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ABSTRACT

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The Politics of Monetary Policy*

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Abstract

In this paper we critically review the literature on the political economy of monetary policy, with an eye on the questions raised by the recent financial crisis. We begin with a discussion of rules versus discretion. We then examine the issue of Central Banks independence both in normal times, in times of crisis. Then we review the literature of electoral manipulation of policies. Finally we address international institutional issues concerning the feasibility, optimality and political sustainability of currency unions in which more than one country share the same currency. A brief review of the Euro experience concludes the paper.

1 Introduction

Had we written this paper before the summer of 2008 we would have concluded that there was much agreement amongst economists about the optimal institutional arrangements for monetary policy. For the specialists there were many open questions, but for most outsiders (including non monetary economists) many issues seemed to be settled.¹An hypothetical paper written (at least by us, but we believe by many others) before the summer of 2008 would have concluded that:

1) Monetary policy is better left to independent Central Banks at harms length from the politicians and the treasury.

2) Most Central Banks should (and must do) follow some type of inflation targeting; that is they look at inflation as an indicator of when to loosen up

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¹See Goodfriend (2007) for a discussion of how such consensus was reached.

or tighten up. Certain Central Banks do it more explicitly than others, but inflation targeting has basically "won".

3) Independent Central Banks anchored to an inflation target have led to the great moderation and a solution to the problem of inflation.

4) Politicians sometimes use Central Banks as scapegoats (especially in Europe) but in practice in recent years politicians in OECD countries have had little room to influence the course of monetary policy, for instance to stimulate the economy before elections. Blaming the ECB in Europe was very common in the early part of this decade as a justification of the low growth in several countries of the Euro area, due to the supposedly too high interest rates.

5) The experience of the Euro was overall relatively positive, but the European currency had not been tested yet in a period of a major recession.

The most serious financial crisis of the post war era, has reopened the debate about monetary policy and institutions. One view is that what went wrong was the fact that monetary policy in the early part of the first decade of the new century went off the right track and abandoned sound principles of inflation targeting, perhaps in response to political pressures to avoid at all cost a recession in the early part of the 2000s and a misplaced excessive fear of deflation.² Others argue instead that inflation targeting has failed because it did not take into proper account the risk of bubbles in real estate and in financial markets. This point of view implies that rules have to be more flexible to allow monetary policy to react to a wider variety of variables in addition to the price dynamics of goods and services. Others have argued instead that inflation targeting is fine but the level of target inflation was too low and should be raised to avoid risk of deflation and monetary traps.³ In addition the current crisis has given us a fresh opportunity to observe the behavior of the economies in Euroland which share a common currency in a period of economic stress.

Therefore the way this chapter is organized is as follows. For each topic we critically review the pre crisis literature and then we discuss what new issues the financial crisis has reopened and how it has changed our perceptions. The topic which we address in turn are: rules versus discretion (in section 2); Central Bank independence (section 3); political influence on monetary policy and political business cycles (section 4); the politics and economics of monetary unions in general (section 5) and with specific reference to the Euro (section 6). The last section concludes.

2 Rules versus Discretion

An enormous literature has dealt with this question, and it is unnecessary to provide yet another detailed survey of it.⁴ There are two ways of thinking about rules versus discretion, one in a specific sense and another one in a broader way.

²See Taylor (2009) for a forceful argument along these lines.

³Blanchard, Dell Ariccia and Mauro (2010)

⁴See for instance Drazen (2000) and Persson and Tabellini (2000).

The narrow interpretation is the "inflation bias" pointed out by Kydland and Prescott (1977) first and then developed by Barro and Gordon (1983a,b). The more general discussion of rules versus discretion, however, goes well beyond this particular example, and encompasses other policy objectives that the Central Bank may have. This more general approach is the way in which we would like to think about the issue of rules versus discretion in the present paper. Namely we want to focus upon whether the actions of the Central Bank should be irrevocably fixed in advance by rules, laws, and unchangeable plans or whether the Central Bank should be free to act with discretion *ex post* with ample margin of maneuver. We will proceed as follows. For concreteness we review the issue of rules versus discretion using the Barro and Gordon (1983a) model and then we discuss how these issues generalize to other areas of policy.

2.1 The basic problem

Politicians may have an incentive to inflate the economy because they believe that the unemployment rate is too high (or the GDP gap too high or the GDP growth too low). This may be because the economy is distorted by taxes or by labor unions which keep real wages above the market clearing full employment level since they care more about employed union members than unemployed non members. By rational expectations only unexpected inflation can temporarily increase real economic activity. The public understands the incentive of the policymakers to increase inflation, rationally expects it and in equilibrium there is inflation above target and output and unemployment at their "distorted" rates. This was offered as an explanation for periods of "stagflation", i.e. trend increases in unemployment and inflation.

A policy rule which commits the policy maker to a certain pre announced inflation path would solve the problem. But, how can one make the rule stick and be credible? Precisely because of the "temptation" to deviate from the rule, one needs a mechanism of enforcement. One is simply the cost of giving up the accumulated stock of credibility of the central bank and the loss of reputation which would entail a deviation from the rule. Another one is some institutional arrangement which makes it explicitly costly (or impossible) for the monetary authority to deviate from it. We examine them both.

2.2 Reputation

Models of reputation building in monetary policy derive from applications of repeated game theory, adapted to the game between a Central Banker and market expectations.⁵ A very simple (and well known) model serves the purpose of illustrating the trade-off between the rigidities of rules and the benefits of discretion. Suppose that output (y_t) is given by :

⁵Some authors have questioned the applicability of repeated game theory to a situation in which a "player" is market expectations. See Drazen (2000) and the references cited therein for discussion of this technical issue.

$$y_t = \pi_t - \pi_t^e \quad (1)$$

where π_t is inflation, π_t^e is expected inflation. The market level of output is normalized at zero. The social planner, or Central Banker (the two are indistinguishable for the moment) minimizes the loss function:

$$L = \frac{b}{2}(y_t - k)^2 + \frac{1}{2}(\pi_t)^2 \quad (2)$$

where $k > 0$ is the target level of output and b is the weight attributed to the cost of deviation of output from its target relative to the deviation of inflation from its target, namely zero. The fact that the target on output k is greater than the market generated level of zero is the source of the time inconsistency problem. The policymaker controls inflation directly.⁶ The discretionary equilibrium is obtained by minimizing (2) holding π_t^e constant and then imposing rational expectations. The solution is, where the subscript D stands for discretion⁷:

$$\pi^D = bk \quad (3)$$

$$y_t^D = 0 \quad (4)$$

Inflation is higher the larger is the weight given to output in the loss function and the difference between the target rate of output k and the market generated one, namely zero. The optimal rule is, instead:

$$\pi_t^* = 0$$

⁶There is no loss of generality in this assumption for the purpose of the use made of this simple model. Closing the model with some demand side which links money to nominal income via a quantity equation for instance would not add anything for our purpose here.

⁷The problem is:

$$\min_{\pi_t} \frac{1}{2}(\pi_t)^2 + \frac{b}{2}(\pi_t - \pi_t^e - k)^2$$

Holding π_t^e as given.

F.O.C.

$$\pi_t = \frac{b}{1+b}\pi_t^e + \frac{bk}{1+b}$$

Set $\pi_t^e = E(\pi_t)$ and solve by simple algebra remembering that $E(\varepsilon_t) = 0$ for the public.

$$y_t^* = 0 \tag{5}$$

where the superscript * stands for rule. The rule provides a net gain: lower inflation and the same level of output. But if the public expects the optimal rule of zero inflation the Central Bank has the "temptation" to generate an unexpected inflationary shock and a short run increase in output. The cost is given by the fact that for a certain number of periods the public will not believe that the Central Bank will follow the rule and the economy will revert to the sub optimal discretionary equilibrium. This is labeled the "enforcement" namely the difference in utility between a certain numbers of periods of discretion instead of the rule. The optimal policy of zero inflation is sustainable when these costs of enforcement are higher than the temptation.

Even when the optimal rule is not sustainable, in general a range of inflation rates with an upper bound of $\pi^D = bk$ is sustainable. The lowest level of this range which is the best sustainable outcome, is the equilibrium⁸ The largest is the enforcement relative to the temptation the lower is the lowest inflation rate in the sustainable range. Formally the sustainable inflation rule is:

$$\pi_t = \pi^o \tag{6}$$

If the public expects the central bank to follow the rule, then the central bank will minimize the loss function by choosing:

$$\pi_t = \frac{b}{1+b}\pi^o + \frac{b}{1+b}k \tag{7}$$

The temptation to deviate from the rule is given by the difference between the utility loss given by not cheating and the utility loss given by cheating and it is equal to:

$$\frac{1}{2(1+b)}(bk - \pi^o)^2 \tag{8}$$

Let's assume, as Barro and Gordon (1983a), that the economy expects the central bank to follow the rule only if it did so last period and otherwise expects the level of inflation under discretion. The enforcement is then:

$$\frac{\beta}{2}(b^2k^2 - (\pi^o)^2) \tag{9}$$

⁸There are of course subtle issues of multiplicity since a range not one level of inflation is in general sustainable. We do not enter into this technical discussion here.

An inflation rule is enforceable only if the cost of cheating is higher than the benefit which is true if:

$$\frac{1 - \beta(1 + b)}{\beta(1 + b) + 1}bk \leq \pi^o \leq bk \quad (10)$$

The best enforceable rule is then:

$$\max(0, \pi^o = \frac{1 - \beta(1 + b)}{\beta(1 + b) + 1}bk) \quad (11)$$

and it implies an equilibrium inflation which may be higher than the first best zero inflation, but lower than the inflation under discretion.⁹ Note that with no discounting $\beta = 1$ the optimal rate of zero inflation is in the sustainable range while with high discounting it would not; also with full discounting of the future $\beta = 0$ there is no enforcement and only the discretionary policy is sustainable.

The basic conclusion of this literature is that if a Central bank has a credibility capital (i.e. it has followed the optimal rule for a long time), it has a low discount factor it would highly value the loss in terms to a return to the sub optimal discretionary equilibrium and therefore the optimal rule would be more easily sustainable. However, as we discuss more below, low discount factors may be the norm rather than the exception, when political incentives (like upcoming elections) are explicitly taken into consideration.¹⁰

Note that the application of the punishment by the public (i.e. the reaction to a deviation from the rule on the part of the Central Bank) relies on the fact that monetary policy is observable, namely the public can detect when the central Bank is abandoning a rule or instead is responding to some unexpected shock (like a shift in money demand). Canzoneri (1985) points out that in this case reputation based models imply difficulties in implementing the optimal rule in equilibrium. Drazen and Masson (1994) argue that the implementation of contractionary monetary policies may decrease instead of increase the credibility of central banks; since policies have persistent effects, an anti-inflationary policy today may have dire effects on unemployment in the future, making the future

⁹Drazen (2000) in Chapter 4 provides a discussion and interpretation of the issue of time inconsistency. He views it, correctly, as emerging from the lack of a policy instrument which makes it optimal even for rational agents to be "fooled". In the example presented above with a full kit of policy instruments one could eliminate the distortion which keeps output level below the full employment one.

¹⁰We have assumed that the punishment period last only one period. If it lasted longer lower inflation rates would be more easily enforceable. In this game the length of the punishment period is arbitrary adding another dimension to the problem of multiplicity of equilibria.

commitment to anti-inflationary policies less credible.¹¹ A large literature has investigated various cases of this game, for instance when the public is unsure about the objective function of the policymaker (Backus and Driffil (1985a,b) and Barro (1986)).¹² The model with uncertainty regarding the policy preferences of the Central Bank seemed to explain why the disinflation of the early eighties in the US led to a recession. The idea was that inflationary expectations took a while to learn the new Volcker's policy rule and whether or not he was really "tough" against inflation. In other words this model explained why even with rational expectations a disinflation can have negative real effects on growth.

2.3 Simple rules and contingent rules

Deviations from simple rules are easy to detect. If a rule says "inflation has to be 2 percent exactly every quarter" it is easy to spot deviations from it, but it is likely to be too rigid. In fact, realistic inflation targeting rules allow for deviations from the target for several quarters, in the course of the business cycle. A very simple example illustrates the trade-off between the rigidity of rules and the flexibility of discretion. Suppose that output (y_t) is given by :

$$y_t = \pi_t - \pi_t^e + \varepsilon_t \tag{12}$$

where we now added ε_t which is an i.i.d. shock with zero mean and variance σ_ε^2 . The social planner minimizes the same loss function as above. The shock to output ε_t captures in the simplest possible way all the random events that monetary policy could possibly stabilize. We abstract from persistence of shocks, multiplicity as well as many other complications. The discretionary equilibrium is solved minimizing (2) holding π_t^e constant and then imposing rational expectations, which are formed before the shock ε_t occurs, but the policymaker chooses inflation after the realization of it. This assumption is what allows a stabilization role for monetary policy.¹³

The solution is¹⁴:

¹¹They present some evidence of this mechanism drawing from the experience of the EMS; in times of high unemployment the absence of a realignment was seen as lowering the credibility of fixed parities instead of enhancing it.

¹²For an extended treatment of reputational model of monetary policy see Cukierman (1992), Drazen (2000) and Persson and Tabellini (2000) and the references cited therein. Given the existence of these excellent surveys we do not pursue the technical aspect of reputation models here.

¹³On simple and standard justification of this assumption is the existence of wage contracts like those proposed by Fischer (1977).

¹⁴The problem is:

$$\min_{\pi_t} \frac{1}{2}(\pi_t)^2 + \frac{b}{2}(\pi_t - \pi_t^e + \varepsilon_t - k)^2$$

Holding π_t^e as given.

$$\pi_t^D = bk - \frac{b}{1+b}\varepsilon_t \quad (13)$$

The discretionary solution includes a positive inflation rate (bk) and a stabilization term ($\frac{b}{1+b}\varepsilon_t$). Thus:

$$E(\pi^D) = bk \quad E(y_t^D) = 0 \quad Var(y_t^D) = \left(\frac{1}{1+b}\right)^2 \sigma_\varepsilon^2 \quad (14)$$

Note that the average inflation is higher than its target (zero) The average output is the market generated level (zero) and therefore below the target k , but its variance is lower than it would be without any monetary stabilization policy. The optimal rule is instead:

$$\pi_t^* = -\frac{b}{1+b}\varepsilon_t \quad \text{with} \quad E(\pi_t^*) = 0 \quad E(y_t^D) = 0 \quad Var(y_t^D) = \left(\frac{1}{1+b}\right)^2 \sigma_\varepsilon^2 \quad (15)$$

This rule keeps inflation on average at its target (zero) and allows for the same output stabilization as discretion. However, this rule is not time consistent because if the market participants expects the rule, the policymaker has an incentive to choose the discretionary policy π_t^D , generating an unexpected burst of unexpected inflation, bk , increasing output. But again, as discussed above, reputational mechanism might sustain the optimal rule.

2.4 All problem solved....?

One view regarding monetary policy is that essentially the problem of optimal monetary policy has been solved with what is often labelled a "flexible" inflation targeting rule. That is a rule that does not only target a given level of inflation but allow for a richer reaction of Central Bank policy to many shocks. The rule described above is an extremely simple (simplistic perhaps) illustrative version of one of those rules which in reality would of course be much more complicated and based upon forecasts of expected inflation, interest rate movements etc.

F.O.C.

$$\pi_t = \frac{b}{1+b}\pi_t^e + \frac{bk}{1+b} - \frac{b\varepsilon_t}{1+b}$$

Set $\pi_t^e = E(\pi_t)$ and solve by simple algebra remembering that $E(\varepsilon_t) = 0$ for the public.

This kind of flexible inflation targeting rule would "end" the discussion about institutional arrangements for monetary policy for either one of two reasons. One is that Central Banks can indeed commit to such a rule so that the time inconsistency problem is not even there anymore because Central Banks do not face those "temptations" of deviating from a pre announced rule.

If indeed the temptation were not even there (which in this model would imply that $k = 0$) that is the Central Bank did not have any incentives ex post to deviate from a pre announced course of action, then indeed the only issue left for monetary policy would be to explain as carefully as possible to the market what the optimal rule is. There would be no disagreement about monetary policy neither ex ante nor ex post and the question would be purely technical of finding out the optimal rule. Any discussion of rules versus discretion, Central Bank independence, optimal institutional arrangements would be meaningless, the question would simply be of finding the optimal monetary reaction function.

The alternative interpretation is that indeed Central Banks have found ways of committing. Even though ex post they may want to deviate, they would not do it because of the perceived loss of reputation. How would that work? Suppose that the shock ε is (ex post) perfectly observable. Then it is easy to check whether the policymaker has followed the rule or deviated from it. Repeated interaction and the reputation and credibility built by the policymaker would sustain the first best. With any reasonable long term horizon these deviations from the optimal rules would disappear in equilibrium.

2.5 May be not

But things may not be that simple. Suppose, more realistically perhaps, that the shock ε is not directly and immediately observable by the public. Then the latter cannot perfectly verify whether the rule has been followed or not. That is the public cannot detect whether a burst of inflation is due to a deviation from the rule or a particularly "bad" realization of ε . In this case reputation based models tend to break down.

We can think of course of a multitude of shocks hitting the economy in the present and in the immediate future, shocks to which, in principle, policy could react to. Some of these shocks are easily observable others are not. Whether or not the rule has been followed is especially difficult to detect if the monetary rule is contingent on the Central Bank expectations of future shocks. Then, the policymaker may have to face a choice: either follow a simple, non contingent rule with constant expected inflation (which would be zero, in our example) or the discretionary policy π_t^D . In other words let's assume that reputational mechanism break down because of the complexity and observability of the optimal rule and let's examine a simple trade off between a simple rule and discretion. The loss of discretion (L^D) is lower than the simple rule (L^{SR}) if and only if:

$$\sigma_\varepsilon^2 > k^2(1 + b) \tag{16}$$

Condition (16) can easily be obtained by computing the expected costs of the discretionary policy and comparing it with the expected costs of the simple rule $\pi^{SR} = 0$.

What does this condition mean? The first best rule is contingent upon the realization of one, in general, many shocks. If a rule is "too complicated" it is not verifiable by the public. Complicated contingent rules make monetary policy unpredictable. The lack of predictability has costs which in this simple model are captured by an increase in average inflation due to a return to discretionary equilibrium. The parameter k represents the cost of "discretion", namely the cost of not having a monetary policy rule. These costs could be modeled much more broadly, for instance all the costs due to market instability due to "guessing games" about the future costs of monetary policy. Assuming then that the first best rule which may be contingent on a vast number of variables is unenforceable, the second best implies a choice between "discretion" and a "simple rule"; the condition which makes one or the other preferable is given in (16). If the variance of the environment is large, than the benefits of the partial stabilization allowed by discretion overcome its costs. To put it slightly differently, if one believes that monetary policy can and should react to a multitude of shocks and has much latitude in stabilizing them, than discretion is the best course of action. If one believes that there is relatively little than monetary policy can do any way and very few shocks can and should be accommodated than a rigid rule is preferable. These considerations seem to capture the rhetoric of real world discussions about pros and cons of monetary rules. Also a change of the environment for a relatively "calm" one with low σ_ε^2 to a more turbulent time may switch the benefit from a simple rule to discretion, an issue to which we now turn to.

2.6 Rules versus discretion during crises

Consider now the distinction between normal times, and crisis. We can think of the former as a situation in which the environment summarized by the shock ε turns extremely negative, that is a very low probability event with a large (in absolute value) and negative realization of ε , a war, or, more interestingly given recent events, of a major financial crisis. An alternative way of thinking of a crisis is an increase in the variance of the shock, σ_ε^2 . In a crisis flexibility may be the primary need of monetary policy. In the language of the model the temptation to create unexpected inflation in a period when output is especially far from its target (remember that costs of deviations from target are quadratic) than the enforcement may not be enough to compensate for it and the simple rule is abandoned. Then we should expect rigid rules to break down in a crisis or, in an alternative interpretation, in a crisis σ_ε^2 increases sufficiently much so that based upon the inequality above, discretion becomes preferable to a simple rule.

However, one can also think of an institutional arrangement based upon rules with escape clauses; namely a simple verifiable rule with the clause that it would be abandoned in the case of war or major crisis. But in order for an

escape clause to be enforceable as such it has to be very clearly specified. A major war could be an example, which is easily verifiable. But what about a "major" financial crisis? How does one define "major"? How deep the crisis and the recession has to be? This enforcement problems have the same nature of those discussed above in the context of enforcing rules based upon non perfectly observable events.

Should we then conclude that in a moment of crisis any simple rule, like inflation targeting should be abandoned? Perhaps, but there are several caveats.

1) A financial crisis inducing a deep recession will lower inflation forecast. Therefore even a simple inflation targeting rule would imply loosening monetary policy without any need of abandoning inflation targeting. In the language of our model, this means that a financial crisis does not require a switch of regime, condition (16) is not satisfied and the simple rule continues to be superior.

2) One may argue that uncertainty about monetary policy (i.e. abandoning an established credible rule) may increase uncertainty in financial markets and make the crisis even worse. In the language of our model this implies than an increase in σ_ε^2 holding k constant would lead the policymaker to abandon the simple rule, but abandoning it would lead to an increase in k , namely to costs of discretion, modeled broadly. Therefore the rule would be preferable even with an increase in σ_ε^2 .

3) A financial crisis may highlight a problem of asymmetry, which most models do not capture. The incentive to abandon the rule when the shock ε is large and negative may be much bigger than when the shock ε is large and positive. If we interpret the shock ε as a proxy of turbulence in financial markets, this means that the policymakers may have a stronger incentive to intervene heavily in financial crises (i.e. when, for instance, stock markets are falling) than when markets are booming, perhaps because of bubbles. That of course creates all sort of moral hazard issues in financial markets¹⁵.

4) If targeting financial variables really means using a symmetric rule, to be applied to both upswing and downswing in the market, it could be justified using our "skeleton model" in two ways. One is that the one optimal contingent rule π^* given in (7) should react to shocks even in financial markets. In addition this rule is enforceable and sustainable by reputation forces.

Finally note that thus far in this subsection we have implicitly assumed that a financial crisis was exogenous to monetary policy. However one may argue that the latter may indeed be partly responsible for the crisis. For instance Taylor (2009) amongst others argues that the Fed starting in 2002 abandoned a Taylor rule, created uncertainty in financial markets, kept interest rate too low, all factors that contributed to the crisis. The reason might have been a misguided attempt at avoiding a recession in the early 2000 and/or a fear of deflation. Low interest rates for too long, the story goes, have created one of the roots of excessive risk taking in search of higher returns and the real estate bubble in the US.

¹⁵To some extent problems of asymmetry between positive and negative shocks may be relevant even for the "basic" model in normal cycles, but in the event of financial instability the issues of asymmetry is magnified.

2.7 Other interpretations of "rules versus discretion"

The inflation bias discussed above is illustrative of a more general issue of "rules versus discretion" and of flexibility versus rigidity in monetary policy. First the incentive of inflating away public debts with unexpected inflation has similar implications. This is an issue which was especially common in developing countries,¹⁶ but also in high inflation countries in the eighties in Europe (e.g. Italy, Belgium, Greece, etc.). Leaving aside the extreme case of hyperinflations, in many cases bursts of inflation have reduced the real value of government debt. The large increase in government debts which will follow the current financial crisis may make this question especially relevant and this is a case in which political pressure on Central Banks may be especially intense. The discussion which we had above applies mutatis mutandis to the ex post incentive to devalue the debt.¹⁷

Second, and this is especially relevant for the financial crisis of 2008/9, the Central Bank (together with the Treasury) may have incentives to announce no "bail out" policies to create incentives to more prudent behavior of large financial institutions, but then, ex post, it has an incentive to provide liquidity and taxpayer money to insure and save the same institutions. Similar considerations apply here: should Central banks have "rules" fixed in stone ex ante so that decisions about bail out are fixed irrevocably, or should they have the flexibility of intervening ex post? Recent events have really moved this question at the center stage. Much of the discussion of rules versus discretion above applies to this case as well. In principle a policy of "no bail out" if perfectly credible would enforce prudent behavior by large financial institutions. On the other hand how credible ex post would such a policy be? The incentive to deviate from it would be enormous as we have seen.

Third, how constrained should the Central bank policy response be to a financial crisis? During the recent crisis the Fed has engaged in activities and purchases of assets which were unusual and required changes in laws and regulations, often creating delays, uncertainty in markets and difficulties for policymakers. Even this issue can be interpreted as one of rules versus discretion. Should Central Bank have a wide latitude of pursuing "unusual" or heterodox policies in term of crisis or should Central Bank policies be restrained by unchangeable rules, for instance regarding which type of assets Central Banks can buy and sell? Once again this can be viewed as another application of the question of rules versus discretion. We return on these issues below.

¹⁶See the Chapter by Jeff Frankel in this volume on monetary policy in developing countries.

¹⁷It goes beyond the scope of this chapter to review the literature of monetary and fiscal policy coordination and various time inconsistency problems associated with it. For a classic treatment see Lucas and Stokey (1983) and for a review of the literature Persson and Tabellini (2000)

3 Central Bank Independence

The question of how far removed should monetary policy be from politics has been at the center of attention for decades. Academics, commentators, politicians and Central Bankers have worried about the optimal degree of independence of Central Banks. The question has implications not only for economic efficiency but also for democratic theory and institutional design, and currently as a result of the financial crisis, has come back at the center of the political debate. We begin by addressing the question of Central Bank independence from the point of view of the debate of rules versus discretion and below we turn to democratic theory and the recent crisis.

3.1 Rules, Discretion and Central Bank Independence

As a potentially superior alternative to the choice between a simple rule and discretion, Rogoff (1985) suggested an ingenious solution. Assuming that the parameter b represents the socially accepted relative cost of deviation of output from target relative to the deviation of inflation from target, society should appoint a Central Bank with a lower " b " than society itself. This person would be a "conservative" central banker, in the sense that he/she would care relatively more about inflation and less about output than society¹⁸.

The inflation under discretion set by the conservative central banker is:

$$\pi_t^D = \hat{b}k - \frac{\hat{b}}{1 + \hat{b}}\varepsilon_t \quad (17)$$

The utility loss is therefore:

$$L = \frac{1}{2}E[(\hat{b}k - \frac{\hat{b}}{1 + \hat{b}}\varepsilon_t)^2 + b(-\frac{1}{1 + \hat{b}}\varepsilon_t - k)^2] \quad (18)$$

By minimizing L with respect to \hat{b} society can choose the central banker that most effectively fights inflation in the interests of society. Rogoff (1985) proved that such a central banker will be more conservative than society in the sense that $0 < \hat{b} < b$. In Appendix we review the derivation of this result. The intuition is that choosing $\hat{b} < b$ allows to optimize over the trade off between the rigidity of the zero inflation rule and the flexibility with inflation bias of discretion.

Central Bank independence is a requirement because ex post after the realization of the shock the policymaker (the principal of the Central Bank) would want to dismiss the conservative central banker and choose inflation ex post following his own objective function rather than the more conservative one of

¹⁸Note that, of course if society could appoint a policymaker with $k=0$, that is that does not target an output level above the market generated one the entire problem would be solved and the first best solution would be enforceable. The idea is that k is not really a preference parameter but the undistorted full employment level of output.

the central banker. Thus the solution of the time inconsistency problem works if the central banker cannot be dismissed ex post, namely if it is independent and can resist political pressures.

3.2 More or less Central Bank Independence in times of crisis?

Suppose that ex post one observes a really bad realization of the shock, i.e. ε is very negative. The independent Central Bank would follow the policy:

$$\hat{\pi}_t^{CB} = \hat{b}k - \frac{\hat{b}}{1 + \hat{b}}\varepsilon_t \quad (19)$$

instead of

$$\pi_t^p = bk - \frac{b}{1 + b}\varepsilon_t \quad (20)$$

where with the π_t^p notation we capture the discretionary policy which would be followed if the politicians had the control of monetary policy. Note that

$$\pi_t^p - \hat{\pi}_t^{CB} = k(b - \hat{b}) + \varepsilon_t \left(\frac{\hat{b}}{1 + \hat{b}} - \frac{b}{1 + b} \right) \quad (21)$$

this difference becomes larger the larger in absolute value is the negative realization of ε_t (remember that $\hat{b} < b$).

So if ε is very large (and negative), the inflation rate chosen by the CB would be much less than what the policymakers would choose. With a little algebra one can show that ex post the temptation of the policymaker to "fire" the Central Banker and choose a more inflationary policy is increasing in the absolute value of ε ¹⁹. Obviously without any cost of firing the Central Bank ex post, the arrangement of the conservative Central Banker would not be credible and only the discretionary policy with the parameter "b" of the policymaker would be enforceable. With "infinite" costs the policymaker could never fire the Central Banker with any realization of ε .

Lohmann (1992) extends Rogoff's model and shows that, in fact, the optimal institutional arrangement is to have positive costs of "firing" the Central Banker, but not infinite costs. This argument is similar to a rule with escape clauses. That is, in normal times, with realizations of ε below a certain threshold the Central Bank is allowed to follow a policy based upon \hat{b} . But for large realization of ε the policymaker takes control of monetary policy and would fire the Central Banker if the latter did not accommodate. In anticipation of this, and in order

¹⁹Once again the model is, for simplicity, symmetric even though the "story" seems especially realistic in one direction.

to avoid incurring into a "firing" procedure, the Central Bank accommodates the desires of the policymaker for realization of ε above a certain threshold (in absolute value) which is determined by the condition of the equality of the costs (institutional, etc.) to eliminate Central Bank independence and the cost of not "accommodating" enough the shock ε . This arrangement generates a non linear policy rule: above a certain threshold the policy reflects not the central banker's conservative cost function, but that of the society's.

Thus, in this model, the degree of Central Bank independence varies, in normal times there is independence in period of crisis there is none. Notice that this institutional arrangement is fully understood by a rational public. Therefore there would no surprise in the conduct of monetary policy even at this switching point. This is of course easier said than done. In practice who decides when a crisis is such? Uncertainty about the switching point introduces lack of predictability of monetary policy, perhaps precisely when it is most needed, that is in relatively turbulent times when the public may wonder whether the economy and financial markets are entering a crisis or not. However this model highlights in a simplified form an issue which is quite hot today in the US in the aftermath of the financial crisis, namely whether the Fed should have less or more independence. We return to this issue below.

3.3 Independent Central Banks and rules

We have presented the case for independent and conservative Central Bank as an alternative to a policy rule. One could think of institutional arrangements which are a mixtures of policy rules enforced by independent Central Bankers. Two have been discussed in the literature.

3.3.1 Instrument versus goal independence

One argument put forward by Fischer and Debelle (1994) is that the policy goal, say the target level of inflation, should be chosen by elected politicians, while the Central Bank should have the independence of choosing the policy instruments more appropriate to achieve that goal. That is the Central Bank could choose whether to target, say, interest rates or quantities of credit and/or money in order to implement the goals chosen by politicians.

This is a rather "minimalist" view of the meaning of Central Bank independence. If policy goals and therefore rules can be changed at will by politicians it is unclear how "instrument independence" would solve the problem of commitment. To put it differently, nobody would probably argue against the view that the legislature should stay out of the intricacies of the day to day choices of interest rates, discount rates and quantities of credit or money supply. The question is whether politicians should be free to choose the direction of monetary policy or whether this decision should be delegated to an independent authority. One may or may not agree with the idea of Central Bank independence.

But the "compromise" of instrument independence does not reconcile the two views, it is essentially a refinement of the idea that Central Banks should *not* be independent, at least for what really matters.

3.3.2 The Contracting approach

Another "mixed" approach is the "contracting" approach to Central Banking, as in work by Persson and Tabellini (1993) and Walsh (1995a). In this model the appointed central banker has the same utility function of the social planner. The Central Bank can choose monetary policy independently but "Society" (i.e. the policymaker, the principal of the Central Bank) sets up a system of punishments and rewards which would induce the Central Bank to follow the first best policy and avoid the inflation bias problem. These authors show that in the model discussed above in the present paper, a very simple incentive scheme, linear in inflation, would enforce the first best. This scheme essentially punishes the Central banker as a linear function of the deviation of inflation from the first best.²⁰ In general the idea of introducing incentives, even contractual incentives in the public sector is an interesting and valid one. Whether it is usefully applicable to monetary policy is questionable and this approach after some initial enthusiasm has died down.

In theory it is reasonably straightforward to devise a contract that creates the right incentives for implementing the optimal policy. In reality there are complex practical issues of implementation similar in spirit to our discussion above concerning the rigidity versus flexibility of monetary rules. The verification of whether a "contract" has been violated or not is tricky. Implementation of "punishment" in case of violation of a contract by a Central Banker may be "ex post" politically costly especially in turbulent times and in periods of financial instability.

3.4 Central bank independence and macroeconomic performance: The evidence

How do independent Central Banks behave, relative to those which are less so? What is the correlation between inflation, unemployment, and other indicators of monetary policy with Central Bank Independence?

A large literature has tried to answer this question. The first step in this endeavor is to measure Central Bank independence. The early literature focused on the statutes of the central banks to evaluate their degree of independence. Four characteristics have emerged as crucial: first the process of appointment of the management, who is in charge of it, how often it occurs and how long is the tenure. Obviously the Central Bank is more independent the less politicized is the appointment process and the more secure is the tenure; second the

²⁰A much popularized proposal in New Zealand (which was actually never implemented) was to link the salary of the head of the Central Banker to the achievement of a pre-specified inflation target (see Walsh (1995b)).

amount of power the government has on the Central Bank, whether the political authority can participate in and overturn the policy decisions of the Central Banks; third the presence of a clear objective, like inflation targeting; last but not least financial independence. These measures seem reasonable, but many have criticized them for two reasons. First the law cannot foresee all possible contingencies and even when it does it is not necessarily applied. In addition, especially in developing countries written rules are often circumvented by *de facto* procedures. Therefore, one would need *de facto* measures of the degree of independence in addition to or even instead of *de iure* measures, especially when dealing with developing countries. The actual turnover of central bank governors is a good example; even if the length of the appointment is specified by the law, the actual duration may differ and how often a governor is removed from office is a good proxy of the independence that the central bank enjoys. Another *de facto* indicator is derived from survey data, questionnaires are sent to experts and the answers are used to create an index of independence.

The early literature, Bade and Parkin (1982) Alesina (1988) and Grilli, Masciandaro and Tabellini (1991) focused on OECD countries and found an inverse relationship between Central Bank Independence and inflation using *de jure* measures of independence. Alesina and Summers (1993) confirm these results and show no evidence of an impact of Central Bank Independence on real variables, such as growth, unemployment and real interest rates.

Since then many studies have revisited this issue. Many authors have stressed the difficulty in measuring Central Bank Independence and choosing the right control variables; Campillo and Miron (1997) present some evidence against a negative correlation of Central Bank Independence with inflation; they perform cross-country regressions of average inflation rates on country characteristics finding that economic fundamentals like openness, political stability, optimal tax considerations have a much stronger impact on inflation than institutional arrangements, like central bank independence. Oatley (1999) employs the same empirical strategy and finds that by including other controls the significance of Central Bank Independence on inflation disappears. Brumm (2000) claims that previous studies, Campillo and Miron (1997) in particular, do not take into consideration the presence of strong measurement error and therefore obtain non robust results; he finds a strong negative correlation between inflation and Central Bank Independence.

As stressed earlier, the problem is that the legal measures of central bank independence may not represent actual central bank independence. Cukierman, Webb and Neyapti (1992) use three indicators of actual independence: the rate of turnover of central bank governors, an index based on a questionnaire answered by specialists in 23 countries, and an aggregation of the legal index and the rate of turnover; they also compare these indicators with a *de jure* measure showing that the discrepancy is higher for developing countries than for industrial ones; using data on the period 1960-1980 they find that Central Bank Independence has a negative statistically significant impact on price stability among industrial countries, but not among developing countries.

The degree of Central Bank Independence might have become less important

after the period of the great inflation when most countries have converged to lower and more stable levels of inflation. In fact using *de jure* measures of Central Bank Independence the early studies found a statistically significant correlation between Central Bank Independence and low inflation for the period pre 90s. Using the same measures on recent data, 2000-2004, Crowe and Meade (2007) cannot find any meaningful statistical relationship; they compute the rate of turnover with updated data and find that it has a correlation close to zero with the *de jure* measure of Central Bank Independence concluding that turnover must capture some other dynamics. Klomp and de Haan (2008) perform a meta regression analysis of studies on the relationship between Central Bank Independence and inflation finding that the inverse relationship between Central Bank Independence and inflation in OECD countries is sensitive to the indicator used and the estimation period chosen; they also find that there are no significant differences between studies based on a cross-country or panel settings.

These results on the (alleged) beneficial effects of central bank independence seem to have been internalized by the politicians and the public opinion. In fact, in the last quarter of the 20th century there has been a global movement towards more independence of monetary authorities. Crowe and Meade (2007) study the evolution of central bank independence using data from Cukierman, Webb and Neyapti (1992). They replicate their index using data from 2003 and broadening the sample adding Eastern European countries amongst others; they then compare their 2003 index with that of Cukierman, Webb and Neyapti (1992) noting that Central Bank Independence has increased. Eighty-five percent of the central banks in 2003 had a score above 0.4, compared with only 38 percent in the 1980s and average independence has risen from 0.3 in the 1980s to above 0.6 in 2003. They also break the sample in two groups, advanced and emerging economies, finding that both experienced an increase in Central Bank Independence but such increase is greater in developing countries, two thirds of the 15 central banks that are rated as highly independent, with scores above 0.8, are eastern European countries.

Crowe and Meade (2008) push the analysis further: looking at the change in the level of the four indexes above mentioned, they note that in the developing countries all of the indexes show a statistically significant increase since the 1980s, but in the advanced economies only the second and the fourth show a statistically significant increase, mainly because central banks in these countries were already scoring very high in the first and third index. They then perform a regression analysis to highlight the determinants of the reforms to Central Bank Independence; reform is correlated with low initial levels of Central Bank Independence and high prior inflation, meaning that the failure of past anti-inflationary policies led to more independence for the central bank; reform is also correlated with democracy and less flexible initial exchange rates. Acemoglu, Johnson, Querubin and Robinson (2008) measure Central Bank Independence by considering only the reforms to the charter of the monetary authority and constructing a simple dummy which takes a value of 1 in every year after a major reform to the Constitution or central bank law leading to increased independence and zero elsewhere. They find that most of the reforms in the post Bretton-

Woods period 1972-2005 took place in the 1990s.

3.5 Causality

Regardless of whether or not the correlations shown above between Central Bank Independence and inflation are robust, there is also an issue of causality as Posen (1993,1995) pointed out. Can we really say that Central Bank independence "causes" low inflation or that countries which prefer (for whatever reason) low inflation choose to delegate monetary policy to independent Central Banks?

The question is well posed, since institutions are generally not imposed exogenously (with few exceptions) on a country and they are slow moving and path dependent.²¹ Posen argues that Central Bank Independence really lead to a reduction of inflation in OECD countries only when it reflects an underlying agreement in society about lowering inflation or when groups that prefer low and stable inflation to other policies are predominant in society. He points to several characteristics of the financial sector and some political characteristics of the country. One in particular is the degree of fractionalization of the party system which is correlated with budget deficits and inflation (Grilli Masciandaro and Tabellini (1991) and Perotti and Kontopoulos (1999) amongst others). Fractionalized systems may have an especially hard time delegating monetary policy to independent experts given the conflicts amongst groups. One may argue, incidentally, that fractionalization of party systems is itself not an exogenous variable but is the result of deeper socio economic and historical characteristics of a country (Aghion Alesina and Trebbi (2004)). In fact fractionalized systems may be those that are more in need of an independent Central Bank committed to stopping various pressures that lead to inflation but such systems may or may not be able to achieve that institutional arrangement.²²

This author concludes that it is an illusion to think that simply imposing an independent central bank in a country that for whatever reason is not ready to accept low inflation will work. and this may explain the murky correlation between *de iure* measure of CBI in developing countries versus OECD countries.²³ This is a valuable point. Nevertheless a country with a problem of high inflation may use an increase in CBI as something that helps achieving that goal. While an independent central bank dropped in a society non at all intolerant of high inflation may serve very little purposes, a move towards more independence in

²¹See Aghion, Alesina and Trebbi (2004) and Trebbi Aghion and Alesina (2008) for discussions about the issues of "endogenous institutions" in more general terms.

²²Posen makes similar argument, perhaps less convincingly, regarding federal systems versus a centralized systems.

²³There have been a couple of attempts at using instrumental variable to address endogeneity. problems Crowe and Meade (2008) employ both an IV and a Limited Information Maximum Likelihood strategies finding a statistically significant negative effect of CBI on inflation; as instruments they use two governance measures, the rule of law and voice and accountability. Jacome and Vazquez (2005) present evidence based on Latin American and Caribbean data in favor of a negative relationship between CBI and inflation; but they also find that using instrumental variables the significance of the correlation goes away.

a country where anti inflation sentiments are present but yet not strong enough may help. To put it differently, from a normative point of view, it would be a good idea for a social planner to recommend, in our view, to an hypothetical new country to adopt a system with an independent central bank. Nevertheless Posen's argument is well taken in the sense that if in this hypothetical country there are not enough political interests to allow this institutional arrangement to survive, it would not.²⁴ Also once an independent Central Bank has been established, institutional inertia and a risk of losing institutional credibility may protect, at least up to a point, direct and frontal attacks to that institution.

3.6 Independent Central Banks: a democratic deficit?

In the previous section we have reviewed some of the potential benefits of an independent authority taking charge of an important policy area: monetary policy. But, this leaves open two questions. First, isn't there a democratic deficit in allowing an independent bureaucracy to make important policy decisions? Second, if the time inconsistency issue is the only justification for this delegation why single out only monetary policy? What is so special about monetary policy? Time inconsistency problems are not a prerogative of monetary policy. Think only of fiscal policy, full of dynamic inconsistencies, not to mention non economic examples, like foreign policy where commitment versus flexibility is also a key trade-off.

On the first question, Drazen (2002) correctly argues that there is nothing non democratic in delegating certain policies to independent agencies and the nature of monetary policy makes it an ideal candidate for delegation. This is because monetary policy can be easily used strategically by politicians to achieve short term goals with cost hard to detect for the voters for possibly a long time. He also argues that there is probably much more agreement about the "correct" long run goal for monetary policy than fiscal policy.

Thus, having established that there is nothing antidemocratic in setting up independent agencies to pursue certain policy goals, the question is which policies should be delegated and which ones should not. Alesina and Tabellini (2007,2008) formally address these questions using a normative and a positive model of delegation²⁵. From a normative point of view these authors ask the question of whether society might benefit in delegating certain tasks to bureaucrats, taking them away from direct control of politicians. They focus on a different incentive structure between the two types of policymakers. Politicians's goal is to be reelected and to do so they need to provide enough utility to a majority of the voters. Voters are rational, and have a minimum threshold of utility that they expect from an incumbent. Bureaucrats instead have career concerns. They want to appear as competent as possible looking ahead toward

²⁴On this issue see also Acemoglu et al. (2008).

²⁵Their model builds upon Dewatripont, Jewitt and Tirole (1999 a,b). For a review of the literature on pros and cons of delegation see Epstein and O'Halloran (1999). For recent contributions by economists on issues of delegation see Besley and Gathak (2005), Maskin and Tirole (2001) and Schultz (2003).

future employment opportunities²⁶. Voters cannot distinguish effort from innate ability: they only observe policy results which are a combination of the two. Applying effort to an activity is costly for both bureaucrats and politicians.

Given these different incentive structures, it is optimal for society to delegate certain types of activities to non elected bureaucrats with career concerns, while others are better left in the hands of elected politicians. Delegation to bureaucrats is especially beneficial for tasks in which there is imperfect monitoring of effort and talent is very important because of the technical nature of the tasks. The intuition is that in technical issues where monitoring is uncertain, career concerned bureaucrats are eager to invest much effort to signal their ability. Politicians instead only need a minimum threshold to win a majority and since there is difficulty in distinguishing effort and ability have lower incentives than bureaucrats to invest in effort. Tasks with the opposite characteristics instead create the opposite incentives. To the extent that monetary policy is a policy task relatively technical in nature and where the "ability" of who is in charge is relatively hard to judge, than it would be a good candidate for delegation to a career bureaucrat. The idea that career bureaucrats might be better at technical tasks is reinforced if judging their ability is also a prerogative of specialists²⁷. Note that this result is not based on the assumption that career bureaucrats are intrinsically more able than career politicians in dealing with technical issues; obviously such an assumption would reinforce the result.

Alesina and Tabellini (2007,2008) also analyze a "positive" model of delegation, namely the case in which politicians can delegate or not certain tasks to bureaucrats having in mind their objective function, namely reelection. One result which is quite important for our discussion of monetary policy versus fiscal policy is that politicians prefer not delegate redistributive policies. The reason is that they are critical to build minimum winning coalition amongst voters. Packaging redistributive flows from income groups to income groups, regions to regions, lobbies to lobbies is what politics is mostly about. This is a reason while fiscal policy is virtually never delegated to independent agencies even though it is plagued by time inconsistency problems just as much, if not more than monetary policy²⁸. To be sure monetary policy has redistributive aspects as well. More or less inflation, a more or less active anti-cyclical policy certainly has redistributive implication. But these redistributive flows are less clear and direct than those caused by fiscal policy such as, for instance, an increase in the progressivity of the income tax or a tax or subsidies for this or that sector or this or that income group. For these reasons politicians may be more willing to grant independence to Central Bank more than they would with an independent Treasury.

²⁶In reality the distinction between the two incentive structures may not be so stark. Politicians may also look for future employment opportunities and bureaucrats may want to enter politics.

²⁷On related points see Maskin and Tirole (2004) and Epstein and O'Halloran (1999).

²⁸See Blinder (1997) for arguments in favor of the social optimality of delegation of certain aspects of fiscal policy and, along similar lines, Council of Australia (1999).

In summary, Alesina and Tabellini (2007, 2008) argue that monetary policy, in addition to the time inconsistency issue, is a good candidate for delegation to an independent agency. It is a relatively technical task where it is often difficult to attribute blame and praise. It is a task where career oriented bureaucrats may have superior incentives than politicians to perform well. It is also a task that politicians may be willing to delegate (at least up to a point) because of its less than direct and clear redistributive and coalition building effects. Also an independent Central bank may also serve occasionally as a perfect scapegoat for politicians: when the economy is not doing well having an non elected official to be blamed is a welcome opportunity.

3.7 Monetary Policy By Committee

Thus far even when analyzing politico economic models of Central Banks like in the subsection above, we always thought of a Central Banks as a single agent making decisions. In reality monetary policy is conducted by committees. Polard (2004) conducted a survey of Central Banks around the world finding that most of them made monetary policy by committee, 79 out of 88. Blinder (2007) discusses this worldwide trend and why most countries prefer their monetary policy to be the final result of a joint effort rather than to be in the hands of just one individual. Blinder and Morgan (2008) present some experimental evidence which shows that groups make decisions as fast or faster than individuals; committees also provide more diversification, a larger and richer knowledge base and a system of checks and balances. Policy-making by committee opens the interesting issue of how decisions are affected by heterogeneity among the members of the committee. The Bank of England constitutes an interesting case study with its monetary policy committee consisting of five internal and four external members. Hansen and McMahon (2008) find that external members vote as internal ones at the beginning, but after a year start voting for lower interest rates; consistently with these results Gerlach- Kristen (2009) find that outsiders dissent more often than insiders and prefer lower rates. The next step is trying to understand why there are such persistent differences in the behavior of the two groups; career concerns could be an explanation, internal members may be interested in signaling themselves as tough inflation fighters and external members may want to be recognized by future employers as business-friendly economists. Both authors reject an explanation based on career concerns; Hansen and McMahon (2008) run a battery of tests, for instance they argue that tenured academics should have less of an incentive to signal their competence and therefore test whether academics behave differently from non-academics and find that they do not; they also test the difference in the behavior of external members between a period when it was impossible to be reappointed in the committee and a period when it was possible, finding no statistical difference. If incentives-base explanations do not work an alternative could be found in the preferences of the agents; Gerlach-Kristen (2009) proposes a model where "recession averse" outsiders have different preferences from insiders.

Different frameworks can be used to model monetary policy making by committee. Riboni and Ruge-Murcia (2010) present five: a consensus model, where a supermajority is required to reach a decision; an agenda-setting model, where decisions are taken with a simple majority rule, but the agenda is set by the chairman of the committee; a dictator model, where the chairman decides the interest rate and finally a simple majority model, where the decision is taken by the median voter. Riboni and Ruge-Murcia (2010) estimate these five models by maximum-likelihood using data from five central banks: the Bank of Canada, the Bank of England, the European Central Bank, the Swedish Riksbank and the US Federal Reserve. They find that the consensus model fits actual policy decisions better than the alternative models.

3.8 Central Bank Independence and the Financial Crisis

The joint appearances in front of Congress of the Treasury Secretary (Paulson) and the Chairman of the Fed (Bernanke) in the worst period of the crisis have been a symbolic event which has called into question the relationship between the Fed and the Treasury and (in the background) the authorities for financial supervision. Was the Fed under pressure from the Treasury, or, conversely, was the Fed overstepping its mandate and spending taxpayers money? Has the US lost the distinction between monetary policy (delegated to an independent Fed) and fiscal policy, controlled by Congress and the Treasury?. It is indeed widely recognized that the Fed's action during the financial crisis have had substantial costs for the taxpayers. The Fed has taken decisions which were fiscal in nature.²⁹

One can read these events in two almost opposite ways. One is to say that the Fed needed to go beyond the limit of what its Statute allowed this institution to do, for instance which assets to purchase, how to intervene to rescue large financial institutions etc. In fact, the argument continues, the desperate cry for more discretion by the Fed in public appearances in front of Congress increased the perceived panic in the market. Or, to put it differently, the Chairman of the Fed had to paint the situation in even more dramatic tones than it actually was to receive more authority from Congress. In addition, delays in obtaining such authority might have worsened the situation. This argument would go in the direction of invoking even more independence and latitude for the Fed in moment of crisis when extraordinary situations require quick action. In fact, as we argued above in general terms, discretion may be an especially valuable asset in moment of crisis when rules which work in normal times have to be abandoned because too restrictive.

On the other hand, to the extent that the Fed takes action which imply costs for the taxpayers, the opposite view holds, than the latter (i.e. the taxpayers) should have their say through their representatives: "no taxation without representation". In addition, the argument continues, the Fed has been "captured" by the interest of the financial industry both before and during the crisis. Be-

²⁹See Zingales (2009) for an especially vehement denunciation.

fore the crisis the excessively low interest rates fueled excessive risk (and profit) taking and during the crisis this excessive risk was "covered" by bailouts with taxpayers' money.

It is the second line of argument that has led to political movements in Congress to limit the Fed independence and increase political supervision. The motivations are in part understandable,³⁰ but the question is whether a politically more controlled Fed would have acted differently or would have made matter worse. After all "regulatory capture" by a certain industry can and does occur even with respect to Congress. Not only, but a politically controlled Fed may later run into the problem highlighted above of time inconsistency. The large public debt accumulated by the US might become an incentive to inflate to which a less independent Central Bank may find it harder to resist. An indebted government controlling the printing press has never been a good idea and has often been the primary cause of large inflations.

However the renewed debate on the role of the Fed raises important politico-economic issue regarding the optimal allocation of regulatory power and the relationship between monetary policy and financial stability. It is only in the aftermath of the recent crisis that economists have turned their attention with sufficient energy to these questions and it is fair to say that a consensus has not yet emerged.

3.9 Financial regulation and monetary policy

It is widely agreed that the pre crisis financial regulatory framework of the US was vastly suboptimal. It seems the result of an accumulation of regulatory bodies born in response to various historical events and crises, and which developed into an uncoordinated institutional system lacking coherence.³¹ The need for a reform is vastly shared but the agreement pretty much stops here.

There are two possible institutional arrangements. One in which financial supervision is done by the Fed and another arrangement in which the Fed controls monetary policy (i.e. interest rates) and another agency (or agencies) deal with financial supervision of the banking system and prudential control.³² These different arrangements have to be judged from three points of view: democratic theory, the potential for regulatory capture and their economic efficiency and not all three criteria may give the same ranking.

Consider first the case in which the Central Bank has the task of monetary policy and supervision of the banking system. One efficiency argument in favor of it is that the level of interest rates influences through a variety of channels

³⁰ A more cynical reading of the events would be that some politicians are using the "excuse" of the crisis simply to regain control of the Fed, something which they wanted independently of the crisis itself.

³¹ For instance the Federal Deposit Insurance was born in 1933 in response to the bank runs of the previous years. The Security and Exchange Commission came about in 1934 to prevent the repetition of stock market manipulations of the 1920s. The Office of Thrift Supervision was created in 1989 in response to the Savings and Loan crisis.

³² See Alesina Carasquilla and Steiner (2005) for some data on which countries have adopted which system around the world.

the degree of risk taking of banks and other financial institutions and inter-bank lending. This has been defined as a "risk taking" channel of monetary policy.³³ In other words, interest rate policies affect bank balance sheets and bank decisions in ways that create incentives for more risk taking and shortening of maturities when interest rates are low and vice-versa.³⁴ Not only, but cyclical fluctuations also affect capital requirements making them pro-cyclical, given the provisions of the Basel II standards. Thus, to the extent that monetary policy has an anti-cyclical component the latter interferes with financial fragility. An efficiency argument for moving financial supervision at the Fed, therefore is quite reasonable. For instance Blanchard, Dell Ariccia and Mauro (2010) and Feldstein (2010) has endorsed this view. He concludes that "while a Council of Supervisors and regulators can play a useful role in dealing with macro prudential risk it should not replace the Central Role of the Fed".³⁵

However from the point of view of democratic theory one could raise an eyebrow (Zingales (2009)). The goals of financial stability and that of inflation targeting imply trading off some objectives against each other. Provision of liquidity to avoid banking crisis may come at the cost of giving up inflation control. In times of financial turbulence there are complex redistributive effects involved especially if when a crisis occurs the Fed has a wide latitude in deciding who and how much to bail out. Is it appropriate, from the point of view of democratic design, than a non elected bureaucrat (the Chairman of the Fed) makes such decisions involving taxpayers money and redistribution between financial institutions' stock holders, depositors, tax payers, debtors and creditors?

The alternative is then to assign to the Fed simply the goal of stabilizing inflation and create another agency for banking supervisions with the goal of achieving financial stability, and possibly a third one for consumer protection of the public, depositors and taxpayers.³⁶ Zingales (2009) argues that this system would attribute to each agency a specific goal thus increasing transparency and the possibility of evaluation of the results of each one. No single agency would have the tools or the mandate to trade off between goals, a decision left to the political arena. This arrangement scores high in terms of democratic theory, since it does not delegate political and redistributive decisions to non elected officials. However the question is how much is lost by the Fed in terms of information needed to conduct monetary policy if the Fed does not supervise the banking system. If one of the main channels of monetary goes indeed through the balance sheet of bank and the interbank complex borrowing system, would the Fed be missing a key ingredient in its tool kit? The jury is still out.

Finally what about "regulatory capture"? In the academic and policy discussion in the aftermath of the crisis there has been a remarkable little attention

³³See Adrian, Estrella and Shin (2009), and Borio and Zhu (2008).

³⁴See Shin (2009), Adrian, Estrella and Shin (2009) and Adrian and Shin (2008, 2009). For a review of liquidity, credit and risk taking channels of monetary policy see Adrian and Shin (2010).

³⁵Peek, Rosengreen and Tootell (1999) also argue that a regulator would acquire superior information which would be useful for monetary policy.

³⁶This is not the place to discuss the complexity of what is an appropriate definition of financial stability. See Morris and Shin (2008) and Borio and Drehmann (2008)

to this issue, as if it were a "non issue" and everybody had forgotten Stigler (1971). In a nut shell the question is whether is it more likely that the Central Bank or a regulatory agency may fall captured by the industry it is supposed to supervise, namely the financial industry. The answer is not obvious. A priori, economists tend to view Central Banks (at least in advanced democracies) as incorruptible institutions interested only in performing as well as possible for the economy as a whole, possibly because economists are involved in leading these institutions. On the other hand economists tend to view other regulatory agencies as much more capturable and less competent. But does it have to be this way? Not necessarily. Even in OECD countries Central bank may fall captured by the banking industry and, as argued above in reference to the Fed, its critics see the bail out policies of the Fed as a result of an excessive attention to the interest of Wall Street. In principle it is not impossible to set up a regulatory agency with the sufficient independence, skill, compensation levels so as to protect it as well as possible against capture. In the end whether a Central Bank of a regulatory agency is more easily captured is an empirical question.

One can certainly agree with Feldstein (2010) when he writes cautiously that "more research and analysis would be desirable before new legislation causes fundamental institutional changes that would be politically difficult to reverse".

4 Political Business Cycles

Thus far we examined models in which the policymaker maximized social welfare, possibly using an agent (the Central Bank) but there was no conflict of interest between the policymakers' objectives and social welfare, nor there was disagreement amongst individuals about the most proper macroeconomic objectives. We now examine models in which this is not the case anymore, namely we have self interested politicians and conflict of macroeconomic goals. These are known as political business cycle models, which can be divided into two groups. In partisan models the two parties have different preferences over inflation and unemployment, in opportunistic cycles the only objective of the parties is to win elections and they have no preferences on the economy per se. The literature on political business cycles has been reviewed extensively in Alesina, Roubini and Cohen (1997), and Drazen (2000, 2001, 2009a,b). Here we highlight some key points and focus upon recent research in the area.

4.1 Partisan Cycles

These are models in which different parties have different objectives over macroeconomic policy. Hibbs (1987) argued that in the post war US the two major parties have systematically differed in their emphasis on the relative cost of inflation and unemployment, the Republican more sensitive to the cost of the former the Democrat of the latter. His work was empirical and was based on

an exploitable Phillips curve. Alesina (1987) revisited the issue emphasizing the role of policy uncertainty when the two potential policymakers do not have the same objectives. This uncertainty can generate policy cycles even with rational expectation with some form of stickiness in wage/price adjustment, like a labor contract model. This model has been labeled the Rational Partisan Theory and here we briefly review it. The economy is again described by:

$$y_t = \pi_t - \pi_t^e$$

The elections take place every other period and two candidates compete for the office: an incumbent and a challenger; expectations are formed rationally. The left-wing party (L) cares relatively more about growth whereas the right-wing party (R) cares relatively more about inflation: in the context of our simple model with $b^L > b^R$:

$$L^L = \frac{b^L}{2}(y_t - k)^2 + \frac{1}{2}(\pi_t)^2 \quad (22)$$

$$L^R = \frac{b^R}{2}(y_t - k)^2 + \frac{1}{2}(\pi_t)^2 \quad (23)$$

The timing of events is as follows. In every period first "expectations" (i.e wage contracts) are set. Then in an electoral period elections take place and then inflation is chosen by the winning party. In an "off year" there are no elections. By minimizing the loss functions we can find the inflation that would prevail if either party wins the elections as a function of expected inflation:

$$\pi^L = \frac{b^L}{1 + b^L} \pi^e + \frac{b^L}{1 + b^L} k \quad (24)$$

$$\pi^R = \frac{b^R}{1 + b^R} \pi^e + \frac{b^R}{1 + b^R} k \quad (25)$$

If P is the probability that party R wins the election, the expected inflation in the period after the election will be:

$$\pi^e = \frac{b^L(1 + b^R) - P(b^L - b^R)}{1 + b^R + P(b^L - b^R)} k \quad (26)$$

Given the expectations of inflation it is easy to determine the levels of inflation and output in the period immediately after the elections:

$$\pi^L = \frac{b^L(1 + b^R)}{1 + b^R + P(b^L - b^R)}k \quad (27)$$

$$\pi^R = \frac{b^R(1 + b^L)}{1 + b^R + P(b^L - b^R)}k \quad (28)$$

$$y^L = \frac{P(b^L - b^R)}{1 + b^R + P(b^L - b^R)}k > 0 \quad (29)$$

$$y^R = \frac{-(1 - P)(b^L - b^R)}{1 + b^R + P(b^L - b^R)}k < 0 \quad (30)$$

In the non election period inflation goes back to $\pi = b^i k$, where i is the identity of the party in office, and output returns to zero. Rational partisan cycles therefore produce a deviation of output from its natural rate for a period and the magnitude of this deviation depends on the extent of the political polarization. The right-wing party causes recessions because the expectations of inflation are kept high by the possibility of a victory of the left; the higher the degree of surprise of the electoral result, the lower the probability P of electing the right-wing government, the larger the recession. The key insight of the model is that policy uncertainty due to electoral uncertainty may deliver real effects of policy shocks until expectations have adjusted to the new regime. Obviously one could add additional dynamics by including elements of slow learning over a new administration true policy objectives

In the simplest version of the model the probability of the electoral result is taken as exogenous. Alesina and Rosenthal (1995) develop a more general model in which both electoral result and partisan cycle are endogenous. There is a distribution of voters preferences over policy objectives and, in addition, different administrations are viewed as more or less "competent" at handling the economy. Voters look at competence and the closeness of the party's objective to their own in order to decide who to vote for. Shocks over the distributions of voters' preferences generate electoral uncertainty. The same authors also illustrate the dynamic of electoral cycles at the Presidential and Congressional level and link the partisan cycle as above to the mid term cycle in congressional elections. This model can also be extended to allow for policy convergence, i.e. the parties moderating their platforms to attract middle of the road voters.

4.2 Opportunistic Cycles

In opportunistic cycles politicians have no goals of their own other than the desire to win elections and remain in office as long as possible. There are no differences in policy objectives. Nordhaus (1975) analyzes an economy where inflation is set by an incumbent who is facing elections and is willing to distort macroeconomic policy to win. In this model voters like growth, and dislike

inflation and unemployment; they heavily discount the past, and, instead, their voting decision is influenced by the performance of the economy in the period immediately before the election. Inflation expectations are adaptive and not rational. In equilibrium the incumbent stimulates the economy before elections in order to boost growth; the voters reward the incumbent for the short run burst in economic activity, without realizing that this policy produces in the post-election period a sub optimally high inflation. The latter then needs a post electoral recession to eliminate it, but the recession will be forgotten soon by short sighted voters with short memories. In this model political business cycles are produced by the short-sightedness of citizens in two ways. First they have adaptive and non rational expectations about inflation. Second, as voters, they heavily discount the past. When a new election comes they have forgotten the early recession and remember only the pre electoral boom.

Nordhaus' model became immediately popular, and the 1972 election won by Richard Nixon with what seemed to be a friendly help from the Fed and some "checks in the mails" sent in the summer and fall of 1972, was often cited as a perfect example of the Nordhaus' model at work. In fact probably it was that election which inspired the paper itself. At the same time however, the "rational expectation revolution" was taking place in macroeconomics, and any paper written without rational expectations was cast aside. As a result the political business cycle models fell out fashion, at least in the mainstream of the profession.

Persson and Tabellini (1990) show how political business cycles may arise even when voters behave rationally. In their model politicians are identical in everything but "competence". More competent governments are better at managing economic policies and will achieve higher levels of output for given inflation and expected inflation. Voters are rational and want to maximize their expected utility; they will obviously want to elect the most competent politician among the candidates. Again the timing of the elections is fixed and only two candidates participate. The incumbent controls the inflation and wants to win the elections: he knows that in order to do so his expected competence must be above the challenger's expected level. There are two types of equilibria. In the separating equilibrium it is too expensive for the incompetent type to distort policies and therefore the competent type is able to achieve a level of growth unattainable by an incompetent incumbent; voters will therefore be able to tell the two types of politicians apart. There is also a pooling equilibrium in which the incompetent type sets a high inflation level to achieve the same output level as the competent type who, on the other hand, does not deviate from the optimal level of inflation. In the more interesting separating equilibrium it is the competent incumbent who chooses a higher than optimal inflation rate in order to achieve a high level of output, whereas the incompetent incumbent will choose the one-period optimal inflation rate because he cannot achieve the same level of output. Voters do not know beforehand the competence of the incumbent, thus expectations of inflation in the period immediately before elections must be an average of a higher and a lower inflation: inflation will be higher than expected if the incumbent is competent and lower than expected otherwise; the competent

policy-maker produces an economic expansion before elections and is reelected. The political business cycle here is different from the one in the Nordhaus model, only one type of politician is able to create economic growth, the other type determines a downturn; furthermore in this model there is no post-electoral recession. In Appendix we sketch the derivation of these results. This model has the advantage of not being based on irrationality or short sightness of voters, However it is difficult to test empirically since difference in the nature of the electoral cycle are related to unobservable variable (by the econometricians) like competence (and expected competence) of policymakers.

The model of competence was in fact introduced by Rogoff(1990) and Rogoff and Sibert (1988) in the context of political budget cycles. These authors argue that politicians may bias fiscal expenditures towards easily observed interventions and away from long-term investments in order to signal competence; the political budget cycle is therefore driven by temporary information asymmetries on competence over the conduct of fiscal policy.

4.3 Political Cycles and Central Bank Independence

Central Bank independence also implies that monetary policy cannot be used (at least directly) by policymakers to generate political business cycles, neither of the opportunistic type nor of the partisan type.³⁷ Following Alesina and Gatti (1995) we provide an illustration of the effect of Central Bank independence in a partisan model where different parties have different policy goals.

Consider the partisan model we have seen before in section 4.1; we now introduce output shocks and the possibility of delegation of monetary policy to an independent Central Bank. The economy is now described by:

$$y_t = \pi_t - \pi_t^e + \epsilon_t \quad (31)$$

where an uncertainty term is added. As before the left-wing party (L) cares relatively more about output than the right-wing party (R), $b^L > b^R$; P is again the probability that the right-wing party wins the elections. For simplicity and no loss of generality we assume that there are elections every period. Like before expected inflation is given by:

$$\pi^e = \frac{b^L(1 + b^R) - P(b^L - b^R)}{1 + b^R + P(b^L - b^R)} k \quad (32)$$

Using expected inflation we can determine inflation and output that prevail under the two parties in the period after elections:

$$\pi^L = \frac{b^L(1 + b^R)}{1 + b^R + P(b^L - b^R)} k - \frac{b^L}{1 + b^L} \epsilon_t \quad (33)$$

³⁷However, as Drazen (2005) points out, the pressure on even independent Central Banks can be different in different phases of the electoral cycles and be stronger right before elections.

$$\pi^R = \frac{b^R(1+b^L)}{1+b^R+P(b^L-b^R)}k - \frac{b^R}{1+b^R}\epsilon_t \quad (34)$$

$$y^L = \frac{P(b^L-b^R)}{1+b^R+P(b^L-b^R)}k + \frac{1}{1+b^L}\epsilon_t \quad (35)$$

$$y^R = \frac{-(1-P)(b^L-b^R)}{1+b^R+P(b^L-b^R)}k + \frac{1}{1+b^R}\epsilon_t \quad (36)$$

The variances of inflation and output are therefore equal to:

$$var(\pi) = \frac{(1-P)P(b^L-b^R)^2}{[1+b^R+P(b^L-b^R)]^2}k^2 + \left[P \left(\frac{b^R}{1+b^R} \right)^2 + (1-P) \left(\frac{b^L}{1+b^L} \right)^2 \right] \sigma_\epsilon$$

$$var(y) = \frac{P(1-P)(b^L-b^R)^2}{[1+b^R+P(b^L-b^R)]^2}k^2 + \left[\frac{P}{(1+b^R)^2} + \frac{1-P}{(1+b^L)^2} \right] \sigma_\epsilon \quad (37)$$

The expression for the variance of output has an intuitive explanation: the first term represents the variation of output determined by the electoral uncertainty, it is increasing in the difference between the two parties' preferences, $(b^L - b^R)$ and disappears when P is either 0 or 1; the second term comes from the economic uncertainty due to the shock ϵ .

The politicians have the possibility of improving on this outcome by agreeing before the election to appoint an independent central banker with preference \hat{b} who cannot be removed from the office. Alesina and Gatti (1995) show that there is a range of values for \hat{b} such that the two parties are better off delegating the monetary policy to the independent central banker. The intuition is that ex ante before the electoral uncertainty is resolved both parties have an incentive to eliminate the uncertainty effect on output fluctuations since their costs are convex. An independent Central Bank provides two benefits then: elimination of the inflation bias and elimination of policy uncertainty. The point here is that by taking away monetary policy from the ebb and flows of the partisan cycles the variance of inflation and output may go down. So while in Rogoff's model the lower level of average inflation is achieved at the cost of a higher level of output variance in this model this is not necessarily the case. In fact by insulating monetary policy from partisan cycles an independent Central Bank can achieve at the same time lower inflation and more output stabilization relative to the case of non independent ones. This because the politically induced variance in output is eliminated.

4.4 The Evidence

Alesina, Roubini and Cohen (1997) use data on the United States for 1947-1994 and find evidence to support the partisan models. We refer the readers to that book for a survey of the literature until 1997. These authors report systematic differences in the rates of growth, the average inflation rate and the unemployment rate between Democratic and Republican administrations with a pattern consistent with the Rational Partisan Theory reviewed above. Instead they find no evidence of opportunistic business cycles: monetary policy is not more expansionary during election years and there seems to be not much pre electoral opportunistic manipulation of fiscal policy, with some exceptions, notably 1972 in the US. Most of these results hold using data on eighteen OECD countries for the period 1960-93: the evidence supports the rational partisan model especially in countries with a two-party system and rejects the opportunistic models. They also test also the implication of the rational partisan theory that the size of the political cycles should depend on the degree of electoral surprise; using a proxy for the probability of electoral outcomes they find evidence in support of the theory. In the period of the great moderation., partisan difference in macroeconomic and inflation policies have vastly diminished at least in OECD countries.

The most recent literature on political business cycles has focused not on growth, unemployment and inflation but upon fiscal variables. Persson and Tabellini (2005) empirically test a large theoretical body of literature on the impact of different political institutional settings on the economic development of a country. They analyze a 60-country panel over almost 40 years in order to uncover the influence of constitutions on the behavior of governments; they find that even if all countries are affected by political budget cycles, different constitutional features have an impact on which type of fiscal policy is chosen. Democracies with proportional representation tend to raise welfare spending before elections, whereas majoritarian democracies cut spending. Presidential regimes postpone unpopular fiscal policy adjustments, but all types of governments seem to cut taxes during elections periods. Brender and Drazen (2005, 2007) show instead that political budget cycles exist only in "new democracies"; they argue that in countries with a longer democratic tradition voters punish those politicians who opportunistically manipulate fiscal policy to be reelected. They show that it is not the nature of the electoral system as in Persson and Tabellini but the "age" of democratic institutions which influence the existence of political budget cycles.³⁸ Gonzalez (2002) presents evidence on Mexican political business cycles; she shows that the government used public spending in infrastructure and current transfers to win elections. Khemani (2004) finds similar results using data on Indian elections. Kneebone and McKenzie (2001) use Canadian province data and find opportunistic political business cycles both in revenues and in spending. Block (2002) uses annual data on 44 Sub-Saharan

³⁸ Drazen and Eslava (2006) design a model of political business cycles which is consistent with this recent empirical evidence.

African countries in the period 1980-1995 finding clear patterns of electorally timed interventions in key monetary and fiscal policy variables, such as money growth, interest rates, inflation, seigniorage and nominal exchange rate changes, fiscal deficits, expenditures and government consumption. Akhmedov and Zhuravskaya (2004) use a monthly panel data set on Russia in the period 1995-2003 and find strong evidence of opportunistic budget cycles. They discover that the budget cycle is short-lived and this may be a reason why previous literature could find only weak evidence of cycles; public spending takes the form of direct monetary transfers to voters; they also find a negative correlation between the magnitude of the cycle and democracy, government transparency, media freedom and voter awareness. Finally they claim that pre-electoral manipulation seems indeed to increase incumbents' chances for reelection. Shi and Svensson (2006) assemble a panel data of 85 countries for the period 1975-95 and they find that on average government deficit as a share of GDP increases by almost one percentage point in election years; these budget cycles, though, seem to be statistically significant only in developing countries. They also control for the election variable being endogenous relative to fiscal policy.

5 Currency Unions

In 1947 at the end of the second world war there were 76 countries in the world. Today there are 193 (with a seat at the UN). Unless one believe that there is a natural "law" according to which each country has to have its own currency, either there were too few currencies in 1947 or there are too many today!³⁹

The question of whether we have too many or too few currencies today is a relevant one. There has been much talk about dollarization especially in South America, and some countries had made steps in that direction (Argentina, Ecuador). Eleven countries in Europe formally adopted the same currency and other countries then joined bringing the total of today at 16. A few countries after decolonization have maintained the currency of the former colonizer (the French Franc zone now linked to the Euro).

The decision about relinquishing their own currency has both economic and political implications. One can think of two types of currency unions. One in which a relatively small country unilaterally adopt the currency of a large country, say Panama adopting the US dollar, or some former colonies keeping the currency of an old colonizers like the French franc zone in Africa . A second type of currency union is one in which a number of countries decide to give up their own currency and create a new common one. The European Monetary Union (EMU) is the primary current example.⁴⁰

Mundell (1961) pointed out that the optimal currency area is the result of

³⁹See Alesina and Spolaore (1997) and Alesina Spolaore and Wacziarg (2000) for theoretical and empirical discussion of the evolution of the number of countries in the world.

⁴⁰In addition there have been several example of currency boards which lasted more or less, like Hong Kong, Argentina and Lithuania with the dollar and Estonia and Bulgaria with the German mark first and then with the Euro.

two countervailing forces. On the one side we have the benefits of a currency union in facilitating trade in goods, services and financial transaction. Weighing against those is the loss of independent monetary policy for each country which gives up its own currency. Mundell stressed the role of wage flexibility and labor mobility as key variables affecting this trade off. More flexibility and mobility make an independent monetary policy less advantageous thus weighing in favor of monetary unions. In fact much of the debate in Europe before the adoption of the common currency was precisely on the issue of whether Europe satisfied the condition of wage flexibility and labor mobility identified by Mundell.

Giavazzi and Pagano (1986) and Giavazzi and Giovannini (1989) pointed out the benefits of fixed rates (and currency unions as a limiting case) as a commitment device. Alesina and Barro (2002) have revisited the question for optimal currency areas extending Mundell's framework and incorporating it in the discussion of rules versus discretion in monetary policy. While many of the issues are common for the two types of currency unions (a unilateral adoption or a creation of a new currency like the Euro) it is useful to analyze them separately.

5.1 Unilateral adoptions

Using a simplified version of the Alesina and Barro (2002) model, consider a world of two countries a large one indicated with the subscript L and one indicated with the subscript S . Their GDP per capita is given by:

$$y_t^L = \pi_t^L - \pi_t^e + \varepsilon_t^L \quad (38)$$

$$y_t^S = \pi_t^S - \pi_t^e + \varepsilon_t^S \quad (39)$$

The two shocks ε_t^L and ε_t^S are i.i.d., with zero average, the same variance (for simplicity) and a covariance equal to $\text{cov}(\varepsilon_t^L, \varepsilon_t^S)$. The loss functions of the two governments are given by:

$$L^i = \frac{1}{2}(\pi_t^i)^2 + \frac{b}{2}(y_t^i - k)^2 \quad i : L, S \quad (40)$$

where $k > 0$. Suppose that country L is committed to the optimal monetary rule:

$$\pi_t^L = -\frac{b}{1+b}\varepsilon_t^L \quad (41)$$

The other country instead, has not solved the problem of time inconsistency of monetary policy and follows the discretionary one:

$$\pi_t^S = bk - \frac{b}{1+b}\varepsilon_t^S \quad (42)$$

Suppose now that country S adopts the currency of L , and in doing so, accepts the inflation rule of the large country (π_t^L). Two are the consequences. First average inflation goes to zero, eliminating the inflation bias: country L serves as a monetary "anchor". Second, monetary policy responds to the "wrong" shock from the point of view of country S , namely it responds to ε_t^L rather than ε_t^S .

Country S chooses the foreign currency iff and only if:

$$k^2(1 + b) > 2\sigma^2 - 2cov(\varepsilon_t^S, \varepsilon_t^L) \quad (43)$$

The factor that weighs against a currency union is a low covariance of the shocks. If the covariance is low country S finds itself often with the "wrong" monetary policy: expansionary during boom and contractionary during recessions. The factor which, on the contrary, weighs in favor of the currency unions is a large value of k , which is a measure of the reduction of average inflation for country S , namely the value of having an "anchor" to low inflation. Obviously country S would never adopt the currency of a country not committed to a credible low inflation policy. Otherwise it would not gain in terms of average inflation and it would import a monetary policy targeted to the "wrong" shock.

In general, examples of unilateral adoption involve one or more small countries adopting the currency of a large one. In that case we could interpret our superscript as L for large and S for small. In addition to these purely monetary aspects of the monetary union there can be significant additional effects due to trade. The small country could greatly benefit from beneficial effects on trade flows with the large country (more on this below). Note that the large country is completely unaffected by the currency union neither in terms of inflation, nor realistically, in terms of trade flows given the relative size of the two countries.⁴¹

The case of one or more average sized countries adopting unilaterally a currency like the dollar or the euro may generate political complications. For instance, imagine several countries in Latin America all adopting unilaterally the US dollar, or several Central and Eastern European countries adopting the Euro. In both cases the Fed and the ECB may come under political pressure if Latin America and Central Europe at some point in time needed some monetary policy different from the one responding solely to the cycle of the US economy or of the 11 original countries of the Euro Area.

5.2 Unilateral currency unions and "crisis"

Currency unions may come under stress during a crisis both for the small country but also for the large anchor country. The most obvious example of a crisis is an exceptionally "bad" realization of the shock of the small country (i.e. a very low value of ε_t^S relative to the shock of the large countries). In this case the

⁴¹Even though we have referred to a large "anchor" country and a small "client" country, economically speaking the size of the country is irrelevant, all that matters is the monetary policy of the anchor country. In that respect Switzerland could be just as good an anchor country as the US. However the trade benefit for the client country are increasing with the size of the anchor country.

small country would need a very expansionary monetary policy, which is not provided by the anchor country. To make matter worse for the small country the anchor may be pursuing a contractionary monetary policy in response to an inflationary shock. In this case, it may be too costly in the short run, to maintain the currency union. The situation is similar analytically to the case discussed above of a negative shock with an independent, inflation averse Central banker committed to low inflation. In that case, we argued, one could think of intermediate institutional arrangements in which a Central Bank loses independence during a crisis. But in the case of a unilateral adoption of a foreign currency this switch is impossible. Either a currency union is broken, or it is not.

Note the analogy and the difference with a fixed exchange rate regime. The choice of abandoning a fixed exchange rate to return to flexible is much less costly, institutionally, than abandoning a currency union. Therefore even a relatively "small" crisis would lead to a breakdown of fixed rate systems. In fact we have observed many examples of fixed rate systems reverting to flexible in response to crises of various nature. This is precisely the reason why certain countries may prefer a currency union to fixed exchange rates, to make the arrangement (and the anchor to a low inflation country) more credible therefore avoiding speculative attacks to the home currency.

But even a crisis in the large country could lead to a breakdown of the currency union. As we have discussed above, a crisis in the anchor country (i.e. an especially low realization of ε_t^L) may lead to a breakdown of the monetary policy rule. In this case the large country may not be any more a good "anchor" for the small country which may decide to abandon the currency union. An inflation prone US, say, would not be a useful anchor for an inflation prone Latin American country.

5.3 Multilateral Currency Unions

Consider now two countries of roughly equal size (in the model exactly equal size) forming a currency union with a new currency and a new Central Bank. Let's label the two countries "Germany" (G) and "Italy" (I). Output is, as usual:

$$y_t^i = \pi_t^i - \pi_t^e + \varepsilon_t^i \quad i = G, I \quad (44)$$

the shocks ε_t^i ($i = G, I$) have mean zero, the same variance, and covariance $\text{cov}(\varepsilon_t^G, \varepsilon_t^I)$. The loss function of the two governments are, as always:

$$L^i = \frac{1}{2}(\pi_t^i)^2 + \frac{b}{2}(y_t^i - k)^2 \quad i = I, G \quad (45)$$

Even without a currency union, Germany follows the optimal policy rule:

$$\pi_t^G = -\frac{b}{1+b}\varepsilon_t^G \quad (46)$$

In Italy, instead, monetary policy follows "discretion":

$$\pi_t^I = bk - \frac{b}{1+b}\varepsilon_t^I \quad (47)$$

How would a currency union between the two countries look like? The two countries adopt a new currency and create a new Central Bank which follows the optimal monetary policy for the entire currency union. In which case the policy (π_t^{CU}) would be:

$$\pi_t^{CU} = -\frac{b}{1+b}(\varepsilon_t^G + \varepsilon_t^I) \quad (48)$$

Germany would never join such a union purely based upon consideration of monetary policy. It would have to adopt a monetary policy not targeted to its own cycle and would not gain anything in terms of commitment or credibility. This was precisely the discussion which predated the adoption of the euro, namely the question was "why would Germany join?". The answer has to rely on considerations outside of purely monetary policy: one is the trade benefits for Germany, other considerations are more political in nature, and we return to those below when we discuss in more detail the Euro.

For Italy the trade off is similar (in fact more advantageous) than the one discussed above for the case of unilateral currency unions. In fact contrary to an hypothetical unilateral adoption of the German mark by Italy, the new Central Bank would target a shock which is an average of the Italian and German shock. Italy loses an independent monetary policy but gains an anchor and in addition a "new" stabilization policy not targeted only to the German shock like in the case of unilateral adoptions. In fact, precisely because Italy would gain more than Germany Italy would be willing to join a currency union even with a monetary policy more tailored to the needs of Germany than to those of Italy (namely reacting more to ε_t^G than ε_t^I), say a policy like:

$$\pi_t^{CU} = -\frac{b}{1+b}(\alpha\varepsilon_t^G + (1-\alpha)\varepsilon_t^I) \quad \text{with } 1 \geq \alpha > \frac{1}{2} \quad (49)$$

It is easy to check that the benefit for Italy to form the currency union are decreasing with α

$$\frac{\partial[E(L^I) - E(L^{CU})]}{\partial\alpha} = \frac{2b^2\alpha(\text{cov}(\varepsilon_t^I, \varepsilon_t^G) - \sigma^2)}{1+b} < 0 \quad \text{for Italy} \quad (50)$$

In general there exist a value of $\alpha > 1/2$ such that Italy would be indifferent between joining the union or not.⁴²

This very simple example captures some of the discussion underlying the creation of the European Monetary Union.

⁴²For certain parameter values, Italy might be willing to adopt a currency union in which monetary policy is fully delegated to Germany, in which $\alpha = 1$. That is for Italy the condition given above for a unilateral currency union (i.e. $\alpha = 1$) might be satisfied.

First, the benefits of the union are unevenly distributed. The countries in need of a monetary anchor gain more. But there is an answer to why the anchor country, say Germany, may want to join, namely the gain emerging from a larger common market with smaller and fewer transaction cost in trade, more competition etc.

Second, with multiple countries joining the currency union one needs certain institutional rules to decide monetary policy, even certain voting rules. With multiple countries we can think of voting rules which affect the choices of the weight " α^i " with i indicating all the member countries. Alesina and Grilli (1992, 1993) discuss precisely this issue. In the first paper they analyze a model in which the median country chooses the objective function of the central bank.⁴³ By "median country" it is meant the country with the median "b" in their objective function, using the notation of the model of the present paper. For the same reason discussed above for the case of the conservative central banker, the median voter (i.e. the median country) in the union would choose an objective function for the supranational central bank more inflation averse than the median voter's preference. Alesina and Grilli (1993) discuss how the structure of the voting rules would influence the incentive to allow more countries to join in. New countries would change the median voter and this move may be seen favorably or unfavorably by those already in. This would affect the decision, by majority rule of which new member to allow in.⁴⁴ The political sensitivities of weight in voting rules, is the reason why the ECB has from the very beginning tried to present itself truly as a supranational institution rather than a committee of national authorities. Had it chosen the other strategy there would have been an explicit, politically costly and potentially damaging debate about the value of the parameters " α " which entered the ECB objective function.

Third, the covariance between shocks, namely $\text{cov}(\varepsilon_T^G, \varepsilon_t^I)$ may be affected by the formation of the union. In fact there are two countervailing effects. One is that a currency union by increasing the policy coordination between members and by increasing market integration, may increase the covariance between national shocks. This would reinforce the benefits of the union. On the other hand an increase in trade between members might lead to a specialization in different sectors of the economies of the country members. This would reduce the covariance of the economic shocks of member countries. Empirically work by Frankel and Rose (1998) suggests that trade integration increases the coordination of business fluctuations.

Fourth, the union would come under stress in times when the national shocks are very divergent, in our example when ε_t^G is, say, large and positive and ε_t^I negative and large in absolute value. This is a situation analogous to that of a stress in a unilateral union discussed above. The difference is that the formation

⁴³In the model there is an objective function common to all citizens of a country, each country is therefore homogenous.

⁴⁴Similar arguments apply to decisions about excluding member countries. There is not a well defined process for exclusions, but as the crisis of Greece, at the time of this writing certain decisions like a bail out or not may be implicitly a decision about keeping a country in or no.

of a common (new) currency like, say the Euro, may imply even bigger costs in breaking it up.

5.4 Trade benefits of currency unions

The benefit of a currency union go beyond those of macroeconomic policy stability and inflation and may involve as we mentioned above trade and financial integration. Rose (2000) started a lively literature on the trade benefits of currency unions. Using a United Nations panel dataset on trade among around 200 countries, Rose estimated a standard gravity model with the addition of a currency union dummy and the coefficient turned out to be strongly statistically significant and astonishingly large; he found that currency unions triple trade among their members. These results were received with skepticism, Persson (2001) for instance raised the problem of endogeneity: the decision of joining a currency union clearly depends on the trade relations with the other members and therefore is endogenous; OLS estimates of currency unions on bilateral trade will be biased and this bias may account for the unusually large estimates. He also showed that the group of countries sharing the same currency had systematically different characteristics: countries in a currency union are smaller and poorer, share a language or a border and they more often had the same colonizer.

Since then many studies have tried to address the endogeneity issue and have confirmed statistically significant effects of currency unions on trade. Several authors have produced estimates below those of Rose (2000) but it has been "hard" at least in that framework involving many small countries adapting large countries currencies to "bring down" the estimates to more reasonable values. Frankel and Rose (2002) analyze a large cross-section of countries and find that giving up the currency by joining a currency union or a currency board both enhances trade and income. Glick and Rose (2002) provide some time-series evidence using a panel data set covering 217 countries from 1948 through 1997; they find using different techniques that leaving a currency union decreases trade. Rose and Stanley (2005) perform a meta-analysis of thirty-four papers studying the effect of currency unions on trade and finds that the hypothesis of no effect is robustly rejected at standard significance levels. Barro and Tenreyro (2007) adopt a new instrumental variable approach. They argue that the decision of creating a currency union between two countries is sometimes due to the independent decision of these two countries to peg to a third country's currency; they estimate the probability that each country adopts the currency of a main anchor country and then compute the joint likelihood that two countries independently peg to the same anchor: these likelihoods are then used as instruments for being member of a currency union.

Alesina and Barro (2002) discuss the tradeoffs in the adoption of another country's currency and find that the countries that most gain in joining a currency union are those that trade most with each other, have the largest comovements in outputs and prices and have stable relative price levels. Alesina, Barro and Tenreyro (2002) try to empirically determine "natural" currency ar-

eas: using the criteria of Alesina and Barro (2002) they determine which countries in the world would gain by choosing as anchor either the euro or the dollar or the yen. They find a dollar area involving Canada, Mexico, most of Central America and parts of South America (except Argentina and Brazil) and a euro area including all of western Europe and most of Africa; empirically there seems to be no clear yen area though, being Japan a rather closed economy.

6 The Euro

The Euro is about 11 years old at the time of this writing (winter 2010). Overall the Euro has been a success and it will probably be with us in the medium run if not more even though at the time of this writing is facing the most serious crisis for its birth with the fiscal problems of Greece and potentially Portugal, Spain and Ireland.⁴⁵ The euro had not been a miraculous "deus ex machina" that would have prompted extraordinary growth for Europe as some of the most naive euroenthusiasts would have dreamed. But it has been more successful than the skeptics would have predicted. Even in the midst of a deep financial crisis the survival of the European common currency does not seem in jeopardy, and in fact one may argue that the "weak currency" countries of Europe might have had a much worse performance during the financial crisis without the currency union. Not only, but some of the European non euro members would have liked to be in after the crisis erupted. The aftermath of the crisis is proving to be challenging with the Greek crisis. At the time of this writing it is hard to predict how such crisis will evolve. More on this below.

6.1 The pre crisis period of the Euro

It is useful to review what one could have said about the Euro before the financial crisis started in the summer of 2008 and how the euro performed during the crisis. At the end of the nineties many (especially American) economists were rather skeptical about the creation of a common currency area in Europe. Obstfeld (1997) offered a very careful analysis of pros and cons ending with a relatively negative tone.⁴⁶ In favor of the union were the anchor effect for high inflation countries, a reduction of trade costs and barriers, a deepening of the common market financial integration, and for those who supported it, a step towards more political unity in Europe. The critics pointed out the problem of abandoning a policy instruments in a region full of rigidities in labor markets, a feature which did not seem to satisfy any of Mundell's conditions of an optimal currency area. The lack of wage flexibility and the low mobility of labor within the union would have made the loss of an independent national monetary policy very costly.

⁴⁵See Issing (2008) for an in depth discussion of the process that led to the creation and consolidation of the Euro and the European Central Bank

⁴⁶See also the exhaustive set of references provided in that paper which summarizes the pre euro discussion regarding the monetary union.

On the latter point the optimists replied, perhaps with a bit of a leap of faith, that the monetary union would have given an impulse to adopt those liberalizing reforms. Alesina, Ardagna and Galasso (2010) investigate whether or not the adoption of the euro has indeed facilitated the introduction of structural reforms, defined as deregulation in the product markets and liberalization in the labor markets. They find that the adoption of the euro has been associated with an acceleration of the pace of structural reforms in the product market. As for the labor market the evidence is harder to interpret. Reforms in the primary labor market have proceeded very slowly everywhere and the euro does not seem to have generated much of an impetus here.⁴⁷ On the other hand in many countries including many euro ones like France, Italy and Spain new form of labor contracts have been introduced based upon temporary agreements between employers and workers. The authors also explore whether the euro has brought about wage moderation: they find evidence of it in the run up (1993-1998) of euro membership but not afterwards.⁴⁸ Thus at least in part the optimist might have been right on this point.

The most radical critics of the Euro, in particular Feldstein (1997) objected that the divergent needs of monetary policy in the euro area would have created more tensions amongst members who would have reduced rather than increased economic cooperation in Europe increasing political tensions. This was rather extreme but even one of us (Alesina 1997) was also worried about conflict regarding the conduct of monetary policy. Eichengreen (2010) after reviewing these arguments concludes (correctly in our view) that reality turned out to be more in line with the predictions of the optimists rather with those of the worst pessimists. To be sure there were indeed conflicts and dissatisfaction in the first years of the Euro. Countries with low growth, like Italy, blamed the euro for being locked in a system which did not allow devaluations.⁴⁹ A second source of tension related to the policy of the ECB. Several European leaders, especially from Italy, France and Spain attacked the ECB for its policies which were, allegedly, too concerned about inflation rather than growth, for having a too low b in the language of our model. The rhetoric in the first part of century was that the ECB was choking the growth in Europe, while the Fed under the miraculous hands of Alan Greenspan was promoting growth in the US. The critiques to the ECB were largely wrong and, in fact the ECB served the purpose of the scapegoat, for timid politicians incapable to deliver structural reforms. It goes beyond the scope of the present paper a detailed analysis of the policies of the ECB but the view that this institution is responsible for the low average

⁴⁷See Blanchard and Giavazzi (2003) for a discussion of the sequencing of labor and product market reforms in Europe.

⁴⁸Bugamelli, Schivardi and Zizza (2009) further pursue this question from a different angle and find that productivity growth has been relatively stronger in those countries and sectors that before the euro was adopted relied more on competitive devaluations to regain price competitiveness.

⁴⁹The current (2009) economic minister of Italy Giulio Tremonti repeatedly expressed very negative views about the role of the Euro in explaining the Italy decline and one member of the Italian parliament who then later became Interior Minister called for an exit for Italy from the Euro. Fortunately the markets paid no attention.

growth of several large countries in continental Europe in the decade before the 2008 crisis is simply incorrect.⁵⁰ The ECB was also in the spot light for the wide fluctuations of the value of the Euro against the Dollar: the Euro went from a minimum of 0.85 cents on the dollar in 2000 to close to 1.6 a few years later. Pundits (often the same ones) were ready to criticize the ECB before for a low and than for a high Euro.

Finally it would appear that the common currency did increase trade amongst members, namely it made the European common market more effective, a major argument in favor of the common currency. Frankel (2009) finds a 15/20% increase in trade over just seven years (1999-2006): this is small compared to the large effects found by Rose studying other currency unions, (see our discussion above) but the effect is by no means negligible especially considering that Euro area countries were already heavily integrated before the adoption of the common currency. Gropp and Kashyap (2010) and Giovannini (2010) discuss the successes and failures of financial integration in the Euro area.

6.2 Political and monetary union

The monetary union in Europe has been seen by many, both before and after its creation, as a step towards political unification. Therefore, the argument goes, the benefits of the Euro have to include its help towards political integration. This argument has two parts. One is that political unification is desirable and, second that the Euro will help to achieve this goal. This is not the place to discuss in detail the first point, but political unification in Europe seems to have stalled.⁵¹ On the second point, i.e. the euro as a political tool to unify Europe one has to raise a bit of healthy skepticism. To begin with only a subset of European Union countries have adopted the Euro. Thus if the Euro is a symbol, and a necessity, for political union it would imply a very strange "United States of Europe" which would not include the UK, Sweden and Denmark for instance, countries which are an integral part of the economic union. More generally Europe is evolving into a collection of countries some of which share some policies (say monetary policies) and other groups other ones (say open borders for travelers, the Schengen Treaty). Second the recent enlargement to 27 countries members of the union have made it less likely that the degree of political integration will intensify due to the large differences of member countries. Third, recent attempts of deepening political ties, like the adoption of a European Constitution have received limited support from European citizens. Finally every time a crisis hits Europe its institutions seem to take a secondary role. For instance for all the talk about fiscal coordination at the onset of the recent crisis every country went on its own. Not only, but there were hints of

⁵⁰See several chapters in the book edited by Alesina and Giavazzi (2010) on the first ten years of the Euro for more discussions.

⁵¹See Alesina and Perotti (2004) for a critical view of the process of European Unification. Issing (2010) also notes how the Euro will have to live without a political union behind it.

"beggar thy neighbor policies".⁵² Rather than fiscal policy coordination, in 2008 and 2009 the feeling amongst member countries was to make sure that nobody benefitted by other countries expansionary fiscal policies and the associated domestic debts. In the case of foreign policy disagreements and inability to act as a unit have been even more obvious. To be sure the European Union has made important progress in establishing a common market, eliminating some, but not all, inefficient government regulations and promoting some reforms especially in goods markets.⁵³ This is all good, but it is well short of political union and in fact one may wonder whether political union would necessarily make reforms more or less likely to be adopted. Some commentators argue of instance that some of the reform policies promoted by the European Commission, regarding for instance, avoidance of government subsidies, elimination of indirect trade barriers etc. have occurred precisely because this body is relatively non political and unresponsive to the European Parliament.⁵⁴ The European Union is becoming more and more a collection of countries with economic integration and sharing of certain policies amongst sub groups of the entire set of members. The idea of a politically united Europe with the Euro as its currency and the ECB as its Central bank is fading (see also Issing (2008)). The Euro will have to exist without a political entity behind its back.

6.3 The Euro in times of crisis

The financial crisis of 2008/9 made the Euro more popular amongst European politicians and leaders. The impression was that high debt, countries like Italy, Greece or Portugal or countries especially hit by the real estate crisis like Spain and Ireland would have suffered Argentinian like currency crises, speculative attacks etc. Many of those who had argued against the Euro in Italy for instance, after the outset of the crisis were singing its praise! Not only, but European countries which had chosen not to join the Euro might have been prompted to reconsider their decisions. For instance Sodestrom (2009) argues that an independent monetary policy and exchange rate fluctuations hurt the Swedish economy at the outset of the crisis. In fact until the crisis since the start of EMU the exchange between the krona and the euro has remained remarkably stable—so stable that one could have argued whether the Riksbank was really targeting domestic inflation, but since the crisis erupted the krona in a few months has depreciated by almost 10% against the euro. This has confronted Sweden with a difficult policy choice: raise interest rates to stabilize the krona-euro exchange rate or lower rates to avoid financial trouble and also a possible recession.

It is interesting that Denmark, Sweden and the UK reacted to the crisis moving in opposite directions. Sweden and the UK have given up on exchange

⁵²Ireland for instance, at the onset of the crisis, introduced emergency banking policies which negatively affected British Banks.

⁵³See Alesina Ardagna and Galasso (2010) for a recent discussion of the effect of the euro adoption on labor and good market reforms.

⁵⁴On these issue see Alesina and Perotti (2004) and several essays in Alesina and Giavazzi (2010).

rate stability and have lowered rates; the Danish central bank has intervened heavily in the foreign exchange market and has been forced to raise interest rates from 5 per cent to 5.5 per cent – a full 1.75 points higher than the ECB's rate, in order to stabilize the exchange rate. As a result, a renewed debate about the benefits of euro membership has opened up in Denmark: some argue that the country should run a new referendum on the euro. Even Iceland now speaks about the benefits of the euro, even if this country is not even a member of the European Union.⁵⁵

Similar problems have manifested themselves in Central and Eastern Europe. In Hungary almost all mortgages are denominated in Swiss francs or euros: a currency depreciation would trigger a series of personal and banking failures. Thus the country is struggling between the desire to stabilize the exchange rate and the need to provide liquidity to the economy. In the Spring of 2009 the IMF suggested that several central and Eastern European countries should have considered joining the Euro area even without a seat in the ECB board.

The Eurosceptics before the adoption of the Euro argued that it would not have survived the first major crisis. Instead the popularity of the Euro seemed to have come stronger with crisis. Why? The type of tension that eurosceptics had in mind were disagreements over the conduct of monetary policy and asymmetric business cycle shock. This indeed in part augured in the first 7-8 years of the cycle. Business cycle fluctuations continued to be not perfectly correlated. However when the crisis of 2008 hit, it affected everyone. Injection of liquidity by the ECB were welcomed by all and all countries felt somehow "protected" by the umbrella of the Euro.

7 Conclusion

The financial crisis of 2007-2009 has shaken some of the foundations of what we thought we knew about monetary policy and its institutions. We thought that independent Central Banks targeting inflation were the solution, which would have eliminated instability, political interference on monetary policy and guaranteed an orderly management of the macroeconomic cycle. This chapter has reviewed the literature that has lead us to those conclusions and has tried to begin to address what novel issues the crisis has brought under the limelight. In this respect the chapter has raised more questions than provided answers. It is fair to say that at the time of this writing we haven't quite digested yet the implications of the crisis for the conduct of monetary policy and its institutions. Probably the next Handbook of Monetary economics in a decade or so will have all the solutions. Now that we have clarified some of the question we need to start looking for the answers.

⁵⁵Willem Buiter and Anne Sibert (2008) argue that Iceland is only an extreme case of a more general phenomenon – of a small country with its own currency, and banking sectors too large to be bailed out by national authorities.

8 Appendix

8.1 Independent Central Banker

The independent central banker is chosen by minimizing the loss function with respect to the parameter \hat{b} . The utility loss is:

$$EL = \frac{1}{2}E[(\hat{b}k - \frac{\hat{b}}{1+\hat{b}}\varepsilon_t)^2 + b(\frac{1}{1+\hat{b}}\varepsilon_t - k)^2] \quad (51)$$

With one line of algebra we can simplify the loss function to:

$$EL = \frac{1}{2}[k^2(\hat{b}^2 + b) + \frac{b + \hat{b}^2}{(1 + \hat{b})^2}\sigma_\varepsilon^2] \quad (52)$$

Minimizing the loss with respect to \hat{b} we obtain the following first order condition:

$$F(\hat{b}) = \hat{b}k^2 + \frac{\hat{b} - b}{(1 + \hat{b})^3}\sigma_\varepsilon^2 = 0 \quad (53)$$

It can be easily checked that $F()$ is an increasing function for the range of coefficients we are interested in, which means that the second order condition is satisfied. If we call \hat{b}^* the value that satisfies the first order condition, $F(\hat{b}^*)=0$, since $F()$ evaluated in b gives $bk^2 > 0$ and $F()$ is an increasing function, then we can deduce that $\hat{b}^* < b$, which means that the central banker chosen is going to be more "conservative" than the general public.

8.2 Central Bank (in)dependence in times of crisis

The economy is described by:

$$y_t = \pi_t - \pi_t^e + \varepsilon_t \quad (54)$$

The government appoints a conservative central banker and commits to let him choose the monetary policy by setting a cost c that she has to pay to override the decisions of the central banker. The loss function becomes:

$$L = \frac{\hat{b}}{2}(y_t - k)^2 + \frac{1}{2}(\pi_t)^2 + \delta c \quad (55)$$

where δ is a dummy variable equal to 1 only when the government fires the central banker and takes over monetary policy. In this model action takes place in three stages: in the first the government chooses \hat{b} , the degree of conservativeness of the central banker, and the cost c of reneging on her commitment. In the second stage expectations are rationally formed; in the third stage the output shock is realized, the central banker sets inflation, the government decides whether to take over monetary policy and finally inflation and output are realized. The model is solved by backward induction and it can be shown that

the optimal contract features a conservative central banker, $\hat{b} < b$, and a strictly positive but finite cost of renegeing on commitment, $0 < c < \infty$. In equilibrium the central banker will choose his favorite policy if the output shock is below a certain threshold and therefore in normal conditions inflation will be lower; in extreme conditions, i.e. when the shock exceeds the threshold, the central banker will choose the policy preferred by the median voter so that he is never fired in equilibrium.

8.3 Opportunistic Business Cycles

Political cycles influence economic outcomes even when politicians are identical in ideology but differ in competence; voters would like to elect the most competent policy-maker and therefore politicians are willing to distort optimal policies in order to signal their abilities. Let us continue assuming that the economy is described by a simple Phillips curve, but we add a competence term:

$$y_t = \pi_t - \pi_t^e + \eta_t \quad (56)$$

where competence has the following time structure:

$$\eta_t = \mu_{t-1} + \mu_t \quad (57)$$

Competence can assume only two values:

$$\begin{aligned} \mu_t &= \bar{\mu}, & \text{with probability } & \rho \\ &= \underline{\mu}, & \text{with probability } & 1 - \rho \end{aligned}$$

such as:

$$E(\mu_t) = \rho\bar{\mu} + (1 - \rho)\underline{\mu} = 0$$

Voters' utility is represented by:

$$U = E \left\{ \sum_{t=0}^{\infty} \beta^t \left[-\frac{1}{2}(\pi_t)^2 + by_t \right] \right\} \quad 0 < \beta < 1 \quad (58)$$

We also assume rational expectations and that the policy-maker directly controls inflation. Let's focus on a two period model where elections are held only at the end of the first period. The model is solved by backward induction. Since there are no elections, in period two the policy-maker has no incentive to signal his competence; he will maximize the period utility so that inflation and output will be: $\pi_2 = \pi_2^e = b$ and $y_2 = \eta_2$. The incumbent expected net gain from winning the election is the difference between his utility if he wins, U^i , and his utility if he loses, U^o , plus a private benefit from being in office H:

$$W(\mu_t^i) = U_{t+1}^i - U_{t+1}^o + H \quad (59)$$

$$= -\frac{1}{2}(b)^2 + bE(\eta_2^i) - [-\frac{1}{2}(b)^2 + bE(\eta_2^o)] + H \quad (60)$$

where η_2^o is the competence of the opponent and is in expectation equal to zero. Simplifying we obtain:

$$W(\mu_t^i) = b\mu_1^i + H \quad (61)$$

We also assume that even an incompetent politician has the incentive to be in office rather than not: $H > -b\mu$. Since in the first period voters do not observe inflation, they are not able to understand whether the incumbent is competent or not; both types of politician have therefore an incentive to appear competent by boosting economic growth. The incumbent sets inflation above expectations:

$$\pi_t(\mu_t^i) = \pi_t^e + y_t - \mu_t^i - \bar{y} \quad (62)$$

Obviously choosing inflation in order to surprise the public has a cost, which can be written as the difference between utility evaluated at the time consistent level of inflation b and utility evaluated at $\pi_t(\mu_t^i)$:

$$C(\mu_t^i, y_t) = -\frac{1}{2}b^2 + b[\bar{y} + b - \pi_t^e + \mu_t^i] - \left\{ -\frac{1}{2}[\pi_t(\mu_t^i)]^2 + b[\bar{y} + \pi_t(\mu_t^i) - \pi_t^e + \mu_t^i] \right\} \quad (63)$$

There are two types of equilibria: separating and pooling.

8.3.1 Separating Equilibrium

The two types of politician achieve two different levels of output so that voters are perfectly able to tell them apart. Voters attribute probability $\rho_{t+1} = 1$ to the incumbent's being competent if and only if output is higher than a certain level: $y_t \geq y_t^s$. The competent politician can achieve this threshold y_t^s , but the incompetent one cannot; for this reason the latter will choose $\pi_t = b$, but the former will choose a higher level of inflation in order to boost the economy. The expected inflation will therefore be:

$$\pi_t^e = (1 - \rho)b + \rho\pi_t(\bar{\mu}) = b + \rho \frac{y^s - \bar{\mu} - \bar{y}}{1 - \rho} \quad (64)$$

Another way to say that only the competent politician can achieve the high level of output is that the discounted net gain from reelection is higher than the cost of signaling; the opposite must be true for the incompetent politician:

$$\beta W(\bar{\mu}) > C(y^s, \bar{\mu}) \quad (65)$$

$$\beta W(\underline{\mu}) \leq C(y^s, \underline{\mu}) \quad (66)$$

The competent politician will obviously choose to achieve minimum level of output that the incompetent incumbent would not be willing to target, y^s will be equal to the value that satisfies (8.3.1) with equality.

8.3.2 Pooling Equilibrium

In the pooling equilibrium both types of incumbent achieve the same level of output; voters attribute the prior probability $\rho_{t+1} = \rho$ to the incumbent's being competent if output is higher than a certain threshold y^p . The competent incumbent chooses inflation without signaling, which implies:

$$y_p = b - \pi_t^e + \bar{\mu} + \bar{y} \quad (67)$$

The incompetent incumbent will have to set inflation above expectations in order to achieve y^p :

$$\pi_t(\underline{\mu}, y^p) = y^p + \pi_t^e - \underline{\mu} - \bar{y} \quad (68)$$

Expected inflation will be:

$$\pi_t^e = \rho b + (1 - \rho)\pi_t(\underline{\mu}, y^p) = b + \frac{1 - \rho}{\rho}(y^p - \underline{\mu} - \bar{y}) \quad (69)$$

Plugging (69) in (67) we find that $y^p = \bar{y}$. Since voters cannot tell apart the two types of politicians, the probability that the incumbent will be reelected will be $\frac{1}{2}$; the incompetent incumbent must find convenient to achieve the high level of output \bar{y} , which means that:

$$C(y^p, \underline{\mu}) \leq \frac{1}{2}\beta W(\underline{\mu}) \quad (70)$$

References

- [1] Acemoglu, Daron, Simon Johnson, Pablo Querubin and James A. Robinson (2008). "When Does Policy Reform Work? The Case of Central Bank Independence" NBER Working Papers 14033
- [2] Adrian, Tobias, Arturo Estrella and Hyung Song Shin (2009) "Monetary Cycles, Financial Cycles and Business Cycle" unpublished
- [3] Adrian, Tobias and Hyung Song Shin (2010) "Money, Liquidity and Monetary Policy" in Benjamin Friedman and Michael Woodford (eds) *Handbook of Monetary Economics* North Holland Amsterdam
- [4] Adrian, Tobias and Hyun Song Shin (2009) "Money Liquidity and Monetary Policy" *American Economic Review Papers and Proceedings*, 600-605.
- [5] Adrian, Tobias and Hyung Song Shin (2008) "Financial Intermediaries, Financial Stability and Monetary Policy" Proceedings of the Federal Reserve Bank of Kansas City, Jackson Hole Symposium
- [6] Aghion Philippe, Alberto Alesina and Francesco Trebbi (2004). "Endogenous Political Institutions," *Quarterly Journal of Economics*, 119(2), 565-611
- [7] Aghion Philippe, Alesina Alberto and Francesco Trebbi (2008). "Democracy, Technology, and Growth", in Elhanan Helpman (ed.) *Institutions and Economic Performance*, Harvard University Press.
- [8] Akhmedov, A. and E. Zhuravskaya (2004), "Opportunistic Political Cycles: Test in a Young Democracy Setting", *Quarterly Journal of Economics*, 119 (4), 1301-1338
- [9] Alesina, Alberto (1987). "Macroeconomic Policy in a Two-Party System as a Repeated Game", *Quarterly Journal of Economics*, 102(3), 651-78
- [10] Alesina, Alberto (1988) "Macroeconomics and Politics" NBER Macroeconomic Annual
- [11] Alesina, Alberto (1997) " Comment on Obstfeld" *Brookings Papers on Economic Activity*.
- [12] Alesina, Alberto, Silvia Ardagna and Vincenzo Galasso (2010) " The euro and structural reforms" in A. Alesina and F. Giavazzi (eds) *Europe and the Euro*, University of Chicago Press and NBER, forthcoming.
- [13] Alesina, Alberto and Robert J. Barro (2002). "Currency Unions", *Quarterly Journal of Economics*, 117(2), 409-436
- [14] Alesina, Alberto , Robert J. Barro and Silvana Tenreyro (2002). "Optimal Currency Areas," NBER Macroeconomics Annual, 17, 301-356.

- [15] Alesina Alberto, Alberto Carrasquilla and Roberto Steiner (2005) "The Central Bank of Colombia" in A.Alesina (ed.) *Institutional Reforms in Colombia* MIT Press Cambridge Mass
- [16] Alesina, Alberto and Roberta Gatti (1995). "Independent Central Banks: Low Inflation at No Cost?", *American Economic Review*, 85(2), 196-200
- [17] Alesina, Alberto and Francesco Giavazzi (2007) *The future of Europe: Reform or Decline*, MIT Press Cambridge Mass
- [18] Alesina, Alberto and Francesco Giavazzi (eds) (2010). *Europe and the Euro*, University of Chicago Press and NBER, forthcoming.
- [19] Alesina, Alberto and Vittorio Grilli (1992). "The European Central Bank: Reshaping Monetary Policy in Europe," in M. Canzoneri, V. Grilli, and P. Masson (eds.), *Establishing a Central Bank: Issues in Europe and Lessons from the U.S.*, Cambridge UK, Cambridge University Press.
- [20] Alesina, Alberto and Vittorio Grilli (1993). "On the Feasibility of a One or Multi-Speed European Monetary Union," NBER Working Paper 4350.
- [21] Alesina, Alberto and Roberto Perotti (2004) "The European Union: A politically incorrect view" *Journal of Economic Perspectives*, Winter 69-84.
- [22] Alesina, Alberto and Howard Rosenthal (1995) *Partisan Cycles Divided Governemtn and the Economy* Cambridge University Press, Cambridge UK
- [23] Alesina, Alberto, Nouriel Roubini and Gerald D. Cohen (1997). *Political Cycles and the Macroeconomy*, the MIT Press.
- [24] Alesina, Alberto and Enrico Spolaore (1997). "On the Number and Size of Nations", *Quarterly Journal of Economics*, 112(4), 1027-1056.
- [25] Alesina, Alberto, Enrico Spolaore, and Romain Wacziarg (2000). "Economic Integration and Political Disintegration", *American Economic Review*, 90(5), 1276-1296.
- [26] Alesina, A. and L. Summers (1993), "Central Bank Independence and Macroeconomic Performance: Some Comparative Evidence", *Journal of Money, Credit and Banking*, 25, 151-162
- [27] Alesina, Alberto and Guido Tabellini (2007) "Bureaucrats of Politicians: Part I single task" *American Economic Review*, 97, 169-79
- [28] Alesina, Alberto and Guido Tabellini (2008). "Bureaucrats or Politicians?Part II: Multiple Tasks". *Journal of Public Economics*, 92, 426-47

- [29] Backus, David and John Driffil (1985). "Rational Expectations and Policy Credibility Following a Change in Regime," *Review of Economic Studies*, 52(2), 211-21
- [30] Backus, David and John Driffil (1985). "Inflation and Reputation", *American Economic Review*, 75(3), 530-38
- [31] Bade, R. and M. Parkin (1982), "Central Bank Laws and Monetary Policy", unpublished manuscript
- [32] Banaian King, Richard C. K. Burdekin, and Thomas D. Willett (1998), "Reconsidering the Principal Components of Central Bank Independence: The More the Merrier?", *Public Choice* 97, 1-12
- [33] Barro, Robert J. and David B. Gordon (1983a). "Rules, Discretion, and Reputation in a Model of Monetary Policy", *Journal of Monetary Economics*, 101-121.
- [34] Barro, Robert J., and David B. Gordon (1983b). "A Positive Theory of Monetary Policy in a Natural-Rate Model." *Journal of Political Economy*, Vol. 91. No. 4
- [35] Barro, Robert J. (1986). "Reputation in a model of monetary policy with incomplete information", *Journal of Monetary Economics*, 17(1), 3-20
- [36] Barro, Robert and Silvana Tenreyro (2000), "Closed and Open Economy Models of Business Cycles with Marked-Up and Sticky Prices," NBER, Working Paper Nr. 8043, December 2000.
- [37] Barro, Robert and Silvana Tenreyro, (2007). "Economic Effects Of Currency Unions" *Economic Inquiry*, Western Economic Association International, vol. 45(1), pages 1-23, 01.
- [38] Bhattacharjee, Arnab and Sean Holly, (2009), "Taking Personalities out of Monetary Policy Decision Making? Interactions, Heterogeneity and Committee Decisions in the Bank of England" *European Journal of Political Economy*, vol. 23, pages 106-123
- [39] Besley, Timothy, and Stephen Coate (2003). "Elected versus Appointed Regulators: Theory and Evidence." *Journal of the European Economic Association*, 1(5), 1176-1206.
- [40] Besley, Timothy, and Maitreesh Ghatak (2005). "Competition and Incentives with Motivated Agents." *American Economic Review*, 95(3), 616-36.
- [41] Besley, Timothy, Neil Meads and Paolo Surico, (2008), "Insiders versus Outsiders in Monetary Policy-Making", *American Economic Review*, 98, 218-223.

- [42] Blanchard Olivier, Giovanni Dell Ariccia and Paolo Mauro (2010) " Rethinking Macroeconomic Policy" IMF Working Paper, February
- [43] Blanchard, Olivier and Francesco Giavazzi (2003), "Macroeconomic effects of regulation and deregulation in goods and labor markets", *Quarterly Journal of Economics*, 118(3), 879-907.
- [44] Blinder, Alan S. (1997). "Is Government Too Political?" *Foreign Affairs*, 76(6): 115-26. Business Council of Australia. 1999. "Avoiding Boom/Bust: Macro Economic Reforms for a Globalized Economy."
- [45] Blinder, Alan S., (2007), "Monetary Policy by Committee: Why and How", *European Journal of Political Economy*, vol. 23, pages 106-12
- [46] Blinder, Alan S. and John Morgan, (2005), "Are Two Heads Better Than One? Monetary Policy by Committee", *Journal of Money, Credit and Banking*, 37, 789-812.\
- [47] Blinder, Alan S. and John Morgan, (2008), "Leadership in Groups: A Monetary Policy Experiment", *International Journal of Central Banking*, 4, 117-150.
- [48] Block, S., S. Singh and K.E. Ferree (2001), "Multiparty Competition, Founding Elections and Political Business Cycles in Africa", CID wp 80
- [49] Block, Steven (2002), "Political business cycles, democratization, and economic reform: the case of Africa", *Journal of Development Economics*, 67, 205-228
- [50] Borio Claudio and Mathias Drehmann (2008) "Towards and Operational Survey for Financial Stability: fuzzy measurement and its consequences" BIS Working Paper n. 284
- [51] Borio Claudio and Haibin Zhu (2008) "Capital Regulation, Risk Taking and Monetary Policy: A Missing Link in the Transmission Mechanism?" BIS Working Paper n.268
- [52] Brender, Adi and Allan Drazen (2005), "Political Budget Cycles in New Versus Established Democracies", *Journal of Monetary Economics*, 52, 1271-1295
- [53] Brender Adi . and Allan Drazen (2007) "Political Budget Cycles in New, Old ,a and Established Democracies" *Comparative Economic Studies*
- [54] Brumm, Harold J. (2000), "Inflation and Central Bank Independence: Conventional Wisdom Redux", *Journal of Money, Credit and Banking*, 32 (4), 807-19
- [55] Bugamelli, Matteo, Fabiano Schivardi and Roberta Zizza (2009). "The euro and firm restructuring", Economic working papers 716, Bank of Italy.

- [56] Buiter, Willem and Anne Siebert (2008) The Icelandic banking crisis and what to do about it , www.cepr.org
- [57] Campillo, Marta and Jeffrey A. Miron (1997), "Why does Inflation Differ across Countries", in Christina D. Romer and David H. Romer eds. *Reducing Inflation: Motivation and Strategy*, Chicago: University of Chicago Press
- [58] Canzoneri, Matthew B (1985), "Monetary Policy Games and the Role of Private Information", *American Economic Review*, 75(5), 1056-70
- [59] Crowe, Christopher and Ellen E. Meade (2007), "The Evolution of Central Bank Governance around the World", *Journal of Economic Perspectives*, 21, 69-90
- [60] Crowe, Christopher and Ellen E. Meade (2008) , "Central Bank Independence and Transparency: Evolution and Effectiveness", IMF Working Papers
- [61] Cukierman, Alex, Steven B. Webb and Bilin Neyapti (1992), "Measuring the Independence of Central Banks and Its Effect on Policy Outcomes", *The World Bank Economic Review*, 6 (3), 353-398
- [62] Cukierman, Alex (1992). *Central Bank Strategy, Credibility and Politics*, Cambridge, Ma: MIT Press.
- [63] Dewatripont, Mathias, Ian Jewitt, and Jean Tirole (1999a). "The Economics of Career Concerns, Part I: Comparing Information Structures." *Review of Economic Studies*, 66(1): 183-98.
- [64] Dewatripont, Mathias, Ian Jewitt, and Jean Tirole (1999b). "The Economics of Career Concerns, Part II: Application to Missions and Accountability of Government Agencies." *Review of Economic Studies*, 66(1): 199-217.
- [65] Drazen Allan (1999) "Central Bank Independence and the Political Business Cycle" in M. Blejer and M Skreb (eds) *Major Issues in Central Banking and Implications for Transition Economies* Cambridge University Press
- [66] Drazen, Allan (2000), "Political economy in macroeconomics", Princeton University Press.
- [67] Drazen, Allan (2001), "The Political Business Cycle After 25 Years", *NBER Macroeconomic Annual*, NBER Cambridge Mass.
- [68] Drazen Allan (2002) "Central Bank Independence Democracy and Dollarization" *Journal of Applied Economics*, 1, 1-17
- [69] Drazen Allan (2005) "Lying Low" During Elections: Political Pressure and Monetary Accommodation" unpublished.

- [70] Drazen, Allen (2009a), "Political Business Cycles", *the New Palgrave Dictionary of Economics*, forthcoming
- [71] Drazen, Allan (2009b), "Political Budget Cycles", *the New Palgrave Dictionary of Economics*, forthcoming
- [72] Drazen, Allan and Marcela Eslava (2006), "Pork Barrel Cycles", NBER Working Paper 12190
- [73] Drazen Allan and Paul Masson (1994):" Credibility of Policies versus Credibility of Policymakers" *Quarterly Journal of Economics*
- [74] Eichengreen Barry (2009) " The future of the Euro" in A. Alesina and F. Giavazzi (eds). 2009. *Europe and the Euro*, University of Chicago Press and NBER, forthcoming.
- [75] Epstein, David, and Sharyn O'Halloran (1999). *Delegating Powers: A Transaction Cost Politics Approach to Policy Making under Separate Powers*. Cambridge: Cambridge University Press.
- [76] Feldstein, Martin (1997). "The Political Economy of the European Economic and Monetary Union: Political", *Journal of Economic Perspectives*, 11(4), 23-42.
- [77] Feldstein Martin (2010) "What Powers for the Federal Reserve" *Journal of Economic Literature*, forthcoming
- [78] Fischer, S. (1977). "Long-term contracts, rational expectations, and the optimal money supply rule". *Journal of Political Economy* 85, 191-205.
- [79] Fischer, Stanley, and Guy Debelle (1994). "How independent should a central bank be?," Conference Series Proceedings, Federal Reserve Bank of Boston, 195-225.
- [80] Forder, James (1998), "The case for an Independent European Central Bank: A Reassessment of Evidence and Sources", *European Journal of Political Economy*, 14, 53-71
- [81] Frankel, Jeffrey A. (2009). "The Estimated Effects of the Euro on Trade: Why are They Below Historical Evidence on Effects of Monetary Unions Among Smaller Countries?", forthcoming in Alberto Alesina and Francesco Giavazzi, (eds) *Europe and the Euro*, University of Chicago Press and NBER
- [82] Frankel Jeffrey and Andrew Rose (1998) "The Endogeneity of the optimal currency area criteri" *Economci Journal*, 108, 1109-25
- [83] Frankel, Jeffrey. and Andrew Rose (2002). "An Estimate of the Effect of Common Currencies on Trade and Income." *Quarterly Journal of Economics*, vol. CXVII, 437-466.

- [84] Gerlach-Kristen, Petra, (2005), "Too Little, Too Late: Interest Rate Setting and the Costs of Consensus", *Economics Letters*, 88, 376-381.
- [85] Gerlach-Kristen, Petra, (2009), "Outsiders at the Bank of England's MPC", *Journal of Money, Credit and Banking*, 41(6), 1099-1115
- [86] Giavazzi, Francesco and Alberto Giovannini (1989). "*Limiting Exchange Rate Flexibility* " Cambridge, MA: MIT Press.
- [87] Giavazzi Francesco and Marco Pagano (1986) "The Advantage of Tying your Own Hand: EMS Discipline and Central Bank Credibility" *European Economic Review*, 32, 1055-75
- [88] Giovannini Alberto (2010) "Why the security market in Europe is not fully integrated" in Alberto Alesina and Francesco Giavazzi(eds) (2010) *Europe and the Euro* University of Chicago Press and NBER, forthcoming
- [89] Glick, R. and Andrew Rose (2002). "Does a Currency Union Affect Trade? The Time Series Evidence", *European Economic Review*, vol. 46(6), 1125-1151.
- [90] Goodfriend Marvin (2007) "How the World Achieved Consensus on Monetary Policy" *Journal of Economic Perspectives*, Fall, 47-68
- [91] Gonzalez, Maria de los Angeles (2002), "Do Changes in Democracy Affect the Political Budget Cycle? Evidence from Mexico", *Review of Development Economics*, 6(2), 204-224
- [92] Grilli, V., D. Masciandaro and G. Tabellini (1991), "Political and Monetary Institutions and Public Financial Policies in the Industrial Countries", *Economic Policy*, (13), 341-92
- [93] Gropp Reint and Any Kashyap (2010) "A new Metric for Banking Integration in Europe" in Alberto Alesina and Francesco Giavazzi(eds) (2010) *Europe and the Euro* University of Chicago Press and NBER, forthcoming
- [94] Grossman, Gene M. and Elhanan Helpman (2005), "Party Discipline and Pork-Barrel Politics", NBER wp 11396.
- [95] Hansen Stephen and Michael F. McMahon, (2008), "Delayed Doves: MPC Voting Behavior of Externals", CEP Discussion Paper 862.
- [96] Helliwell, John (1998). *How Much Do National Borders Matter?* Washington D.C., Brookings Institution Press.
- [97] Hibbs, Douglas A., Jr. (1987). "The American Political Economy: Macroeconomics and Electoral Politics" Cambridge, MA: Harvard University Press.
- [98] Issing Otmar (2010) A Greek bail out would be a disaster for Europe" *Financial Times*, February 16.

- [99] Issing Otmar (2008) *The Birth of the Euro* Cambridge University Press Cambridge UK
- [100] Jacome, Luise I. and Francisco Vazquez (2005), "Any Link Between Legal Central Bank Independence and Inflation? Evidence from Latin America and the Caribbean", IMF Working Papers
- [101] Keefer, Philip and David Stasavage (2002), "Checks and Balances, Private Information and the Credibility of Monetary Commitments", *International Organization*, 56, 751-74.
- [102] Khemani, Stuti (2004), "Political Cycles in a Developing Economy: Effect of Elections in the Indian States", *Journal of Development Economics*, 73, 125-154
- [103] Klomp, Jeroen G. and Jakob de Haan (2008), "Inflation and Central Bank Independence: a Meta Regression Analysis", unpublished manuscript
- [104] Kneebone, R.D. and K.J. McKenzie (2001), "Electoral and Partisan Cycles in Fiscal Policy: An Examination of Canadian Provinces", *International Tax and Public Finance*, 8, 753-774
- [105] Kydland, F. and E. Prescott (1977), "Rules rather than discretion: The inconsistency of optimal plans", *Journal of Political Economy*, 85, 473-490.
- [106] Lohmann, S., (1992), "Optimal Commitment in Monetary Policy: Credibility versus Flexibility", *American Economic Review*, 82, 273-286.
- [107] Lucas, Robert Jr. & Stokey, Nancy L., 1983. "Optimal fiscal and monetary policy in an economy without capital," *Journal of Monetary Economics*, Elsevier, vol. 12(1), pages 55-93.
- [108] Mangano, Gabriel (1998), "Measuring central bank independence: a tale of subjectivity and of its consequences", *Oxford Economic Papers*, 50, 468-492
- [109] Maskin, Eric and Jean Tirole (2001). "Markov Perfect Equilibrium: I. Observable Actions", *Journal of Economic Theory*, 100(2), 191-219.
- [110] Maskin, Eric, and Jean Tirole (2004). "The Politician and the Judge: Accountability in Government" *American Economic Review*, 94(4), 1034-54.
- [111] Mc Callum, John (1995). "National Borders Matter: Canadian-U.S. Regional Trade Patterns", *American Economic Review*, 85(3), 615-623.
- [112] Morris Stephen and Hyun Song Shin (2008) "Financial Regulation in a System Context" *Brookings Papers on Economic Activity*, Fall 229-74.
- [113] Mundell, Robert (1961). "A Theory of Optimum Currency Areas", *American Economic Review*, 51(4), 657-665.

- [114] Nordhaus, W.D. (1975). "The Political Business Cycle" *The Review of Economic Studies*, Vol. 42, No. 2 (Apr., 1975), pp. 169-190.
- [115] Oatley T. (1999), "Central Bank Independence and Inflation: Corporatism, Partisanship, and Alternative Indices of Central Bank Independence", *Public Choice*, 98: 399-13.
- [116] Obstfeld, Maurice (1997). "Europe's gamble" *Brookings Papers on Economic Activity*, Economic Studies Program, The Brookings Institution, vol. 28(1997-2), pages 241-317.
- [117] Obstfeld, Maurice and Kenneth Rogoff (2000). "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?" *NBER Macroeconomics Annual*, Cambridge MA, MIT Press.
- [118] Peek Joe, Eric Rosengreen and Geoffrey Tootell (1999) "Does the Federal Reserve Posses an Exploitable Informational Advantage?" unpublished
- [119] Perotti, Roberto and Yianos Kontopoulos(1999). "Government Fragmentation and Fiscal Policy Outcomes: Evidence from OECD Countries," *NBER Chapters in: Fiscal Institutions and Fiscal Performance*, 81-102.
- [120] Persson, Torsten, 2001. "Currency Unions and Trade: How large Is the Treatment Effect?", *Economic Policy*, 33, 433-448
- [121] Persson, Torsten, and Guido Tabellini (1990). "Macroeconomic Policy, credibility and politics" Chur, Zurich.
- [122] Persson, Torsten, and Guido Tabellini (1993). "Designing Institution for Monetary Stability" *Carnegie Rochester Conference on Public Policy* 39: 55-89.
- [123] Persson, Torsten, and Guido Tabellini (2000). *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.
- [124] Posen, Adam S. 1993. Why Central Bank Independence Does Not Cause Low Inflation: There is No Institutional Fix for Politics. In *Finance and the International Economy 7 - The Amex Bank Review Prize Essays*, edited by R. O'Brien. Oxford: Oxford Univ. Press.
- [125] Posen, Adam S. 1995. Declarations Are Not Enough: Financial Sector Sources of Central Bank Independence. In *NBER Macroeconomics Annual 1995*, edited by B. Bernanke and J. Rotemberg. Cambridge, MA: MIT Press.
- [126] Riboni, Alessandro and Francisco J. Ruge-Murcia, (2010), "Monetary Policy By Committee: Consensus, Chairman Dominance, or Simple Majority?", *The Quarterly Journal of Economics*, 125, 363-416.

- [127] Rogoff, Kenneth S (1985). "The Optimal Degree of Commitment to an Intermediate Monetary Target." *Quarterly Journal of Economics*, 100(4), 1169-89.
- [128] Rogoff, Kenneth and Anne Sibert (1988). "Elections and Macroeconomic Policy Cycles", *Review of Economic Studies*, 55(1), 1-16.
- [129] Rogoff, Kenneth (1990). "Equilibrium Political Budget Cycles", *American Economic Review*, 80(1), 21-36.
- [130] Rose, Andrew (2000). "One Money One Market: Estimating the Effect of Common Currencies on Trade," *Economic Policy*, 30, 7-45.
- [131] Rose, Andrew (2001). "Currency Unions and Trade: the Effect is Large", *Economic Policy*, 31, 449-461
- [132] Rose, Andrew K. and T. D. Stanley (2005). "A Meta-Analysis of the Effect of Common Currencies on International Trade", *Journal of Economic Surveys*, 19(3), 347-365
- [133] Schultz, Christian (2003). "Information, Polarization and Delegation in Democracy." Economic Policy Research Unit Working Paper 03-16.
- [134] Shi, M. and J. Svensson (2006), "Political budget cycles: Do they differ across countries and why?", *Journal of Public Economics*, 90, 1367-1389
- [135] Shin Hyung Song (2009) "Financial Intermediation and the Post Crisis Financial System" unpublished.
- [136] Soderstrom, Ulf (2008). "Re-Evaluating Swedish Membership in EMU: Evidence from an Estimated Model," CEPR Discussion Papers 7062,
- [137] Stigler George (1971). "The Theory of Economic Regulation," *Bell Journal of Economics*, The RAND Corporation, vol. 2(1), pages 3-21, Spring.
- [138] Taylor, John B. (2009) "The Need to Return to a Monetary Framework", unpublished
- [139] Tenreyro, Silvana (2001) "On the Causes and Consequences of Currency Unions", Harvard University, unpublished.
- [140] Trebbi, Francesco, Philippe Aghion and Alberto Alesina, (2008) "Electoral Rules and Minority Representation in U.S. Cities," *The Quarterly Journal of Economics*, MIT Press, vol. 123(1), pages 325-357
- [141] Walsh, Carl (1995a). "Optimal Contracts for Central Bankers", *American Economic Review*, 85, 150-76.
- [142] Walsh, Carl (1995b). "Is New Zealand Reserve Bank Act of 1989 an optimal Central Bank contract?" *Journal of Money, Credit and Banking*, 27, 1179-91.
- [143] Zingales Luigi (2009) "A New Regulatory Framework" *Forbes*, March 31