by Gian Maria Tomat (November 2007).
N. 652 – *The general equilibrium effects of fiscal policy: Estimates for the euro area,* by Lorenzo Forni, Libero Monteforte and Luca Sessa (November 2007).
N. 653 – *Securitisation and the bank lending channel,* by Yener Altunbas, Leonardo Gambacorta and David Marqués (November 2007).
N. 654 – *The cyclical response of fiscal policies in the euro area. Why do results of empirical research differ so strongly?*, by Roberto Golinelli and Sandro Momigliano (January 2008).
N. 655 – *What's behind "inflation perceptions"? A survey-based analysis of Italian consumers*, by Paolo Del Giovane, Silvia Fabiani and Roberto Sabbatini (January 2008).
N. 656 – *The effects of fiscal policy in Italy: Evidence from a VAR model*, by Raffaela Giordano, Sandro Momigliano, Stefano Neri and Roberto Perotti (January 2008).
N. 657 – *Excess money growth and inflation dynamics*, by Barbara Roffia and Andrea Zaghini (January 2008).
N. 658 – *R&D and market structure in a horizontal differentiation framework*, by Davide Fantino (January 2008).
N. 659 – *Housing market spillovers: Evidence from an estimated DSGE model*, by Matteo Iacoviello and Stefano Neri (January 2008).
N. 660 – *Real exchange rate volatility and disconnect: An empirical investigation*, by Riccardo Cristadoro, Andrea Gerali, Stefano Neri and Massimiliano Pisani (April 2008).
N. 661 – *The effect of investment tax credit: Evidence from an atypical programme in Italy*, by Raffaello Bronzini, Guido de Blasio, Guido Pellegrini and Alessandro Scognamiglio (April 2008).
N. 662 – *Accounting for sampling design in the SHIW*, by Ivan Faiella (April 2008).
N. 663 – *Delayed privatization*, by Bernardo Bortolotti and Paolo Pinotti (April 2008).
N. 664 – *Portfolio selection with mononotone mean-variance preferences*, by Fabio Maccheroni, Massimo Marinacci, Aldo Rustichini and Marco Taboga (April 2008).
N. 665 – *Directed matching with endogenous Markov probability: Clients or competitors?*, by Emanuela Ciapanna (April 2008).
N. 666 – *What are borders made of? An analysis of barriers to European banking integration*, by Massimiliano Affinito and Matteo Piazza (April 2008).
N. 667 – *Innovation driven sectoral shocks and aggregate city cycles*, by Andrea R. Lamorgese (April 2008).
N. 668 – *On applying synthetic indices of multidimensional well-being: Health and income inequalities in selected EU countries*, by Andrea Brandolini (April 2008).
N. 669 – *Values, inequality and happiness*, by Claudia Biancotti and Giovanni D'Alessio (April 2008).

(*) Requests for copies should be sent to:
Banca d'Italia – Servizio Studi di struttura economica e finanziaria – Divisione Biblioteca e Archivio storico – Via Nazionale, 91 – 00184 Rome – (fax 0039 06 47922059). They are available on the Internet www.bancaditalia.it.

2005

L. DEDOLA and F. LIPPI, *The monetary transmission mechanism: Evidence from the industries of 5 OECD countries,* European Economic Review, 2005, Vol. 49, 6, pp. 1543-1569, **TD No. 389 (December 2000)**.

D. Jr. MARCHETTI and F. NUCCI, *Price stickiness and the contractionary effects of technology shocks*. European Economic Review, Vol. 49, 5, pp. 1137-1164, **TD No. 392 (February 2001)**.

G. CORSETTI, M. PERICOLI and M. SBRACIA, *Some contagion, some interdependence: More pitfalls in tests of financial contagion,* Journal of International Money and Finance, Vol. 24, 8, pp. 1177-1199, **TD No. 408 (June 2001)**.

GUISO L., L. PISTAFERRI and F. SCHIVARDI, *Insurance within the firm*. Journal of Political Economy, Vol. 113, 5, pp. 1054-1087, **TD No. 414** (**August 2001**)

R. CRISTADORO, M. FORNI, L. REICHLIN and G. VERONESE, *A core inflation indicator for the euro area,* Journal of Money, Credit, and Banking, Vol. 37, 3, pp. 539-560, **TD No. 435 (December 2001)**.

F. ALTISSIMO, E. GAIOTTI and A. LOCARNO, *Is money informative? Evidence from a large model used for policy analysis,* Economic & Financial Modelling, Vol. 22, 2, pp. 285-304, **TD No. 445 (July 2002)**.

G. DE BLASIO and S. DI ADDARIO, *Do workers benefit from industrial agglomeration?* Journal of regional Science, Vol. 45, (4), pp. 797-827, **TD No. 453 (October 2002).**

G. DE BLASIO and S. DI ADDARIO, *Salari, imprenditorialità e mobilità nei distretti industriali italiani,* in L. F. Signorini, M. Omiccioli (eds.), *Economie locali e competizione globale: il localismo industriale italiano di fronte a nuove sfide*, Bologna, il Mulino, **TD No. 453 (October 2002).**

R. TORRINI, *Cross-country differences in self-employment rates: The role of institutions*, Labour Economics, Vol. 12, 5, pp. 661-683, **TD No. 459 (December 2002)**.

A. CUKIERMAN and F. LIPPI, *Endogenous monetary policy with unobserved potential output,* Journal of Economic Dynamics and Control, Vol. 29, 11, pp. 1951-1983, **TD No. 493 (June 2004)**.

M. OMICCIOLI, *Il credito commerciale: problemi e teorie,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 494 (June 2004)**.

L. CANNARI, S. CHIRI and M. OMICCIOLI, *Condizioni di pagamento e differenziazione della clientela,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 495 (June 2004)**.

P. FINALDI RUSSO and L. LEVA, *Il debito commerciale in Italia: quanto contano le motivazioni finanziarie?,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 496 (June 2004)**.

A. CARMIGNANI, *Funzionamento della giustizia civile e struttura finanziaria delle imprese: il ruolo del credito commerciale,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 497 (June 2004)**.

G. DE BLASIO, *Credito commerciale e politica monetaria: una verifica basata sull'investimento in scorte,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 498 (June 2004)**.

G. DE BLASIO, *Does trade credit substitute bank credit? Evidence from firm-level data.* Economic notes, Vol. 34, 1, pp. 85-112, **TD No. 498 (June 2004).**

A. DI CESARE, *Estimating expectations of shocks using option prices,* The ICFAI Journal of Derivatives Markets, Vol. 2, 1, pp. 42-53, **TD No**. **506 (July 2004).**

M. BENVENUTI and M. GALLO, *Il ricorso al "factoring" da parte delle imprese italiane,* in L. Cannari, S. Chiri e M. Omiccioli (eds.), *Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia*, Bologna, Il Mulino, **TD No. 518 (October 2004)**.

L. CASOLARO and L. GAMBACORTA, *Redditività bancaria e ciclo economico,* Bancaria, Vol. 61, 3, pp. 19-27, **TD No. 519 (October 2004)**.

F. PANETTA, F. SCHIVARDI and M. SHUM, *Do mergers improve information? Evidence from the loan market,* CEPR Discussion Paper, 4961, **TD No. 521 (October 2004)**.

P. DEL GIOVANE and R. SABBATINI, *La divergenza tra inflazione rilevata e percepita in Italia,* in P. Del Giovane, F. Lippi e R. Sabbatini (eds.), *L'euro e l'inflazione: percezioni, fatti e analisi*, Bologna, Il Mulino, **TD No. 532 (December 2004).**

R. TORRINI, *Quota dei profitti e redditività del capitale in Italia: un tentativo di interpretazione*, Politica economica, Vol. 21, 1, pp. 7-41, **TD No. 551 (June 2005)**.

M. OMICCIOLI, *Il credito commerciale come "collateral"*, in L. Cannari, S. Chiri, M. Omiccioli (eds.), Imprese o intermediari? Aspetti finanziari e commerciali del credito tra imprese in Italia, Bologna, il Mulino, **TD No. 553 (June 2005)**.

L. CASOLARO, L. GAMBACORTA and L. GUISO, *Regulation, formal and informal enforcement and the development of the household loan market. Lessons from Italy,* in Bertola G., Grant C. and Disney R. (eds.) The Economics of Consumer Credit: European Experience and Lessons from the US, Boston, MIT Press, **TD No. 560 (September 2005)**.

S. DI ADDARIO and E. PATACCHINI, *Lavorare in una grande città paga, ma poco*, in Brucchi Luchino (ed.), *Per un'analisi critica del mercato del lavoro*, Bologna , Il Mulino, **TD No. 570 (January 2006)**.

P. ANGELINI and F. LIPPI, *Did inflation really soar after the euro changeover? Indirect evidence from ATM withdrawals,* CEPR Discussion Paper, 4950, **TD No. 581 (March 2006)**.

S. FEDERICO, *Internazionalizzazione produttiva, distretti industriali e investimenti diretti all'estero,* in L. F. Signorini, M. Omiccioli (eds.), *Economie locali e competizione globale: il localismo industriale italiano di fronte a nuove sfide*, Bologna, il Mulino, **TD No. 592 (October 2002).**

S. DI ADDARIO, *Job search in thick markets: Evidence from Italy,* Oxford Discussion Paper 235, Department of Economics Series, **TD No. 605 (December 2006)**.

2006

F. BUSETTI, *Tests of seasonal integration and cointegration in multivariate unobserved component models*, Journal of Applied Econometrics, Vol. 21, 4, pp. 419-438, **TD No. 476 (June 2003).**

C. BIANCOTTI, *A polarization of inequality? The distribution of national Gini coefficients 1970-1996*, Journal of Economic Inequality, Vol. 4, 1, pp. 1-32, **TD No. 487 (March 2004)**.

L. CANNARI and S. CHIRI, *La bilancia dei pagamenti di parte corrente Nord-Sud (1998-2000)*, in L. Cannari, F. Panetta (a cura di), Il sistema finanziario e il Mezzogiorno: squilibri strutturali e divari finanziari, Bari, Cacucci, **TD No. 490 (March 2004).**

M. BOFONDI and G. GOBBI, *Information barriers to entry into credit markets,* Review of Finance, Vol. 10, 1, pp. 39-67, **TD No. 509 (July 2004).**

FUCHS W. and LIPPI F., *Monetary union with voluntary participation,* Review of Economic Studies, Vol. 73, pp. 437-457 **TD No. 512 (July 2004).**

GAIOTTI E. and A. SECCHI, *Is there a cost channel of monetary transmission? An investigation into the pricing behaviour of 2000 firms*, Journal of Money, Credit and Banking, Vol. 38, 8, pp. 2013-2038 **TD No. 525 (December 2004)**.

A. BRANDOLINI, P. CIPOLLONE and E. VIVIANO, *Does the ILO definition capture all unemployment?,* Journal of the European Economic Association, Vol. 4, 1, pp. 153-179, **TD No. 529 (December 2004)**.

A. BRANDOLINI, L. CANNARI, G. D'ALESSIO and I. FAIELLA, *Household wealth distribution in Italy in the 1990s,* in E. N. Wolff (ed.) International Perspectives on Household Wealth, Cheltenham, Edward Elgar, **TD No. 530 (December 2004)**.

P. DEL GIOVANE and R. SABBATINI, *Perceived and measured inflation after the launch of the Euro: Explaining the gap in Italy*, Giornale degli economisti e annali di economia, Vol. 65, 2 , pp. 155-192, **TD No. 532 (December 2004).**

M. CARUSO, *Monetary policy impulses, local output and the transmission mechanism*, Giornale degli economisti e annali di economia, Vol. 65, 1, pp. 1-30, **TD No. 537 (December 2004).**

A. NOBILI, *Assessing the predictive power of financial spreads in the euro area: does parameters instability matter?,* Empirical Economics, Vol. 31, 1, pp. 177-195, **TD No. 544 (February 2005)**.

L. GUISO and M. PAIELLA, *The role of risk aversion in predicting individual behavior, In P. A. Chiappori e C. Gollier (eds.) Competitive Failures in Insurance Markets: Theory and Policy Implications, Monaco, CESifo*, **TD No. 546 (February 2005).**

G. M. TOMAT, *Prices product differentiation and quality measurement: A comparison between hedonic and matched model methods*, Research in Economics, Vol. 60, 1, pp. 54-68, **TD No. 547 (February 2005)**.

F. LOTTI, E. SANTARELLI and M. VIVARELLI, *Gibrat's law in a medium-technology industry: Empirical evidence for Italy*, in E. Santarelli (ed.), Entrepreneurship, Growth, and Innovation: the Dynamics of Firms and Industries, New York, Springer, **TD No. 555 (June 2005).**

F. BUSETTI, S. FABIANI and A. HARVEY, *Convergence of prices and rates of inflation*, Oxford Bulletin of Economics and Statistics, Vol. 68, 1, pp. 863-878, **TD No. 575 (February 2006).**

M. CARUSO, *Stock market fluctuations and money demand in Italy, 1913 - 2003*, Economic Notes, Vol. 35, 1, pp. 1-47, **TD No. 576 (February 2006)**.

S. IRANZO, F. SCHIVARDI and E. TOSETTI, *Skill dispersion and productivity: An analysis with matched data*, CEPR Discussion Paper, 5539, **TD No. 577 (February 2006).**

R. BRONZINI and G. DE BLASIO, *Evaluating the impact of investment incentives: The case of Italy's Law 488/92.* Journal of Urban Economics, Vol. 60, 2, pp. 327-349, **TD No. 582 (March 2006).**

R. BRONZINI and G. DE BLASIO, *Una valutazione degli incentivi pubblici agli investimenti,* Rivista Italiana degli Economisti , Vol. 11, 3, pp. 331-362, **TD No. 582 (March 2006).**

A. DI CESARE, *Do market-based indicators anticipate rating agencies? Evidence for international banks*, Economic Notes, Vol. 35, pp. 121-150, **TD No. 593 (May 2006).**

L. DEDOLA and S. NERI, *What does a technology shock do? A VAR analysis with model-based sign restrictions*, Journal of Monetary Economics, Vol. 54, 2, pp. 512-549, **TD No. 607 (December 2006)**.

R. GOLINELLI and S. MOMIGLIANO, *Real-time determinants of fiscal policies in the euro area*, Journal of Policy Modeling, Vol. 28, 9, pp. 943-964, **TD No. 609 (December 2006).**

P. ANGELINI, S. GERLACH, G. GRANDE, A. LEVY, F. PANETTA, R. PERLI,S. RAMASWAMY, M. SCATIGNA and P. YESIN, *The recent behaviour of financial market volatility*, BIS Papers, 29, **QEF No. 2 (August 2006)**.

2007

L. CASOLARO. and G. GOBBI, *Information technology and productivity changes in the banking industry*, Economic Notes, Vol. 36, 1, pp. 43-76, **TD No. 489 (March 2004)**.

M. PAIELLA, *Does wealth affect consumption? Evidence for Italy*, Journal of Macroeconomics, Vol. 29, 1, pp. 189-205, **TD No. 510 (July 2004).**

F. LIPPI. and S. NERI, *Information variables for monetary policy in a small structural model of the euro area*, Journal of Monetary Economics, Vol. 54, 4, pp. 1256-1270, **TD No. 511 (July 2004)**.

A. ANZUINI and A. LEVY, *Monetary policy shocks in the new EU members: A VAR approach*, Applied Economics, Vol. 39, 9, pp. 1147-1161, **TD No. 514 (July 2004)**.

R. BRONZINI, *FDI Inflows, agglomeration and host country firms' size: Evidence from Italy*, Regional Studies, Vol. 41, 7, pp. 963-978, **TD No. 526 (December 2004).**

L. MONTEFORTE, *Aggregation bias in macro models: Does it matter for the euro area?*, Economic Modelling, 24, pp. 236-261, **TD No. 534 (December 2004)**.

A. DALMAZZO and G. DE BLASIO, *Production and consumption externalities of human capital: An empirical study for Italy,* Journal of Population Economics, Vol. 20, 2, pp. 359-382, **TD No. 554 (June 2005).**

M. BUGAMELLI and R. TEDESCHI, *Le strategie di prezzo delle imprese esportatrici italiane,* Politica Economica, v. 3, pp. 321-350, **TD No. 563 (November 2005)**.

L. GAMBACORTA and S. IANNOTTI, *Are there asymmetries in the response of bank interest rates to monetary shocks?,* Applied Economics, v. 39, 19, pp. 2503-2517, **TD No. 566 (November 2005).**

S. DI ADDARIO and E. PATACCHINI, *Wages and the city. Evidence from Italy*, Development Studies Working Papers 231, Centro Studi Luca d'Agliano, **TD No. 570 (January 2006)**.

P. ANGELINI and F. LIPPI, *Did prices really soar after the euro cash changeover? Evidence from ATM withdrawals,* International Journal of Central Banking, Vol. 3, 4, pp. 1-22, **TD No. 581 (March 2006)**.

A. LOCARNO, *Imperfect knowledge, adaptive learning and the bias against activist monetary policies*, International Journal of Central Banking, v. 3, 3, pp. 47-85, **TD No. 590 (May 2006)**.

F. LOTTI and J. MARCUCCI, *Revisiting the empirical evidence on firms' money demand*, Journal of Economics and Business, Vol. 59, 1, pp. 51-73, **TD No. 595 (May 2006)**.

P. CIPOLLONE and A. ROSOLIA, *Social interactions in high school: Lessons from an earthquake*, American Economic Review, Vol. 97, 3, pp. 948-965, **TD No. 596 (September 2006).**

A. BRANDOLINI, *Measurement of income distribution in supranational entities: The case of the European Union*, in S. P. Jenkins e J. Micklewright (eds.), Inequality and Poverty Re-examined, Oxford, Oxford University Press, **TD No. 623 (April 2007).**

M. PAIELLA, *The foregone gains of incomplete portfolios*, Review of Financial Studies, Vol. 20, 5, pp. 1623-1646, **TD No. 625 (April 2007).**

K. BEHRENS, A. R. LAMORGESE, G.I.P. OTTAVIANO and T. TABUCHI, *Changes in transport and non transport costs: local vs. global impacts in a spatial network*, Regional Science and Urban Economics, Vol. 37, 6, pp. 625-648, **TD No. 628 (April 2007).**

G. ASCARI and T. ROPELE, *Optimal monetary policy under low trend inflation*, Journal of Monetary Economics, v. 54, 8, pp. 2568-2583, **TD No. 647 (November 2007).**

R. GIORDANO, S. MOMIGLIANO, S. NERI and R. PEROTTI, *The Effects of Fiscal Policy in Italy: Evidence from a VAR Model*, European Journal of Political Economy, Vol. 23, 3, pp. 707-733, **TD No. 656 (December 2007).**

2008

S. MOMIGLIANO, J. Henry and P. Hernández de Cos, *The impact of government budget on prices: Evidence from macroeconometric models*, Journal of Policy Modelling, v. 30, 1, pp. 123-143 **TD No. 523 (October 2004).**

P. ANGELINI and A. Generale, *On the evolution of firm size distributions*, American Economic Review, v. 98, 1, pp. 426-438, **TD No. 549 (June 2005).**

P. DEL GIOVANE, S. FABIANI and R. SABATINI, *What's behind "inflation perceptions"? A survey-based analysis of Italian consumers, i*n P. Del Giovane e R. Sabbatini (eds.), *The Euro Inflation and Consumers' Perceptions. Lessons from Italy*, Berlin-Heidelberg, Springer, **TD No. 655 (January 2008).**

FORTHCOMING

S. SIVIERO and D. TERLIZZESE, *Macroeconomic forecasting: Debunking a few old wives' tales,* Journal of Business Cycle Measurement and Analysis, **TD No. 395 (February 2001)**.

P. ANGELINI, *Liquidity and announcement effects in the euro area*, Giornale degli economisti e annali di economia, **TD No. 451 (October 2002).**

S. MAGRI, *Italian households' debt: The participation to the debt market and the size of the loan*, Empirical Economics, **TD No. 454 (October 2002)**.

P. ANGELINI, P. DEL GIOVANE, S. SIVIERO and D. TERLIZZESE, *Monetary policy in a monetary union: What role for regional information?*, International Journal of Central Banking, **TD No. 457 (December 2002)**.

L. MONTEFORTE and S. SIVIERO, *The Economic Consequences of Euro Area Modelling Shortcuts*, Applied Economics, **TD No. 458 (December 2002).**

L. GUISO and M. PAIELLA,, *Risk aversion, wealth and background risk*, Journal of the European Economic Association, **TD No. 483 (September 2003).**

G. FERRERO, *Monetary policy, learning and the speed of convergence,* Journal of Economic Dynamics and Control, **TD No. 499 (June 2004).**

F. SCHIVARDI e R. TORRINI, *Identifying the effects of firing restrictions through size-contingent Differences in regulation*, Labour Economics, **TD No. 504 (giugno 2004)**.

C. BIANCOTTI, G. D'ALESSIO and A. NERI, *Measurement errors in the Bank of Italy's survey of household income and wealth*, Review of Income and Wealth, **TD No. 520 (October 2004)**.

D. Jr. MARCHETTI and F. Nucci, *Pricing behavior and the response of hours to productivity shocks*, Journal of Money Credit and Banking, **TD No. 524 (December 2004).**

L. GAMBACORTA, *How do banks set interest rates?,* European Economic Review, **TD No**. **542 (February 2005).**

R. FELICI and M. PAGNINI,, *Distance, bank heterogeneity and entry in local banking markets*, The Journal of Industrial Economics, **TD No. 557 (June 2005).**

M. BUGAMELLI and R. TEDESCHI, *Le strategie di prezzo delle imprese esportatrici italiane*, Politica Economica, **TD No. 563 (November 2005).**

S. DI ADDARIO and E. PATACCHINI, *Wages and the city. Evidence from Italy*, Labour Economics, **TD No. 570 (January 2006)**.

M. BUGAMELLI and A. ROSOLIA, *Produttività e concorrenza estera*, Rivista di politica economica, **TD No. 578 (February 2006).**

PERICOLI M. and M. TABOGA, *Canonical term-structure models with observable factors and the dynamics of bond risk premia,* **TD No. 580 (February 2006).**

E. VIVIANO, *Entry regulations and labour market outcomes. Evidence from the Italian retail trade sector*, Labour Economics, **TD No. 594 (May 2006)**.

S. FEDERICO and G. A. MINERVA, *Outward FDI and local employment growth in Italy,* Review of World Economics, Journal of Money, Credit and Banking, **TD No. 613 (February 2007).**

F. BUSETTI and A. HARVEY, *Testing for trend*, Econometric Theory **TD No. 614 (February 2007).**

V. CESTARI, P. DEL GIOVANE and C. ROSSI-ARNAUD, *Memory for Prices and the Euro Cash Changeover: An Analysis for Cinema Prices in Italy*, In P. Del Giovane e R. Sabbatini (eds.), The Euro Inflation and Consumers' Perceptions. Lessons from Italy, Berlin-Heidelberg, Springer, **TD No. 619 (February 2007).**

B. ROFFIA and A. ZAGHINI, *Excess money growth and inflation dynamics,* International Finance, **TD No. 629 (June 2007)**.

M. DEL GATTO, GIANMARCO I. P. OTTAVIANO and M. PAGNINI, *Openness to trade and industry cost dispersion: Evidence from a panel of Italian firms,* Journal of Regional Science, **TD No. 635 (June 2007)**.

A. CIARLONE, P. PISELLI and G. TREBESCHI, *Emerging Markets' Spreads and Global Financial Conditions*, Journal of International Financial Markets, Institutions & Money, **TD No. 637 (June 2007).**

S. MAGRI, *The financing of small innovative firms: The Italian case*, Economics of Innovation and New Technology, **TD No. 640 (September 2007)**.