The relevance of pragmatism in front of Keynesian uncertainty:
comparing the FED and the ECB monetary policies

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Abstract

Contrasting with a general view, we argue that the Fed and ECB missions are fundamentally identical: beyond the declared objectives and the technical details, the primary objective is the stabilization of the price index in the long run. However, the policies that have been implemented for more than fifteen years show some distance from the underlying theory, especially in the case of the Fed. Yet, although the European Union seems to follow the new-macroeconomics governance principles more accurately as concerns prices and public deficits control, the monetary policy of the Federal Reserve looks more effective. Various authors have put forward the pragmatism of Alan Greenspan and the dogmatism of the ECB when discussing the relative success of the Fed, but the reasons why pragmatism ought to do better than a thorough application of (new macroeconomics) theoretical recommendations remain unexplored. The paper focuses on the advantage of the monetary policy pragmatism in front of Keynesian uncertainty. More specifically, it points out the trials of the "new macroeconomics" principles of monetary policy when they are implemented in a system which do not have any "natural" anchor. It discusses furthermore the additional difficulties inherent to monetary unions which result from the lack of coordination between the central bank and the national budgetary-fiscal policies. Some Keynesian principles aiming at improving the ECB contribution to the economic growth of the Eurozone are suggested.

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Introduction

Though the European Union applies accurately the "new macroeconomic governance" rules\(^1\), the economic performances of the Eurozone look weaker than those of the United States. Observers often have pointed out the ECB inexperience (bad communication, dogmatism, lack of flexibility…) and Greenspan's know-how (intuition, communication, pragmatism…) as the main factors of the Fed relative success\(^2\). It is also underlined that employment one of the Fed objectives, along with price stability (despite the Fed considers price stability as a "precondition for maximum employment", as the ECB do). We put forward three arguments that could reveal to be more fundamental causes of the ECB counter-performance.

1) Pernicious effects owing to policies based upon presumed "natural" unemployment and interest rates while there is no such natural trajectory.

According to the "new Keynesian macroeconomics", monetary policy may be helpful in stabilising the economy around the presumed natural trajectory in case of nominal rigidities. But in a system without natural anchoring, as the one Keynes considered in his *General Theory*, if the central bank takes the current rate of unemployment as a natural one, it tends to anchor the economy away from the full employment. Greenspan's pragmatism and prudence in interpreting economic fluctuations seems to have weakened that bias in the U.S.A.

2) Pernicious effects owing to the monetary policy in front of a distributive conflict.

In the Keynesian approach, distributive tensions (like wages, mark up or fiscal pressures) feed the demand for money, and push monetary authorities to arbitrate between to provide more money (which feeds the cost push spiral) or to raise the rate of interest so as to repress inflationary pressures (which depresses the economic activity and employment level). The profit share increase in Europe, along with the lower productivity gains (as compared with the U.S.A.), is likely to have kindled the distributive conflict in Europe, and to have pushed the ECB to play against employment in order to maintain prices stability.

3) Coordination problems between the central bank and the governments.

Macroeconomic policy involves both monetary and fiscal authorities, but the instruments interactions may be harmful in case of coordination failures. It happens that it is quite more

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\(^1\) These rules aim basically to weaken the discretionary power of economic policy, in order to ensure the central bank credibility and ability to control inflation. In the Eurozone, they work through a two-pillar institutional architecture: the central bank independency and the stability and growth pact which aims to ensure that no inflationary bail out will arise.

\(^2\) According to Wray & Sardoni (2005), these factors do not explain correctly the difference in performances between the USA and the Eurozone; fiscal policies also should be taken into account.
difficult to coordinate monetary and fiscal policies within the Eurozone than in the U.S.A., for
decentralised fiscal policies ought to be coordinated both with each other and with the central
bank.

The paper contains two sections. The first one compares the "official" monetary policies of
both regions. The 'new macroeconomics' precepts are emphasized, and then compared with
the implemented policies over the period 1990-2006. Section 2 discusses the three sources of
inefficiency.

1. The Federal Reserve and ECB monetary policies

While it does not appear explicitly in their external communication, both institutions clearly
refer to the "new macroeconomics" theoretical background, that is, a framework where:

- competitive markets and flexibility are supposed to ensure the efficiency of the resources
allocation process

- prices stability is the only legitimate objective in the long run as regards monetary policy
(money neutrality);

- credibility strengthens the monetary policy capacity to control the inflation level, which
requires strong institutional guarantees (central bank independence, clear anti-inflationary
mandate)

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3 "The EC Treaty also binds the Eurosystem to the principle of an open market economy with free
competition. The Eurosystem complies with this principle in several ways. By maintaining price
stability, the ECB contributes to the proper operation of the price mechanism, which is an essential

As concerns the Federal Reserve, we cite an excerpt of the report to the Congress Alan Greenspan
made at the end of his mandate: "Another prominent concern is the growing evidence of anti-
globalization sentiment and protectionist initiatives, which, if implemented, would significantly
threaten the flexibility and resilience of many economies. This situation is especially troubling for the
United States, where openness and flexibility have allowed us to absorb a succession of large shocks
in recent years with only minimal economic disruption. That flexibility is, in large measure, a
testament to the industry and resourcefulness of our workers and businesses. But our success in this
dimension has also been aided importantly by more than two and a half decades of bipartisan effort
aimed at reducing unnecessary regulation and promoting the openness of our market economy. Going
forward, policymakers will need to be vigilant to preserve this flexibility, which has contributed so
constructively to our economic performance in recent years." (Testimony of Chairman Alan
Greenspan, Federal Reserve Board's semiannual Monetary Policy report to the Congress before the
Committee on Financial Services, U.S. House of Representatives, July 20, 2005; available on the
Federal Reserve website).

4 " If a central bank enjoys a high degree of credibility in pursuing its objective, monetary policy can
exert a powerful direct influence on price developments by guiding economic agents’ expectations of
future inflation and thereby influencing their wage and price-setting behaviour. The credibility of a
This section studies the official obligations and discourses of both institutions. Contrasting with a general view, we argue that the Fed and ECB missions are fundamentally identical: beyond the declared objectives and the technical details, the primary objective is to stabilize the price index over the long run (1.1). However, the policies implemented for more than fifteen years show some distance from the underlying theory, especially in the case of the Fed (1.2).

1.1. Beyond the appearances, identical missions

According to the Treaty on European Union (Article 105), the primary objective of the Eurosystem is «to maintain price stability» and, «without prejudice to the objective of price stability, to support the general economic policies in the Community with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2», which include a «high level of employment» and «sustainable and non-inflationary growth». For his part, the Federal Reserve Act states that the monetary policy should seek «to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates».

It is often emphasized that maximum employment and price stability, along with moderate long term interest rates, are equally weighed in the Federal Reserve Act, whereas price stability is affirmed as the primary objective of the ECB, yet the stake is far weaker than looks. The issue actually refers to different matters depending on the span of time which is considered.

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central bank to maintain price stability in a lasting manner is crucial in this respect. Only if economic agents believe in the central bank’s ability and commitment to maintain price stability will inflation expectations remain firmly anchored to price stability. This in turn will influence wage and price-setting in the economy given that, in an environment of price stability, wage and price-setters will not have to adjust their prices upwards for fear of higher inflation in the future. In this respect, credibility facilitates the task of monetary policy.” ECB (2004), The monetary policy of the ECB, p. 47.

“(…) a credible anti-inflation policy will lead businesses and households to expect less wage and price inflation; workers then will not feel the same need to protect themselves by demanding large wage increases, and businesses will be less aggressive in raising their prices, for fear of losing sales and profits. As a result, inflation will come down more rapidly, in keeping with the policy-related slowing in growth of aggregate demand, and will give rise to less slack in product and resource markets than if workers and businesses continued to act as if inflation were not going to slow.” FRS, 2005, p. 20.
Price stability as the long run primary objective

Since monetary policy is seen as having no durable influence upon real magnitudes (as a result of money neutrality and of the leading role of the supply side\(^5\)), the official documentation published by the ECB denies any influence of the monetary policy on output and employment in the long run:

"(...) in the long run, real income is essentially determined by supply-side factors (e.g. technology, population growth, the flexibility of markets and the efficiency of the institutional framework of the economy). It is therefore the task of fiscal and structural policies – but also of those involved in the wage-bargaining process – to enhance the growth potential of the economy." ECB (2006) *The European Central Bank - History*..., p 47.

"(...) the theoretical foundations of monetary policy as well as experience drawn from the past demonstrate that monetary policy can ultimately only influence the price level in the economy (...)." ECB (2006) *The European Central Bank - History*..., p 45

With the result that monetary policy can not have but a nominal target over the long run\(^6\).

"Thus, price stability is the only feasible objective for the single monetary policy over the medium term" ECB (2006) *The European Central Bank - History*..., p 45

Price stability then is justified because of the positive effects it provides as concerns the resources allocation. The ECB\(^7\) and the Fed positions are perfectly similar with this respect (though, in *The Federal Reserve System, Purposes and functions*, the Fed does not explicitly mention the neutrality of money in the long run):

"Price stability makes it easier for people to recognize changes in relative prices since such changes are not obscured by fluctuations in the overall price level. This enables firms and consumers to make better-informed decisions on consumption and

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\(^6\) The ECB refers actually to a «medium term»; see *The monetary policy of the ECB* (ECB, 2004, p. 55).

\(^7\) See also "the benefits of price stability" in *The monetary policy of the ECB* (ECB, 2004, p. 42-43).
investment. This in turn allows the market to allocate resources more efficiently. By helping the market to guide resources to where they can be used most productively, price stability raises the productive potential of the economy". *The European Central Bank – History…*, 2006, p 46

"When prices are stable and believed likely to remain so, the prices of goods, services, materials, and labor are undistorted by inflation and serve as clearer signals and guides to the efficient allocation of resources and thus contribute to higher standards of living. Moreover, stable prices foster saving and capital formation, because when the risk of erosion of asset values resulting from inflation—and the need to guard against such losses—are minimized, households are encouraged to save more and businesses are encouraged to invest more. (…) price stability can help achieve maximum sustainable output growth and employment over the longer run,…". FRS, 2005, p 15

It follows finally that, over the long run, the objective of both institutions comes down to price stability:

"Stable prices in the long run are a precondition for maximum sustainable output growth and employment as well as moderate long-term interest rates." FRS, 2005, p 15

"By fulfilling its clearly defined mandate to maintain price stability in the euro area, the ECB supports the general economic policies in the Community “with a view to contributing to the achievement of the objectives of the Community as laid down in Article 2”. Indeed, as shown above, the best contribution which the ECB can make to promoting, among other things, “sustainable and noninflationary growth” and a “high level of employment”, as referred to in Article 2 of the EC Treaty, is to pursue a monetary policy aimed at price stability. In this way, a stability-oriented monetary policy creates a stable environment for other policies to be carried out as effectively as possible. By contrast, monetary policy has very limited scope to exert a lasting influence on real variables through other channels; in the long run, real income is essentially determined by supply-side factors (e.g. technology, population growth, the flexibility of markets and the efficiency of the institutional framework of the economy). It is therefore the task of fiscal and structural policies – but also of those involved in the wage-bargaining process – to enhance the growth potential of the
economy. Accordingly, the mandate to support the general economic policies in the euro area does not give the ECB direct responsibility for any additional objectives other than price stability. Instead, the Treaty requires the ECB to take account of the other Community objectives in pursuing its primary objective. In particular, given that monetary policy can affect real activity in the shorter term, the ECB typically should avoid generating excessive fluctuations in output and employment on condition that this does not jeopardize its pursuit of its primary objective. Likewise, the mandate to support the general economic policies in the Community does not require the ECB to coordinate its policy ex ante with the economic policies in the Community. It is, however, part of the rationale behind the dialogue between the ECB and the economic policy-makers at the Community level." The European Central Bank --History..., 2006, p 47

Price stability and employment: the short run dilemma

"The Federal Reserve sets the nation’s monetary policy to promote the objectives of maximum employment, stable prices, and moderate long-term interest rates. The challenge for policy makers is that tensions among the goals can arise in the short run and that information about the economy becomes available only with a lag and may be imperfect." FRS, 2005, p. 15

"New Keynesian Macroeconomics” apprehends short run fluctuations as temporary deviations from natural trajectory. These deviations are interpreted as the result of supply or demand shocks\(^8\). On this topic also the Fed and the ECB do agree:

"For a wide variety of shocks (e.g. demand shocks, which move output and prices in the same direction) a prompt reaction by monetary policy is often adequate and will not only preserve price stability but also help to stabilize the economy. However, there are other types of economic shock (e.g. of a cost-push nature, like oil price hikes) that move output and prices in opposite directions. An excessively aggressive policy response to restore price stability in a very short span of time may, in these circumstances, risk imparting a significant cost in terms of output and employment

\(^8\) While it is possible to identify inflationary pressures quickly, it takes longer to determine their causes and know if they are temporary or permanent. Such an uncertainty makes problems for the adequate monetary policy response is not the same in both cases (see below, section 1.2 and section 2).
volatility which, over a longer horizon, could also affect price developments. In these cases, it is widely recognized that a gradual response of monetary policy is appropriate both to avoid unnecessarily high volatility in real activity and to maintain price stability over a longer horizon. "The monetary policy of the ECB (ECB 2004, p 54).

"Although price stability can help achieve maximum sustainable output growth and employment over the longer run, in the short run some tension can exist between the two goals. Often, a slowing of employment is accompanied by lessened pressures on prices, and moving to counter the weakening of the labor market by easing policy does not have adverse inflationary effects. Sometimes, however, upward pressures on prices are developing as output and employment are softening—especially when an adverse supply shock, such as a spike in energy prices, has occurred. Then, an attempt to restrain inflation pressures would compound the weakness in the economy, or an attempt to reverse employment losses would aggravate inflation. In such circumstances, those responsible for monetary policy face a dilemma and must decide whether to focus on defusing price pressures or on cushioning the loss of employment and output.” FRS, 2005, p 15

Thus, both central banks aim at counter short run price deviation that come form temporary demand shocks (which supposes active support to activity in such a context), but on the other hand, they will arbitrate between reducing inflationary pressures that come from supply shocks and smoothing their impact on employment and activity.

1.2. Monetary policies in practice (1990-2006)

The Fed and ECB policies have know very different macroeconomic contexts over the period 1990-2006. In the United States, the nineties start with a noticeable reduction of inflationary tensions, which will extend with the help of the "new economy" productivity gains. Short term interest rates therefore decrease by waves, punctuated by the pronounced tightening of 1994 and by the weaker one of the end of the decade.
Meanwhile, the monetary unification in Europe, which increases the number of fiscal adjustment programs, makes it possible to relax interest rates after the European monetary system crisis of 1992-93. That détente weakens the depressive impact of the Bundesbank tightening which has followed the German reunification, and extends to the Eurozone (see the figure below); but it happens in a context of fiscal adjustment and unfavourable economic situation, with the result that positive effects do not benefit altogether, all the more so as interest rates were particularly high in 1991.

This first period ends at the turn of the century with a sharp increase in oil prices and a tightening of monetary policies that will be ephemeral in both regions, because of the change of the international macroeconomic context. In the United States, the burst of the speculative bubble at the end of 2000 and the terrorist attacks of September 2001 weaken the economic
growth; in Europe, the accomplishment of the fiscal adjustments strengthens the economic recovery started from 1998. Yet, the activity bounces rapidly in the United States, strengthened by the rapid decrease in the Fed interest rates and the prompt budgetary response, whereas it runs out of steam in the Eurozone from spring 2000, in spite of the decreasing rates of the ECB.

*The Fed and ECB policies in the nineties*

The first stage of the European economic and monetary union (EMU) starts on 1 July 1990. The Committee of the governors of the central banks of the member states is charged with the mission of coordinating the monetary policies:

«The gradual realisation of a single market, in particular the liberalisation of capital movements and the rapid integration of financial markets, and the enhanced stability of exchange rates within the Exchange Rate Mechanism (ERM) of the EMS have strengthened the interdependence between national monetary policies. As a result, the effectiveness of monetary policy in Member States is becoming increasingly dependent upon central bank co-operation.» (ECB, 1992, p. 1)

The principles which govern monetary coordination clearly are centred on price stability:

«The Committee of Governors was established in 1964 and has since then been the principal forum for co-operation between the central banks of the EEC Member States. On the entry into Stage One of EMU the role of the Committee was considerably strengthened and its tasks were extended. In particular, additional emphasis was placed on the promotion of the co-ordination of monetary policies with the aim of achieving price stability as a necessary condition for the proper functioning of the European Monetary System (EMS).» (ECB, 1992, p. 1)

It might be however that, instead of ensuring a smooth functioning, seeking price stability unconditionally had corrupted the mechanisms of the EMS, and thrown the system into the crisis of the early nineties. That is at least what the retrospective study of the EMS mechanisms suggests. The EMS initially aims at limiting exchange rates variations between the member states. Currencies have a theoretical price in terms of the European Currency Unit (ECU), and therefore in terms of any currency of the system. The mechanism supposes that
the central banks intervene on the currencies market so as to stabilize the exchanges rates about their official level (+/- 2.25%). Interventions have self-regulatory effects in theory: countries with relatively high inflation incur a balance of payments deterioration, which increases the demand for ECU and pushes the central bank to sell part of its ECU reserves in exchange of national currency. As far as the monetary base is reduced, aggregate demand and prices slow down. The ERM hence ensures that the quantity of money adjusts in every country so as to reduce the inflation gap.

Notice that this theoretical functioning actually controls the inflation gap between member countries, not the average inflation. Furthermore, such a mechanism does not work if authorities sterilize the contraction of the monetary base, in order for example to support the aggregate demand (which may be useful in case of low fiscal room for manoeuvres). Of course, such flexibility may introduce a bias into the system, for sterilisation inhibits the adjustment process and extends the ECU reserves decrease. Therefore, in case of strong shocks, parities revisions can hardly be avoided as suggests the numerous realignments of the seventies and eighties. As recurrent depreciations against the Deutschemark allow for persistent inflation differential vis-à-vis Germany, the Bundesbank policy appears more and more as the best defence against inflation.

Consequently, the EMS functioning in the second half of the eighties is deeply altered. Admittedly, the anchoring of the main European currencies in the Deutschemark makes disinflation easier, but the EMS functioning on the other hand became asymmetric since the leader de facto no more had to worry about the parity (which diverted the leader's monetary policy from any common objective). Hence, while the Bundesbank austerity is suitable for the German situation, the general implementation of restrictive monetary policies in the European Community inconveniently raises interest rates, harms public finances and increases unemployment.

The original symmetric mechanisms, on the contrary, would have induced an increase in the ECU reserves and in the quantity of money in Germany in order to restrain the Deutschemark appreciation, which would have appeased the interest rates tensions. Such a monetary relaxation would have been all the most suitable as the eighties had largely reduced the fiscal policies room for manoeuvre.
Because it is unable to give rise to a coordinated increase of liquidity, the 'New EMS' however sets in a deflationary straitjacket\(^9\) where tensions build up until the German reunification and the concomitant hardening of monetary policy which most member countries no more can follow, and which precipitates the collapse of the system\(^{10}\). Owing to the large exchange rates movements of 1992-1993 most countries get their breath back and implement the public finance recovering which is required in mind to qualify for the monetary unification. But, despite the considerable enlargement of the fluctuation band (+/- 15\%), monetary policies remain clenched on the disinflation achievement so as to respect the required 'convergence criteria' of the monetary unification process, therefore contributing to the persistence of high interest rates, low fiscal revenues and high unemployment.

**Greenspan's method**

As dissensions resulting to decentralized monetary policies vanish when there is only one, the question arises in very different terms as concerns the United States monetary policy of the nineties.

Because of the investment cycle turning point, the United States enters the nineties with a depression and an increasing public deficit partly due to the first war in Iraq. The monetary policy responds promptly and vigorously: after the first relaxation of 1990, the federal funds rate, still hanging out at 7\% at the end of the year, drop sharply to 4\% at the end of 1991, then to 3\% from the end of 1992 till the beginning of 1994. Thus, in spite of the restrictions that aim at reducing the budget deficit, the United States economy promptly recovers, without inflationary pressures since the monetary relaxation actually offsets the deflationary trends. The Fed then raises rather sharply the interest rate in February 1994, in order to kill inflationary expectations from the outset, though such expectations do not appear clearly\(^{11}\).

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\(^9\) Restrictive monetary policies are not the sole cause for that; the lack of fiscal policy room for manoeuvre and unusually strong shocks also take part of the depressive context, as well as the lack of macroeconomic policies coordination among interdependent countries (see the section 2 below on this point).

\(^{10}\) See De Grauwe (1996) about the EMS crisis sequence of events.

\(^{11}\) Brender [2002] and Creel & Fayolle [2002] consider the Fed reaction as a preventive measure, but this does not fit with Mankiw's econometric results [2001], which suggest that the Fed responds mainly to inflation and current unemployment rate. On the other hand, James K. Galbraith (2006) considers that the rise of interest rates in 1994 is the main factor of the economic recovering which had to launch the "New economy era" by means of banks credit: increased short term rates would have prompted banks to increase the credit to the economy because short terms rate then became higher that the long term ones, which would had deterred banks from borrowing from the Fed to lending to the government, as they had done till then in order to make their balance sheet healthier with high rate and quality assets.
The Productivity gains acceleration will then prove to be sufficient to dissolve inflationary tensions, with the result that interest rates will be maintained around 5 to 5.5% until 1999.

This productivity acceleration raises some problem as concerns monetary policy, because it is not immediately perceived as an acceleration, with the result that the Fed hesitates between the hypothesis of a cyclical (therefore temporary) phenomenon which forthcoming reversal could be accompanied by inflationary pressures, and the hypothesis of a technological shift, which elevates the potential output of the economy and removes the inflationary threat. In front of uncertainty, the Federal Reserve actually will prudently maintain the interest rates, so long as effective signs of inflationary tensions do not appear. Conscious that a decrease in unemployment does not necessarily announce more inflation when productivity accelerates, Greenspan decides not to rise the federal funds rates on the basis of advanced indicators such as the number of voluntary left jobs (which do not rise in the period).

Uncertainty drives in principle to gradual responses, but gradualism does not mean necessarily feeble interest rate adjustments. Vigorous gradual responses may be usefully implemented, provided they are clearly interpreted as part of a necessary sequence. The effectiveness of such a policy depends on whether it is credible or not. From this point of view, Mankiw (2001) pointed out that the Clinton administration maintained Greenspan and did not comment the Fed decisions in public.

Finally, the economic performances of the United States during the 1990s are rather good, especially in the second half. Admittedly, the macroeconomic context is rather favourable; according to Mankiw (2001), depressive shocks hit the demand side, which allows for monetary relaxation without inflationary pressures, whereas positive shocks, which hit the supply side, makes it easy for the central bank to prolong a benevolent "wait-and-see" strategy. It is true nevertheless that, whatever the case, the Fed's policy plays it's role altogether, by adjusting interest rates both vigorously in case of inflation pressures (so as to avoid pernicious effects on the real interest rate) and with precaution (so as to take delays into account and to avoid impacting the aggregate demand either prematurely or too late).

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12 The will of managing cautiously with financial markets that are grappling with the 'speculative bubble' also may have played in favour of Greenspan's wait-and-see attitude. See Palley (2002) for a discussion about monetary policy stakes in terms of financial stability.

13 Because of money neutrality in the long run, the mainstream literature only recognizes the role of credibility as a precondition of inflation control. By contrast, in the Keynesian approach (see the Section 2), credibility also affects real magnitudes through the influence on the "state of the confidence". Le Heron (2006) argues that confidence was a crucial aspect of Greenspan's strategy.

14 For example, if interest rate increase is not strong enough, expectations of inflation may not decrease enough, with the result that real interest rates actually decrease and reinforce inflationary
1999-2006: United States recovery and European stagnation

This second phase is mainly marked by the oil price increase, the terrorist events of September 2001 and the second intervention in Iraq, while the Eurozone implements a major institutional change by delegating the common monetary policy to the ECB.

The moderate increase of the Federal funds rate in 1999-2000 brings them to 6.5% at the end of 2000. Rates then decrease quickly during the first five months of 2001 (50 basis points by month) before the slowdown of the summer when they reach 3.5%. The terrorist attacks trigger a second decreases wave: from 3.5% in the early September, the federal funds rate pass to 3% on September 17, 2,5 in October, 2 in November, and 1,75% in December, staying at this level about one year). Clearly, the oil prices inflationary pressures are relegated in the background because of the deflation threat, with the result that the monetary policy supports aggregate demand strongly.

In the same time, the recession in Europe prompts the ECB to relax its policy, but the response is much weaker. Considering that monetary policy does not influence real magnitudes over the medium run, the ECB gives priority to stabilize inflation expectations. Such an analysis corroborates the results of Creel and Fayolle (2002) concerning the responses that would have been those of the ECB if it had applied the Fed's "Taylor rule" estimated by Mankiw (2001) over the nineties.

"Si on applique brutalement cette formule aux données de la zone euro, on trouve deux résultats : le taux de refinancement pratiqué par la Bce depuis 1999 aurait du être en permanence franchement plus bas qu’il ne l’a été, et même négatif, mais il aurait dû tensions ... According to Mankiw (2001), the Fed responses have been stronger in the nineties, compared with the 1960s, 1970s and 1980s.  
15 See "The outcome of the ECB’s evaluation of its monetary policy strategy", ECB monthly bulletin, Jun 2003, pp. 80-81.  
16 The "Taylor rule" stipulates, on the basis of empirical observations, that the real interest rate varies according with the presumed (natural) long run value and according with the output gap. That supposes a relation between the nominal interest rate on the one hand, and the natural real rate of interest, the output gap and the expected inflation rate on the other hand. Such an automatic monetary behaviour is not that easy in practice, since uncertainty makes it impossible to identify any "natural rate" (see the discussion on this point in section 2.1.2). For a critical appraisal of the "Taylor rule", see also Arestis & Sawyer (2003).
aussi connaître depuis début 1999 une remontée nettement plus prononcée que celle qu’il a connu...” Creel et Fayolle (2002), p 195.

Here can be seen the consequences of declaring an inflation target: by committing to maintain the inflation rate near to 2% over the medium term, the ECB indeed leaves itself some room for manoeuvre in the short run\(^\text{18}\), some discretionary power, all the more as the "short" and "medium run" notions are not precisely defined. But, on the one hand, that power is more limited than the Fed's one, for the Fed does not precise any quantitative target\(^\text{19}\), and on the other hand, it makes it dangerous to support frankly the economic activity in front of important shocks, since the inflation gap which would result could be considered as an infringement of the declared target, and therefore could feed inflation expectations.

Finally, the sort of "constrained discretion" implemented by the ECB seems more effective to stabilize prices:

\(^{17}\) "If one applies roughly the formula to the data of the Eurozone, we find two results: the refinancing rate the ECB used since 1999 should have been permanently right ahead lower that it has been, and even negative, but it should had known also a markedly more pronounced rise that it had known…"

\(^{18}\) The idea of room for manœuvre in monetary policy refers to the "constrained discretion » in the literature about inflation targeting (see Bernanke & Mishkin 1997, p 106). It is based upon the theory of dynamic inconsistency of discretionary policies, which recommends to limit the discretionary power.

\(^{19}\) Various authors have pointed out the discretionary nature of Greenspan's monetary policy. “The low inflation and economic stability of the 1990s shows that discretionary monetary policy can work well. Yet it leaves only a limited legacy for future policymakers. U.S. monetary policymakers during the 1990s may well have been engaged in "covert inflation targeting” at a rate of about 3 percent, but they never made that policy explicit.” Mankiw, 2001, pp. 52-53. James K. Galbraith's interpretation is still more clear-cut : "This brief review of Federal Reserve policy reveals an institution with a stricking doctrinal flexibility. […] In so doing, it has devalued the contribution of theoretical and ideological economists to the point where, at the most, their role is to provide window dressing for decisions taken largely –if not entirely- for other reasons. Doctrine in American monetary policy has become endogenous to the policies that it serves.” Galbraith (2006), pp. 431-32.
But the short experience of the ECB suggests that there is a substantial cost in terms of economic activity:

An assessment of the discourses and practices
According to the official texts, the idea that the ECB gives priority to prices stability while the Federal Reserve also takes employment into account exaggerates the differences between the Fed and the ECB missions. Both institutions seek for price stability over the long period as a precondition for high employment and economic growth. In the short run however, some difference of style is possible; by avoiding to declare a precise inflation target, the Fed leaves
itself a larger room for manœuvre in terms of output stabilization, especially in front of supply shocks.

Things appear less clear-cut in reality. First, in the nineties, the many currencies of the EMS raised a specific problem of coordination in Europe. The crisis of 1992-93 revealed the pernicious effects of trying to coordinate through national disinflation objectives. The delegation of monetary policy to the ECB was a major institutional change from this point of view, because it entrusted a common objective to a common authority (Asensio, 2002), but the benefits of the monetary unification struggles to be effective: as a matter of facts, the monetary policy of the Fed gave stronger support to the economic activity than the ECB since 1999, without losing the control of inflation (though the ECB do slightly better as regards this criteria).

2. Explaining the ECB counter-performance

The empirical discussion of Section 1 leaves some doubt about the monetary policy neutrality. One can hardly maintain that the relative performances of the United States economy owes a bit to Greenspan's know how and that money is neutral over the long term. One can also hardly deny that the lack of monetary cohesion within the EMS and then the lower reactivity of the ECB have had some influence upon the Eurozone performances since 1990. Furthermore, is it not paradoxical to believe in money neutrality and to be so anxious about inflation? To believe in money neutrality and to affirm at the same time, as both central banks do, that inflation is prejudicial to the resources allocation process? Either money is neutral and inflation does not really matter, or it is not, and then inflation and monetary policy must be investigated within a different theoretical framework.

The walrasian approach to general equilibrium, in the form proposed by K. Arrow and G. Debreu in 1954, rests upon a theoretical market system which allows for spot and future contracts. The hypothesis of a complete set of markets ensures that spot and all futures prices are known; as a matter of consequences, the system is not really dynamic, since agents take decisions on the basis of such prices, in such a way that the future is reduced to the accomplishment of the transactions initially decided.

In this framework, any competitive equilibrium is shown to be Pareto optimal as concerns the resources allocation. But inflation, money and monetary policy raise important difficulties, for it would require (except if the future is foreseeable owing to some ergodic property, say "natural law") that spot markets will open in the future so as to take account of
new higher prices, which would contradict the view of predetermined transactions for all dates in the future that is required for equilibrium to be determined. Hence, inflation and monetary policy can not be integrated but in the neutral way. That supposes to reduce uncertainty to risk, in order for future prices to be foreseeable, within a stochastic "white noise" around the natural trajectory. But in front of true uncertainty, allocating resources is quite more problematic since spot and future prices do not yield the complete information.

Actually, from the theoretical point of view, it is well known that optimality is not a general property of competitive markets, even in the absence of uncertainty; optimality requires specific conditions (namely gross substitution of aggregate demand functions). But the "Sonnenstein-Mantel-Debreu" theorem stated that nothing ensures such conditions within the Arrow-Debreu framework. Thus, efficiency of competitive markets unfortunately simply is a postulate that reflects the beliefs of those who refer to it, not a scientifically established result. It is because they deny uncertainty and believe to competitive market optimality that central banks claim that prices stability is a precondition of efficiency.

The view on the effectiveness of uncertainty is crucial in the monetary policy theory, for monetary policy closely depends on the long run properties of the economic system. For example, stochastic stationary regimes possess strong regulatory forces which anchor the system on a predictable trajectory\(^{20}\), what makes rational expectations reliable. In such regimes, which inspired the New Consensus Macroeconomics (NCM)\(^{21}\), the best monetary policy can do is to stabilize the economy around the long run trajectory. On the other hand, there is no predictable trajectory in non-ergodic regimes, with the result that people can not reasonably have full confidence in their expectations, even rationally conceived. That is the starting point of Keynes's liquidity preference theory, and of The General Theory. In these regimes, monetary policy takes part in the trajectory of the economic system both in the short and in the long run. It is not neutral.

This section reveals some drawbacks that may result from implementing the type of monetary policy recommended in the new-macroeconomics within a Keynesian system which

\[^{20}\text{These forces of course relate back to the competitive mechanisms. That property has been identified as the dynamic stability of a stochastic process (ergodicity). See Vercelli (1991: 40, 154) and Davidson (2002: 39, 69).}\]

\[^{21}\text{Actually, the view according to which economic processes are stationary is more and more denied on both empirical and theoretical grounds (Farmer 2002 and Henri 2002). The flourishing literature on regime-switching (Hinich, Foster & Wild 2006, Evans & Ramey 2006), non rational expectations and adaptive learning (Sargent 1999; Preston, 2006), rational beliefs (Kurz 1994, Kurz & Motelese 2001, Wu & Guo, 2003)… show how enlarging is the notion of uncertainty in contemporaneous macroeconomics.}\]
does not have any "natural" trajectory. It enlightens the ECB counter-performance as the result of dogmatism, by contrast with Greenspan's pragmatism (2.1). Then it studies additional difficulties related to the coordination problem between the national fiscal policies and the ECB, and offers eventually some Keynesian principles that are amenable to improve the ECB contribution to the economic performance of the Eurozone (2.2).

2.1. Pernicious effects of dogmatism in monetary policy

This section discusses some effects of uncertainty on macroeconomic mechanisms, before considering the trials of dogmatism in monetary policy.

2.1.1. Uncertainty and macroeconomic adjustment

Keynes, in relation with the largest apprehension of uncertainty, conceived his general theory without postulating any 'natural' position or trajectory. That does not mean that people can not make rational expectations, but that implies that the meaning and usefulness of such forward looking information is far weaker than the one usually given to it in mainstream's economics. Keynesian rational expectations admit that people make use of all the available information of course, but whatever the kind of probabilistic tools they might make use of, true uncertainty makes it not so rational to consider expectations as a satisfactory basis for decision making. That is the reason why Keynes thought that decisions actually "also depend on the confidence with which we make this forecast--on how highly we rate the likelihood of our best forecast turning out quite wrong" (Keynes, 1936, ch. 12, s. 2).

The liquidity preference concept, which results from that kind of uncertainty, has heavy consequences as concerns the macroeconomic adjustment process. In ergodic competitive regimes, aggregate demand adjusts to the supply of goods, in the same time that investment adjusts to the supply of saving, because nothing hinders the adjustment of real wages and interest rate. If aggregate demand (and prices) decreases, the need for transaction-money falls, and the rate of interest decreases, rising the demand and the price of goods and moving the real wages towards their full employment level\(^{22}\). But, in Keynesian contexts, the magnitude

\(^{22}\text{Theoretically, it is possible for flexible nominal wages to reach this solution without any variation in the rate of interest (but some obstacles may jeopardize it; see The General Theory, Ch. 19): through positive effects on the marginal efficiency of capital and effective demand, wage flexibility may}
of the decrease in interest rate (the so-called 'Keynes effect') and of any positive real balance effect (people do not want to hold idle cash balances and therefore increase the demand for goods) depends on speculative decisions concerning the demand for money, with the result that the income and employment levels finally depend on the degree of confidence of the moment and its impact on the demand for money. Since the nominal wages decrease does not ensure positive effects on effective demand (and price index) either, there is no endogenous correction of unemployment, and, furthermore, Keynesian unemployment has to be thought as a situation where both the real wages and the interest rate meet a kind of threshold.

General equilibrium conditions according to the mainstream approach

Within the usual four macro-markets framework, general equilibrium supposes a set of conditions which expresses suppliers and demanders plans. Because of the Walras law, three markets only have to be explicit. Moreover, since the money supply is assumed to be exogenous for the moment, the general equilibrium conditions reduce to five: the supply and demand for labour conditions, the supply and demand for goods conditions, and the market for money clearing condition (see Table 1).

We focus on the short run deviations (around the 'natural' trajectory), in the sense that the productive physical stock of capital is assumed to be constant during the period. Hence, variables are expressed in terms of relative variations from their initial value, excepting the rate of interest and the tax rate, which are expressed as variations. All the parameters are positive. Furthermore, we suppose that labour contracts have been negotiated, at the starting point of the period, on the basis of the expected rate of inflation for the current period ($p^e$). Hence, if $p^e=p$, inflationary shocks have no effect on employment (equation 1) and production (equation 3), but in case of inflationary surprise ($p\neq p^e$), demand shocks influence the level of employment through the prediction error ($p-p^e$).

produce inflation, reduce real wage and rise production. If on the other hand nominal wages are sticky, the role of interest rate becomes crucial.

23 This is why Keynes thought about his general theory as a theory of shifting equilibrium (The General Theory, Ch. 21, Section I, third paragraph).

24 See the footnote n°22.

25 Otherwise, wages would decrease continuously because of unemployment pressure. See Tobin (1975) and Palley (2005) about this kind of instability.

26 The reader will find more details on the methodological aspects of our modelling in Asensio (2005a).
Table 1: New macroeconomics’s general equilibrium conditions
(deviation from the ‘natural trajectory’)

<table>
<thead>
<tr>
<th>Market</th>
<th>Equation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour market ((n, w))</td>
<td>(n = \rho(p - w - \xi \hat{i}) + d)</td>
<td>(1) Demand: marginal productivity equalization to real labour cost (including taxes, see appendix n°1)</td>
</tr>
<tr>
<td></td>
<td>(w - p^a = \theta n)</td>
<td>(2) Supply: marginal disutility of labour equalization to the expected real wage</td>
</tr>
<tr>
<td>Goods market ((y, \hat{i}))</td>
<td>(y = \alpha n + c)</td>
<td>(3) Supply: short run production function (diminishing marginal product: (\alpha &lt; 1))</td>
</tr>
<tr>
<td></td>
<td>(y = -\sigma \hat{i} + \lambda (\rho g + a) - \gamma \hat{i})</td>
<td>(4) Aggregate demand (see appendix n°2)</td>
</tr>
<tr>
<td>Money market ((p))</td>
<td>(m = y + p - \eta \hat{i})</td>
<td>(5) Market clearing condition (exogenous supply*); by setting the quantity of money, the central bank controls (p) and may (temporarily) impact the demand for labour and the supply of goods through inflation surprises: (p - p^a)</td>
</tr>
<tr>
<td>Bonds market</td>
<td>Implicit</td>
<td>Walras law</td>
</tr>
</tbody>
</table>

* The case for endogenous money is discussed below.

\(n\) is the relative variation in employment
\(w\) is the nominal wage relative variation
\(p^a\) is the expected increase in prices till the next period
\(d\) is an exogenous term
\(y\) is the relative variation in volume of output
\(c\) represents exogenous technological factors
\(g\) is the relative variation in the government demand for goods
\(\hat{i}\) is the variation in the tax rate
\(a\) is the relative variation in the exogenous part of aggregate private demand
\(\hat{i}\) is the variation in the rate of interest
\(m\) is the relative variation in the quantity of money
Remark

The model lends itself to an analysis in terms of aggregate supply and aggregate demand. Equations (4) and (5), which are similar to the IS-LM conditions, give the demand equation \( y(p) \), which may be written as \( p(y) \):

\[
p = -\frac{(\eta + \sigma)y + \eta \lambda(\varphi + \alpha) - \eta \gamma \hat{i}}{\sigma} + m
\]

Equations (1), (2), and (3) give the supply equation:

\[
y = \frac{\alpha p (p - p^*) + \alpha d - \alpha \rho \xi \hat{i}}{1 + \rho \theta} + c
\]

Resolution yields \( y \) and \( p \), which permits to solve for \( n \) by (3), then \( w \) by (2), and finally \( \hat{i} \) by (5). Remember that output variations do not really depend on current price index variations, but on the current price index error of prediction, as the supply equation clearly shows.

In recent versions of the NCM (see Romer, 2000), monetary policy consists in controlling the rate of interest rather than the quantity of money, which has to be considered as an endogenous variable. In this case, the output \( y \) is determined by the sole aggregate demand components (equation 4). Then we can get \( n \) by (3), \( w \) by (2), \( p \) by (1) and finally \( m \) by the function LM (equation 5), which actually is not required for determining real magnitudes\(^{27}\). It is however important to note that this demand led behaviour only may hold temporarily, in case of a prediction error. Indeed, it can be shown that if authorities set the rate of interest so as to avoid any price index error of prediction (that is \( p = p^\sigma \)), then the results are the same as in the case of exogenous money supply where \( m \) is set so as to avoid errors of prediction (the interest rate remains in this case at the 'natural' level). Since there can be no systematic prediction errors, but only stochastic ones, it is obvious from Table 1 that in the long run a) employment is determined in the market for labour, b) output and interest rate are determined in the market for goods, conditionally to the market for labour results, and c) money is necessary exogenous and governs the price index behaviour, in accordance with the pure Classical features.

\(^{27}\) Notice that employment is determined by conditions related to the goods market, whereas prices are determined by conditions related to the labour market.
**General equilibrium conditions according to the Keynesian approach**

Let us now consider a context of Keynesian unemployment in which the rate of interest is exogenously determined by the monetary authorities (which does not control it perfectly however, especially if reductions are concerned; see below), and real wages have met an exogenous threshold ($\bar{w}$) owing to the workers resistance to wages decreases that do not reduce unemployment (or make it worse). The current wage may deviate from this threshold when certain events occur, such as a change in unemployment rate or exogenous disturbances, like in equation $2_k$ of Table 2 (where $n_j$ is the total labour force).

<table>
<thead>
<tr>
<th>Goods market ($\rightarrow y, p$)</th>
<th>$y = -\sigma \hat{i} + \lambda (\varphi g + a) - \gamma \hat{i}$</th>
<th>(4) Effective demand drives aggregate supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor market ($\rightarrow n, w$)</td>
<td>$n = p \left( p - w - \xi \hat{i} \right) + d$  $\iff$  $p = w + n - y - \bar{\alpha} + \xi \hat{i}$</td>
<td>(1) marginal productivity equalization to the real labour cost provides the mark-up price equation ('1\textsuperscript{st} postulate' holds; see appendix n°3), as a function of aggregate demand</td>
</tr>
<tr>
<td>Money market ($\rightarrow m$)</td>
<td>$m = y + p - \eta_k \hat{i}$</td>
<td>(5\textsubscript{k}) Market clearing condition (endogenous money supply); the demand for money is unstable, hence the CB imperfectly controls $\hat{i}$.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Implicit</th>
<th>Walras law</th>
</tr>
</thead>
</table>

**Table 2: Keynesian 'shifting equilibrium' conditions (deviation from previous equilibrium)**

Because of the effects of uncertainty on the "state of confidence", the liquidity preference theory can explain unforeseeable shifts in the demand for money (The General Theory, Ch. 12). This specificity of Keynes's approach will be formally underlined through considering $\eta_k$.
as an exogenous variable which is subject to the volatility of expectations (equation 5). It has heavy implications on monetary policy because it makes the central bank control of the long term interest rate questionable. When the monetary base is increased through lowering the short term rate, lower long term bank rates in principle boost the demand for credit, provided the liquidity preference does not shift too much. But an increasing liquidity preference may conversely make banks able to sell more credit without having to reduce their interest rates, for non-bank loans (bonds) rates in this case tend to rise in order to compensate the increasing liquidity preference. Moreover, the liquidity trap may also block the transmission process in case of generalized 'bearishness'. For these reasons, the NCM optimal monetary rule, which assumes that authorities always can adjust the rate of interest to the natural level, is irrelevant in a Keynesian context.

Interestingly, from a formal point of view, the model of Table 2 looks very much like the New macroeconomics model with endogenous money, especially when the labour force is constant in the short run \(n_f = 0\), as it is usually assumed. Here again, the output \(y\) is determined by the sole aggregate (effective) demand (equation 4), \(n\) by the production function (3), conditionally to the output level, \(w\) by equation (2), \(p\) by equation (1) and finally \(m\) through LM. These similarities have been a source of confusion for a long time, because they hide fundamental differences as concerns the signification and properties of equilibrium, as well as the stakes of monetary policy. In Keynesian regimes, aggregate demand has not only temporary effects; it matters in the long run as far as adjustment mechanisms are polluted by uncertainty as discussed above; hence deficient effective demand may keep the economy away from full employment. In addition, there is volatility of expectations, and therefore volatility of aggregate relations and various possible equilibria and trajectories (open future), since there is no objective anchor for them (no foreseeable trajectory).

2.1.2. Taylor rule drawbacks in the absence of "natural" anchor

According to the section 1, the ECB seems to have respected more accurately the new macroeconomics principles than the Federal Reserve, with a certain success as concerns inflation control, but less successfully as concerns the economic activity. This section put forward some theoretical arguments according to which the mainstream designed monetary

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28 Actually, it is important to bear in mind that most equations of Keynesian models do not pretend to the stability that is usually assumed.

29 See Arestis (2006) on this point.
policy has (non-temporary) negative effects on employment when the system does not have any "natural" anchor.

According to the new macroeconomics, the monetary and fiscal instruments that influence the aggregate demand can be activated usefully in front of nominal rigidities, so as to reduce the volatility of output and prices around the natural trajectory, as indicated in Table 3.30

<table>
<thead>
<tr>
<th>Monetary policy (→ (i), &quot;Taylor rule&quot;)*</th>
<th>(p = -\beta n)</th>
<th>(6) (\beta \geq 0), 'flexibility' of monetary policy, i.e. relative weight of unemployment deviations compared to price deviations (structural parameter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgetary-fiscal policy (→ (g), (\hat{\gamma}))*</td>
<td>(b = \psi n)</td>
<td>(7) (\psi \geq 0), relative weight of unemployment deviations, compared to budget balance deviations (b) in the government preferences (structural parameter)</td>
</tr>
</tbody>
</table>

*These simple policy rules can be derived by minimization of some loss-functions 31.

Remark

As stated in Section 1, both central banks feed some imprecision about their objectives so as to leave themselves some discretionary room for manoeuvre. The Fed behaves more freely on that ground, as suggests the following excerpt:

"The “Taylor rule,” named after the prominent economist John Taylor, is another guide to assessing the proper stance of monetary policy. It relates the setting of the federal funds rate to the primary objectives of monetary policy—that is, the extent to which inflation may be departing from something approximating price stability and the extent to which out-put and employment may be departing from their maximum sustainable levels. For example, one version of the rule calls for the federal funds rate

30 On the supply side, competitive distortions and other real rigidities which explain the gap between the natural level of activity and the full capacity level, come under the competence of "structural" policies.
31 For example, the first order condition that \(g\) must verify in order to minimize:
\[L=(1/2)(\xi n^2+b^2) = \xi n(\hat{\gamma}n/\hat{\gamma}g)+b(\hat{\gamma}b/\hat{\gamma}g)=0\]
which is equivalent to \(b=\psi n\) provided that \(\psi=-(\hat{\gamma}n/\hat{\gamma}g)/(\hat{\gamma}b/\hat{\gamma}g)\). This approach sometimes raises difficulties that will not be discussed here.
to be set equal to the rate thought to be consistent in the long run with the achievement of full employment and price stability plus a component based on the gap between current inflation and the inflation objective less a component based on the shortfall of actual output from the full-employment level. If inflation is picking up, the Taylor rule prescribes the amount by which the federal funds rate would need to be raised or, if output and employment are weakening, the amount by which it would need to be lowered. The specific parameters of the formula are set to describe actual monetary policy behaviour over a period when policy is thought to have been fairly successful in achieving its basic goals. Although this guide has appeal, it too has shortcomings. The level of short-term interest rates associated with achieving longer-term goals, a key element in the formula, can vary over time in unpredictable ways. Moreover, the current rate of inflation and position of the economy in relation to full employment are not known because of data lags and difficulties in estimating the full-employment level of output, adding another layer of uncertainty about the appropriate setting of policy."

FRS, 2005, p 23.

As long as the government can adjust the two instruments \((g, \dot{i})\) freely, there are three instruments and three objectives. Solving the system of equations (1), (2), (3), (4), (6) and (7) yields: \(p=n=b=0\). Thus, the New Consensus governance gets the ideal outcome in terms of prices, output and budget balance stabilization. There is a kind of 'symbiosis' between monetary and fiscal policies\(^{32}\). The symbiosis however may turn into severe drawbacks when the new governance principles of Table 3 are implemented into the non-ergodic system of Table 2. In the presence of Keynesian unemployment \((q>0)\), that is, without spontaneous return towards the full employment, as long as the actual unemployment and interest rates are interpreted as 'natural' rates, they serve as macroeconomic policy targets, with the result that the policy mix 'symbiotically' anchors the system away from the full employment: since they targeted \(n=0\), they get \(q-n=q\). The situation then may persist for it seems to be the consequence of the real wages rigidity \((p=0, \text{ and } w=\bar{w} \text{ provided } n_f=0)\), which is one of the main causes of natural unemployment in the "New Keynesian Economics".

This line of argument suggests that implementing dogmatically the new macroeconomics monetary policy within a system that does not verify the theory hypothesis may produce a

\(^{32}\) Dixit & Lambertini (2001, 2003) recently extended this result to monetary unions.
kind of unemployment trap, to which the mainstream uses to refer as hysteresis\textsuperscript{33}: when authorities lack for room for manoeuvre in front of a negative shock, for example because of budget balance considerations, the symbiosis only works partially, and unemployment increases. Since nothing tends to reduce it then, authorities take the actual unemployment rate as the new natural one. That gives a rational to the idea that the Stability and Growth Pact, along with the dogmatism of the ECB, could have weighed on the employment situation after the economic reversal of the early 2000s, therefore explaining the stagnation that followed (see the section 1.2 about the period 1999-2006).

Similar drawbacks may arise in case of distributive tensions. According to Table 2, equation (1) can be written as a mark-up equation, therefore revealing inflation factors that depend on income distribution concerns (mark-up, fiscal tax rate, wages pressure\textsuperscript{34}). These factors influence indirectly the unemployment rate through the monetary policy reaction they may trigger. Hence, whatever the causes of inflationary pressures are, the central bank always can restrict the effective inflation by increasing the interest rate and the level of unemployment in such a way that the pressures fade. Inflation therefore always is a monetary phenomenon since it expresses higher monetary prices of goods and services; but whereas the mainstream's economics incriminates irresponsible or lax policies, the Keynesian approach points out the dilemma involved by the distributive tensions: to preserve the value of money and assume higher unemployment, or to preserve employment and let inflation develop. The former think moreover that reducing monetary inflation has no permanent cost in terms of unemployment, whereas it does for the latter, as far as persistent tensions induce monetary authorities to maintain high interest rates\textsuperscript{35}.

In this aspect also the Fed has had the advantage of knowing more favourable economic conditions than the ECB during the nineties. If globalization is scarcely propitious for wage claims (in both regions), the period nevertheless is characterized by a noticeable increase of the profit share (and therefore of the mark-up) in Europe, whereas that share revealed more stable in Anglo-Saxon countries\textsuperscript{36}. Furthermore, the appreciable acceleration of the United States productivity gains in the second half of the nineties resulted in a persistent difference

\textsuperscript{33} On hysteresis, ergodic and non-ergodic regimes see the Minisymposium in the \textit{Journal of Post Keynesian Economics}, 15(3), Spring 1993.\textsuperscript{34} In an open economy, prices of oil and imported intermediate goods should also be taken into account.\textsuperscript{35} See Palley (1997, 2001) for an empirical discussion.\textsuperscript{36} See Lequiller & Sylvain (2006) for a recent assessment.
between the annual rates of change (which relaxes the inflationary tensions; see the influence of \( y-n \) in equation 1, Table 2):

![Labour productivity index (2000=100) total economy](image)

Source: OECD, Unit Labour Cost – Annual Indicators

2.2. Monetary policy and macroeconomic governance in the Eurozone

This section extends the discussion so as to consider additional difficulties of the monetary policy of the Eurozone (2.2.1), and puts forward some propositions which aim at strengthening the ECB contribution to the economic growth of the Eurozone (2.2.2).

2.2.1. The pernicious effects of monetary policy dogmatism in a monetary union

The European monetary history of the nineties suggests that monetary cooperation based on disinflation may involve pernicious effects, like inadequate quantity of money\(^{37}\). That is the way competitive disinflation turned into competitive deflation in the "New EMS": the benefit of disinflation fades when all the member states make disinflation, while the negative effects of simultaneous restrictive monetary policies operates. Basically, a concerted monetary

---

\(^{37}\) This paragraph extends the discussion about the "New EMS" of the section 1.2. Remember that disinflation is officially at the core of the coordination program of the Committee of the governors of the central banks of the member states.
expansion would benefit to all the member states, but no one wants to take the plunge for lack
of information about what the others are going to do: on the one hand, Germany fears a
generalized inflationary drift in the case where the Bundesbank relaxes somewhat its policy,
for the "New EMS" disinflation discipline is hard to support in many other countries; on the
other hand, the other member states fear to loose price-competitiveness if there were to relax
their monetary policy, as were the case in the first half of the eighties.\(^{38}\)

The United States implemented on the contrary a monetary expansion when it was
confronted with such a problem in the early eighties (public deficit and unemployment);
reduction of the public deficit was engaged later, when the economic recovery had been
launched and low interest rates had lightened the debt burden. Thus; while a centralized
policy mix made it easy to coordinate the monetary and fiscal responses, the decentralized
policy mix in Europe made it impossible to have a coherent set of national monetary and
fiscal responses, beyond the common objective of disinflation: a) on the one hand the central
banks do not want to relax their policies for the reason mentioned above; b) on the other hand,
they have good reasons, since they aim at controlling inflation, for waiting that the public
deficits reduction were engaged before relaxing the monetary corset, while fiscal policies
have good reasons, since they fear to increase unemployment, to wait for a monetary
relaxation before cutting deficits\(^{39}\).

The Maastricht convergence criteria helped to unblock the situation, since they prompt
budgetary policies to make the first step. Contrary to the American experience, the decrease
in interest rates was triggered by generalized deficit reduction programs, not by the wish of
monetary policies to stimulate the European economy. According to the simulations of the
model MIMOSA\(^{40}\), the same policy mix as in the United States would have offset the 1993
recession (+1,3% instead of –0,5%) and consistently reduced the global public deficit (3,4
instead of 5,2% of GDP in 1995). Furthermore, the budgetary restrictions of 1996 and 1997
also would have been offset, as well as the 1996 slowdown. The inflation cost of such a policy
mix would finally have been quite limited (+ 0.3% in 1994 and 1995).

These events attest of the pernicious effects that may result from lack of coordination
within interdependent countries. The monetary unification of the Eurozone potentially reduces
considerably the scale of the coordination problem, since there is no more than one monetary
authority left, but the policy mix efficiency remains conditioned by the ECB policy as

\(^{38}\) The inadequacy of the system’s liquidity here appears as a matter of international coordination.

\(^{39}\) Here is a second coordination problem; between monetary and fiscal policy in this case.

\(^{40}\) See Muet (1998) and OFCE (1999).
concerns the liquidity of the system. In order to discuss the point, we extended the model of Table 2 so as to build a two-country monetary union model.

**Table 4: ‘Shifting equilibrium’ in a monetary union**
*(deviations from previous equilibrium)*

<table>
<thead>
<tr>
<th>Labour markets ((\rightarrow n_i, w_i))</th>
<th>Country 1</th>
<th>Country 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y_1 = \alpha_1 n_1 + c_1)</td>
<td>(y_2 = \alpha_2 n_2 + c_2)</td>
<td></td>
</tr>
<tr>
<td>(w_1 = \bar{w}<em>1 - \theta</em>{k1} (n_{f1} - n_1))</td>
<td>(w_2 = \bar{w}<em>2 - \theta</em>{k2} (n_{f2} - n_2))</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goods Markets ((\rightarrow y_i, p_i))</th>
<th>Country 1</th>
<th>Country 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(y_i = -\gamma_i \hat{t}_i - \sigma \hat{t}_i + \kappa (p_2 - p_1) + \lambda_i (\varphi_i g_i + a_i))</td>
<td>(y_2 = -\gamma_2 \hat{t}_2 - \sigma \hat{t}_2 - \kappa (p_2 - p_1) + \lambda_2 (\varphi_2 g_2 + a_2))</td>
<td></td>
</tr>
<tr>
<td>(n_1 = \rho_1 (p_1 - w_1 - \xi_1 \hat{t}_1) + d_1) &amp; (n_2 = \rho_2 (p_2 - w_2 - \xi_2 \hat{t}_2) + d_2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(p_1 = w_1 + n_1 - y_1 - \alpha_1 + \xi_1 \hat{t}_1)</td>
<td>(p_2 = w_2 + n_2 - y_2 - \alpha_2 + \xi_2 \hat{t}_2)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Money market ((\rightarrow m))</th>
<th>Implicit</th>
</tr>
</thead>
<tbody>
<tr>
<td>(m = \frac{1}{2}(y_1 + y_2) + \frac{1}{2}(p_1 + p_2) - \ell \hat{t})</td>
<td></td>
</tr>
</tbody>
</table>

| Bonds market | Implicit |

\((y_1 + y_2)/2\): is the relative variation in the average output of the Union

\((p_1 + p_2)/2\): is the relative variation in the average price index

Let us suppose in this perspective that the money market and the bonds market has been unified. The system comprises six markets (the two labour markets -immobile factor-, the two markets for goods - imperfect substitutes -, the market for bonds, and the market for money), which supposes five relative prices (two real wages in terms of goods, the international relative price of goods, the rate of interest and the real price of money in terms of goods, which inverse is the nominal price of goods). Because of the Walras law, the equilibrium condition for the market of bonds will remain implicit.
It can be shown\textsuperscript{41} that the Taylor's rule drawbacks that have been identified in the section 2.1.2 are at work in this extended framework, what pleads for substantial changes in the macroeconomic governance of the Eurozone. First, the blind faith in money neutrality and beneficial natural forces is not accurate in an uncertain world. Consequently, authorities should no refer to any "natural" position (natural rate of interest, natural rate of unemployment...), for that tends to block the economy where the effective demand puts it. That means to discard automatic rules in the vein of Taylor's one. Greenspan's experience rather put forward the benefits of not defining too precisely the inflation target. Second, as the European Central Bank can not repress recurrent distributive inflationary pressures without having non-temporary depressive effects on employment, one ought to promote institutional ways (regulations, union mediation...) of making the outcome distribution less conflictive, less inflationist and by means of less restrictive monetary policy, less depressive eventually. As detailed in the section below, that would furthermore allow the ECB to support more effectively the member-states macroeconomic policies.

2.2.2. How could the ECB's support the macroeconomic policies in the Eurozone? Some additional Keynesian propositions

Whereas mainstream economics aims at formulating stabilization policy rules that would be as neutral as possible vis-à-vis the presumed natural trajectory of the economy, Keynesian economics has to deal with the more difficult problem of designing a policy in the absence of predetermined trajectory.

Although it is always possible to have ideal objectives, it is not always reasonable to make it the short run target of a policy mix, because economic policy may spark changes in expectations and private economic decisions, which may in turn make the policy inappropriate (as the Lucas critique popularized\textsuperscript{42}). The Keynesian context requires pragmatic governance, which goes through intermediate targets in order to avoid jolts that could destabilize expectations and private decisions.

\textsuperscript{41} See Asensio (2005b).
\textsuperscript{42} Keynes raised the question in \textit{The General Theory} (Ch. 15, see the last third of section II). Of course, the meaning and implications of the argument considerably differ owing to the methodological opposition (see Vercelli, 1991).
The table n°5 presents the macroeconomic governance principles suggested by the Keynesian approach.43

Table 5: Keynesian governance principles in a monetary union (pragmatism and discretion)

<table>
<thead>
<tr>
<th></th>
<th>Country 1</th>
<th>Country 2</th>
<th>Appearse distributive tensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income distribution policy</td>
<td>( \bar{w}_1, \hat{\alpha}_1, \hat{\iota}_1 )</td>
<td>( \bar{w}_2, \hat{\alpha}_2, \hat{\iota}_2 )</td>
<td>( \beta_k \geq 0 ) is set according to the context</td>
</tr>
<tr>
<td>Monetary policy (( \rightarrow \hat{\iota}, \text{endog. money} ))</td>
<td>( \frac{1}{2} (p_1 + p_2) = \beta_k \frac{1}{2} ((q_1 + q_2) - (n_1 + n_2)) )</td>
<td>( 0 &lt; \mu_i \leq 1 ) is set according to the context</td>
<td></td>
</tr>
<tr>
<td>Budgetary-fiscal policy (( \rightarrow g_i, \hat{i} ))</td>
<td>( n_1 = \mu_1 q_1 )</td>
<td>( n_2 = \mu_2 q_2 )</td>
<td>( b_i = -\psi_{i1} (q_1 - n_1) + z_i )</td>
</tr>
</tbody>
</table>

\( q_i \) is the relative increase in employment that is initially required to get full employment; it measures 'inherited' unemployment (as \( n_i \) is the variation of employment in the current period, \( q_i - n_i \) measures unemployment at the end of the period).

\( \beta_k \) represents the monetary policy flexibility (the higher \( \beta_k \) is, the more the central bank will concede inflation in exchange of an increase in employment). The parameter value is chosen according to the context; notably, but not only, according to the state of distributive tensions.

\( \mu_i \) is a coefficient that the government chooses according to the context (effective demand, expected sensitivity to the policy instruments; financial constraints, political considerations (e.g. public opinion).

\( b_i \) is the budget balance; \( b_i = \varphi (y_i - g_i) + \hat{i} \) (see Appendix 4)

\( \psi_{i1} \geq 0 \) represents the budgetary-fiscal policy flexibility (the higher \( \psi_{i1} \) is, the less governments will adjust the tax rate, and the higher the deficit will be).

\( z_i \) represents the other factors that may interfere with the short run budgetary-fiscal objectives (structural deficit related to the public investments and long run financial policies).

In the absence of natural anchorage, designing monetary and budgetary-fiscal policies as much concerns the objectives selection (values of \( \beta_k, \psi_{i1} \) and \( \mu \) as the instruments adjustment (values of \( g \) and \( \hat{i} \) which solves the system, given the equations of Table 4).43

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43 See Asensio (2005b, 2006) for the methodological details.
Appendix n°5 presents the solutions for the simple case where parameters are identical in both countries. As can be seen from the solutions, the instruments of country $i$ not only are moved when it has been hit by a shock, but also when the partner has been hit. The reason is of course that shocks transmit across countries, as well as policies do. Economic policies often carry positive or negative externalities, depending on the type of spillover and depending on the macroeconomic context abroad. For example, in the system formed by the equations of Table 4, an increase in expenditures of country $i$ has positive externalities when $q_{1} < 0$ and $q_{2} < 0$ (because $\hat{c}_{n_{i}/\hat{g}_{j}} \neq 0$), and negative ones when $q_{2} = 0$. Many configurations are possible, according to the initial situation, the type of shock that may arise during the period, the transmission of shocks and policies...

One of the important elements of the context is the central bank behaviour. Let us first suppose that a dogmatic central bank pursues the following objective, instead of the one of Table 5 (as the economy is supposed to be on the natural trajectory, the central bank implements disinflation measures when the level of unemployment decreases):

$$\frac{1}{2} (p_{1} + p_{2}) = -\beta \frac{1}{2} (n_{1} + n_{2})$$

It can be shown that budgetary-fiscal policies in that case produce negative externalities. More generally, because of the effective demand and employment sensitivity to the interest rate, the adjustment of fiscal and budgetary instruments which is required in order to reach the objectives of Table 5, depends on monetary policy decisions (see the appendix n°5). Of course, interest rates also matter for the choice of objectives ($\mu, \psi_{k}$). For example, if the governments think that the central bank will accommodate, they can adopt more ambitious plans in terms of employment, or limit the cost of a given increase in employment in terms of deficits, taxes and/or expenditures adjustment. Thus, monetary policy can make it more or less difficult for governments to reach their objectives.

Notice that the central bank participation to economic recovery does not absolutely necessitate lower interest rates. Remember that $i=0$, for example, means that the banks adjust the supply of money to the demand expressed at the unchanged rate of interest. Thus, even when the central bank can not significantly reduce the interest rates (if, for example, they are

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44 As an increase in $g_{i}$ reduces the unemployment rate below the presumed natural level, the central bank raises the rate of interest so as to stabilize the average level of employment in the union, what implies a depression in country $j$. 

33
already very low), it can help in a decisive way by weakening the monetary tensions that economic recovery usually provokes.

The gain of coordinating the central bank and governments decisions is likely to be reinforced in the case of a heterogeneous monetary union (differentiated parameters in Table 4). Indeed, in the presence of heterogeneity, shocks, whatever they are symmetric or asymmetric, have common and idiosyncratic effects. By contrast with the homogeneous case, it can be shown\(^{45}\) that the central bank no more concentrates on the symmetric components, for asymmetric components have common effects which fall within the central bank field of action. Conversely, governments respond to the common components of demand shocks for the central bank no more can offset them completely because of their idiosyncratic effects.

In addition, it turns out that heterogeneity is likely to enforce adverse interactions, especially in contexts of high unemployment. The intuitive rational is that there are more interactions between authorities because the central bank and the governments respond now to every component of shocks, and these interactions are as stronger as unemployment is higher.

However, such adverse interactions could be avoided, and policies efficiency could be improved as regards price stability and employment, provided authorities were able to control the distributive conflict and its inflationary consequences. Indeed, when monetary policy can freely specialize in countering the common effects of shocks upon employment (including inherited unemployment), it pushes the governments to specialize in countering the idiosyncratic effects of shocks (including asymmetric inherited unemployment), and distracts by the way every authority of others objectives, what eliminates adverse interactions eventually.

It is of interest to consider that division of labour from the collective point of view: by countering the common effects, the central bank does something governments could not do without triggering adverse interactions, while by countering the asymmetric effects, governments do something the central bank can not.

**Conclusion**

The discrepancy between the FED and ECB effective policies over the period 1990-2006 and the theoretical principles they invoke attests the difficulties of implementing the "optimal policy" in accordance with the "new macroeconomic" theory. We have argued that the trials

\(^{45}\) See Asensio, 2006.
of the new macroeconomics come from a restrictive definition of uncertainty, according to which "structures" determine the natural (predictable) trajectory of the economy within a white noise. It is quite normal that the kind of monetary policy that has been designed for such a word has pernicious effects when it is implemented in a system without predictable trajectory.

As the Keynesian approach offers a conceptual framework to think about macroeconomics in the presence of strong uncertainty, we have been able to identify theoretically three types of pernicious effects:

- the "unemployment trap" that results from dogmatically taking the Keynesian rate of unemployment as a natural one, in such a way that monetary policy decisions tend to perpetuate that rate.
- the depressive effect of restricting the monetary policy in response to recurrent distributive inflationary tensions that the central bank offsets by rising the interest rates and unemployment levels
- the negative externalities related to the lack of coordination between monetary and budgetary-fiscal instruments, especially in a heterogeneous monetary union.

In these three domains, the United-States have had a net advantage over the period considered. Many authors have emphasized the relative pragmatism of Greenspan in explaining the relative success of the Fed monetary policy as concerns macroeconomic performances, but they did not explain why pragmatism (mean deviation from theoretical principles which are governed by a specific context) ought to work better than thorough implementation of theoretical principles. Our discussion provides a theoretical explanation of the relative success of Greenspan's pragmatism in monetary policy.

The Keynesian approach furthermore pleads in favour of important changes in the current governance of the Eurozone, as suggested in Asensio (2005b, 2006). Firstly, since the European Central Bank can not repress distributive the inflationary pressures without having non-temporary depressive effects on aggregate demand and employment, authorities should admit that the contractual way of designing income distribution rules is better than aggressive monetary policy. Secondly, authorities should abandon any "optimal rules" that can not be but designed in order to stabilize the economy near to an imaginary "natural" trajectory. Keynesian uncertainty rather suggests a gradual and pragmatic approach to macroeconomic policy. From this perspective, we show that the European Monetary Union could take advantage of the complementarity between the common monetary policy and the national budgetary and fiscal instruments. Although heterogeneity is likely to enforce adverse
interactions between the central bank and the governments, we pointed out that, provided institutions are able to control the distributive conflict, these adverse interactions can be avoided (and macro policies efficiency can be improved) if the monetary policy specializes in countering the common effects of shocks (including inherited unemployment), for it pushes governments to concentrate in countering the idiosyncratic effects. Hence, by countering the common effects, the central bank does something beneficial governments could not do without triggering adverse interactions, while governments do something beneficial the central bank could not.

References


Galbraith J.K., 2006, Endogenous doctrine, or, why is monetary policy in America so much better than in Europe?, *Journal of Post Keynesian Economics* 28(3) 423-32.


Appendices

Appendix n°1
It is possible to introduce fiscal distortion effects by supposing that in the short run they work through the price of the variable input: replacing the nominal cost of labour (W) by W(1+\(\xi t\)), where 0\(\leq\xi<1\) measures the (weakened) impact of the tax rate on the labour cost, profit maximisation requires \(\partial Y/\partial N=W(1+\xi t)/P\). The demand for labour relative variation (n) then takes the form of a function of the fiscally-corrected labour cost, which relative variation can be approximated by \((p-w-\xi\hat{t})\) for small values of \(\hat{t}\) (\(\hat{t}\) is the variation in t).

Appendix n°2
Starting from the aggregate demand function 
\[\nu(Y-tY)-\beta(i-p_{+1}^{a})+G+A,\]
where \(Y\) represents the output volume, \(i\) the rate of interest, \(p_{+1}^{a}\) the expected inflation rate till the next period, \(t\) the tax rate (taxes/output), \(\nu\) the propensity to consume, \(G\) the governments expenditures, \(A\) an autonomous component, the market for goods equilibrium requires:
\[Y=\nu(Y-tY)-\beta(i-p_{+1}^{a})+G+A.\]

Differentiating around a solution indexed by 0 (with \(d\nu=0\) and \(dp_{+1}^{a}=0\)), and dividing by \(Y_0\), we get:
\[\frac{dY}{Y_0}=\nu\frac{dY}{Y_0}-\nu_0\frac{dY}{Y_0}-\nu dt-\frac{\beta}{Y_0}dI_1+\frac{dG}{Y_0}+\frac{dA}{Y_0}\]

Since \(t_0=T_0/Y_0\), the equality \(dG/Y_0=t_0dG/G\) holds when the budget is balanced (\(T_0=G_0\)).
Writing relative deviation rates with small letters (\(x=dX/X_0\)), except \(a=dA/Y_0\), we have:
\[y=\nu(1-t_0)y-\nu dt-\frac{\beta}{Y_0}dI_1+t_0g+a\]
hence:
\[ y = -\sigma \hat{t} + \lambda (\varphi g + a) - \gamma \hat{i} \]

where \( \hat{i} = di, \hat{t} = dt, \varphi = t_0, \gamma = \frac{v}{1 - v(1 - t_0)}, \lambda = \frac{1}{1 - v(1 - t_0)}, \sigma = \frac{1}{1 - v(1 - t_0)} Y_0 \)

**Appendix n° 3**

It is not essential to make imperfect competition assumptions in order to obtain a mark-up relation. For example, starting from the production function \( Y = C N^\alpha, \alpha < 1 \), competitive pricing requires the marginal productivity to be equal to the real cost of labour:

\[
\frac{\partial Y}{\partial N} = W(1 + \zeta t)/P \Rightarrow P = W(1 + \zeta t)/(CN^{\alpha - 1}) = (WN(1 + \zeta t)/Y)/\alpha; \text{ hence, by differentiation of the associated logarithmic expression (for small values of } \hat{t}, \text{ we have } p = w + n - y - \hat{\alpha} + \hat{\zeta}, \text{ where } \hat{\alpha} \text{ is the rate of variation in } \alpha \text{ (exogenous). Notice that an increasing mark-up on unit labour cost expresses in this case a declining wages-output ratio } (\hat{\alpha} < 0) \text{ and/or increasing fiscal taxes } (\hat{t} = dt > 0). \]

**Appendix n° 4**

The budget balance \( (B) \) is defined as:

\[ B = tPY - PG \]

Differentiating around a solution indexed by 0 yields:

\[ dB = t_0 P_0 dY + P_0 Y_0 dt + t_0 P_0 dP - P_0 G_0 dP \]

and dividing by the initial value of output:

\[ dB/(P_0 Y_0) = t_0 dY/Y_0 + dt + t_0 dP/P_0 - dG/Y_0 (G_0/Y_0)(dP/P_0) \]

Hence, around a situation of balanced budget where \( t_0 = G_0/Y_0 \) (remember \( g = dG/G_0 \)):

\[ b = t_0 (y - g) + dt \]

and, with the same notation as in appendix n°2:

\[ b = \varphi (y - g) + \hat{t} \]
Appendix n°5

\[ g_1 = \sigma \frac{\kappa}{\varphi(\lambda - \gamma)} i + \frac{\kappa}{\varphi((\lambda - \gamma) - 2\kappa \xi)} (\overline{w}_1 - \bar{\alpha}_1 - \overline{w}_2 + \overline{\alpha}_2) + \]
\[ \frac{\xi \alpha (\lambda \varphi - 1) - (\lambda - \gamma) (1 - \alpha + \bar{\theta}_1) \mu_2 + \lambda \xi \psi_{\lambda 2} (1 - \mu_2)}{\varphi((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{(\lambda - \gamma)((1 + \bar{\theta}_2 \kappa + (1 - \gamma \varphi - \kappa) \alpha)) + ((2\gamma - \lambda) \varphi - 1) \xi \alpha \kappa \mu_1 + (\kappa \xi (2\gamma - \lambda) - \gamma (\lambda - \gamma)) (1 - \mu_1) \psi_{\lambda 1} q_1 +}{\varphi((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{((\lambda \varphi - 1) \xi + \lambda - \gamma) \kappa c_2 + ((\xi (2\gamma - \lambda) \varphi - 1) - (\lambda - \gamma)) \kappa + (1 - \gamma \varphi)(\lambda - \gamma) c_1}{\varphi((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{\lambda \kappa \xi}{\varphi((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} (a_2 - z_2) + \frac{\lambda (\kappa \xi - (\lambda - \gamma)) a_1 + \gamma (\lambda - \gamma) + \kappa \xi (\lambda - 2\gamma) z_1}{\varphi((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]

\[ \hat{i}_1 = \frac{\sigma}{(\lambda - \gamma)} i + \frac{\kappa}{((\lambda - \gamma) - 2\kappa \xi)} (\overline{w}_1 - \bar{\alpha}_1 - \overline{w}_2 + \overline{\alpha}_2) + \]
\[ \frac{\xi \alpha (\lambda \varphi - 1) - (\lambda - \gamma) (1 - \alpha + \bar{\theta}_1) \mu_2 + \lambda \xi \psi_{\lambda 2} (1 - \mu_2)}{((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{(\lambda - \gamma)((1 + \bar{\theta}_2 \kappa + (1 - \gamma \varphi - \kappa) \alpha)) - (1 - \varphi \lambda) \xi \alpha \kappa \mu_1 - (\lambda - \gamma - \kappa \xi) \lambda (1 - \mu_1) \psi_{\lambda 1} q_1 +}{((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{((\lambda \varphi - 1) \xi + \lambda - \gamma) \kappa c_2 + ((\lambda \varphi - 1) \xi - (\lambda - \gamma)) \kappa + (1 - \lambda \varphi)(\lambda - \gamma) c_1 +}{((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]
\[ \frac{\lambda \kappa \xi}{((\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} (a_2 - z_2) + \frac{\lambda (\gamma - \lambda + \kappa \xi)(a_1 - z_1)}{(\lambda - \gamma) - 2\kappa \xi)(\lambda - \gamma)} \]

NB: \( g_2 \) and \( t_2 \) can easily be deduced by permutation of the variable coefficients: \( \psi_{\kappa 1} \) and \( \psi_{\kappa 2} \), \( \mu_1 \) and \( \mu_2 \).

Since at equilibrium: \( n_i = \mu_i q_i \) (Table 5), then we have \( y_i = a_i \mu_i q_i + c_i \) and \( b_i = z_i - \psi_{\kappa i} q_i (1 - \mu_i) \).