No 1998 – 14
December

Monetary Policy under a Fixed Exchange Rate Regime: the Case of France 1987-1996

Benoît Mojon

TABLE OF CONTENTS

SUMMARY

In this paper, I describe the implementation of monetary policy by the Banque de France during the period beginning in January 1987. This period was characterised by a quasi-fixed exchange rate for France, as the franc was never realigned within the European Monetary System (EMS).

The behaviour of the Banque de France is modelled with VAR models, which are a means of breaking down the dynamics of interdependent time series of macroeconomic variables, into the various sources of exogenous fluctuations. In the case of an open economy the modelling of the monetary policy requires a careful account for the exchange rate impact on the short-term interest rate. This is even more tricky in the countries like France who target a fixed exchange rate to the DM. Even in the very short term, a variation of the interest rate can be interpreted either as a response to a demand shock for currencies, or as a genuine shock of monetary policy.

I propose a “procedural” identification of French monetary policy shocks in the spirit of Bernanke and Mihov (1995, 1996). This approach helps to solve the problem of the simultaneous determination of the exchange rate and interest rate instruments of the central bank. I use two interest rates of the French interbank market: the intervention rate, which I assume, represents the instrument of the monetary policy and the day-to-day market rate. In the model, the short run reaction function of the Banque de France was to raise its intervention rate in case of a German short-term rate innovation or when the franc depreciated and to let the day to day rate increase steadily in periods of stress on the Franc.

I build indicators of the stance of French monetary policy. These show the influence of the ERM constraint on French monetary policy in an original way. I also show that since 1987, the shocks of purely domestic French monetary policy (i.e. the variations of the interest rate around a rule of defence of the ERM peg of the franc), have only had very little impact on the French economy.

JEL: E50, F31.

Keyword: Identification, SVAR, and French monetary policy.

RÉSUMÉ

La France est à la fois membre du Système Monétaire Européen (S.M.E.) et financièrement intégrée avec l'Allemagne. La simultanéité entre le taux d'intérêt français et le taux change franc D-mark y est donc particulièrement sensible. On cherche ici à décrire le comportement de la Banque de France dans ce régime de change "quasi-fixes". Pour cela on utilise une modélisation VAR de ce comportement dans la période postérieure à janvier 1987, date du dernier réalignement du franc dans le SME.

La modélisation VAR est un moyen de décomposer la dynamique de séries temporelles interdépendantes, par exemple des variables macroéconomiques, en différentes sources de fluctuations exogènes les unes par rapport aux autres. Par exemple, on identifie des chocs exogènes de politique monétaire. Cette recherche de l'exogénéïté rencontre des problèmes de simultanéité entre les variations de l'instrument de la politique et celles des autres variables macroéconomiques.

La modélisation de la politique monétaire en économie ouverte a rendu encore plus difficile la résolution des problèmes de simultanéité car les taux de change, qui sont des variables clefs de la politique monétaire, s'ajustent aussi rapidement que les taux d'intéret. La prise en compte du taux de change rend nécessaire l'interprétation des variations simultanées entre le taux d'intérêt instrument de la banque centrale et le taux de change. Même dans le très court terme, une variation du taux d'intérêt peut s'interpréter soit comme une réponse à un choc de demande de devises, soit comme un mouvement de politique monétaire.

Nous proposons dans cet article une identification "procédurale " de la politique monétaire française a la manière de Bernanke et Mihov (1995, 1996). Cette approche permet de résoudre le problème de simultanéité entre taux de change et taux d'intérêt. Nous utilisons deux taux d'intérêt du marché interbancaire français : le taux des appels d'offre qui représente l'instrument de la politique monétaire et le taux au jour le jour. Ce second taux d'intérêt, qui est déterminé par le jeux de l'offre et de la demande sur le marché de la liquidité bancaire s'avère être une bonne variable instrumentale du taux de change franc mark pendant la période considérée. Il nous est donc possible d'identifier des chocs de politique monétaire exogènes par rapport à la gestion des tensions sur l'objectif de change.

Le modèle nous permet de construire des indicateurs de tension de la politique monétaire française. Ceux-ci montrent d'une manière originale l'influence de la contrainte du S.M.E. sur la politique monétaire française. Les simulations tirées du modèle VAR soulignent aussi le fait que, depuis 1987, les chocs de politique monétaire spécifiquement français, c'est-à-dire les écarts du taux d'intérêt à une règle de défense du cours pivot du franc, n'ont eu que très peu d'impact sur l'économie française.

JEL : E50, F31

Mots clés : identification, SAV, politique monétaire française.

Monetary Policy under a Quasi-Fixed Exchange Rate Regime, The case of France between 1987 and 1996

Benoît Mojon [1]

1. INTRODUCTION

For the last 15 years, the major objective of the French monetary policy has been to achieve nominal convergence with Germany. To do so, the Banque de France (BdF) has aimed at stabilising the Franc parity to the D-mark within the European Exchange Rate Mechanism (ERM). The rationale for this strategy was to gain some of the Bundesbank credibility in controlling inflation. The stability of the exchange rate would insure private agents against the endemic French disease of chronic inflation and repeated devaluations.

This policy was implemented in a context of growing financial integration with a total freedom of capital circulation installed at the end of the 1980's. In theory, the combination of the latter with fixed exchange rate forbids an independent monetary policy. Yet, the European Monetary System was not a purely fixed exchange rate system. The ERM bands, the possibility of a realignment or of leaving the EMS, and an unperfect substitutability between Franc denominated asset and foreign currency denominated asset left the BdF with some leeway to implement a monetary policy independent from the German one.

The purpose of this paper is to assess the existence of a purely domestic monetary French monetary policy in the period of the "hard EMS". Our approach is an empirical one. We use institutional and historical insights to build a model of French monetary policy. The analysis of the procedures of the BdF on the French interbank liquidity market and the knowledge of the periods of EMS crises allows rationalising the reaction function of the BdF and identifying what can be understood as purely French monetary policy. The analysis focuses on the period starting in 1987 which marks the last change of the EMS peg of the Franc to the D-mark and the full achievement of deregulation in the domestic financial markets. Structural VAR econometrics is the method employed. It is particularly suited to analyse macroeconomic policy shocks, as shown by its increasing use by monetary policy analysts.

[1] Now at the Directorate General Research of the European Central Bank. The present paper was prepared while the author was economist at CEPII. I want to thank Michel Aglietta, Agnès Bénassy-Quéré, Christian Bordes, Michel Boutillier, Nathanael Fournier, Stéphanie Guichard, Claire Lebfevre, Jean-Paul Pollin and Frank Smets for their comments on previous draft of this paper. The usual disclaimers apply.

The model presented in this paper avoids two important shortcomings of the previous VAR literature on French monetary policy. First, economists just ignored the EMS context of French monetary policy. For instance De Bandt (1990) has no exchange rate in his model while Kim and Roubini (1996) use the exchange rate of the dollar and ignore the DM. Secondly, most economists impose a common structure on (roughly) the last twenty years (Bruneau and De Banbt 1998, Kim 1998, Smets 1997). This might not be consistent with the profound changes of the background and the procedures of French monetary policy, which took place during the mid-eighties. Instead I put forward a model which is estimated after 1987. This insures a stable framework of the implementation of monetary policy. It also means that the monetary policy regime has been one of moderate inflation and quasi-fixed exchange rate, without realignment of the Franc in the EMS. In this context, we implement a procedural identification of monetary policy in the spirit of Bernanke and Mihov (1995, 1996). The intervention rate is assumed to be the instrument of monetary policy while the market day to day rate accounts mainly for shocks to the risk premium on the Franc. The use of two domestic interest rates helps to overcome the simultaneity between exchange rate shocks and monetary policy shocks.

The paper is planned as follow. I briefly survey Structural VAR identification of monetary policy shocks in small open economies in section 2. Section 3 introduces the identification scheme for French monetary policy shocks. Section 4 presents the results of the estimations of the identification scheme and of the VAR simulations. The last section concludes.

2. IDENTIFICATION OF FRENCH MONETARY POLICY

2.1. VAR models and the quest for exogenous monetary policy shocks

The measurement of monetary policy is not an easy task. Even the preliminary stage of knowing when monetary policy is activated requires designation of what are exogenous monetary policy shocks and what are the endogenous response of central banks to shocks originating elsewhere in the economy. This is far from obvious, as shown by the growing literature on the identification of monetary policy. Most contributors use Structural VARs to pursue the quest for truly exogenous monetary policy shocks. Plain vanilla VAR models decompose the dynamics of a vector of macroeconomic variables in two parts. On the one hand, the autoregressive part of the model represents the endogenous response of the economy through time. On the other hand, innovations of the variables defined as deviations from the average autoregressive dynamic represent the original shocks of the economy. The first VAR analyses of monetary policy just made the assumption that the bare innovation[2] of some monetary policy instrument, like a monetary aggregate or a short-term interest rate, over an unrestricted autoregressive vector of macroeconomic variables, was an exogenous monetary policy shocks. Further research thereafter demonstrated that using economic theory to identify monetary policy shocks as combinations of innovations greatly improved the VAR modelling of monetary policy[3].

[2] Or the Choleski orthogonalisation of this bare innovation with respest to the innovations of the other variables when the monetary policy instrument is not ordered first in the VAR.
[3] For a recent survey, see Leeper, Sims and Zha (1996).

The identification of monetary policy shocks in small open economies is particularly concerned with the simultaneity between exchange rate and short-term interest rate variations. As a matter of facts the two variables can react instantaneously to one another. The short-term interest rate is usually assumed to be the instrument of monetary policy. One then have to determine whether its innovation is an exogenous monetary policy shock or an endogenous response to an innovation in the exchange rate. Grilli and Roubini (1995, 1996) find that a simultaneity problem between exchange rate and interest rate causes an exchange rate puzzle in simulations of responses to monetary policy shocks. In particular, an adverse monetary policy shocks appears to increase interest rates and to depreciate the currency. This occurs when the interest rate is modelled as reacting only with a lag to exchange rate innovations, so that the reaction of the central bank to exchange rate shocks innovations is not properly taken into account.

Solving the simultaneity problem requires an instrument that can be introduced in the interest rate equation or in the exchange rate equation but not in both. Clarida and Gertler (1995) in Germany, and Kim and Roubini (1996) in the G7 countries use the US Federal funds rate to this end. They assume that within one month, central banks do not care about the US interest rate innovation except for its impact on their exchange rate. Cushman and Zha (1997) study Canadian monetary policy in a model in which contains both Canada and US variables. The four US macroeconomic variables included in addition to traditional domestic variables are exogenous with respect to the Canadian variables. In other words, the latter have no impact on the US macro-economy. Thus, both the flexible exchange rate regime and the fact that the Canadian economy depends on the US real economy and on the stance of the US monetary policy are taken into account in the identification of the monetary policy shocks. The short run money supply function of the Bank of Canada contains innovations of the exchange rate as well as the innovations of the US federal funds rate. But it does not contain all the private sector variables, either Canadian or US, which can be observed only after a delay, i.e. consumer prices, trade and output. These private sector variables are the instruments used to overcome the simultaneity problem between the interest rate and the exchange rate.

2.2. Domestic Monetary policy in the EMS

The case of European monetary policies is more difficult because the unquestioned leadership of Germany in the EMS challenges their existence. In theory, being in the EMS means giving up monetary policy. The financial integration among the European countries is now such that a country intending to remain in the EMS must use its interest rate to stabilise its exchange rate with respect to the DM.

Empirical evidence on the determinants of European interest rates is mixed. Investigating interest rates linkages in Europe has been undertaken in a literature of its own. For instance Artus *et al.* (1991) show that in the 1980's the French short-term interest rate responded more to German monetary policy than to domestic prices or production. A Recent paper by Garcia-Herrero and Thornton (1996) shows for instance that the leadership of German interest rates can not be proved while Henry and Weidmann (1994), who use high frequency eurorates conclude that there is a dominance of German rates over French ones, especially after reunification.

The purpose of this paper differs from that in this literature. We just concentrate on the margins of an autonomous French monetary policy in the EMS. In facts, the margins around the ERM central parity, the possibility of realignments and or of leaving the EMS, and an unperfect substitutability between domestic asset and foreign currency denominated asset mightleave some leeway to implement a monetary policy independent from the German one. In any case this exercise should acknowledge the German monetary policy leadership properly.

Recent VAR analyses of European monetary policies take this leadership into account more or less explicitly. The minimum representation of the EMS constraint is to introduce the exchange rate of domestic currencies with respect to the DM into the model (Barran et al 1996). The EMS constraint should then appear through a reaction function of monetary authorities where depreciation shocks foster an increase of domestic interest rates. This raises two concerns. First, there is a simultaneity problem in the identification of monetary policy shocks because the exchange rate reacts instantaneously to interest rates and *vice versa*. Second, it is to some extent a dubious exercise to estimate purely domestic monetary policy shocks, as the commitment to the EMS requires the renunciation of domestic monetary policy.

Recent papers try to uncover purely domestic monetary policy shocks in EMS countries. Kim and Roubini (1996) study the case of G7 countries, including France, Italy and the UK. Smets (1997) focuses on Italy and France, Montalvo and Shioji (1997) study, Spain, Italy, Belgium, France, Holland and the UK, Kim (1998) investigates the cases of Spain and France. De Arcangelis and Di Girogio (1998) concentrate on Italy, Shioji (1997) on Spain while Bruneau and De Bandt (1998) and Levy and Halikias (1997) focus on France. In these papers, the EMS constraint on monetary is more or less taken into account.

Kim and Roubini (1996) ignore *de facto* the EMS regime, as it is the exchange rate to the Dollar, which enters their model[4]. Smets (1997) undertakes an identification strategy inspired from the literature on the Monetary Condition Index. He defines exogenous monetary policy shocks as a weighted average of exchange rate and interest rate innovations, which can be seen as a short run MCI. The EMS constraint is taken into account twice. First, the domestic parity to the ECU is the exchange rate used in the model. Second, in the case of France and Italy, the German short-term interest rates and the DM-dollar exchange rates are instruments to estimate exogenous monetary policy shocks. More precisely Smets uses the innovations of these two variables over their own lags and over lags of Italian or French variables which constitutes Italian and French models.

This is close to the strategy of putting a foreign interest rate in the VAR to alleviate the simultaneity problem between the domestic exchange rate and the interest rate targeted by monetary policy (Clarida and Gertler (1995), and Kim and Roubini (1996) above mentioned). Along the same lines Shioji (1997) uses the DM-dollar exchange rate in his model for Spain. One limit of using foreign interest rates or exchange rate as instruments, which can be excluded from the domestic interest rate equation, is that the latter can react directly to the former. This is especially the case in the EMS. As most models use monthly variables, it is most likely that a change in the German rate will be transmitted to other countries interest

[4] This does not amount to complete ignorance of EMS, which has been and still is very much influenced by the dollar exchange rate to the DM.

rate without the bilateral "monthly average" or the "end of the month" exchange rates being affected.

This issue is addressed by Bruneau and De Bandt (1998) and Levy and Halikias (1997). Both studies use the differential between the French interest rate and the German one to account for any independent French Monetary policy. Though, Bruneau and De Bandt (1998) do not include the DM exchange rate in their model or the German interest rate. Therefore, they can not account for the Banque de France endogenous response to exchange rate pressure and to German interest rate shocks. On the contrary, Levy and Halikias (1997) distinguish between three structural shocks: shocks on the German interest rate, shocks to the Franc-DM exchange rate and shocks to the differential between the French interest rate and the German one. They obtain that the German interest rate shocks have a strong impact on the French economy while the shocks to the differential do not. They conclude that the risk premium of Franc over the DM was not harmful to the French economy. In other words, the instrument they choose for French monetary policy is so much influenced by the risk premium of the Franc over the anchor currency of the EMS that they don't interpret it as exogenous monetary policy shocks.

Finally[5], Kim (1998) provides Structural VAR analyses of French and Spanish monetary policy, in which he models consistently the EMS constraint. A common structural VAR framework is applied to both countries. In the short run, the German interest rate innovations impact on the other country interest rates. He obtains that domestic French and Spanish central banks react mainly react to exchange rate depreciation and to German interest rates. Another interesting conclusion is that French and Spanish monetary policy shocks are a major source of their respective exchange rate variance. This is somehow puzzling because one would expect that the non-German participants in the EMS to stabilise the exchange rate. One possible explanation for this result is that Kim identification do not disentangle French and German Monetary policy shocks from risk premium shocks. As a matter of facts, he uses market short-term rates as instruments of monetary policy. We know that in the periods of EMS crises, which account for a high share of the variance of these rates during the 1990's, these rates rocketed because of shocks to the risk premium on currencies that the market expected to be devaluated. In the cases of these periods, the central banks increased their domestic short-term rates to respond to market pressure on the exchange rate. Some of the monetary policy shocks identified when using market rates as central banks monetary policy instruments might be misleading.

An alternative is to use an administratively set interest rate as the instrument of monetary policy. For instance, Bernanke and Mihov (1996) have shown that the Lombard rate was a better proxy for the Bundesbank policy than the call rate. Their choice of using the Lombard comes from institutional and historical study of the German monetary policy.

[5] The Montalvo and Shioji (1997) purpose is different. They focus on the transmission of German monetary policy to the monetary policy of other EMS. They first identify German monetary policy shocks with a purely German model. Then they introduce the series of monetary policy shocks in models of other economies just as others did with the raw series of interest rate or exchange rates. This is not fully satisfactory as it is the level of German interest rate which put pressure on domestic monetary policy, whether it comes from German monetary policy or not.

Ex post, it is supported by econometric analysis as the monetary policy shocks and the patterns of responses of macroeconomic variables to it are more satisfactory than when using the call rate.

Following Bernanke and Mihov (1995, 1996), I propose a model of French monetary policy in which the intervention rate is the instrument of the Banque de France [6]. We build the choice of this instrument on an investigation of the procedures of Banque de France on the market for bank liquidity. Actually, the intervention rate, which is the floor of this market, remained standstill during the EMS crisis. Never the less I build a model where the Banque de France reacts to exchange rate pressure and to its German counterparts in a way which is consistent with the EMS context. Moreover, using the intervention rate, I probably can better isolate purely domestic monetary policy shocks from both the German influence and the risk premium shocks.

My line of reasoning can be summarised in the following way. Previous SVAR modelling of monetary policy showed that the key to a successful identification is a careful treatment of any kind of shocks which could raise the interest rate without being a change in the stance of monetary policy. This method permitted most of the puzzles associated with the VAR analyses of monetary policy to be solved. In the case of France, over the recent years the major risk is to misunderstand some sudden increases in interest rate, which have resulted from shocks on the German interest rate or from the increased risk premium of the FF. Therefore it should be emphasised in the identification of FMP shocks. Only when this is properly modelled, can the possibility of a purely domestic monetary policy and its transmission channels to domestic objectives be tested. This is the purpose of section 3. But, before exposing the model, I will briefly describe the macroeconomic and institutional environment of French monetary policy over the last decade.

2.3. The case of France over the last decade

I choose to limit the estimation to the period after 1987 because it is the date of profound changes in the macroeconomic background and operating procedures of French monetary policy. Altogether, the last decade differs in many respects from what it was before[7]. It is one of stable inflation; market oriented operating procedures of monetary policy in liberalised financial markets and ex post quasi-fixed exchange rate to the DM. The latter is probably seen by the BdF as its major achievement.

This section puts forward identification strategies, which solve this simultaneity problem in the case of French monetary policy. To begin with, we describe briefly some important features of French monetary policy over the last decade. Firstly, the policy of competitive disinflation, which begun in 1983, was mainly completed during the first three or four years (**Figure 1**). Since 1987, the variance of French inflation has been very weak. Inflation has not exceeded 3.5% in annual terms since then, and this, despite a sustained growth period in the late 1980's. Secondly, the official EMS parity rate of the franc has not

[6] See De Arcangelis and Di Giorgio (1998) for another "procedural approach" to monetary policy identification within the EMS.

[7] In this respect, the above mentioned literature which estimate a common structure on a period starting between the mid 1970's and the early 1980's usually ignore the impact of these changes on monetary policy.

been realigned since 1987, in spite of the occurrence of several speculative attacks. The BdF defence of the franc appears *ex post* to have been effective.

Thirdly, a major reform of French financial markets took place in the mid-eighties. It has changed profoundly the operating procedures of French monetary policy. Before this reform, monetary policy was carried out through administrative credit rationing (*encadrement du crédit*), within highly segmented financial markets. At that time, the Banque de France was setting a yearly target for the aggregate volume of credit, and making sure that each commercial bank's credit was consistent with the target. 1987 was the official end date of the " *encadrement du crédit* " policy (stopped in practise in 1984). It was also the date when the administrative procedure of the fixing daily the day-to-day interbank market rate has been abandoned. Ever since, this rate has fluctuated freely in the course of the day. The new intervention procedures of the BdF on the interbank market and on the money market have not evolved since 1987. The Banque de France operates with two interest rates, which constitute a spread within which the day-to-day rate, which balances supply and demand of liquidity, fluctuates (**Figure 2**).

The first rate is the one at which the BdF provides liquidity to the market, through repurchase tenders held weekly. This rate is called the intervention rate or the tender rate (*taux des appels d'offre*) and it is the floor of the market rate at which the BdF takes eligible securities, public or private, as collateral for the liquidity it provides to the main market operators. The second rate, which is fully settled by the BdF, is the rate of repurchase agreements (*taux des prises en pension*). It usually has a maturity of 5 to 10 ten days, but the BdF may reduce its maturity to 24 hours, when the French franc (FF) is under pressure. The procedure of repurchase agreements is *de jure* accessible daily for banks in need of liquidity. As this rate is superior to the intervention rate by 50 to 100 basis points, banks resort to this second procedure only when the market rate remains above the rate of repurchase agreements for several days.

Direct interventions on the market and modification of the compulsory reserve ratios have also been used since 1987, but their role is of very limited importance[8]. The repurchase tenders are obviously the main source of central bank money. Their share in the total amount lent by the BdF to the banks fluctuates around 80 %. So the intervention rate probably impact as much as the day-to-day rate on banks liquidity.

Altogether, the decade starting in 1987 is a period of stable inflation and stable intervention procedures of the Bank de France on the interbank liquidity market. Ex post, it

[8] The BdF can proceed with interventions in the interbank market, by repurchasing (or 're-selling' when it wants to reduce the liquidity of the market) supplementary papers to those held through the two standard official procedures, or by open market operations. Repurchase agreements are generally done at the rate of the market, for durations of one to two days. However, market procedures represent a marginal dimension over the whole range of interventions by the BdF. Eventualy, the BdF still has the possibility of modifying the compulsory reserve ratio. This potential instrument, hardly ever used, has fallen to a very low level. The major changes of compulsory reserves ratio during the period took place in October 1990, when the ratio on time deposits fell from 3 % to 0.5 % and in Mai 1992 when the ratio on demand deposits fell from 4.1 % to 1.0 %.

has been a period of quasi-fixed exchange rate of the Franc against the DM. These features allow a stable structure for a model of monetary policy to be imposed on the data.

Figure 1 :

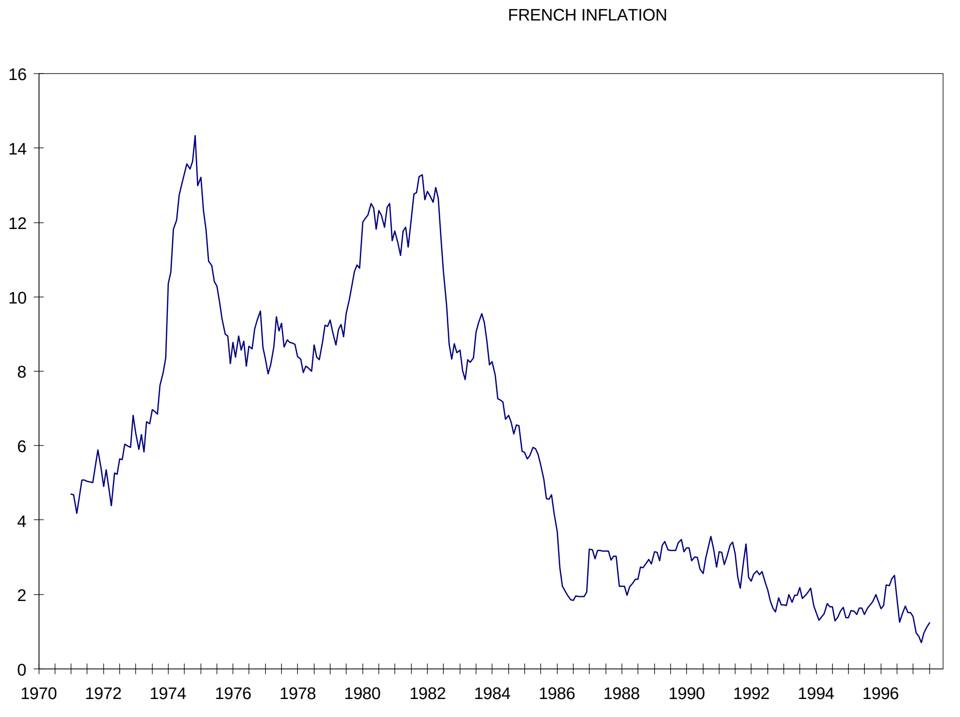
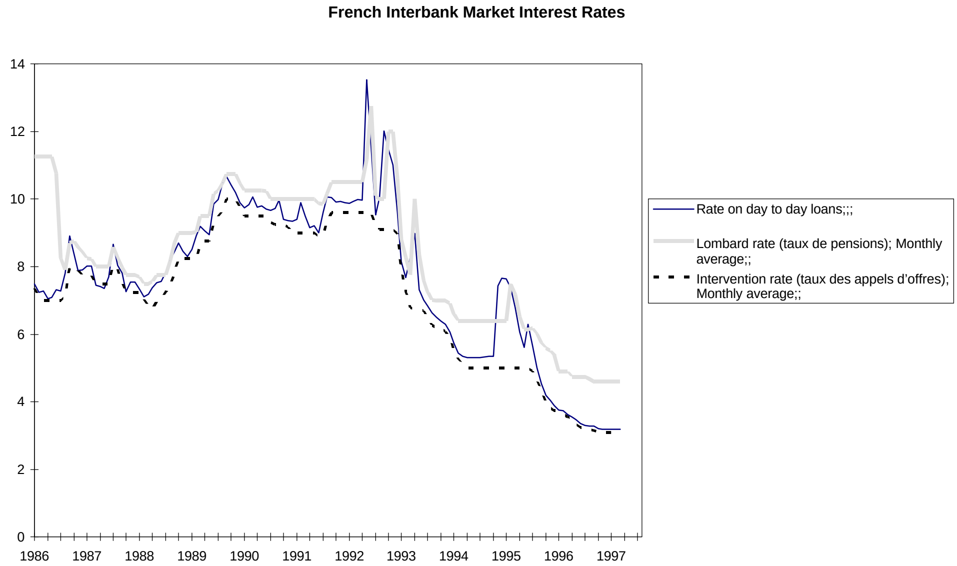


Figure 2 :



3. The Model

3.1. Choice of variables

VAR models of monetary policy are limited in the number of variables they can include. The minimum is to use three variables as in Smets and Gerlach (1995) who use prices and GDP, as the final objectives of monetary policy, and a short-term interest rate as the instrument of monetary policy. Usually, VAR models also include some of the key variables of the transmission mechanism such as exchange rates, long-term interest rates, and money or credit aggregates.

In the case of France since 1987, a monthly model can not do without prices, industrial production, a short-term French interest rate and the exchange rate to the DM. This is similar to the four variables used by Smets (1997), except for the exchange rate, which he defines with respect to the Ecu, and to the variables used by Kim (1998) who also uses a monetary aggregate. Due to the constraint of limiting the number of variables, I choose not to include such an aggregate. As a matter of facts, I assume domestic money was only secondary in the policy objectives of the Banque de France during the period[9]. I find more important to include in the model a variable which could be used as an instrument to overcome the simultaneity between the exchange rate and the monetary policy instrument.

[9] Evidence in favour of the exclusion of monetary aggregates are shown in section 4.

Here, we can not follow Smets (1997), who uses the German interest rate and the US-DM exchange rate, because we don't want to rule out the possibility of a direct impact of the German rate on the French interest rate. Kim (1998) allows for such a direct impact. He uses a Sims and Zha approach where the innovations of the exchange rate reacts to all other innovations of the model while the innovation in the monetary policy instrument is restricted from responding to prices and output innovations, which can be observed only with a lag. This approach does not work on the post 1987 sample. The latter is not surprising if one considers that real sector variables, such as prices and output, play only a minor role in the "within a month" adjustments between exchange rate and interest rates.

I then looked for an additional instrument variable among variables which are more correlated to the exchange rate, especially in the short run. An obvious possibility is to use the interventions on the foreign exchange markets. Although they are in principle secret, they can be proxied by the variations in the BdF currency reserves. Figure 3 plots the latter and the exchange rate to the DM. It appears that the correlation of this proxy for interventions on the foreign exchange market and the exchange rate differs before and after the 1993 widening of the EMS bands from +/- 2.25 % to +/- 15 %. Before the EMS reforms, the BdF intervened heavily, with a climax in July 1993 when the interventions reaches 250 billions francs, the net currency reserves falling from around 100 to minus 150 billion francs. In contrast, after the widening of the EMS bands, the interventions became non-significant even when the deviation of exchange rate from the EMS central parity reached 6 % in 1995. This change in the BdF strategy of interventions implies that it can not be used in a model estimated between 1987 and 1996.

The other way to defend one's currency is to increase domestic interest rates. This raises the question of which interest rate should be used in the model. It is clear from Figure 2 that the day-to-day rate (DD) and the intervention rate behave differently in the short run. Many sudden jumps of the DD rate occur during an EMS crisis or before a major French election. This was the case for the Maastricht referendum of September 1992, the parliamentary elections in the spring of 1993, the EMS crisis of summer 1993 and the presidential election of 1995[10]. In fact, the DD rate being a market rate, it appears more influenced by market pressure than the intervention rate. Then, the spread between the DD rate and the INT rate carries information either on the market pressure on the Franc.

Figure 4 which shows this spread and the exchange rate confirms that it is the case before, during and after the EMS crises of 1992 and 1993. This is why we propose to distinguish two parts of the day-to-day rate in the model.

First, the intervention rate is considered as the BdF operating instrument of monetary policy. Using an interest rate of bank liquidity as an operative instrument of monetary policy is now the most widespread assumption in empirical studies of European monetary policy (Gerlach and Smets (1995), Sims (1992), and others including the references above mentioned. Yet, the use of a market rate is not straightforward. For instance Bernanke and Mihov (1996) find that in Germany, shocks to the Lombard rate can better be understood as monetary policy shocks than shocks to the call rate. Second, we use the spread between the day-to-day rate and the intervention rate as a proxy for the demand pressure on the interbank market. Actually, the spread may also imbed information on domestic demand for money. But, in that respect, we show below on that the BdF does not respond to domestic

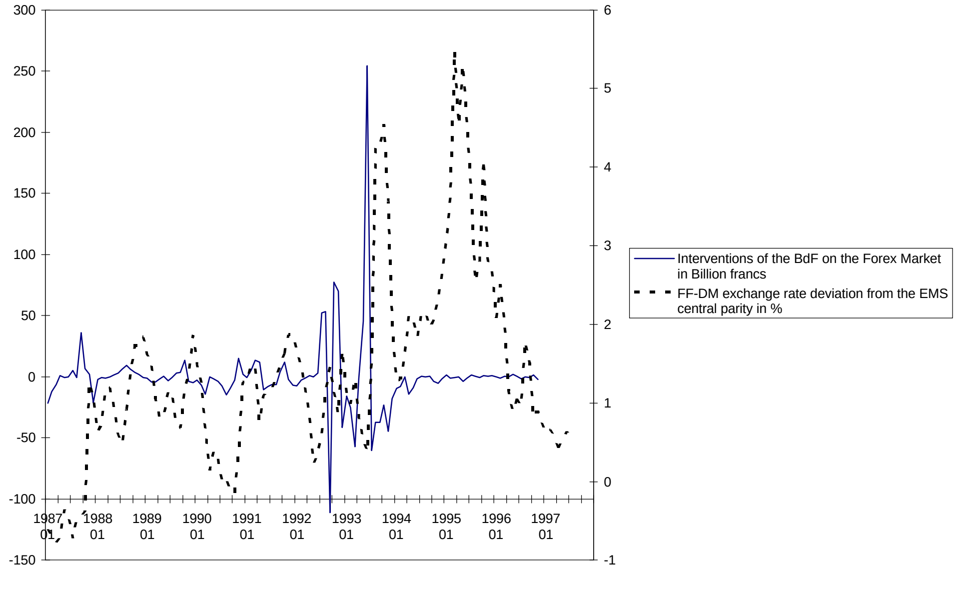
[10] It is worth noting that the advanced lower chamber of parliament election of June 1997 did not move the markets, probably because of the perspective of EMU.

money demand so that this potential determinant of the spread is probably of secondary importance.

Finally, the leadership of Germany in the EMS justifies that the German short-term interest rate can be included in the model. This is the case in Kim (1998) and in more strutural models of French monetary policy. For instance Mefisto directly model the spread between the French interest rate and the German interest rate as the operating instrument of French Monetary Policy. We may also put the German short-term interest rate in the model because it is a major determinant of the French interest rate. Yet this inclusion requires caution. The model should in particular be able to distinguish between shocks to the risk premium on the Franc over the DM and purely French monetary policy shocks.

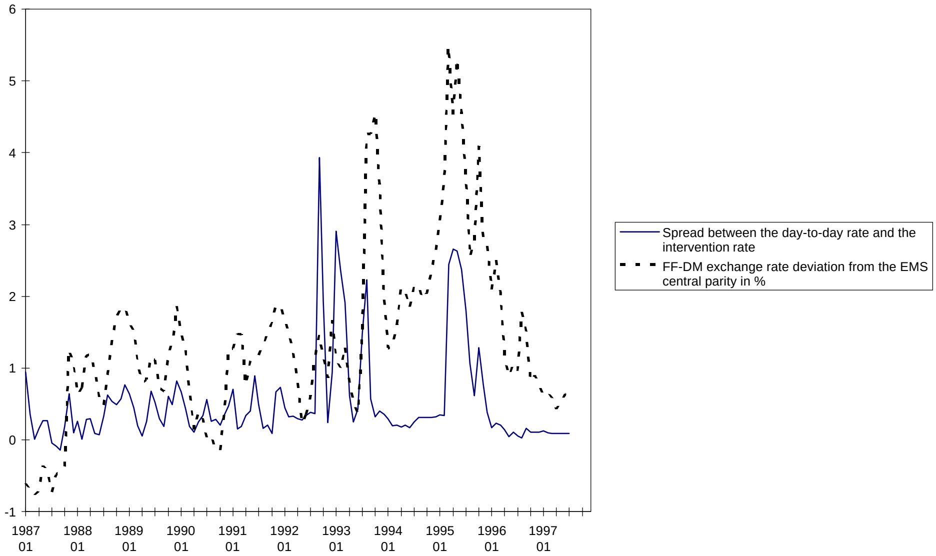
Altogether, our VAR models of French monetary policy include at least five endogenous domestic variables: the consumer price index (CPI); industrial production (IP)[11], the intervention rate (INT), the spread between the day-to-day rate and the intervention rate (S_DD) and the exchange rate of the DM quoted in French francs (DM). On the top of that, the model may include the German short-term interest rate.

Figure 3



[11] We use monthly variables.

Figure 4



3.2. Identification

Let the true auto-regressive representation of the structural model be:

$$B_0 Y_t + B_1 Y_{t-1} .+ ... +B_p Y_{t-p} = \varepsilon_t \text{ , or } B(L)\, Y_t = \varepsilon_t \text{ ,}$$

with Y_t the vector of endogenous variables, L is the lag operator and B(L) a polynomial of order p.

The ε_t vector consists of six structural shocks of the economy which are assumed to be serially uncorrelated and orthogonal to one another, so that their covariance matrix, D, is diagonal. The estimated AR reduced form of the model is

$$Y_t = A_1\, Y_{t-1} +...+ A_p Y_{t-p} + u_t \text{ ,}$$

where the estimated residuals, u_t, are not orthogonal and have a covariance matrix Ω. A comparison of the estimated and the structural AR forms give the following relationship between the structural shocks and the residuals:

$$B_0\, u_t = \varepsilon_t$$

It implies that Ω can be diagonalised into D, with $\Omega = [B_0]^{-1\,'}\ D\ [B_0]^{-1}$. The estimation of B_o, called $A_{0,}$ allows orthogonal structural shocks to be obtained. These structural shocks are therefore interpretable without confusion due to simultaneity. A_o cannot have more than 10 off diagonal free parameters, so that at least 10 constraints have to be imposed in its estimation. We propose the following form for A_o.

System **(I):**

$$\begin{pmatrix} u_{CPI} \\ u_{IP} \\ u_{S\_DD} \\ u_{INT} \\ u_{DM} \\ u_{G\_SIR} \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 0 & a_{34} & a_{35} & a_{36} \\ 0 & 0 & (a_{43}) & 0 & a_{45} & a_{46} \\ a_{51} & a_{52} & (a_{53}) & a_{54} & 0 & a_{56} \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix} \times \begin{pmatrix} u_{CPI} \\ u_{IP} \\ u_{S\_DD} \\ u_{INT} \\ u_{DM} \\ u_{G\_SIR} \end{pmatrix} + \begin{pmatrix} e_{CPI} \\ e_{IP} \\ e_{PREMIA} \\ e_{M\_POLICY} \\ e_{DM\_DEMAND} \\ e_{G\_SIR} \end{pmatrix}$$

The pattern of this system is close to that of the Kim and Roubini (1997) identification, except that we use the German call rate instead of the US Federal funds rate. Also, we do not use the price of oil or a price of commodities in this model because it has not had such an important role over the last decade. The key difference with Kim and Roubini (1997) and with Kim (1998) is to use two domestic interest rates to overcome the simultaneity between monetary policy shocks and an exchange rate shocks.

The identification relies partly on standard assumptions. There is a block recursive structure between " sluggish " real economy variables and both information variables and policy variables, which should be modelled as interacting instantaneously (Leeper, Sims and Zha 1996). Within the real economy variables, we assume recursivity between demand and supply shocks. The DM exchange rate belongs to the information sphere so that it takes into account the innovations of every other variable. In contrast, the money supply function of the BdF depends only on currently observable exchange rate innovations and DD rate innovations. Finally, only what is generally the short-term money demand is missing in the model. It is replaced by the spread (S_DD) equation, which proxies the market pressure on the interbank market interest rates. This spread is mainly influenced by the risk premia on the franc so that its innovation should react to the exchange rate innovation and to the French interest rate innovation. We also assume that its innovations depend on CPI and IP innovations, which are usually assumed to be arguments of a short run domestic money demand.

All these supposed relations between innovations of the endogenous variables should not be emphasised equally. The high frequency of variables suggests that the impact of the sluggish variables on the exchange rate or on the spread do not deserve the same effort as the impact between financial markets variables. For example the sign of the correlation between IP innovations and the DM innovations can be positive or negative over the sample of estimation without bringing the whole model into question. In contrast, the cross impacts between interest rates (including the spread), and exchange rate innovations deserve scrutiny because such variables do indeed react rapidly. The consistency of estimates of System **(I)** should be assessed mostly with respect to the bottom right-hand block. Within this block, we constrain the impact of the spread on the exchange rate to be nil ($a_{53} = 0$). This is for two reasons. Firstly, it helps the simultaneity problem between the spread and the exchange rate to be solved. Secondly, as the two innovations are positively correlated, it seems more likely that the depreciation of the franc causes the French market interest rates to increase than the opposite.

In contrast, both the intervention rate and the spread react to exchange rate innovations. In addition, we exclude the possibility that, on average, the BdF changes its intervention rate because of its spread with the day-to-day rate, so that $a_{43}=0$.[12] This identification scheme basically introduces a hierarchy in the Banque de France short term operating procedures. The defence of the exchange rate is the key short-term objective of the central bank and pressure on French market interest rates is only second. This somehow artificial hierarchy permits the simultaneity problem between exchange rate and interest rate to be solved in a very simple manner.

On the basis on this common structure, we estimate four models. Each model differs in the modelling of German interest rate impact on French monetary policy. The first model assumes that, the BdF only reacts to the exchange rate and not to the German interest rates. This is a benchmark model, which corresponds to what has been assumed in many previous VAR analyses of French monetary policy (Sims 1992, Barran et al. 1996 and others). In this model, the final impact of a German rate increase might be a French rate increase, but this would work through the exchange rate. The shortcoming of this is the possibility that within a month, the transmission between rates occurs without any trace on the exchange rate. The inclusion of a German interest rate in the model should then be considered. We undertake these under three forms. In the second model, the German rate is considered as a genuine endogenous variable (like in Kim 1998). This model requires that the innovation of the German rate over French variables can be interpreted. Although there are spill overs between the two major participants in the EMS, each being a key trading partner for the other, it is undeniable that the German rate does not depend on the French economy.

In the third model, the German rate is added to the model as an exogenous variable, while the fourth model has a block recursive structure *a la* Cushman and Zha (1997) so that it impacts on the French variables without the opposite being true. In the third model, the German rate has an instantaneous impact on all the variables of the model. In the fourth model, the German rate only depends on its own lags and its innovations can only impact on the three fast-reacting variables. This changes only slightly from the second model, which assumes that the contemporaneous German rate impact on innovations of every other variables.

The identified monetary policy shocks and their impact on the French economy are presented in the next section.

4. RESULTS

4.1. Short run identication

Table 1 gives the estimates of the instantaneous cross-impact between rapidly adjusting variables in the four models and the short run elasticity involving sluggish variables

[12] Though this eleventh restriction lead to a o ne degree over-identification of the model, it is necessary for numerical convergence of the estimations.

in Model 3. The estimated coefficients refer to System (I) mentioned above. For instance, in Model 1, an exchange rate innovation of 1 % results in an increase of the DD spread of 37.38 basis points (coefficient a35). Overall we are more satisfied wih the signs of the coefficients than with the significance level obtained. Yet, one must bear in mind that these "very short run" relations are difficult to establish as the innovations on which they are worked out are quite volatile.

We observe in every model, except in Model 1 which does not take the German interest rate into account, that a depreciation of the franc raises the intervention rate, and the DD spread so that, altogether, the DD rate reaction is much higher than that of the intervention rate. Limiting the EMS constraint to the exchange rate, as in Model 1, leads to reverse the causality between the exchange rate and the intervention rate. Actually, models 2, 3 and 4, which include the German rate explicitly, show that its innovation has no impact on the exchange rate. Thus, using the German rate as an instrument for the exchange rate (a la Clarida and Gertler 1996) would not be efficient. instead, the German rate innovation triggers an increase of the intervention rate, of about 20 basis points in Models 2 and 3. This limited response is due to the fact that the intervention rate is less volatile than the German call rate. Surprisingly, the DD rate is hardly affected by the German rate within one month (the decrease in the DD spread almost cancels the increase in the intervention rate). Therefore, on average, shocks on the German rate did not lead to an increase or a decrease of the tensions on the market rate for Franc liquidity. It is also worth noting that an increase in the intervention rate increases the DD spread. This can be interpreted as the market rate for liquidity, i.e. the DD rate, overshooting changes in the intervention rate. Finally, the instantaneous impact of the intervention rate on the exchange rate is not significant. At least, it is not of the wrong sign in model 2 and 3. One interpretation of this result would be that the market considers the intervention rate moves to be credible only after a delay.

Tableau 1 **: Simultaneous relations between the variables**

	Model 1					**Model 2**		
	Coeff	T-Stat	Signif			Coeff	T-Stat	Signif
A_{34}	0,010	0,06	0,95		a_{34}	0,788	3,71	0,00
a_{35}	37,384	8,68	0,00		a_{35}	40,927	8,03	0,00
a_{36}					a_{36}	-0,284	-2,16	0,03
a_{45}	-21,235	-1,16	0,24		a_{45}	12,101	1,17	0,24
a_{46}					a_{46}	0,188	4,49	0,00
a_{54}	0,036	1,63	0,10		a_{54}	-0,014	-0,67	0,50
a_{56}					a_{56}	0,001	0,26	0,80
	Model 3					***Model 3***		
	Coeff	T-Stat	Signif			*Coeff*	*T-Stat*	*Signif*
a_{34}	0,226	1,08	0,28		a_{21}	*1,27*	*3,36*	*0,00*
a_{35}	35,304	8,28	0,00		a_{31}	*30,93*	*1,86*	*0,06*
a_{36}	-0,467	-2,13	0,04		a_{32}	*0,57*	*0,19*	*0,85*
a_{45}	15,952	1,16	0,25		a_{51}	*-0,66*	*-1,85*	*0,06*
a_{46}	0,203	3,10	0,00		a_{52}	*0,03*	*0,60*	*0,55*
a_{54}	-0,033	-0,87	0,38					
a_{56}	-0,001	-0,46	0,64					
	Model 4							
	Coeff	T-Stat	Signif					
a_{34}	0,079	0,35	0,72					
a_{35}	37,115	8,23	0,00					
a_{36}	-0,229	-2,59	0,01					
a_{45}	1,762	0,18	0,85					
a_{46}	0,083	2,63	0,01					
a_{54}	0,000	0,01	0,99					
a_{56}	-0,001	-0,41	0,68					

These results give a picture of what could have been the BdF operating strategy during the last decade. It is a strategy of targeting the intervention rate except for innovations in the German short-term interest rate and depreciation of the franc. In contrast, the DD rate is settled by the market. In this respect, it is worth noting that the DD rate reproduces almost exactly the other market rates. In fact the spread between the 1, 3, 6 and 12 months PIBORs and the intervention rate are all very similar to the DD spread.

Finally the estimated short run elasticities involving sluggish variables are also worth commenting. They are not given for each model (to save space) but they are very similar across models. It is interesting to note that the impact of industrial production and prices innovations on the DD spread is positive. This is all the more striking as models which include a money aggregate (not reported to save space) do not exhibit such positive impacts, in what are usually interpreted as short run money demand functions. In terms of the SVAR identification of monetary policy, the short run money demand function in France since 1987 is better modelled by a market interest rate than by a money aggregate.

To put it in a nutshell, this part shows that it is possible to identify a short run reaction function of the BdF in an SVAR framework, over the last decade. In particular, it seems preferable to use the intervention rate, which is the floor rate of the interbank market for liquidity, as the BdF's operating instrument. In the short run relations we have been working with, this EMS co appears either through the defence of the exchange rate (coefficient a_{45}) or and through the direct impact of the German rate on the French rate (coefficient a_{46}). It appears preferable to model the latter impact explicitly, as it is very significant and inferior to one. Therefore, Models 1, which ignores the German rate, should not be used to represent French purely domestic monetary policy shocks. Model 2 is also excluded because it implicitly makes the assumption that French variables of the model determine the German rate. The next part of the paper will use Model 3, where the German rate is an exogenous variable, to simulate monetary policy shocks. Model 4, in which it is endogenous in the Model, but only to itself, i.e. it does not depend on French variables, will be used to decompose the variance of the variables into each identified structural shocks.

4.2. Identified monetary policy shocks

This part provides insights into the SVAR identification of monetary policy shocks. After we have shown that the intervention rate can be interpreted as the operating instrument of monetary policy, we compare the identified monetary policy shocks obtained from different models. The first model of monetary policy just considers first differences in the intervention rate as changes in the stance of monetary policy. The second model, called Model 0, is a three-variable standard VAR containing the intervention rate, the CPI and the Industrial Production. It shows what could be considered as monetary policy shocks in a Model, which ignores the EMS constraint. The last series of French Monetary policy shocks is the one identified in Model 3. This is done on Figure 5 in which the series of shocks are smoothed through a 5-periods moving average.

Figure 5 shows why it can be interesting to distinguish between changes in the interest rate and identified shocks. In fact, looking at the variation of the intervention rate (doted line), French Monetary policy appears as very tight at the end of the eighties and very loose between mid-1992 and mid-1994 and again after the autumn of 1995. This is very different from the picture given by the identified shocks, which condition monetary policy on the state of the economy. Thus, French monetary policy was relatively loose in 1990 if one considers that the economy was booming during this period. Therefore, the FMP was then looser than the average "lining against the wind" policy of the whole period. Likewise, it is not that loose in the second half of 1992, in 1994 and it was relatively tight in 1995, all periods when either the economy was depressed or inflation was decreasing. The next section shows how the model decomposes the intervention rate variance between these possible determinants.

Figure 5: Monetary Policy Shocks

The bottom Figure 5 presents the series of structural shocks identified with Model 3 and with Model 0. The correlation between the two series of monetary policy shocks is only equal to 0.49. The difference between Model 0 and Model 3 is that the former does not take into account the German interest rate, the DD spread and the exchange rate. In other words, some of the variance of Model 0 shocks in fact follows from German leadership within the EMS. For instance, in the last six months of 1989, the German rate was rapidly increasing, so that the monetary policy shocks identified in Model 0 (which does not take into account the German rate) appears tighter than the “ purely domestic ” French monetary policy shocks in Model 3. But the most striking differences take place in 1990 and in 1995. 1990 is characterised by the lowest exchange rate of the whole period, and by a decreasing German interest rate, so that there is no EMS constraint at all. That is why monetary policy identified in Model 0 appears to be wrongly loose. The story for the period around the first half of 1995 is just the opposite. If one takes into account the depreciation of the franc (Figure 3), monetary policy is much looser (Model 3 shocks) than if it is ignored (Model 0 shocks). Finally, it is worth noting that the decrease of the intervention rate over the last 18 months of the sample (see Figure 2) is not a deviation from the Model 3 reaction function of the BdF the (the doted line in the bottom box of Figure 5 remains nil). Therefore this decrease of the French rate not correspond to a loosening of the purely French Monetary Policy. The intervention rate just shadows the German rate.

The next section will further analyse the impact of between purely domestic monetary policy shocks, by simulating their impact on the French economy.

Figure 6: Responses to shocks on DD-spread 1^{st} line
Intervention rate 2^{nd} line
FF-DM X rate 3^{rd} line

4.3. French monetary policy in action

Figure 6 shows the impulse responses of the economy to the three exogenous shocks identified within the information and policy operating procedure sphere obtained from Model 3. First of all, the reaction function of the BdF is consistent with what could be expected. The intervention rate rises significantly after a demand shock on the interbank market (line 1 column 4 Graph) and after shock in the demand for DM (line 3 column 4 Graph). Yet, the pattern of responses appears much more lasting in Model 1 when the German interest rate is not taken into account. The size of what the model would designate as a purely domestic money supply shock is very small. It only amounts to a few basis points in the intervention rate. Yet its impact on all the variables of the model (given by line 2 of Graphs) corresponds to the textbook image of monetary policy. The exchange rate appreciates. Prices decrease from the start and the industrial production decreases only temporarily. Finally it reduces the DD spread because of the appreciation of the franc.

Besides, the exchange rate depreciation shock also has a standard impact on the simulations obtained from both models (line 3 of Graphs). It leads to higher prices and its stimulates industrial production, even though the French interbank interest rates rise. Finally, the structural shocks associated with the DD spread equation do not impact on the exchange rate.

The forecast error variance decomposition confirms that the purely domestic monetary policy contribution to the determination of prices and output is very small. Table 2 gathers the variance decomposition of the variables from Model 4, which allows the impact of the German interest rate to be accounted for. The exchange rate is the only variable, which is influenced by monetary policy shocks. But, contrary to Kim (1998), the influence of the German rate on the exchange rate is as high as the one of the FMP shocks. This might come from the fact Kim uses a longer period when several realignment of the Franc occurred. And, the French interest rate has been much more volatile than the German one around realignments.

Finally and paradoxically, what we have identified as purely domestic monetary policy shocks explain very little about the variance of the variables of the model. In fact, the intervention rate has had an impact mostly on the exchange rate. Even the variance of the intervenvion rate itself is not explained by monetary policy shocks after a few months. Up to 77 % of it is explained by the German rate after a year. The German rate also has an important impact on French prices and on French industrial production.

Table 2: **Forecast error variance decomposition from Model 4**

Shocks to	German rate	Prices	Industrial Prod	Reserves demand	Monetary policy	DM demand
explain prices variance						
At horizon						
0	0	100	0	0	0	0
12	14	44	24	7	5	6
24	18	34	31	5	4	8
36	13	30	40	4	4	9
explain industrial production variance						
At horizon						
0	0	3	97	0	0	0
12	7	9	76	3	3	2
24	6	8	61	4	5	15
36	12	7	54	5	6	16
explain DD spread variance						
At horizon						
0	3	0	0	71	0	26
12	9	4	20	32	2	32
24	11	6	18	27	4	34
36	10	7	16	26	5	36
explain intervention rate variance						
At horizon						
0	3	0	0	0	96	1
12	78	3	5	3	8	3
24	91	1	4	1	2	1
36	92	1	4	1	2	1
explain DM exchange rate variance						
At horizon						
0	0	3	0	0	0	97
12	4	6	9	1	14	66
24	10	6	13	2	17	51
36	16	7	12	3	18	45

Altogether, the identified purely domestic monetary policy shocks have had an impact on output, prices and the exchange rate. The output and the prices decrease after an adverse monetary policy shock, while the exchange rate appreciates. Never the less, the contribution of FMP shocks to the fluctuations of the real economy has been very limited during the period of estimation. This is not surprising as French monetary policy is usually considered to have been passive with the only objective of avoiding realignments in the EMS. Yet this result is important in the perspective of forgiving monetary policy when joining EMU. France will loose an instrument which could have been effective but which she has not been using since 1987.

5. CONCLUSION

This paper analyses French Monetary policy since 1987 which marks both the last realignment of the franc in the ERM and the completion of major reforms of the French financial system. In particular, these reforms deeply changed the operating procedures of French monetary policy. The Banque de France has given up administrative control of the total credit for a more market-oriented policy. The day-to-day rate has become a market rate, which the central bank influences indirectly by setting the intervention rate and the Lombard rate. The paper focuses on the dynamics of the interbank market interest rates and on the German leadership in the EMS to identify purely domestic French monetary policy shocks.

A new structural VAR identification is implemented in which the intervention rate is the operating instrument of monetary policy and the spread between the day-to-day rate and the intervention rate is a proxy for other sources of disturbances, mainly risk premium of the franc but also liquidity demand shocks. Using information from the two French interest rates helps the simultaneity problem between interest rates and exchange rates to be solved. The short run identification also underlines the role of the German short-term interest rate and the exchange rate against the DM.

Over the last decade, the short run reaction function of the Banque de France was to raise its intervention rate in case of a German short-term rate innovation or when the franc depreciated. At longer horizon, the intervention rate was fully determined by the German interest rate.

Finally, monetary policy shocks identified to deviations from this short run reaction function do not account for substantial share of prices and industrial production fluctuations. The absence of impact of a purely domestic French Monetary policy means that joining EMU is loosing something which has not been used during the last decade.

REFERENCES

Barran Fernando, Virginie Coudert and Benoît Mojon, 1996, The Transmission of Monetary Policy in the European Countries, Document de travail CEPII, n° 96-03, février.

Bernanke, Ben S. and I. Mihov, 1995, Measuring Monetary Policy, Working Paper n°5145, NBER.

Bernanke, Ben S. and I. Mihov, 1996, What Does The Bundesbank Target ?, Working Paper n°96/73EPS/FIN INSEAD.

Bernanke, Ben S. and Alan S. Blinder, 1992, The Federal funds rate and the channels of monetary transmission, American Economic/ Review, September.

Bruneau Catherine and Olivier De Bandt, 1998, La modelisation VAR structurel : application a la politique monétaire francaise, Notes d'études et recherche n°52, janvier.

Cushman, David O., and Tao Zha, 1997, Identifying monetary policy in a small open economy under flexible exchange rates, Journal of Monetary Economics 39, p 433-448.

Dale Spencer and Andrew Haldane, 1995, Sectoral VAR Analysis of the Credit Channel, European Economic Review, December.

De Arcangelis Guiseppe and Di Giorgio, 1998, In Search of Monetary Policy Measures: The Case of Italy in the 1990's, mimeo, Ministero del Tesoro.

De Bandt Olivier, 1990, L'identification des chocs monétaires et financiers en France : une étude empirique, Banque de France, Notes d'Etude et Recherche 90/6.

Garcia-Herrero Alicia and John Thornton, 1996, Additional Evidence on EMS Interest rates Linkages, International Monetary Fund WP/96/115, October.

Gordon, David B. and Eric M. Leeper, 1994, The dynamic impacts of monetary policy: an exercise in tentative identification, Journal of Political Economy, vol. 102, n° 6.

Grilli Vittorio and Nouriel Roubini, 1995, Liquidity and Exchange Rates: Puzzling Evidence from the G-7countries, New York University, Salomon Brothers Working Paper: S/95/31.

Grilli Vittorio and Nouriel Roubini, 1996, Liquidity Models in Open Economies: Theory and Empirical Evidence, European Economic Review, n° 2-3.

Hamilton, James D., 1995, Time Series Analysis, Chapter 11, Princeton University Press.

Henry Jérôme and Jens Weidman, 1994, Asymetry in the EMS Revisited: Evidence from the Causality Analysis of Daily Eurorates, Notes d'Etude et Recherche de la Banque de France.

Kim Soyoung, 1998, Identifying European Monetary Policy interactions: French and Spanish System with German Variables, Documento de Trabajo n° 9811.

Leeper, Eric M., Christopher A. Sims and Tao Zha, 1997, What Does Monetary Policy Do ?, Brookings Paper on Economic Activity 1996 2, W.C. Bainard and G.L. Perry Editors.

Levy Joaquim andf Ioannis Halikias, 1997, Aspects of the Monetary Transmission Mechanism under Exchange Rate Targeting: The case of France, International Monetary Fund WP/97/44, April.

Kim, Soyoung and Nouriel Roubini, 1997, Liquidity and Exchange Rates in the G-7 countries: Evidence from Identified VARs, mimeo New York University.

Montalvo, Jose Garcia, and Esturo Shioji, 1997, Monetary Policy Transmission in the EMS: A VAR Approach, mimeo Universitat Pompeu Fabra.

Rudebush Glenn D., 1996, Do Measures of Monetary Policy in VAR Make Sence?, Termi di discussione, Number? , Banca d'Italia.

Sims, Christopher A., 1996, Comment on Glenn Rudebush's 'Do Measures of Monetary Policy in VAR Make Sence?', mimeo, Department of Economics, Yale.

Sims, Christopher A., 1992, Interpreting the Macroeconomic Time Series Facts. The Effects of Monetary Policy, European Economic Review n°36.

Sims, Christopher A, 1986, Are forecasting models usable for policy analysis?, Federal Reserve Bank of Minneapolis, Quarterly Review Winter.

Sims, Christopher A, 1980, Macroeconomic and Reality, Econometrica.

Sims, Christopher A, 1972, Money, Income, and Causality, American Economic Review.

Sims, Christopher A. and Tao Zha, 1995, Does monetary policy generate recessions : using less aggregated price data to identify monetary policy, Yale University Mimeo.

Shioji, Esturo, 1997, Spanish Monetary Policy : a Structural VAR Analysis, Economics Working Paper n°215, Universitat Pompeu Fabra, May.

Smets, Frank, 1996, Measuring monetary policy in the G7 countries : interest rates versus exchange rate, Bank for Internation Settlements, miméo.

Smets, Frank, 1997, Measuring monetary policy shocks in France, Germany and Italy: The role of the Exchange Rate, Working paper n°42 Bank for Internation Settlements.

Strongin, Steven, 1995, The identification of monetary policy disturbances Explaining the liquidity puzzle, Journal of Monetary Economics, Vol. 35.

Tobin James, 1970, Post hoc proter ergo hoc, Journal of Political Economy.

LISTE OF WORKING PAPER RELEASED BY THE CEPII[13]

1998

"Wages and unemployment : trade-off under different labour market paradigms" Olivier Bontout et Sébastien Jean, *document de travail n°98-13,* décembre.

"Structures financières et transmission de politique monétaire. Applications à l'Allemagne, la France, l'Italie et le Royaume Uni" Benoît Mojon, *document de travail n°98-12,* octobre.

"Le marché du travail britannique vu par la France" Michel Fouquin, Sébastien Jean, Aude Sztulman, *document de travail n°98-11,* octobre.

"Compétitivité de régime de change en Europe Centrale", Michel Aglietta, Camille Baulant, Virginie Coudert, *document de travail n°98-10,* octobre.

"Sensibilité des salaires relatifs aux chocs exogènes de commerce international et de progrès technique : une élévation d'équilibre général", Sébastien Jean et Olivier Bontout, *document de travail n°98-09,* septembre.

"Evolution sur longue période de l'intensité énergétique", Pierre Villa, *document de travail n°98-08,* septembre.

"Sacrifice Ratios in Europe: a Comparison", Laurence Boone, Benoît Mojon, *document de travail n°98-07,* août.

"La politique japonaise et la crise monétaire", Stéphanie Guichard, *document de travail n°98-06,* juillet.

"La régionalisation du commerce international : une évaluation par les intensités relatives bilatérales", Michaël Freudenberg, Guillaume Gaulier, Deniz Ünal Kesenci, *document de travail n°98-05,* août.

"Pegging the ceec's currencies of the euro", Agnès Bénassy-Quéré et Amina Lahrèche-Révil, *document de travail n°98-04,* juillet.

"The international role of the euro", Agnès Bénassy-Quéré, Benoît Mojon, Armand-Denis Schor, *document de travail n°98-03,* mars.

"EMU and Transatlantic Exchange Rate Stability", A. Bénassy Quéré et B. Mojon, *document de travail n°98-02,* avril. (épuisé).

"Programme de travail 1998", Jean-Claude Berthélemy, *document de travail n°98-01,* avril.

[13] Working papers are circulated free of charge as stocks are available ; thank you to send your request to CEPII, Sylvie Hurion, 9, rue Georges Pitard, 75015 Paris, or by fax 33 01 53 68 55 03 or by e-mail : HURION@CEPII.FR. CEPII *is also on the Web : http ://www.cepii.fr.*

1997

"Why the Euro Will Be Strong : an Approach Based on Equilibrium Exchange Rates", Michel Aglietta, Camille Baulant, Virginie Coudert, *document de travail n°97-18,* décembre.

"How foreing Direct Investment Affects International Trade and Competitiveness. An Emppirical Assessment", Lionel Fontagné, Mickaël Pajot, *document de travail n°97-17,* décembre.

"Cycles de production industrielle : une analyse historique dans le domaine des fréquences", Pierre Villa *document de travail n°97-16*, novembre.

"International and External Policy Coordination: a Dynamic Analysis", Fabrice Capoën, Pierre Villa, *document de travail n°97-15*, octobre.

"Optimal Pegs for Asian Currencies'", Agnès Bénassy-Quéré, *document de travail n°97-14,* octobre.

"Pour ou contre le système commun de TVA?", Stéphanie Guichard, Claire Lefèbvre, *document de travail n°97-13,* juin.

"The Euro and Exchange Rate Stability", Agnès Bénassy-Quéré, B. Mojon, Jean Pisani-Ferry, *document de travail n°97-12,* juin.

Estimation du cycle à l'aide d'un modèle à tendance stochastique et application au cas du Royaume-Uni", Laurence Boone, *document de travail n°97-11,* juin.

"Looking for French Monetary Policy", Benoît Mojon, *document de travail n° 97-10,* juin.

"Incertitude sur le choix du modèle et rationalité", Pierre Villa, *document de travail n° 97-09,* mai.

"Quel est l'impact du commerce extérieur sur la productivité et l'emploi ?", Olivier Cortes, Sébastien Jean, *document de travail n° 97-08,* avril

"Trade Patterns Inside the Single Market" Lionel Fontagné, Michael Frendenberg & Nicolas Péridy, *document de travail n° 97-07,* avril.

"The Exchange Rate Policy of the Euro: A Matter of Size", Philippe Martin, *document de travail n° 97-06,* avril. (épuisé)

"Ces taux de change réels qui bifurquent", Pierre Villa, *document de travail n° 97-05,* avril.

"Chômage non-qualifié et imitation : les raisons d'un accord international sur la propriété intellectuelle", Lionel Fontagné & Jean-Louis Guérin, *document de travail n° 97-04,* mars.

Symmetry and Asymmetry of Supply and Demand Shocks in the European Union a Dynamic Analysis", Laurence Boone, *document de travail n° 97-03,* février. (épuisé)

"Interest Rates in East Asian Countries: Internal Financial Structures and International Linkages", Isabelle Bensidoun, Virginie Coudert et Laurence Nayman, *document de travail n° 97-02,* janvier. (épuisé)

"Intra-Industry Trade: Methodological Issues Reconsidered", Lionel Fontagné, Michael Freudenberg, *document de travail n° 97-01,* janvier. (épuisé)

1996

"The Cost of Fiscal Retrenchment Revisited: How Strong is the Evidence?", Philippine Cour, Eric Dubois, Selma Mahfouz & Jean Pisani-Ferry, *document de travail n° 96-16,* décembre.

"Les dynamiques sectorielles de la croissance en Europe centrale", Françoise Lemoine, *document de travail 96-15,* décembre.

"Growth and Agglomeration", Philippe Martin & Gianmarco I.P. Ottaviano, *document de travail n° 96-14,* décembre.

"La coordination interne et externe des politiques économiques : une analysee dynamique", Fabrice Capoen et Pierre Villa, *document de travail n° 96-13,* décembre. (épuisé)

"L'intégration asymétrique au sein du continent américain : un essai de modélisation", Philippine Cour et Frédéric Rupprecht, *document de travail n° 96-12,* octobre.

"Croissance et contrainte financière dans les PED", Pierre Villa, *document de travail n° 96-11,* octobre.

"Bulgaria From Entreprise Indiscipline to Financial Crisis", Roumen Avramov et Jérôme Sgard, *document de travail n° 96-10,* juillet.

"Potentialities and Opportunities of the Euro as an International Currency", Agnès Bénassy-Quéré, *document de travail n° 96-09,* août. (épuisé)

"Credit Crisis and the Role of Banks During Transition: a Five-Country Comparison", Jérôme Sgard, *document de travail n° 96-08,* août.

"Exchange Rate Regimes and Policies in Asia", Agnès Bénassy-Quéré, *document de travail n° 96-07,* juillet.

"France in the Early Depression of the Thirties", Pierre Villa, *document de travail n° 96-06,* juillet.

"Pays émergents, emploi defficient ?", Olivier Cortès et Sébastien Jean, *document de travail n° 96-05,* mars.

"Trade with Emerging Countries and the Labor Market : the French Case", Olivier Cortès, Sébastien Jean et Jean Pisani-Ferry, *document de travail n° 96-04*, mars.

"The Transmission of Monetary policy in the European Countries", Fernando Barran, Virginie Coudert et Benoit Mojon, *document de travail n° 96-03* , février. (épuisé)

"Trade Policy and Trade Patterns During Transition : A Comparison Between China and CEECs", Françoise Lemoine, *document de travail n° 96-02*, février.

"Financial Markets Failures and Systemic Risk", Michel Aglietta, *document de travail n° 96-01*, janvier

1995

"Why NAFTA Might be Discriminatory", Lionel Fontagné, *document de travail n° 95-12*, décembre. (épuisé)

"Régionalisation et échanges de biens intermédiaires", Lionel Fontagné, Michael Freudenberg et Deniz Ünal-Kesenci, *document de travail n° 95-11*, décembre.

"The Geography of Multi-speed Europe", Philippe Martin et Gianmarco I.P Ottaviono, *document de travail n° 95-10*, novembre.

"The Political Economy of French Policy and the Transmission to EMU", Christian de Boissieu et Jean Pisani-Ferry, *document de travail n° 95-09*, octobre (épuisé).

"L'importance des exclus de l'intégration monétaire en Europe", Philippe Martin, *document de travail n° 95-08*, novembre.

"Asymétries financières en Europe et transmission de la politique monétaire", Virginie Coudert et Benoit Mojon, *document de travail n° 95-07*, septembre (épuisé).

"La mesure du capital éducatif", Pierre villa, *document de travail n° 95-06*, septembre.

"Capital humain, mobilité des capitaux et commerce international", Pierre Villa, *document de travail n° 95-05*, juin.

"L'Europe à géométrie variable : une analyse économique", Jean Pisani-Ferry, *document de travail n° 95-04*, avril. (épuisé)

"Comparaison de l'efficacité énergétique des pays d'Europe centrale et orientale avec celle des pays de l'OCDE", Nina Kounetzoff, *document de travail n° 95-03*, mars.

"L'organisation de la politique économique dans un cadre stratégique", Pierre Villa, *document de travail n °95-02*, mars.

"Interest Rates, Banking, Spreads and Credit Supply: The Real Effects", Fernando Barran, Virginie Coudert, Benoît Mojon, *document de travail n° 95-01*, mars. (épuisé)