

# The recessive attitude of EMU policies: reflections on the italian experience, 1998–2008

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# THE RECESSIVE ATTITUDE OF EMU POLICIES: REFLECTIONS ON THE ITALIAN EXPERIENCE, 1998–2008[1]

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## Abtract

The EMU assigns a very marginal role to economic policy and relies on the leading idea that, if prices are kept constant, there will be an automatic convergence towards long-run equilibrium income. These beliefs represent the theoretical underpinnings of fiscal and monetary policy strategies in Europe. In order to highlight the weakness of these foundations, the paper evaluates empirically the effects of public expenditure and interest rate setting on equilibrium income in Italy from 1998 to 2008. The analysis supports the conclusions that government spending has a positive impact on national income while inflation targeting has a negative impact. Moreover the empirical evidence shows that a high level of debt does not produce negative effects on GDP. Finally, at a time of financial crisis, these results appear to be reinforced for fiscal policy, but weakened for monetary policy. The paper finally states that the EMU's rigid rules for both fiscal and monetary policy have recessive attitudes, and limit the use of instruments to deal with high levels of unemployment, definitely undermining the future existence of the single-currency area.

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## 1. Introduction

The policy framework of the European Monetary Union (EMU) is based on the idea that monetary and fiscal policies can be effective only if they follow rigid rules. This leads to a subordination of any other policy target to the *wider* objective of the stability of the Euro. This stability is considered to be the necessary condition for long-run convergence towards the natural unemployment rate.

The global financial crisis that occurred in 2008 has shown dramatically that sometimes this convergence does not happen automatically and has brought some economists to consider that policy interventions could be necessary to sustain development. The strategy of allowing market forces – which, in the long run could lead to steady growth, regional convergence and sound public budgets – to operate freely has apparently failed.

The European policy framework relies on the conclusion that, following the rational expectation hypothesis, "only unanticipated money matters" (Lucas 1972, Sargent and Wallace 1975, Kydland and Prescott 1977) and that public expenditure just creates expectations for greater future taxation and public debt (Barro 1974). These analytical results have been reinforced by studies underlining the immoral behaviour of politicians. They rarely aim to serve the public interest, but often just seek to be re-elected: therefore they subordinate decisions about the optimal policy to the consensus mechanism (Buchanan and Tullock 1962).

In the EMU, central banks and national governments are denied any active role in influencing equilibrium income because:

1. Short-term policies are not desirable. Even if they could have positive effects in the short-run, the final result is just an increase of inflation;
2. Inflation is a monetary phenomenon. It is possible to control the quantity of money in circulation to control the inflation rate;
3. Gross domestic product and unemployment fluctuate around their long-run value. The latter is independent of active fiscal and monetary policies;

These principles are the theoretical foundation of the Maastricht Treaty and the Stability and Growth Pact, whose general content is to ensure that monetary variables do not disturb the spontaneous convergence towards the 'non-accelerating inflation rate of unemployment' (NAIRU) and to help the European Central Bank to reach its goal of price stability (Arestis, McCauley and Sawyer 2001, Arestis and Sawyer 2003, 2005). National governments belonging to the EMU are obliged to respect rigid parameters and cannot use fiscal policy freely to increase growth and employment, or they can use it when not needed[3].

However, income and employment are not just supply-side determined, even in the long run[4]. Current events have revived interest in the effectiveness of economic policy, both fiscal and monetary. Concerning monetary policy, a central bank moving interest rates is able to influence private demand through its effects on both investment and consumption. An inflation-targeting policy, in this respect, could be very counterproductive because of its indirect influence on aggregate demand[5]. Concerning fiscal policy it still could have an active role – through the Keynesian multiplier – in influencing the output growth.

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[3] This blind limit imposed on fiscal policy weakens the monetary union and undermines the feasibility of its existence in the long run. This position is discussed in depth in a dedicated number of the *Eastern Economic Journal* for winter 1999, see, in particular, Kregel (1999) and Parguez (1999). See also Krugmann (2009a).

[4] The NAIRU is generally viewed as supply-side determined equilibrium rate of unemployment. In most presentations of the NAIRU, aggregate demand plays no essential role in the determination of such an equilibrium rate of unemployment. In those macroeconomic models from which a NAIRU is derived as an appearance, the nature of the models is such that the level of aggregate demand has to adjust to the level of unemployment as set by the supply-side factors (Sawyer 2002).

[5] "According to the conventional inflation targeting approach in order to achieve long-run price stability the CBs need to respond to any change in the current or expected rate of inflation, […] by raising the real interest rate, hence curbing the aggregate demand and current output. But what if current output is also affected by the level and time path of aggregate demand?" (Fontana and Palacio-Vera 2005, p.1). The theoretical foundation of this statement is that money is

In order to highlight the weakness of the EMU's policy foundations, the paper evaluates empirically the effects of public expenditure and interest rate setting on equilibrium income in Italy from 1998 to 2008. The empirical analysis supports the conclusions that government spending has a positive impact on national income, while inflation targeting has a negative one. Moreover the empirical evidence shows that a high level of debt – in contrast with Barro's (1974) conclusions – did not produce negative effects on the level of GDP. Finally, we find – through the Kalman filter technique, that at a time of financial crisis, the results are reinforced for fiscal policy, while weakened for monetary policy.

After considering the empirical results of the Italian experience, the paper finally reflects on the fact that EMU's rigid rules for both fiscal and monetary policy have recessive attitudes and, during a period of crisis, in which other market forces do not work, they limit the use of the instruments capable of dealing with high levels of unemployment.

Considering the more recent events, the paper draws the conclusion that the fear of the effects of unsound public finance and the aim of preserving the Euro stability limit the use of policy instruments undermining the future existence of the single-currency area.

The work is organized as follows: section two briefly recalls the theoretical foundations and the empirical evidence about the inefficacy of fiscal and monetary policy; section three gives an account of the policy events that occurred in Italy before and after joining the EMU single currency area. Section four contains the empirical analysis of some indicators of policy interventions from 1998 to 2008 and is divided into two parts. In the first, through the OLS technique, we evaluate the contribution of government spending and and the effects of interest rate setting to GDP, and in the second part we estimate – through the Kalman filter – the measure of this contribution within these ten years. Section five derives policy implications from the results.

## 2. Do policy interventions increase growth?

The ineffectiveness of economic policy in changing the value of equilibrium income has been widely maintained in the economic literature, and to conduct an exhaustive review would require much more than a paragraph.

On the side of monetary policy the mainstream literature can be divided into two streams of thought. The first refers to Lucas's critique, which extends very old classical conclusions about the long-run neutrality of money, according to which expansive monetary policies have neither short- nor long-term effects. On the contrary, it could be destabilizing through the influence on prices expectations. All a central bank has to do – as the Taylor rule suggests – is to set the interest rate in order to counterbalance any inflationary pressure coming from the market. This strategy would assure automatic convergence towards the level of full employment.

The second stream of thought can be termed New Keynesian Macroeconomics (also known as new consensus macroeconomics; see Fontana 2009), according to which monetary policy could be effective because of labour, goods and credit market rigidities (Blanchard 2008). These rigidities "anchor expectations" and monetary policy "can be more activist in the short term" (Peson 2008).

The empirical analysis of the European Central Bank for the Euro area (ECB *Working papers* from no. 91 to no. 114) supports these conclusions because (a) monetary policy decisions appear to have temporary effects; (b) these effects decrease as long as time goes on; (c) prices effects are lasting even if reduced at the beginning; (d) apparent initial real effects are due to prices and wages stickiness. Despite Lucas's (1977) well-known conclusion that "only unanticipated money matters", there is a relevant body of empirical literature that is not consistent with this, even among consensus economists. For instance, Cochrane (1998) finds that monetary policy has real effects even if it is expected. This result is reinforced by the famous contributions of Clarida, Gali and Gertler (1999 and 2000) and Galì and Gertler (2007), who find that – because of imperfect competition – it can be effective to reduce unemployment, without leading to higher inflation.

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endogenous and therefore dependent on current output: any manoeuvre to control money – in order to be effective – must have effects on current output. See Symposium (2002).

Benhabib, Schmitt-Grohé and Uribe (1999) show that the practice of setting interest rates could have recessive influences when the inflation rate, actual and expected, is very low. This result depends on the fact that central banks cannot fix negative interest rates.
On the side of fiscal policy, the theoretical underpinnings of its inefficacy are: (1) the crowding-out effect; (2) Barro's reinterpretation of the Ricardian equivalence; and (3) the inflationary effect. Governments are said to cause interest rates to increase in order to convince the public to buy bonds. The increase in interest rates would crowd-out private investment, and cause a reduction in the equilibrium income. The final result would be a total or partial offsetting of the effects of the increase in public expenditure. As a final point, Robert Barro (1974), revisiting Ricardian conclusions about the intertemporal equilibrium between income and expenditure, concluded that public expenditure in the present causes expectation of greater future taxation, higher interest rates and greater public debt. These expected effects – joined with the circumstance that government bonds do not represent wealth – reduce current consumption and offset the increase in income generated by the increase in autonomous demand.
In synthesis, any government borrowing to finance public expenditure must be done at the expense either of investment or of consumption (Cochrane 2009, Fama 2009).
As Krugman says, this is "one of the most basic fallacies in economics – interpreting an accounting identity as a behavioural relationship […]. An increase of G [public expenditure] doesn't reduce I [or C] one for one, it increases GDP which leads to higher S and T." (Krugman 2009b). Reich (2009) shares the same point of view.
It has to be noted that the efficacy of fiscal policy is largely dependent on its interaction with monetary policy. When the central bank sets the interest rate influences the macroeconomic performance of fiscal policy and the intertemporal equilibrium between present and future consumption through the effects on the rate of actualization of future revenues (Canale 2008). The policy rate, set by the monetary authority, is, in fact, the reference value for the all the other interest rates, including the treasury bill rate. The latter in turn could diverge from the average of the market according to the country's rating. The point is, therefore, to know whether and in which cases the debt-financed public expenditure can reduce the country's rating. Therefore – even if it were possible to overcome the other limits of these contributions[6] – whether or not the crowding-out effect or the Barro-Ricardo theorem applies, depends for the great part on the action of monetary policy (Canale, Foresti, Marani and Napolitano 2008).
As a final point if fiscal policies increase private demand it is said to cause inflation because of the so-called real-balance effect. However, in order to state that an increase in demand causes an increase in prices, it has to be that: (a) the supply curve has a positive slope and if so (b) the increase in public expenditure does not cause a shift in the supply curve as well. However, very often, especially when government intervention is requested, there are a lot of unexploited resources, fixed investment is underutilized, and there would be many cases in which the relation between wages and productivity remains constant. The supply curve, therefore, could be horizontal and increase in demand would not create inflation.
Despite the extensive empirical literature, an unambiguous conclusion has not yet been found even in this field. The debate concentrates on the  on the size of the overall output effect "wich is mostly found to be in the Keynesian direction" (von Hagen and Wyplosz 2008p.6). Following the theoretical assumptions, the literature concentrates on the long-run possible effects of un-predicted policy interventions and uses different versions of VAR approaches. However, many difficulties arise in examining the effects of governmental interventions (Perotti 2007):
(a) the impossibility of separating the fiscal policy from monetary policy effects
(b) the endogenity of fiscal policy effects
(c) the identification of the structure of the economy.

[6] There are in fact many shortcomings to be considered: they are related to life-term, wealth effects and to the general limits of intertemporal choice in conditions of underemployment when it is not possible to choose whether or not to work.

The most famous contributions are Ramsey and Shapiro (1999) (dummy variable approach), Fatás and Mihov (2001) and Blanchard and Perotti (2002). All of these attempt to identify the fiscal stimulus separately from the monetary one, and the unexpected interventions from expected ones.
Fatás and Mihov (2009) – assuming that sound public finance is an objective rather that an instrument -- document the evolution of fiscal balances in the Euro area. They find that because of the absence of discretionary interventions and the use of automatic stabilizers, government policies appear to be counter cyclical (i.e., having the opposite sign of output growth) and public accounts do not deteriorate, but help convergence towards the full employment rate (for the same point of view, see also Alesina, Campante and Tabellini 2007).
Following a different perspective, Gali and Monacelli (2005) provide an analysis of the effects of an exogenous change in government spending in a small open economy belonging to a monetary union: an increase in government spending always raises output and the price level in the short run. Many critiques on the approach denying the positive effects of fiscal policy interventions can be found on a special number of *Oxford Review of Economic Policy* (vol. 21(4), 2005) entirely dedicated to the macroeconomic role of government spending (see Allsopp and Vines 2005, Krugmann 2005, Solow 2005). Furthermore Kirsanova, Stehm and Vines (2005) find that, in modern policy regimes under which fiscal and monetary policy are independent, economic policy in a single country gives better results if both authorities cooperate to reach their goals.

## 3. Policy actions in Italy before and after joining the EMU (1992–2008)

The period from 1992 to 2008, was characterized by independent monetary policies and fiscal strategies oriented to the reorganization of public accounts in order to respect the Maastricht parameters and the Stability and Growth Pact. However the entire period can be divided into two parts – before and after 1998 – in relation to the adoption of the single currency. In the first period the policies, although autonomous, were in accordance with the objective of joining the Euro area, while the policies in the second period, as it is well known, were qualified by the transfer of monetary sovereignty to the European Central Bank and by a fiscal policy action inside strict limits due to the pre-existence of fiscal imbalances.

### 3.1 Fiscal and monetary conditions in Italy after the ERM crisis: 1992–1998

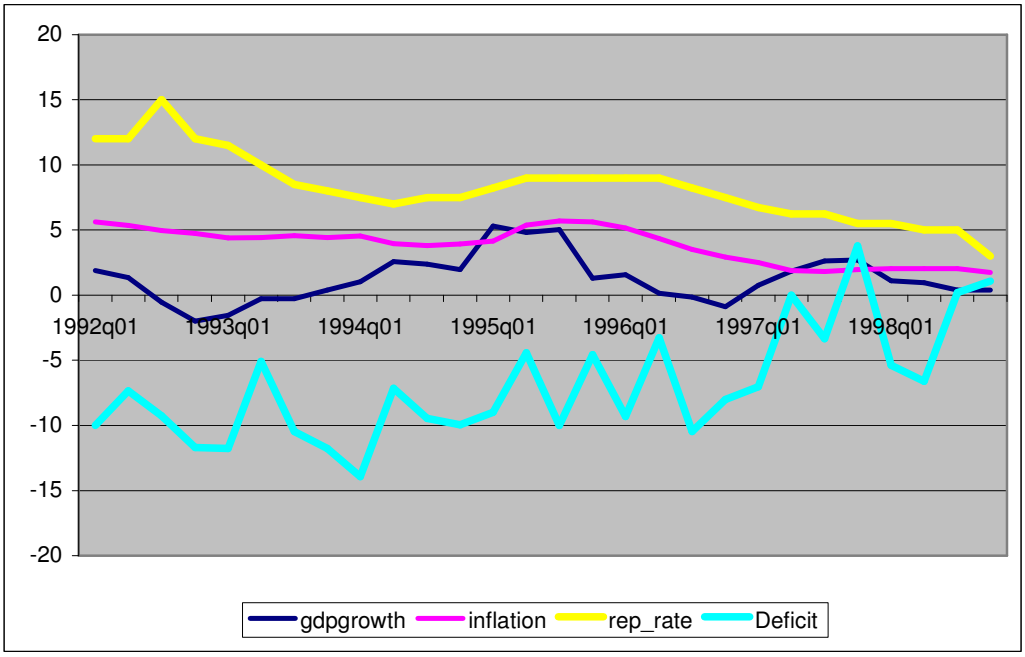
In the 1970s and the early 1980s Italy experienced high inflation rates, but by 1992 inflation remained stable at approximately 5% for many years due to the dis-inflationary policy of the central bank. In fact in 1981 the Bank of Italy started its "divorce" from the Italian Treasury (it was no longer forced to act as a residual claimant of unsold Italian Treasury debt securities) and used interest rates to preserve the participation of Italy to the ERM.

At the beginning of 1990s, the process of German reunification, and the effects on internal income of the policy of increasing interest rates, brought the 1992 currency crisis (Canale, Montagnoli and Napolitano 2008). Unfortunately the higher rates of discount of preceding years, despite the progress in terms of inflation, caused an ever-increasing deterioration of fiscal accounts. If the debt was 100% of GDP in 1992, it continued to grow rapidly; interest payments generated a vicious spiral and an ever-increasing burden on the budget. The large fiscal adjustment of 6% of GDP, approved by the government after the 1992 crisis, was only able to slow down the rate of growth of the debt.

During 1996, it became increasingly clear that a strict adherence to the limit of a 3% deficit-to-GDP ratio in 1997 would be required of countries to be admitted to the European Monetary Union. To steer markets towards favourable expectations, in 1996 the Italian government increasingly stressed a commitment to the fiscal discipline needed to enter the EMU, and in the autumn of 1996, a

carefully crafted fiscal package of spending cuts and tax increases was approved. The size of the fiscal adjustment of 1996 was much smaller than the one that was approved in the wake of the 1992 crisis, and it was just enough to tip the markets into believing that Italy would be able to join the EMU.

**Figure 1. Macroeconomic performance of fiscal and monetary policy in Italy from 1992 to 1998**



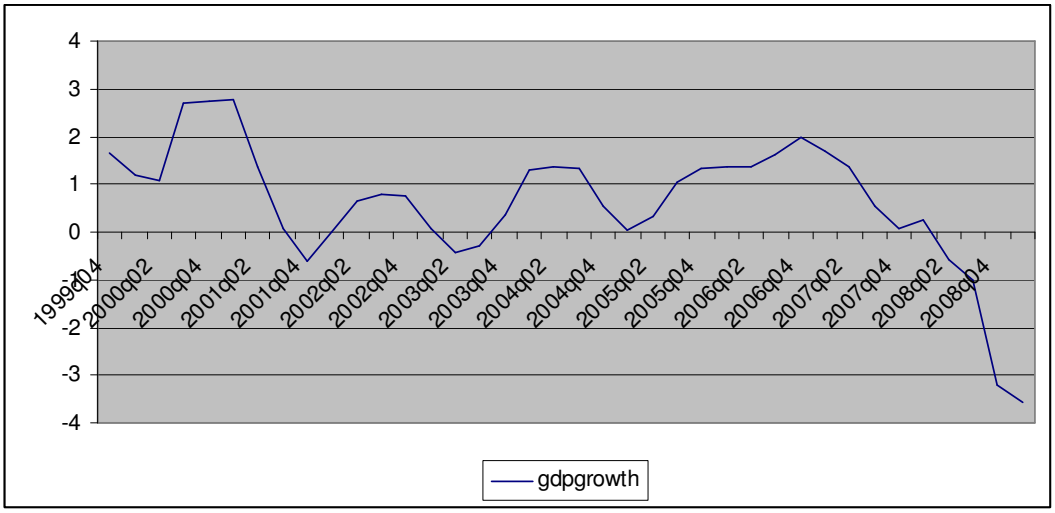

Source: IFM-Financial Statistics, ECB

Figure 1 shows the behaviour of the monetary policy instrument (*rep_rate*), inflation rate (*inflation*), the growth rate of income (*gdpgrowth*) and fiscal balance (*deficit*) in the period considered. The behaviour of the line representing the GDP path clearly illustrates the periods of recession (1992) and slow-down of the economy (1995). It also shows that, starting from 1998, the growth of the Italian economy declined, reaching almost the value of zero. Except for the years 1995-96, when the economy was growing at 5% due to the increase of exports via devaluation of the exchange rate, Italy experienced very low rates of growth. The inflation rate depicts a negative trend that, in 1998, reached the value of about 2.5%. The interest rate converged towards the value of 3% at the end of 1998 as required for joining the EMU by the prescriptions of the Maastricht Treaty. Finally, the deficit had non-negative values just at the beginning of 1998, but its trend during the whole period is guided by the target of fiscal balance.

### 3.2 Fiscal and monetary conditions in Italy after introduction of the single currency

In 1998 Italy joined the EMU and the Bank of Italy was reflected first by European Monetary Institute and then at the launch of the Euro by the European Central Bank. The following years can be divided into two period. The first goes from 1999 to the end of 2001, when Italy experienced a relative high rate of growth. The second was characterized by two global shocks, the first in 2001, whose symbol is the events of 9/11, and the second the global financial crisis that started with the bursting of the US housing bubble at the end of 2007.

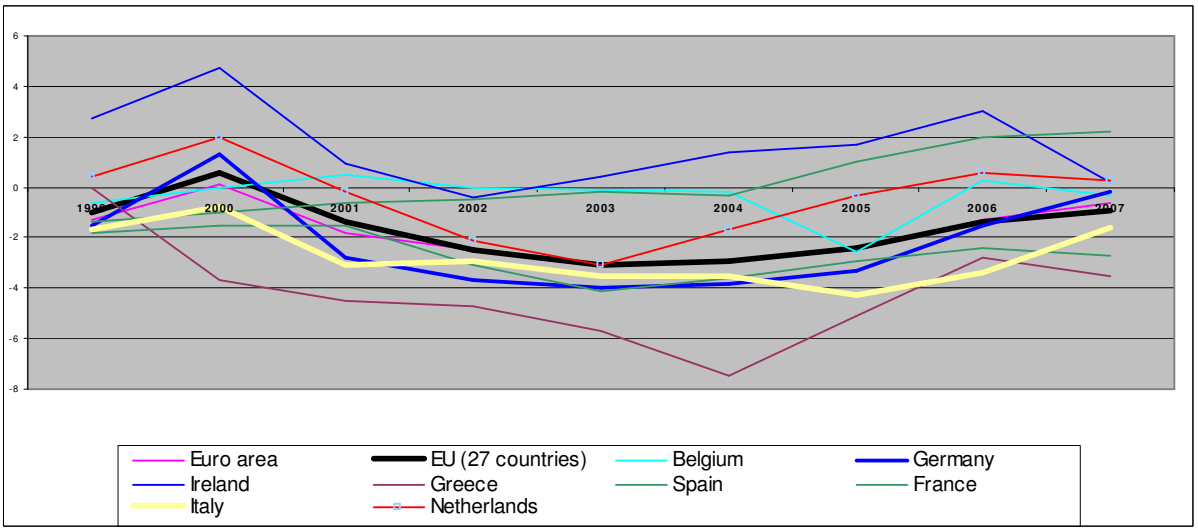
**Figure 2. Output growth in Italy from 1999 to 2008**




Source: IFM-Financial Statistics

Figure 2 illustrates the growth rate of income for Italy after the EMU. The average rate was about 0.6%, with peaks of 2.5% and -3.2%. However, it was much below the 5.26% consistent with the optimistic expectations of the European Commission when it fixed the ceiling level of 3% of ratio of deficit/GDP in order to ensure a convergence towards a stable management of public debt[7].

**Figure 3. Public deficit in the Euro Area**




Source: Eurostat

This condition of instability has been shared by many other EMU countries. In Figure 3 we plot the general government primary balance as percentage of GDP for Ireland, Italy, Greece, the Netherlands, Belgium, Spain, Germany and France. Except for Ireland – whose positive economic

[7]In order to have a debt/GDP ratio of 60% - as Maastricht fiscal parameters state - and preserve the deficit/GDP ratio at 3% it is necessary to have a growth rate of GDP equal to 5% (De Grauwe 2008).

conditions in that period are well-known – all the EU countries experienced difficulties in managing the ratio of deficit/GDP. In Italy (thick yellow line), the ratio always remains negative, despite the hard fiscal policy retrenchments set in the periods 1999-2000 and 2006-2007.
Table 1 summarizes the main stability programmes proposed by the Italian government after the launch of the Euro. In the light of the considerations made above, it is clear that they failed in their aims. In fact, reading the table from left to right and from top to bottom we observe that the programmed levels of debt and deficit are never respected.

**Table 1. Key figures of Italy's stability programmes (2000–2008)**

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General government balance | – 0.8 | – 0.5 | 0 | 0.3 | | | | | | | |
| Primary balance | 5.3 | 5.5 | 5.6 | 5.5 | | | | | | | |
| Government debt | 106.6 | 103.5 | 99.6 | 94.9 | | | | | | | |
| *Real GDP growth (%)* | 2.9 | 3.1 | 3.1 | 3.1 | | | | | | | |
| General government balance | | -2.1 | -1.5 | -0.8 | -0.2 | 0.1 | | | | | |
| Primary balance | | 3.8 | 4.5 | 5 | 5.3 | 5.5 | | | | | |
| Government debt | | 109.4 | 105 | 100.4 | 98.4 | 96.4 | | | | | |
| *Real GDP growth (%)* | | 0.6 | 2.3 | 2.9 | 3 | 3 | | | | | |
| General government balance | | | | – 2.9 | – 2.7 | – 2.0 | – 1.4 | – 0.9 | | | |
| Primary balance | | | | 2.4 | 2.5 | 3.3 | 4 | 4.7 | | | |
| Government debt | | | | 106 | 104.1 | 101.9 | 99.2 | 98 | | | |
| *Real GDP growth (%)* | | | | 1.2 | 2.1 | 2.2 | 2.3 | 2.3 | | | |
| General government balance | | | | | | -4.4 | -2.4 | -2.2 | -1.5 | -0.7 | 0 |
| Primary balance | | | | | | 0.1 | 2.5 | 2.6 | 3.4 | 4.2 | 4.9 |
| Government debt | | | | | | 106.8 | 105 | 103.5 | 101.5 | 98.5 | 95.1 |
| *Real GDP growth (%)* | | | | | | 1.9 | 1.9 | 1.5 | 1.6 | 1.7 | 1.8 |
| General government balance | | | | | | | | -2.6 | -3.7 | -3.3 | -2.9 |
| Primary balance | | | | | | | | 2.5 | 1.3 | 1.9 | 2.6 |
| Government debt | | | | | | | | 105.9 | 110.5 | 112 | 111.6 |
| *Real GDP growth (%)* | | | | | | | | *-0.6* | *-2* | *0.3* | *1* |

Source: European Commission

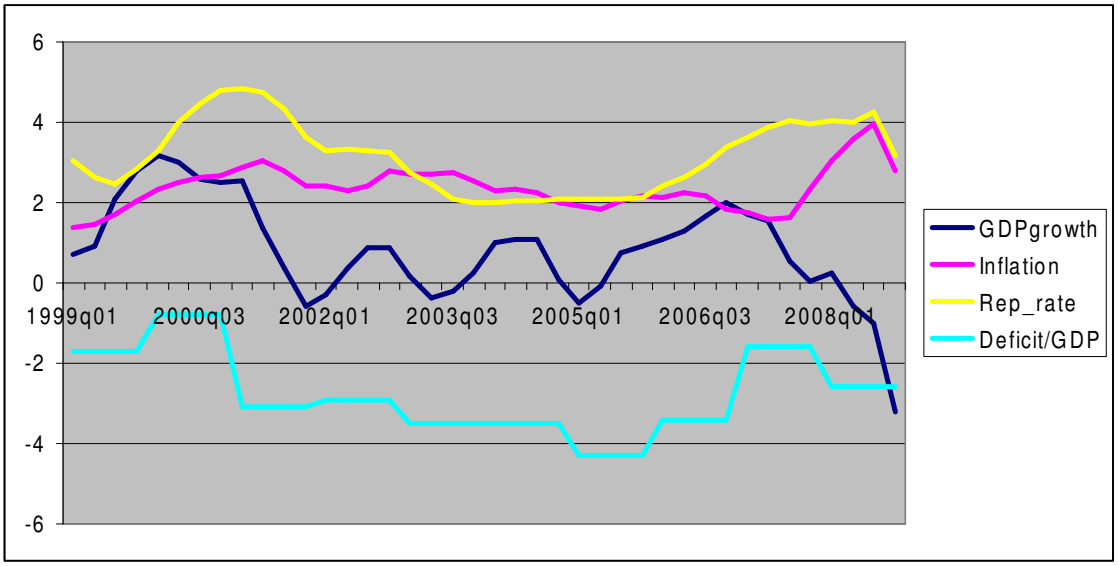
Confirming the initial strategy of fiscal discipline set in the Maastricht Treaty, and guided by the idea that sound public finances is a precondition for economic development, in the year 2000 the European Commission passed the following sentence on the Italian government:

> The Council urges Italy firmly to commit itself to respect the programme's objectives. Primary surpluses should remain at the high levels projected in the programme. Any deviation from the planned deficit and primary surplus outcomes should be promptly addressed and corrective measures taken. This should be ensured through a tight control of current primary expenditure. The Council encourages Italy to accompany the reduction in the ratio of current primary expenditure to GDP with a more effective and more comprehensive rationalisation of public spending, aimed at improving the supply-side

conditions of the economy. Moreover, even though Italy fulfils the requirements of the Stability and Growth Pact, it should take every opportunity to improve future budgetary targets and speed up the consolidation process, in order to accelerate the reduction of the government debt ratio. The Council recommends that future decisions to reduce the tax and social security contributions burden should be matched by offsetting expenditure cuts[8].

The reorganization of fiscal accounts is explicitly considered an objective to be reached as soon as possible as a precondition for economic development. The sentence quoted above explains that, for the European Commission, the reduction of the taxation and social security contributions via cuts in the government's expenditure could have a positive effect on the economy. Unfortunately, Italy's macroeconomic performance in the decade after 1999 dramatically worsened relative to the average of the other members of the Euro area.
In the early 1990s, the vigorous increase in exports compensated the weakness of the domestic demand, while in the years after, the fiscal adjustment required by EMU and the inflation-targeting strategy of the centralized monetary policy might explain the evolution of the macroeconomic performance (Figure 4).

**Figure 4. Macroeconomic performance of fiscal and monetary policy in Italy**




Source: IFM-Financial Statistics, ECB

The average growth rate of income was about 0.8% with peaks of 3.2% and -3.5%. It was a bit higher than in the pre-EMU period but still below the 5.6% required to make the debt converge to 60% of GDP. The discount rate, the main instrument of monetary policy, appears having been growing from 1991 to 2001, while decreasing in the years after. At the end of 2005 it starts growing again in response to the average inflation dynamic in the EMU. The entire period is also characterized by a low level of inflation (2.3% on average) which starts increasing again at the end of 2007. Finally as already shown in Figure 3, the dynamic of public deficit was ever guided by the attempt to respect the Stability and Growth Pact, without taking care of its effects on output growth.
Taking a global look at the macroeconomic performance of Italy in these years, we can say that, despite the initial positive influence derived from the gain in credibility for having joined the EMU,

[8] European Economy. European Commission. Directorate General for Economic and Financial Affairs. Public Finance in EMU, no. 3, 2001, p. 148.

from 2001, the increase in the discount rate is accompanied by a decrease – with some time delay – in output growth, and vice versa. Furthermore, in the period 2006–2008, the tight ECB policy was associated with a restrictive fiscal policy. The reduction of public funds, especially for education, scientific research, innovation, business support, investment, and so on, resulted in significant economic decline, triggering a perverse cycle with further negative effects on public accounts[9]. Lacking the private demand because of the crisis, these combined policies hardly influenced the sharp decrease of the growth rate of income from 2007. However, empirical results will show that without the ever-reduced level of public expenditure, the macroeconomic performance would have been worse than it was.

## 4. Empirical analysis

### 4.1 The theoretical model

The model we use for the empirical analysis follows the theoretical assumption that current income is the result of the effects of the components of aggregate demand. Because we do not suppose that current income is simultaneously determined by its components, our model is represented by the following:

$$Y_t = f(Z_{t-i}) \qquad (1)$$

Where $Z_{t-i}$ synthesizes the lagged variables influencing gross domestic product.

The value of the index $t-i$ varies in relation to the lags considered to be relevant in influencing current income:

$$Z_{t-i} = \begin{bmatrix} z_{1t-i} \\ z_{2t-i} \\ z_{3t-i} \\ .... \\ .... \\ z_{nt-i} \end{bmatrix}$$

Where the first index indicates the independent variable, while the second is the time lag considered, so that it can be i = 1, 2, 3…

We can rewrite our model as:

$$Y_t = \beta_0 + \beta_1 z_{1,t-i} + \beta_2 z_{2,t-i} + \beta_3 z_{3,t-i} + ..... + \beta_n z_{n,t-i} \qquad (2)$$

In order to study the influence of monetary and fiscal policy separately and avoid problems of autocorrelation – very difficult to overcome in these cases – we consider one variable at a time so that we estimate the value of each coefficient:

[9] Moreover, among the various economic fundamentals that contributed to the degradation of the Italian capacity of exports, there is also the factor of labour productivity. For Italy and Spain, that productivity has remained essentially unchanged from 1999 to 2008. Conversely, it increased considerably in France (+9.6%) and Germany (+9.5%), which contributed to increase the average level of the EMU (+7.7%).

$$\beta_1 = \frac{\partial Y_t}{\partial z_{1,t-i}} \text{ or } \beta_2 = \frac{\partial Y_t}{\partial z_{2,t-i}} \text{ or } \ldots\ldots\ldots\ldots\ldots \beta_n = \frac{\partial Y_t}{\partial z_{n,t-i}}$$

or, as one would say, *ceteris paribus*.

We use the OLS technique since it better captures the effects of the components of aggregate demand on equilibrium income in the short run, taking into account not only the deviation from the original path, but especially the overall contribution to equilibrium income. As a final step we examine the variation of the coefficients weight over time. Using the Kalman filter technique we evaluate during the time interval considered the way in which fiscal and monetary policy has influenced the value of GDP.

### 4.2 Empirical results

The time interval is ten years, from 1998 to 2009 and data are from ISTAT, EUROSTAT and ECB databases quarterly adjusted. Most time series are seasonally adjusted by the source. Whenever this is not the case, we seasonally adjust the respective series using the Census X11 multiplicative procedure. The chosen time period is based on the effective launch of the EMU, which took place in January 1998 with the creation of the European Central Bank.
Definition of variables and descriptive statistics of the explanatory variables are provided respectively in Table 2

**Table 2 - Definition of variables**

| Variable | Description (source) |
|---|---|
| NGDP | Nominal Gross Domestic Product (source ISTAT) |
| RGDP | Real Gross Domestic Product (source ISTAT) |
| EXP | Total Government Expenditure seasonal adjusted (source ISTAT) |
| REPR | Repurchase rate (source European Central Bank) |
| HCPI | Harmonised Consumer Price Index (source ISTAT) |
| REV | Total Government revenue seasonal adjusted (source ISTAT) |
| DEB | Public Debt (source ISTAT) |

A first step of analysis is referred to a stationary relationship between integrated time series.
A formal test for stationary or the presence of a unit root was implemented and as Table 3 shows, the result strongly suggested that all the variables were integrated of order one I ~ (1).

**Tab. 3. Test for stationarity**

| | ADF | Phillips Perron | 1st difference | ADF | Phillips Perron test |
|---|---|---|---|---|---|
| **NGDP** | -2.409 | -2.410 | **ΔNGDP** | -4.176 | -4.214 |
| **RGDP** | -3.453 | -3.156 | **ΔRGDP** | -4.677 | -4.698 |
| **EXP** | -0.138 | -0.332 | **ΔEXP** | -8.179 | -29.14 |
| **REPR** | -1.849 | -1.961 | **ΔREPR** | -4.490 | -6.399 |
| **REV** | -1.550 | -0.161 | **ΔREV** | -35.94 | -47.39 |
| **DEB** | -0.955 | -0.989 | **ΔDEB** | -9.862 | -13.44 |
| **Sample 1999:1 2009:1**<br>**ADF crit. val. (1 %) -3.60** | | | | | |

In fact, in Table 3 we present the ADF and Phillips Perron tests. At the level (left side), we cannot reject the null hypothesis of no stationarity. However, taking the first difference, the results of the two tests allow us to reject the null hypothesis. This implies that all the variables are integrated of order one. These results reinforce the outcomes of the regression presented below.
Once assumed that all variables are integrated of the same order, the next step concerns the concept of cointegration. This refers to a stationary relationship between integrated time series. In order evaluate a possible long-run relationship between the variables we are going to analyse, for each regression we will present the cointegration test.
Our first estimate concerns the effects of public expenditure on gross domestic product (Table 4).
The dependent variable NGDP represents the nominal index number of gross domestic product, while EXP represents the nominal index of total government expenditure.

**Table 4. Public expenditure effects on nominal GDP**
Dependent Variable: N*GDP*

| *Section 1 Cointegration test on the residuals* | | |
|---|---|---|
| | **ADF** | **Phillips Perron test** |
| *Restab4* | **6.90** | **7.44** |
| **ADF crit. val. (1 %) -3.61** | | |
| *Section 2 OLS regression* | | |
| *Variable* | Coefficient | *t*-statistic |
| *C* | 15.714** | 2.97 |
| *EXP(-1)* | 0.765*** | 23.49 |
| $R^2$ 0.937 | | |
| Obs.: 39, Sample (adjusted): 1999:02; 2008:4 | | |
| **D-W** stat: 2.15; **AIC** 5.462; **F stat** 552.15*** | | |

*significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level

We consider a one-period time lag. The empirical results show that the Italian government expenditure of the previous period had a positive correlation with nominal current income from 1998 to 2008. The empirical relation appears to be a long period one because of the results of the cointegration test.

**Table 5 Public expenditure and Revenues effects on real GDP**
Dependent Variable: R*GDP*

| *Section 1 Cointegration test on the residuals* | | |
|---|---|---|
| | **ADF** | **Phillips Perron test** |
| *Restab4* | **-4.923** | **-5.031** |
| **ADF crit. val. (1 %) -3.62** | | |
| *Section 2 OLS regression* | | |
| *Variable* | Coefficient | *t*-statistic |
| *C* | 7.433 | 1.093 |
| *RGDP(-1)* | 0.956*** | 11.946 |
| *EXP(-2)* | 0.039* | 1.748 |
| *REV(-2)* | -0.052** | -2.160 |
| $R^2$ 0.977 | | |
| Obs.: 38, Sample (adjusted): 1999:02; 2008:4 | | |
| **D-W** stat: 1.669; **AIC** 2.289; **F stat** 483.276*** | | |

*significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level

In order to overcome the criticism that the effect is just nominal, the make a different regression using as a dependent variable the real index of NGDP, R*GDP*, derived by dividing N*GDP* by the HCPI the harmonised consumer price index. In this regression we introduce an autoregressive component and evaluate the joined effects of nominal expenditure and total revenues on RGDP.
Table 5 shows first of all that variables are cointegrated. Therefore there is a long-run relationship between RGDP on one side and the explanatory variables on the other.
Furthermore we observe that the effects on RGDP are 1) for public expenditure positive – despide reduced-RGDP; 2) for public revenues a negative. These results are consistent with the Keynesian theory.
Table 6 evaluate the effects of the European Central Bank monetary policy strategy on internal income expressed in terms of real index. The dependent variable is the real index of GDP, RGDP, while the independent variable in the repurchase rate (Table 6). The repurchase rate – set by the central bank – is the lowest rate it is possible to find in the market, i.e., the floor of the interest rate corridor, and represents the reference value of all the re-financing operations of the economy. We see in Table 6 that the sign of the coefficient is negative.

**Table 6. Real effect of monetary policy strategy**

Dependent Variable: R*GDP*

| *Section 1 Cointegration test on the residuals* | | |
|---|---|---|
| | **ADF** | **Phillips Perron test** |
| *Restab6* | **-5.595** | **-5.643** |
| **ADF crit. val. (1 %) -3.62** | | |
| *Section 2 OLS regression* | | |
| *Variable* | Coefficient | *t*-statistic |
| *C* | 10.62128*** | 3.430827 |
| *RGDP(-1)* | 0.924243*** | 38.34049 |
| *Rep_rate(-2)* | -0.317137** | -2.338799 |
| $R^2$ 0.977134; Adjusted $R^2$ 0.975827 | | |
| Obs.: 38; Sample (adjusted): 1999:03 2008:4 | | |
| **D-W** stat 1.936779; **AIC** 2.234471; **F stat** 747.8319*** | | |

*significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level

**Table 7. Real effect of public debt**

Dependent Variable: R*GDP*

| *Section 1 Cointegration test on the residuals* | | |
|---|---|---|
| | **ADF** | **Phillips Perron test** |
| *Restab7* | **-4.858** | **-5.026** |
| **ADF crit. val. (1 %) -3.60** | | |
| *Section 2 OLS regression* | | |
| *Variable* | Coefficient | *t*-statistic |
| *C* | 19.96988*** | 7.230646 |
| *RGDP(-1)* | 0.772619*** | 17.88903 |
| *Deb(-1)* | 0.078703*** | 2.755561 |
| $R^2$ 0.9839600; Adjusted $R^2$0.983158 | | |
| Obs.: 43; Sample (adjusted): 1998:02 2008:4 | | |
| **D-W** stat 1.634168; **AIC** 2.482092; **F stat** 1226.903*** | | |

*significant at the 0.10 level; **significant at the 0.05 level; ***significant at the 0.01 level

Thus because of the direct proportionality between the interest rates the central bank sets and the average rates the monetary and financial institutions apply – in the years considered, monetary policy had a negative effect on RGDP. Once again – as the ADF test shows the variables are linked in the long-run.
Finally, despite all the suggestions coming from the theoretical literature about public debt, evidence emerging from Italian data shows that the level of debt has effects of the same sign on the real GDP index (Table 7) and the effects are persistent in the lon-run.
These results appear to operate in a sense opposite to Barro's theoretical conclusions about the public bonds wealth effect.

### 4.3 Incidence of policies through time ( the Kalman filter)

In this final section we implement the Kalman filter methodology. This algorithm, which provides the recursive estimation of unobserved, time-varying parameters or variables in the system contingent on all available information, will allow us to investigate further the behaviour of coefficients of the policy variables. The reason for applying the Kalman filter at this stage is that this time-varying methodology is able to recover unobservable factors related to fiscal and monetary policy that could have affected Italian GDP from 1998 to 2008, i.e., to detect how the respective coefficients have changed over time[10].
Assuming that $\beta i,t$ is determined by an autoregressive process AR($n$), we apply the following time-varying parameters model:

$$y_t = \beta_{0,t} + \beta_{1,t} Z_t + \mu_{it} \qquad (3)$$

Where $y_t$ is the GDP at time t, $\mu_{it}$ is an independent white noise, the vector of coefficients $\boldsymbol{\beta_{i,t}}$ is assumed to be random walks. This can be written in state space form where the observation equation is given by the expression in (3) above and the state equations are given by:

$$\begin{bmatrix} \beta_{0,t} \\ \beta_{1,t} \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} \beta_{0,t-1,} \ldots \beta_{0,t-n} \\ \beta_{1,t-1,} \ldots \beta_{1,t-n} \end{bmatrix} + \begin{bmatrix} \mu_{0,t} \\ \mu_{1,t} \end{bmatrix} \qquad (4)$$

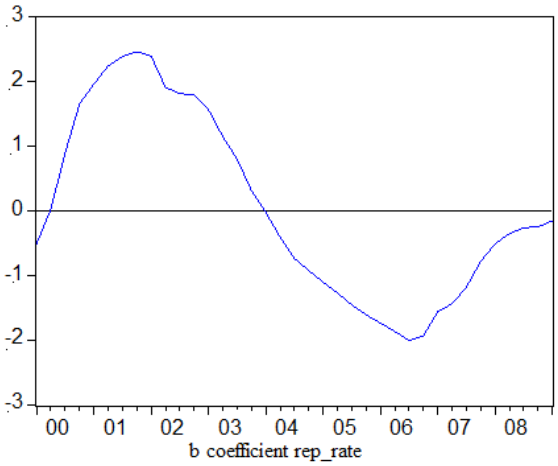
The above eq. (4) is the measurement equation in which $\beta_{it}$ and $\mu_{it}$ are $[n \times 1]$ vectors[11]. The relevant results and estimates are reported in Table 8 and in Figures 5 and 6.
The coefficients have the correct signs and are highly significant. Overall, the patterns of the coefficients $\beta_{it}$ (see Figures 5 and 6) seem to add insightful elements to the analysis of the dynamics of the fiscal and monetary variables over the period.

[10] "[...] when the disturbances and the initial state vector are normally distributed, it enables the likelihood function to be calculated via what is known as the prediction error decomposition. This opens the way for estimation of any unknown parameters in the model." (Harvey 1991, p. 10).
[11] For a more complete explanation of the Kalman filter approach, the state space form and the measurement and transition equations, see Harvey (1989).

**Tab le 8. The Kalman estimations**

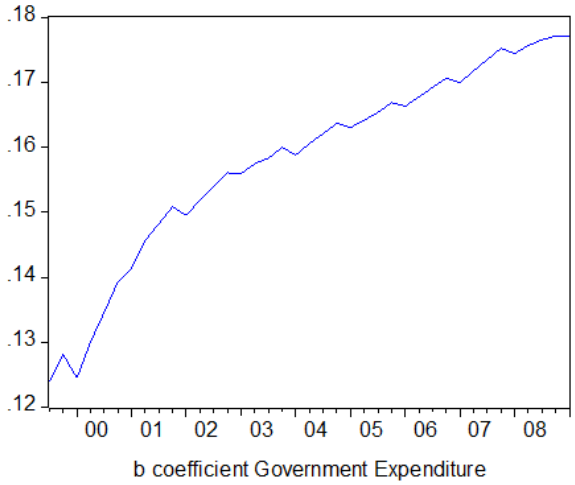
| ***(rep_rate)*** | $\beta_{1,t}$ | $\beta_{2,t}$ |
|---|---|---|
| AIC=7.03 | 127.03** | -0.2865** |
| Schwarz=7.07 | (76.59) | (-11.29) |
| Obs. 38(Q) | [ 0.000] | [ 0.003] |
| ***(Govern. Expenditure)*** | $\beta_{1,t}$ | $\beta_{2,t}$ |
| AIC=8.61 | 73.81** | 0.50111** |
| Schwarz=8.65 | (6.687 ) | (6.054) |
| Obs. 39 (Q) | [ 0.000] | [ 0.000] |

**Figure 5. Monetary policy coefficient behaviour**




Indeed, it is interesting to observe (Figure 5) that a significant change in the pattern of the coefficients b (the interest rate) occurs a few years after the introduction of the Euro (2001).
Another change in the pattern, around 2006, is also shown by the coefficient on the interest rate moving from a negative to a positive trend. This change and the value of this coefficient suggest that the effect of the monetary policy instrument started to adjust in anticipation of the financial crises. The adjustment took place well before the crisis was officially accepted. Not surprisingly the coefficient on the interest rate does not show a positive value. It moves to a value close to zero at the end of 2008. This represents a kind of proof of the fact that in a time of crisis monetary policy is unable to stabilize output. The lowering of interest rates cannot inject money into private markets if it cannot be used productively.

**Figure 6. Fiscal policy coefficient behaviour**




At the other extreme, the coefficient on the government expenditure shows positive and stedily increasing dynamics over the whole period (Figure 6). To a more careful interpretation, this pattern should not be surprising since the $\beta_1$ coefficient captures the effect on GDP of actual government expenditure. Summarizing, the analysis shows that the introduction of the Euro has implied a stronger impact of the fiscal variable and less stable coefficients for the monetary variable.

## 5. Policy structure and the future of EMU

European policy framework relies on two pillars: (1) a monetary policy with the final aim of stable inflation, and (2) rigid fiscal rules relegating government action to a very marginal role. While these two pillars appeared to be of benefit for Italy in the period preceding the Euro, in the latter phase, especially during the last five years, they seem to have weakened Italy's economic growth.
From the empirical analysis it emerges that fiscal policy in this last ten years had effects of the same sign on growth and that the centralized monetary policy was not neutral in relation to the effect on GDP. These effects appeared to be reinforced when the components of aggregate demand linked to private choices were lacking, i.e., over a financial crisis.
In particular, examining the influence of public expenditure on growth through time we observe an increasing value, demonstrating that government spending had a central role in sustaining demand.
Examining then the effects of monetary policy, it is possible to conclude that the interest rate setting practice had not only anti-inflationary effects, but also real effects. However, the power of influencing the economic performance of Italy in periods of crisis appeared to be very weak, because of the impossibility of injecting money into the market when it is not desired, i.e., when aggregate demand is lacking.
Our conclusion is, therefore, that the European policy framework was not built to confront the recent depression because it relies exclusively on the action of the market. We can add that the absence of fiscal instruments and the centralized monetary action cultivate the seeds of a further instability because of the non-neutrality of monetary policies. In short, the European policy framework subordinates employment and growth to sound public finance and price stability. However, the experience of the global economic crisis has shown that containing inflation, deficit and public debt is not enough to fight unemployment. On the contrary, as more recent events show, the unique objective of the internal stability of the currency ultimately weakens the existence of the EMU. Like any fixed exchange rate system, if the costs of preserving the parity are too high, the existence of the agreements will appear to be at risk (Krugman 2009a).

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