THE BANK CREDIT CHANNEL AND THE ASYMMETRIC EFFECTS OF MONETARY POLICY IN THE EURO AREA[‡]

Rafaela Pizarro-Barceló[*]

Florida Universitaria
(University of Valencia)
and
University of Alcalá

May, 2003

Abstract: The implementation of the common monetary policy by the Eurosystem seems a difficult task since it could cause important asymmetries of economic activity across regions. It is argued that part of the heterogeneous effects in the response on output reflects different transmission mechanisms, so how much does the transmission of the common European monetary policy differ across the member states of EMU?. This paper addresses this question in three steps. First, I focus on the link between monetary policy and financial structure through the *bank credit channel,* because this channel is determined by imperfections in the financial markets and can capture the heterogeneous financial systems across countries. Second, I identify the most notable differences in financial structure for a number of EMU members. Finally, I demonstrate the existence of distributional consequences of monetary policy across European countries – using a VAR approach – and confirm the role of the *bank credit channel* in explaining the asymmetries of a single European monetary policy.

Keywords: bank credit channel, financial structure, monetary policy transmission mechanism.

JEL Classification: E5.

[‡] A preliminary version of this paper was presented in IIIémes Journées D´Estudes Jean Monet, University Montesquieu Bordeaux IV, 18-19 June, 2003.

[*] Corresponding author: Florida Universitaria, Departamento de Economía, C/Rei en Jaume I nº 2, 46470 Catarroja, Valencia, Spain. Tel. +34 96 122 03 80. E-mail: rpizarro@florida-uni.es.

CONTENTS

1.- INTRODUCTION

From the early 90´s the EU countries were preparing for the beginning to the European Economic and Monetary Union (EMU) which occurred in January 1999. During this period, the member countries co-ordinated their economic policies in order to maintain low inflation rates and promote the fiscal consolidation. The result of this harmonization has been a higher synchronization of business cycles in the EU countries (Mihov, 2001). However, the implementation of the common monetary policy by the ECB appears to be a difficult task since it could cause important asymmetries of economic activity across regions, mainly because of the economic structural differences that still remain. In particular, wage-price setting practices and financial structures differ across countries. Both features establish that a common monetary shock transmission may generate important distributional effects in the Euro zone.

This paper focuses on the relationship between monetary policy and financial structure through the bank credit channel, which emphasizes the role of the banking system in the monetary policy transmission. Since banks are deposit taking institutions, and rarely fund themselves with non-reservable forms of finance, a monetary contraction that decreases reserves will lead banks to cut back on the loan supply. Those borrowers that rely on bank lending – because they do not have access to public bond markets – will be led to cut back on investment, and ultimately, on aggregate economic activity. As I argue below, this channel might influence the potency of monetary policy. If a financial system is well-developed, banks are healthy, and the bank concentration ratio is high, then bank credit will play no role in the transmission of monetary impulses and output responses will coincide with those that predict the interest rate channel or money view. In the opposite sense, the lending channel is to be stronger and aggregate money channel effect will be amplified.

Following on form Kashyap and Stein (1997a) and Cecchetti (1999), who focus on the importance of the banking system in explaining the distributional effects of monetary policy changes, the goal of this paper is twofold. Firstly, to identify the most notable differences in financial structure for a number of EMU countries – Germany, Spain, France, Italy and United Kingdom –, and then, to demonstrate the existence of a heterogeneous impact of monetary policy on output – size and timing - across such countries, highlighting the role that the bank credit channel plays in explaining these asymmetries of European monetary policy.

The remainder of this paper is divided as follows. In section 2, I analyse the causes of the asymmetric effects of the monetary shocks, and I provide a brief survey of the empirical evidence of these asymmetries, focusing on the differences in the monetary transmission. Section 3 establishes the importance of financial structure in the monetary policy mechanism trough the role of the bank credit channel, and identifies the most notable differences in financial systems across countries. Section 4 reports estimates of the differential impact of an interest rates increase on output and bank loans, consistent with the bank credit view, and finally, section 5 presents the conclusions drawn from this.

2.- ASYMMETRIC EFFECTS OF MONETARY POLICY: CAUSES AND THE EMPIRICAL EVIDENCE.

Can we consider the EMU as an optimal currency area [1](Mundell, 1961), in which a common monetary policy operates in a similar way across all the countries in the Union? A growing body of empirical literature addresses this issue and there is consensus on the asymmetric effects of monetary shocks, but not on what causes such differences[2].

The next step will be to study the reasons for the differential impact of monetary policy changes, and to survey the existing empirical evidence on the European monetary transmission channel.

2.1.- Causes of the asymmetric effects of monetary shocks.

Why do the effects of monetary shocks on economic activity differ, in magnitude and in timing, across countries? According to the body of empirical literature there are at least three justifications. Firstly, ***wage-price structure*** determines that wages (prices) rigidity leads to a great reduction of output after monetary contraction because the aggregate demand decreases more than if the wages (prices) setting is flexible. Guiso *et al.* (1999) find evidence of an imperfect adjustment in prices by looking at labour market frictions consistent with the legislation governing the hiring and firing of workers in Europe. Moreover, they present a measure of employment protection legislation as a weighted average of indicators pertaining to regular labour contracts, temporary contracts, and collective dismissals. The data confirms that labour market institutions in the UK are much more flexible than in the rest of Europe, where employment protection is fairly similar.

Secondly, Central Banks' ***reaction functions*** vary considerably across countries, because the official interest rates responses to different shocks depend on the authorities preferences with respect to inflation and output targeting. Clements *et al.* (2001) estimate a VAR system for each country in the Euro zone (except Greece and Luxembourg) – in which interest rate equation can be interpreted as monetary authority reaction function –, and they find that monetary shocks are more persistent, and have a strong effect on output in those countries more closely aligned with German monetary policy[3] – Austria and Holland –, while they are moderate in France, Belgium, Italy, and Portugal, and extremely weak in Spain and Finland. In addition of this issue, the short-run impact of monetary policy is also related to the "credibility" of the Central Bank. For example, in a country with "noncredible" monetary

[1] There are at least three conditions that accompany to an optimal currency area: first, agreement on the ultimate goals to be achieved through monetary policy; second, business cycles alignment, and third, similar monetary policy transmission mechanism across countries.

[2] Favero and Giavazzi (2001) and Cecchetti (1999) propose a higher harmonization in economic policy that involves a diminishing in those asymmetries.

[3] The Bundesbank´s reaction function weighs the inflation deviation in relation to its target more than the output goal.

policy, the optimal behaviour for agents who know that the monetary contraction will not last for very long, would be to avoid any adjustment, thus having no effect on GDP.[4]

And thirdly, ***transmission mechanism of monetary policy*** can differ across European countries. Monetary transmission channels can be divided mainly into three different channels[5]. The *interest rate* (or *money*) *channel* which is based on the monetary authorities modifying the official interest rates, which determine the interest rates on the monetary market. Given a contractionary monetary policy, the real interest rates increase, affecting the aggregate spending in three ways: a) the higher costs of capital as a result of higher interest rates leads to an investment expenditures contraction; b) consumption spending decreases because of the substitution effect, since higher rates change consumer preferences in favour of future consumption over current consumption; c) spending also depends on income effect positively –interest rates affect disposable income through dividends and interests payments–, but the sign and magnitude of the income effect depend on the net asset position of firms and households. Some empirical studies focusing on this channel as a source of significant asymmetries of monetary shocks – Mihov (2001), Guiso *et al.* (1999), Dedola and Lippi (2000), Clements *et al.* (2001), and Carlino and DeFina (1998) –, maintain that after a monetary contraction the magnitude of output response is higher in those countries with a higher concentration of interest-sensitive industries – manufacturing and construction –, these countries being Germany, Spain, France, and Italy.

The *exchange rate channel* determines that a monetary contraction will raise domestic interest rates relative to foreign rates and, consequently, domestic currency will be appreciate, reducing net exports and then aggregate output. The magnitude of this channel depends on the country's openness. Dornbusch *et al.* (1998) suggest that countries that have a large amount of extra-European trade – the UK (47.0), Greece (46.0), Italy (45.0), Germany and Sweden (44.0)[6] –, will experience more of a loss in competitiveness following a negative monetary shock[7].

And lastly, the *credit channel* that focuses on financial market imperfections as an important factor of propagation and amplification of the money channel effects. It operates in two ways: a) the *balance sheet channel* points up how the problems of informational asymmetries between lenders and borrowers determine a cost spread between the external finance and self-financing – called the external finance premium –, which increases after a monetary contraction, reducing access to credit markets for firms (specially medium and small sized firms) and households; b) the *bank credit channel* emphazises the role of banking sector in the transmission of monetary policy. Since banks are deposit taking institutions and rarely fund themselves with non-reservable forms of finance, a monetary tightening that decreases

[4] For an extensive analysis about the reaction functions see Dornbusch *et al.* (1998) for Germany, France, Italy, Spain, Sweden, and the UK, and Mihov (2001) for Germany, France, and Italy.

[5] See Mishkin (1995), Meltzer (1995), and De Bondt (1997) for a survey of the different transmission channels of the monetary shocks.

[6] The data refer to 1995.

[7] BIS (1995) presents an accounting of the exchange rate channel contribution to GDP response after an increase in short-term interest rates.

reserves will lead banks to cut back on loan supply and those borrowers that rely on bank lending – because they do not have access to public bond markets – will be led to cut back on investment, and ultimately, on aggregate economic activity.

The advantage of this last sub-channel is that it identifies as a principal cause of the asymmetric effects of a common monetary shock the cross-country differences in financial structure. If financial system is well-developed, banks are healthy, and the bank concentration ratio is high, then bank credit will play no role in the transmission of monetary impulses and output responses will be in line with those that predict the interest rate channel or money view; in the opposite sense, the lending channel is to be stronger and aggregate money channel effect will be amplified.

2.2.- Existing empirical evidence on the transmission mechanism of monetary policy.

As existing empirical evidence on the impact on output and prices of monetary policy across the countries in the union is based on historical pre-EMU data, past forecasts of economic variables may no longer be relevant after January 1999. However, it is to be expected that EMU has not brought a sharp structural break because agents adjust their behaviour gradually and furthermore, the reaction function of the ECB imitates the behaviour of central banks in the past regime. Taking this into account, a study based on past experience would be informative about across-country differences in the transmission mechanism of a common monetary policy. Therefore, I will survey the existing empirical literature on the five major European countries monetary transmission mechanisms.

Following Britton and Whitley (1997), Kieler and Saarenheimo (1998), and Guiso *et al.* (1999), the empirical studies can be classified into five groups:

(i) *Large-scale macroeconometric single-country models (MEM1).*

(ii) *Large-scale macroeconometric multi-country models (MEM2).*

(iii) *Small-scale structural models (SSM).*

(iv) *Single equation models (SEM).*

(v) *Structural VAR models (SVAR).*

The results are reported in **Table 1**. I distinguish the output responses of monetary policy change across Germany (D), Spain (E), France (F), Italy (I) and the United Kingdom (UK), and I rate them according to the strength of the monetary transmission mechanism. Next, I summarise the main characteristics of these models that differ in the econometric specification, in the exchange rate assumption, and in the type of monetary shock. As a result the estimations are often not comparable across studies.

Table 1a. Empirical evidence of the impact of a monetary contraction on output.

		5 quarters						8 quarters					
STUDY	***Shock***	D	E	F	I	UK	***Ranking***	D	E	F	I	UK	***Ranking***
MEM1													
National Central Bank Models (BIS, 1995)	Type 1	-0.15	-0.05	-0.18	-0.32	-0.35	E<D<F<I<UK	-0.37	-0.02	-0.36	-0.53	-0.89	E<F<D<I<UK
MEM2													
MCM Model (BIS, 1995)	Type 1	-0.72	-	-0.68	-0.44	-0.92	I<F<D<UK	-0.65	-	-0.70	-0.30	-1.20	I<D<F<UK
EUROMON (Bondt *et al.*, 1997)	Type 1	-0.10	-	-0.04	-0.10	-0.20	F<D=I<UK	-0.25	-	-0.17	-0.19	-0.60	F<I<D<UK
Quest II Commision Services (Roeger and In´t Veld, 1997)	Type 2	-	-	-	-	-	-	-0.40	-0.40	-0.40	-0.30	-0.40	I<D=E=F=UK
NIGEM (McAdam and Morgan, 2001)	Type 1	-0.31	-0.26	-0.17	-0.17	-	F=I<E<D	-0.34	-0.41	-0.29	-0.34	-	F<D=I<E
SSM													
Britton and Whitley (1997)	Type 1	-	-	-	-	-	-	-0.50	-	-0.50	-	-0.30	UK<D=F
SEM													
Ciccarelli and Rebucci (2002)	Type 1	-0.41	-0.15	-0.37	-0.26	-	E<I<F<D	-1.41	-0.90	-1.35	-1.51	-	E<F<D<I
Dornbusch *at el.* (1998)	Type 3	-0.50	-0.40	-0.50	-1.10	-0.50	E<D=F=UK<I	-1.40	-1.40	-1.50	-2.10	-0.90	UK<D=E=<F<I

Table 1b. Empirical evidence of the impact of a monetary contraction on output.

		5 quarters						8 quarters					
STUDY	***Shock***	D	E	F	I	UK	***Ranking***	D	E	F	I	UK	***Ranking***
VAR													
Barran *et al.* (1995)	Type 1	-0.60	-	-0.40	-0.30	-0.40	I<F=UK=D	-	-	-	-	-	-
Gerlach and Smets (1995)	Type 1	-0.25	-	-0.18	-0.32	-0.40	F<D<I<UK	-0.21	-	-0.14	-0.15	-0.70	F<I<D<UK
Ramaswamy and Sloek (1997)	Type 1	-0.40	-0.30	-0.25	-0.40	-0.40	F<E<D=I=UK	-0.80	-0.25	-0.40	-0.25	-0.75	E=I<F<UK<D
Ehrmann (1998) [(1)]	Type 4	0.50	0.28	0.60	0.50	-0.10	UK<E<D=I<F	0.25	0.00	0.25	0.30	0.20	E<UK<D=F<I
Kieler and Saarenheimo (1998)	Type 1	-0.09	-	-0.08	-	-0.05	UK<F<D	-0.20	-	-0.16	-	-0.17	F<UK<D
Dedola and Lippi (2000)	Type 4	0.20	-	0.05	-0.15	0.00	UK<F<I<D	0.10	-	-0.15	-0.35	-0.10	UK=D<F<I
Mihov (2001)	Type 1	-0.40	-	-0.30	-0.40	-0.10	UK<F<D=I	-0.60	-	-0.20	-0.30	-0.30	F<I=UK<D
Sala (2001)	Type 1	-0.17	-0.30	-0.25	-0.20	-	D<I<F<E	-0.35	-0.45	-0.50	-0.30	-	I<D<E<F
Mojon and Peersman (2001)	Type 1	-0.20	-0.15	-0.20	-0.12	-	I<E<D=F	-0.15	-0.04	-0.12	-0.04	-	E=I<F<D
Clements *et al.* (2001)[(2)]	Type 1	-	-0.10	-0.60	-0.55	-	E<I<F	-	-0.10	-0.75	-0.45	-	E<I<F
Clements *et al.* (2001)[(3)]	Type 1	-0.80	-0.80	-1.90	-1.10	-	D=E<I<F	-0.60	-1.20	-2.20	-1.10	-	D<I<E<F
Clements *et al.* (2001)[(4)]	Type 1	-0.50	-1.00	-1.50	-1.00	-	D<E=I<F	1.00	-0.50	-1.10	-0.50	-	F<D<E=I

Monetary Shocks: Type 1: 1% point rise in short-term interest rates sustained for at least two years; Type 2: 1% permanent decrease in money target; Type 3: 1% simultaneous permanent increase in short-term interest rates; Type 4: 1 standard deviation interest rate shock.

[(1)] Monetary expansion; [(2)] Responses during pre-EMU period; [(3)] Simulation of a common monetary shock with fixed intra-EMU exchange rate; [(4)] Simulation of a common monetary shock with flexible intra-EMU exchange rate.

(i) Large-scale macroeconometric single-country models (MEM1).

The BIS study of financial structures and the monetary transmission mechanisms (BIS, 1995) reports the national econometric models carried out by the G10 national central banks. These models capture the structural characteristics of the respective economies as noted by their monetary authorities, imposing different specifications according to the prior assumptions, the instruments of monetary policy, the expectations mechanism – adaptive or forward-looking –, and the long-run constraints on the economy. These differences should be caveat in mind in analysing the output responses simulations to a common monetary shock, because if any difference is observed it could reflect either different model specifications or real economic structure differences.

In spite of that, the BIS study points out the differential output responses to a common increase in short-term interest rates, disentangling the interest rate[8] channel from the exchange rate channel, assuming fixed intra-ERM exchange rates in Germany, France and Italy, and endogenous exchange rate for Spain and the UK: output decreasing is about twice as large in the UK – as a result of indirect effect of interest rate – than in France and Germany – where the exchange rates channel predominates –, and there is no effect in Spain. A special mention is output contraction in Italy caused by exchange rate channel in the first year and by direct effect of interest rates in the second year.

(ii) Large-scale macroeconometric multi-country models (MEM2).

The multi-country models assume a similar structural behaviour across economies and impose a common econometric specification for all countries. This provides results that are comparable but these models are less able to capture specific characteristics of each economy.

These macroeconometric models consider endogenous exchange rate but differ in monetary shocks, for example, the US Federal Reserve's MCM model (reported in BIS, 1995) analyses the output responses to an increase in short-term interest rates, and finds that they are similar in France and Germany, smaller in Italy and much higher in the UK; the Commission services' Quest II model (Roeger and In´t Veld, 1997) obtains homogenous output responses between countries to a decrease in money target; the NiGEM model (National Institute Global Economic Model) applied in Euro zone for McAdam and Morgan (2001)[9] reports that the output responses are stronger in countries which extra-European trade large due to currency appreciation – Germany, Italy and France –, but the exception is Spain which output falls because its higher interest-sensitive production; and finally, the EUROMON model for EU (Bondt *et al.* ,1997) suggests the greatest response to a monetary contraction in the UK even after two years.

[8] It distinguishes between the direct effect – substitution effect – and the indirect effect – income and wealth effects – of interest rates on consumption and investment spending.

[9] As well as the national macroeconomics models (MEM1) that model decomposes output changes into interest rates and exchange rate channels.

(iii) Small-scale structural models (SSM).

These models are based on a theoretic scheme, for example, Britton and Whitley (1997) use the Dornbusch overshooting exchange rate model, including rational expectations. The advantage of these models is that estimated output effects are comparable between countries and permit to identify if the differences are statistically significant. However, one criticism against this type of model is that it may be difficult to capture the main structural characteristics differences across the economies, because of a highly aggregated level and small parameters.

The Britton and Whitley (1997) estimations point out that output response to an increase in short-term interest rates is less sensitive in the UK than in France and Germany, but these differences are not statistically significant.

Summing up, these three types of structural models – MEM1, MEM2, and SSM – obtain cross-country differences in output both in magnitude and in timing. But these models are liable to the same criticism – Lucas' criticism –. Because the estimated parameters reflect economic behaviours and specific policy regime, they should be modified by a regime change as the implementation of EMU. Consequently, in order to interpret these estimations we have to suppose neither structural change nor changes in expectations mechanism exist. Besides, the structural models do not specify the credit channel since they do not use any equation either the bank credits either the loan interest rates.

(iv) Single equation models (SEM).

The single equation models capture the interdependency across European economies and take into account the monetary policy reaction function for each country. This approach presents the same methodological problems as the other models.

Dornbusch *et al.* (1998) estimate a single equation for output growth in each country based on past output growth, past output growth in other countries, present and past values of interest rates, and present and past values of each country's bilateral exchange rate against the DM and the US dollar. They obtain that the impact of a common interest rates change on output is similar across countries in short-run – except in Italy where the effect is larger –, but the long-run output responses are stronger – due to the interrelation between countries that this model permits – and the differences are more noticeable.

Ciccarelli and Rebucci (2002) use the same methodology than Dornbusch *et al.* (1998) and find cross-country differences in output and emphasize the monetary shock persistence in long run. On the other hand, Spain stands out with a smaller output response.

(v) Structural VAR models (SVAR).

The VAR methodology presents some advantages: it estimates the dynamic economic effects of monetary policy and permits to adopt different schemes identifying monetary shocks according to the monetary authorities reaction functions. However, this approach has been criticised at least in two ways: a) the estimated parameters can not capture the economic structure in each country and then the model does not indicate what economic structures cause the differences across countries; b) since the VAR model focuses on the effects of monetary

shocks – when monetary decisions deviate form their normal reaction function – it does not give any information about the consequences of a systematic monetary policy.

Table 1b reports the results of some studies which adopt this methodology. The baseline model of the VAR includes output, prices, short-term interest rates (Gerlach and Smets (1995), Ramaswamy and Sloek (1997), and Kieler and Saarenheimo (1998)), and exchange rate, which extends to monetary aggregate (Barran *et al.* (1995), Dedola and Lippi (2000), and Clements *et al.* (2001)), bank credit (Barran *et al.* (1995) and Clements *et al.* (2001)), and specific variables of each country: an information variable about the central bank's behaviour (Ehrmann, 1998), oil prices and German interest rates (Mihov, 2001), and US' output and interest rates for Germany and German interest rates for France, Italy and Spain (Mojon and Peersman, 2001).

Regarding to the identification scheme of monetary policy, the most studies rely on *Cholesky Decomposition*[10], that is, monetary policy effects output and prices with a lag of one period and reacts contemporaneously to macroeconomic variables[11], imposing the following order in variables: output, prices, short-term interest rates, monetary aggregate, exchange rate, and the rest of specific variables – except Barran *et al.* (1995) in which short-term interest rates changes affect contemporaneously to macroeconomic variables –. On the other hand, Kieler and Saarenheimo (1998) adopt different identification for each country and avoid the *price puzzle* problem but do not find any significant differences across countries. Following on this line, Sala (2001), through a Dynamic Factor Model, identifies a common monetary shock, which coincides with German monetary shock, and obtains cross-country differences in output, more persistent in France and Spain.

The rest of studies show differential impact across economies but differ in magnitude and in duration. It can stand out the higher response in the UK in short and long run when the interest rate channel is only taking into account (Gerlach and Smets, 1995), joins to German output response in Ramaswamy and Sloek (1997). However, when exchange rate is including the impact of monetary policy is weaker in UK and the heterogeneous response across countries decreases, except in Mihov (2001) in which German output contraction is almost twice as much as than the other countries after two years. Finally, Clements *et al.* (2001) compare the differences in output responses of monetary policy during the pre-EMU and under EMU periods, and conclude that a common monetary policy generates stronger effects in all countries, and the adoption of fixed intra-EMU exchange rate imposes higher costs to adjust to monetary policy changes.

Summing up the evidence reviewed, the assumption of different priors and different methodology imply that the results are often not comparable across countries and not even across studies. Therefore, this empirical evidence is not quite valid to asses neither the power of monetary policy nor the ranking of differences of a single monetary policy on the Euro area countries.

[10] Gerlach and Smets (1995) adopt also long-run restrictions.

[11] This type of identification provokes the *price puzzle* phenomenon, that is, after monetary contraction prices increase, that may means specification error identifying monetary shocks.

3.- FINANCIAL STRUCTURE AND MONETARY POLICY TRANSMISSION MECHANISM.

This section begins with an analysis of the importance of the financial sector in the transmission of monetary impulses through the existence of the bank credit channel. Next, evidence will be given of the differences that exist in the different financial systems of the countries being studied. This will allow us to infer how production may heterogeneously react following a monetary shock affecting all these countries.

3.1.- Financial system and bank credit channel.

Differing from the money channel (or interest rate) transmission mechanism – the IS-LM model– in which there are only two assets, bonds and money, and the banking sector only intervenes passively as a deposit taker, the *bank credit channel* adds a third asset, bank credit, allowing it to act in two ways in the banking system: on one hand passively, intervening in the process of monetary creation, and on the other hand actively, offering credit to finance economic agents' costs. In an extension of the IS-LM model, developed by Bernanke and Blinder (1988), monetary policy does not solely operate modifying bond interest rates, but it also produces a change in bank credit. Thus, in the extreme case in which bonds and money were very close substitutes for one another, a monetary contraction would hardly cause any increase in interest rates – the money channel being very weak – but a reduction in the reserves that contractionary policy brings about would have important consequences since the banks would react by reducing the amount of credit they offer, affecting the costs of those agents who depend on the banks to finance them.

As Bernanke y Blinder (1988) have shown, in order for the *bank credit channel* to work and have a real effect due solely to a modification in bond interest rates, two conditions are necessary[12]: 1) that the agents who depend on the banks to finance them cannot obtain other sources of finance; 2) that the banks do not have another source to attract funds that is a perfect substitute for reserve deposits.

Just how well both hypotheses can be fulfilled depends on the workings and development of the financial system. The first condition is much more likely to be fulfilled even though a tendency exists nowadays towards financing through the securities market instead of using banking intermediaries; however, on an aggregate level, the banking system still plays a crucial role in financing businesses, especially small and medium sized ones, for several reasons: businesses that have strong relationships with banks have less chance of suffering liquidity restrictions, the monitoring by banking intermediaries reduces the problem of asymmetric information – which brings about a large spread between the costs of internal and external financing- and finally, businesses put their trust in certain banks, establishing very close relations, making a change of intermediary very expensive[13].

[12] Besides there must be some form of incomplete price adjustment.

[13] Petersen and Rajan (1992) find that the availability of credit to a small business is an increasing function of the length of its relationship with its bank.

As far as the second condition is concerned, the following question would have to be answered in the affirmative: Can the monetary authority affect the bank credit supply by manipulating the amount of reserves available for the banking sector? At least four factors exist that weaken or can break the relationship between reserves and the credit supply: i) *the importance of the non-banking intermediaries*: if the volume of credit provided by the agents were considerable, and these institutions did not need to finance themselves via deposits subject to reserve requirements, then the relationship between the Central Bank and the aggregate credit supply would be very weak[14]; ii) the *maintenance of bonds as a buffer against reserves shocks:* what would be the reaction of a bank in the case of a reduction in its deposits after a monetary contraction? The bank would have at least three alternatives: reduce its offer of credit, sell some bonds to obtain liquidity or, increase alternative sources of finance (Certificates of deposit (CDs), shares, short and long term bonds,...). In order to complete the second condition some type of adjustment in the credit supply would be necessary. This would require (with regard to the second alternative since the third one will be analysed in the next factor) that the proportion of bonds to total assets low in relation to the proportion of credit. Achieving this would not be difficult, since banks hold bonds in order to be able to deal with an unexpected withdrawal of funds, but the tendency to do this is low since bonds are not as profitable as credits[15]; iii) *the bank's ability to use non-reservable forms of finance:* can the banks make up for the loss of deposits by issuing, for example, CDs? Romer and Romer (1990) believe so, as they assume that the offer of CDs is perfectly elastic, in other words, the bank can emit as many CDs as it needs to without having to pay any extra premiums. However, the evidence does not confirm this hypothesis since CDs are not secured, investors must relate them with the solvency of the bank that is issuing them, so if any degree of asymmetric information occurs between the bank and the investors, problems of adverse selection appear, which interferes in the banks ability to access other external sources of financing. These considerations make the marginal cost of external financing a growing factor with regard to the amount issued[16]; iv) *the impact of capital requirements*: if the banks must maintain an amount of capital as a percentage of its risk assets, and if the issue of new shares is costly for a bank (due to the information problems that accompany the issue of new shares), then the banks will prefer to hold more bonds that are not subject to these requirements rather than invest in new credits (risk assets). Under these circumstances, the higher the regulation on the volume of capital, the lower will be the impact of monetary policy on output due the bank credit channel not being able to fully operate [17].

---

[14] The growth of non-banking intermediaries depends on whether the transactions of attracting deposits can be carried out independently the credit transactions.

[15] Kashyap and Stein (1994) obtain that large banks hold less of securities than do medium-sized banks, who hold less than small banks (15.1%, 22.3% and 28.9%, respectively in 1990), because the smaller banks, with fewer depositors, are more vulnerable to large withdrawals, and then, they protect themselves by holding more securities.

[16] Kashyap and Stein (1994) develop a partially equilibrium model and show that credits and CDs are not perfect substitutes for each other since the differential between the interest rates of the credits and the interest rates of the CDs is affected by a shock in reserves.

[17] Bernanke and Lown (1991) and Kishan and Opiela (2000) provide empirical evidence that bank capital can be a factor that weakens the lending channel. However, Ehrmann *et al.* (2001) find that capital requirements do not affect bank credit response to a monetary contraction.

3.2.- Characteristics of financial structures and their implications for the importance of bank credit in the transmission of monetary impulses.

This section will present data concerning those characteristics of the financial systems of the countries included in this study which are relevant in order to determine how much of the 2 necessary conditions need be fulfilled for the bank credit channel to exist, thus establishing if a common monetary policy will have unequal distributive effects between countries due to the differences in their financial structures.

Can the economic agents who are bank-dependent access to other forms of finance?

Looking at **Table 2** one can appreciate the high degree of dependency that households and non-financial enterprises have on bank financing (credits and other instruments), being growing in households – except in Spain where there has been a slight decrease –. However, in the case of non- financial enterprises the tendency is decreasing, especially in the United Kingdom where bank debt has dropped to 49.4%, followed by Spain (77.3), France (80.2), Germany (85.1) and Italy (94.6). Does this fact point to the development of new, outside, non-banking means of finance? **Table 3** shows other financial instruments such as shares, bonds (long term debt) and trade credit. The first two of these have an increased effect on GDP in every country except in Spain, where the importance of bonds is slightly reduced. It is worth noting that those countries with a greater number of large firms (**Table 4**) – Germany, United Kingdom and France – have tended to turn more to the share market through the issue of shares – United Kingdom and France – and bonds – Germany and France –, as it is easier for these firms to substitute bank financing by these new means of finance. However, small and medium sized firms can use trade credit as a substitute for bank credit, this being especially important in France and Spain. This supposes that the impact of monetary policy could be reduced, as enterprises would substitute bank credit for trade credit following a monetary contraction and even, those that do not suffer from liquidity restrictions could adopt the role of financial intermediaries conceding liquidity to the others through trade credits.

One can conclude, although the data provided is not exhaustive concerning access to other sources of finance, that this source is greater in France and the United Kingdom, followed by Spain, and in last place would be Italy and Germany.

Table 2. Bank financing for households and non-financial enterprises, 1983-1993.

Share of liabilities with banks:	**D**		**E**		**F**		**I**		**UK**	
	1983	1993	1983	1993	1983	1993	1983	1993	1983	1993
Households	99.2	100.0	90.8	88.3	77.3	82.2	-	94.6	93.3	97.5
Non-financial enterprises	91.3	85.1	81.2	77.3	88.7	80.2	-	94.6	77.6	49.4

Source: BIS (1995).

Table 3. Non-financial enterprises sector balance sheet, 1983-1993.

	D		E		F		I		UK	
	1983	1993	1983	1993	1983	1993	1983	1993	1983	1993
Dedt/GDP[(a)]	50	75	70	60	55	70	-	45	20	50
Equity/GDP	20	30	20	35	50	215	-	50	50	120
Long-term debt/GDP	37.6	55.9	6.8	4.5	34.9	41.8	16.9	20.2	1.6	21.4
Debt/Equity[(b)]	3.20	2.71	2.97	2.10	1.41	0.41	1.47	1.47	0.42	0.49
Long-term debt./Short-term debt[(b)]	2.40	2.60	-	-	1.70	1.60	0.90	0.60	0.10	0.60
Trade credit granted/GDP	7.5	5.7	40.1	32.1	42.4	49.3	-	-	19.4	14.7
Trade credit received/GDP	4.6	3.5	30.6	20.8	40.2	39.4	2.5	2.3	20.3	15.5

Source: BIS (1995).
[(a)] Debt does not include neither equity nor trade credit. [(b)] Data are referred to 1982 and 1992.

Table 4. Size distribution of employment, 1990.

Country	< 10 employees	10 – 449 employees	≥ 500 employees
Germany	18.3	45.6	36.1
Spain	45.8	38.9	15.3
France	28.0	41.0	31.0
Italy	42.5	37.8	19.7
UK	27.1	39.1	33.8

Source: Kashyap and Stein (1997a).

The importance of the non-banking intermediaries.

The percentage of credit available by Other Financial Institutions (OFIs) – **Table 5** – is very low in all cases, which would make one expect that following a reduction in reserves, *ceteris paribus*, one could expect a contraction in credit availability at the aggregate level.

Table 5. Bank loans and other financial intermediaries.

	Percentage of total loans			
	1983		1993	
	Banks	OFIs	Banks	OFIs
Germany	84	16	89	11
Spain	98	2	91	9
France	88	12	85	15
Italy	89	11	89	11
UK	95	5	92	8

Source: BIS (1995).

Holdings of bonds as a buffer against reserves shocks.

Ehrmann *et al.* (2001) study the banking system in the four countries in the Euro zone – Germany, Spain, France and Italy – using desaggregate data to distinguish between small and large banks – **Table 6** –, and comes to the same conclusion as Kashyap and Stein (1994) for the American banking sector. This being, that small banks have a higher percentage of liquid assets as a total of all assets when compared to large banks. On the other hand, in an aggregate form, the weight of bank loans is appreciably higher in the United Kingdom and in Germany, slightly higher in Spain and France and, exceptionally, lower in Italy. This composition of the asset portfolio supposes that banks in the United Kingdom and Germany find it more difficult to compensate for a reduction in reserves through the sale of liquid assets, being obliged to reduce their credit supply; whilst Italian banks can react to a negative monetary *shock* without altering their credit.

The ability of banks to use alternative forms of finance rather than deposits.

Using the size, the concentration and bank health as proxy variables for the ability of the banks to access other forms of finance which are not subject to reserve requirements, it can be shown that where there are healthy banking systems with a high concentration of only a few banks in the marketplace, problems of asymmetric information between investors and the banks issuing new instruments to capture funds can be reduced, it being easier to get them and, thus, compensating for a reduction in deposits without changing the credit supply.

Looking at **Table 7**, we see that the United Kingdom has the most highly concentrated banking system, followed by France and Spain. Germany – with a large number of small banks – is where the credit channel can play a major role, followed by Italy. Looking at the data pertaining to the health of the banking system – **Table 8** – collected in Kashyap and Stein (1997a), the United Kingdom shows itself to be the healthiest system, Germany, Spain and France hold intermediary positions, and in last place comes Italy. Therefore, one can suppose that the British banks will find it easiest to obtain other types of funds, as opposed to the Italian banks where the possibility of finding them will be very difficult, and, therefore, the credit offer will play an important role in the transmission of monetary impulses. Germany, Spain and France will have an intermediary position.

Capital requirements

In Spain and Italy we can see that banks have the highest level of capitalisation – **Table 6** –, which is also accompanied by a high liquidity ratio. In these countries the bank credit reaction will not be as great as in Germany and the United Kingdom that have lower ratios.

Conclusion

To conclude, it is possible to order countries in terms of the magnitude of their output reaction following a monetary shock, taking into account how far the 2 conditions necessary for the bank credit channel to be operative are met. Thus, establishing a scale from least to most fulfilling (1 to 3) of every determining factor – **Table 9** –, shows that Germany's output will have the biggest reaction, followed by the United Kingdom and Italy, and in last place will be Spain and France where the impact of monetary policy will be less important.

Table 6. Banking structure with respect to absolute size, 1998.

	Germany			Spain			France			Italy			UK[a]
	Small	Large	Total	Small	Large	Total	Small	Large	Total	Small	Large	Total	Total
Number of banks	2710	64	3207	150	17	243	182	24	332	629	32	759	-
Share of total assets	0.121	0.668	1	0.044	0.661	1	0.027	0.754	1	0.100	0.714	1	-
Market share of total loans	0.186	0.534	1	0.051	0.625	1	0.026	0.752	1	0.112	0.739	1	-
Liquid assets[b]/Total assets	0.175	0.149	0.173	0.438	0.362	0.407	0.455	0.317	0.401	0.413	0.258	0.399	0.160
Loans[c]/Total assets	0.576	0.327	0.563	0.439	0.461	0.459	0.379	0.335	0.403	0.390	0.398	0.388	0.839
Deposits/Total assets	0.773	0.287	0.747	0.639	0.514	0.614	0.549	0.491	0.585	0.538	0.334	0.508	0.735
Capital and reserves/Total assets	0.057	0.036	0.055	0.172	0.054	0.132	0.123	0.034	0.089	0.120	0.065	0.112	0.065

Source: Ehrmann *et al.* (2001) and Bank of England, *Monetary and Financial Statistics* for UK. "Small" banks have assets less than 1 billion euros, while "large" banks have assets more than 10 billion euros.

[a] 1997. [b] See Appendix for a definition. [c] Loans are the bank credits to non-financial private sector.

Table 7. Size and bank concentration, 1995.

Country	Number of banks by OECD	Percentage of assets in 5 largest institutions	Percentage of assets in 10 largest institutions
Germany	3500	17	28
Spain	318	49	62
France	1453	47	63
Italy	269	29	45
UK	40[(a)]	57[(b)]	78[(b)]

Source: BIS (1996).
[(a)] Only commercial banks. [(b)] 1994.

Table 8. Bank health, 1993-1995.

Country	Estimated ROA, (no. of major banks)	Profit before tax relative to assets, (no. of banks)	Loan losses relative to loans (no. of major banks)[(a)]	Thomson Ratio (no. of banks)[(a) (b)]
Germany	0.22 (205)	0.26 (3627)	0.17 (204)	B/C (24)
Spain	0.20 (101)	0.45 (317)	4.09 (105)	B/C (14)
France	0.15 (298)	0 (1569)	2.56 (269)	B/C (22)
Italy	-0.01 (57)	0.11 (296)	7.47 (105)	C (30)
UK	1.84 (6)	0.67 (38)	1.21 (6)	B (25)

Source: Kashyap and Stein (1997a).
[(a)] Data are referred to 1995.
[(b)] Thomson Ratio (from most to least health): A > A/B > B > B/C > C > C/D > D > D/E > E.

However, this result differs from other similar studies[18], for example, Kashyap and Stein (1997a) that use other indicators such as the importance of small banks, bank health, the importance of small businesses and the ability to access finance from other non-banking sources. They found the United Kingdom to be the country least sensitive to the bank credit channel, Spain and Germany were in an intermediary position, next France and finally Italy which was the most sensitive to monetary policy. On the other hand, Cecchetti (1999)[19] using 3 indicators – the importance of small banks, bank health and the ability of financing from alternative non banking sources – found the following order from the least to the most reaction: the United Kingdom, Spain, Germany and France and, finally, Italy. Then main difference lies in the fact that both studies include the sizes of the banks, but don't take into account the banks' capitalisation. Some empirical studies exist taking this into account– Carlino and Defina (1998) and Ehrmann *et al.* (2001) – that show that the size of the banks is not a good indicator of the bank's capacity to compensate for a monetary contraction without making a change in the credit supply. They advise using the liquidity ratio (Ehrmann *et al.*, 2001) or the capital ratio.

Table 9. Summary of determinants of bank credit channel and effectiveness of monetary policy.

Country	**1st Condition**	**2nd Condition**				**Effectiveness of Monetary Policy** [(a)]
	Availability of Non Bank Financing	Importance of Non-Bank Intermediaries	Importance of Bonds	Availability of Alternative Finance	Capital Ratio	
Germany	3	3	3	2	3	2.8
Spain	2	3	2	2	1	2
France	1	3	2	2	2	2
Italy	3	3	1	3	1	2.2
UK	1.5	3	3	1	3	2.3

[(a)] Average of five previous columns.

[18] DNB (2000) and Favero and Giavazzi (2001).

[19] He analyses legal structures as factors of differences in financial structures – in the way of La Porta *et al.* (1997) study about the legal determinants of external finance – and he rates countries by its effectiveness of monetary policy associated with different legal systems from stronger to weaker responses as follows: German law (Germany), France law (France, Italy and Spain), Scandinavian law, and English law (UK).

4.- MEASURING THE IMPACT OF MONETARY POLICY ON OUTPUT AND BANK CREDIT.

In order to demonstrate that bank credit plays an important role not only in the transmission of monetary impulses - amplifying their effects - but also in the justification of the asymmetries that monetary policy between countries causes – as have been mentioned in the previous section –, we need to estimate what the impact on output and bank credit would be following a monetary contraction. In order to do this I am going to use the VAR methodology – in spite of the criticism mentioned in section 2 – since this allow us to easily make a comparison between the monetary policy transmission mechanism amongst countries, moreover, it allows for new variables to be included which are specific to each country within the reference model. The model used to estimate this is the following:

$$Y_t = \sum_{i=1}^{k} A_i Y_{t-i} + \sum_{i=0}^{k} B_i X_{t-i} + C\varepsilon_t$$

where vector Y represents the main macroeconomics variables – production, inflation y interest rate –, while vector X encompasses a monetary aggregate, the exchange rate and bank credit. In order to estimate how the variable would react when faced with a monetary shock we first need to impose a series of restrictions in matrix C, in other words, identify what the existing relations between the variables are. As in the majority of studies, I am basing this on *Cholesky's* triangular decomposition, establishing that monetary policy has a delayed effect on production and inflation. In practice, this implies adopting the following order when introducing the variables in VAR: production, prices, interest rates, monetary aggregate, exchange rate and bank credit, so the last three will be effected simultaneously by a monetary impulse.

The following OECD data has been used for the 5 countries with reference to the variables in question: GDP in real terms or the Industrial Production Index for Germany (output), Consumer Price Index, CPI (prices), the Central Bank official bank interest rates (short term interest rates), M3 for Germany, Spain and France and M2 for Italy and the United Kingdom (monetary aggregate), the exchange rate of the German mark against the dollar for Germany, and the British pound against the dollar for the United Kingdom, and bank credit to private sector (bank credit)[20]. A more detailed description of the data can be found in Appendix.

Maintaining the previous order of the variables, except for Germany where monetary aggregate precedes interest rate, and only including the exchange rate in Germany and the United Kingdom, since for the other countries the inclusion of this variable in the returns would not substantially alter the reactions in the face of any innovations, dynamic reactions in all variables can be observed following a 100 basic point increase in interest rates[21]. **Figure 1** shows the reactions of output, prices and bank credit. The first result worthy of note is the increase in prices following a monetary contraction in every case – the *price puzzle* –, which

[20] Except in France where the variable is the total debt for private sector.

[21] About the lags included in each VAR see Appendix.

is, the monetary authorities anticipate inflationary pressures due to offer *shocks* and decide to reduce money supply in order to reduce these stresses. This phenomenon is generally attributed to an error in the specifications of the model or to an omission of one of the variables. Regarding the first of these, another identifying concept on monetary policy has been added, for example, that a monetary shock simultaneously affects all the variables –the order being: interest rate, monetary aggregate, exchange rate, bank credit, production and prices – without any satisfactory results. However, some variable related to how each Central Bank reacts, and to the collecting of information concerning future inflation, needs to be included.

In spite of this imprecision, the model can be useful to analyse production and bank credit reactions. In **Table 10** one can see the differences in the reduction in output, in both magnitude and duration, amongst the countries. The United Kingdom stands out in first place in both the short term and after 2 years, followed by Germany, Italy, Spain and France, however, whilst recuperation begins after the first year in the United Kingdom, it occurs after the second year in Germany, France and Italy. In Spain the effect is felt more since production decreases until the 3rd year. These results agree with those in **Table 9,** where Germany followed by the United Kingdom were the countries where it was predicted that monetary policy would have a greater effect, and the effect would be felt less in Spain and France. Moreover, looking at the effect on bank credit, this is reduced immediately following an increase in interest rates in Germany and the United Kingdom, whilst in Spain and Italy this does not happen until more than a year later (France's case is not representative because the variable does not relate exclusively to credit, so the reduction observed could be due to a reduction in bank credit or to a reduction in the rest of its debts), this confirms the different role that the bank credit channel analysed in the last section has[22].

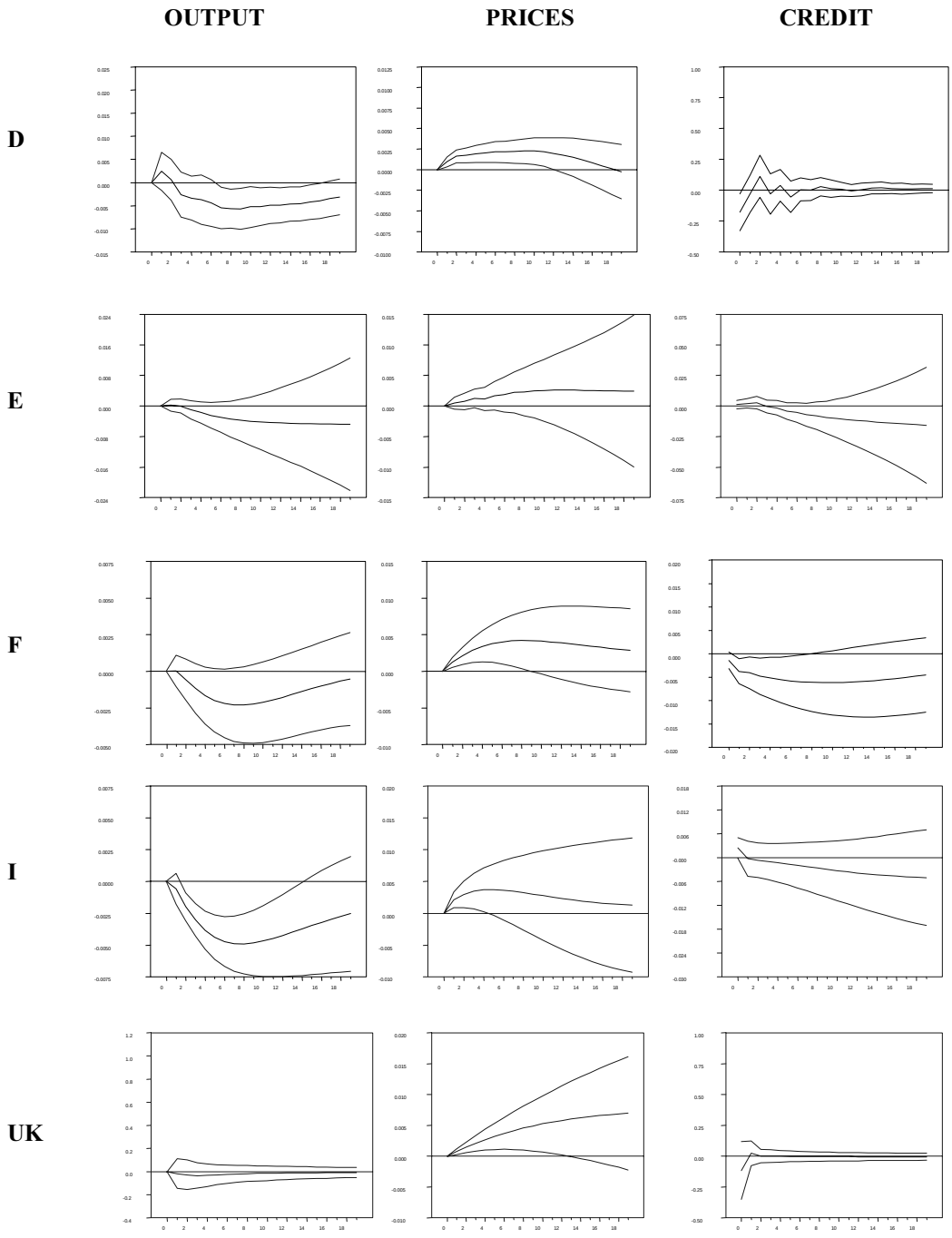
Table 10. Impact of interest rates shock on output and bank credit.

	OUTPUT		CREDIT	
	First year	**Second year**	**First quarter**	**First year**
Germany	-0.33	-0.56	-18.65	-1.47
Spain	-0.17	-0.36	0.12	-0.04
France	-0.15	-0.20	-0.14	-0.45
Italy	-0.37	-0.46	0.23	-0.09
UK	-2.8	-1.4	-9.54	-0.15

Note: Data are in percentage points.

[22] Bernanke and Blinder (1992) establish the following evidence to demonstrate the role of bank credit in the transmission of monetary impulses: after one or two years, bank credit reduces more than monetary aggregates, and the evolution of output coincides with those of bank loans.

Figure 1. Responses on output, prices, and bank credit to monetary shocks.



5.- CONCLUSIONS.

In the presence of the new challenge that the ECB is facing concerning the differential impact that its single monetary policy could have amongst the member states of the EMU, this paper has focused on the importance of the different financial structures in the transmission of monetary impulses – through the different level of effectiveness of bank credit channel – as a possible justification for these asymmetries, since if this transmission route exists then effects on output will be greater than those only due to changes in interest rates.

The characteristics of the financial systems that are relevant in order to determine the fulfilment of the two conditions necessary for the bank credit channel to exist have been analysed. The conditions being, that the economic agents who depend on the banks for financing can not access other sources of finance, and the banks do not have another source to attract funds that are a perfect substitute for deposits. The characteristics looked at were the composition of the debts of non-financial enterprises and households, the importance of non-banking intermediaries, the structure of the banks' balance sheet, the size and bank concentration, and the banks' solvency. The conclusion that has been drawn, along with the evidence that different financial structure exist between countries, is the different grade of effectiveness of credit channel and, therefore, the strength of monetary policy; Germany is the country where a monetary shock could have the biggest effect on output, followed by the United Kingdom and Italy. The countries it would have the least impact on would be Spain and France.

To corroborate these conclusions an estimation has been made of the reaction of output, prices and bank credit in the face of an increase in official interest rates using the VAR methodology and it has been found that the differential response of production between countries agrees with that which the grade of operativity of the bank credit channel predicts.

However, this last result is not very convincing due to the specification problems of the VAR system that have brought about the *price puzzle* phenomenon, so a solution would be to include a variable belonging to the reaction function of each Central Bank, and to collect information concerning future inflation. Although this alternative would allow a more precise estimate of the impact on production, it wouldn't be able to precisely explain what the reduction in bank credit was due to, if it was due to a contraction in demand or to a reduction in the banks' credit supply. Determining the cause is important because only in the second case would it imply the existence of the bank credit channel, so the effects of monetary policy would be amplified. A way to avoid this ambiguity is by using desaggregate data from the banking system of each country. Future investigation in order to determine the role of banks in the transmission of monetary policy, and therefore be a source of the generation of asymmetries should take this aspect into account.

APPENDIX

TABLE 6

Liquid assets: In Germany and Spain, it includes cash, short-term interbank deposits and government securities. In France, cash and interbank deposits. In Italy, cash, interbank deposits, government securities and repurchase agreements. In UK, bonds and other assets.

VAR MODEL ESTIMATION

Database: *Main Indicators*, OECD. *Annual Report,* BIS (1996). *Monetary and Financial Statistic*s, Bank of England.

Samples and Lags:

Country	Sample	Lags[(1)]
Germany	1974:1 – 1998:4	4
Spain	1980:1 – 1998:4	3
France	1978:1 – 1998: 2	2
Italy	1975:1 – 1998:4	2
United Kingdom	1986:4 – 2002:2	1

[(1)] According to Likelihood Ratio Test, except in the UK where I adopt one lag because the sample is very short.

Variables: In Germany, Spain, France, and Italy the variables are in billion euros. In the UK in million pounds sterling.

Estimation of VAR Model: The series of GDP, monetary aggregate and bank credit are transformed in real terms. It applies logarithms to GDP, monetary aggregate, bank credit, prices and exchange rate. Each equation includes dummies seasonal variables.

REFERENCES.

ASHCRAFT, A.B. (2001): "New Evidence on the Lending Channel", *Federal Reserve Bank of New York Staff Reports* No. 136.

BARRAN, F.; COUDERT, V., and MOJON, B. (1995): "Transmission de la politique monétaire et credit bancaire, une application à cinq pays de l´OCDE", *Revue Economique 46,* 393-413.

BERNANKE, B. S. and MIHOV, I. (1997): "What does the Bundesbank target?", *European Economic Review* 41, 1025-1053.

BERNANKE, B. S. and MIHOV, I. (1998): "Measuring Monetary Policy", *The Quaterly Journal of Economics* No. 113, 869-902.

BERNANKE, B. S. and BLINDER, A.S. (1988): "Is It Money or Credit, or Both, or Neither? Credit, Money, and Aggregate Demand". *AEA Papers and Proceedings,* Vol. 78, No. 2, May, 435-439.

BERNANKE, B .S. and BLINDER, A.S. (1992): "The Federal Funds Rate and the Channels of Monetary Policy". *The American Economic Review,* Vol. 82, No. 4, September, 901-921.

BERNANKE, B. S. and LOWN, C. S. (1991): "The Credit Crunch". *Brookings Papers on Economic Activity 2:205-39.* Washington, D.C.: Brookings Institution.

BIS (1995): *Financial Structure and the Monetary Policy Transmission Mechanism".* Basle, March.

BRITTON, E. and WHITLEY, J. (1997): "Comparing the Monetary Transmission Mechanism in France, Germany and the United Kingdom: Some Issues and Results". *Bank of England Quarterly Bulletin,* May.

CARLINO, G. and DeFINA, R. (1998): "The Diffrential Regional Effects of Monetary Policy", *Review of Economics and Statistics,* 572-587.

CECCHETTI, S. G. (1999): "Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism", *NBER Working Paper Series* No 7151.

CICCARELLI, M. and REBUCCI, A. (2002): "The Transmission Mechanism of European Monetary Policy: Is There Heterogeneity? Is it Changing over Time?", *IMF Working Paper* No. 02/54.

CLEMENTS, B.; KONTOLEMIS, Z. G., and LEVY, J. (2001): "Monetary Policy Under EMU: Differences in the Transmission Mechanism?", *IMF Working Paper* No. 01/102.

De BONDT, G. J. (1997): "Monetary Transmission in Six EU-Countries: an Introduction and Overview", *Research Memorandum WO&E nr 527/9742.*

DEDOLA, L. and LIPPI, F. (2000): "The Monetary Transmission Mechanism: Evidence fron the Industries of Five OECD Countries", *Temi di discussione del Servizio Studi* No 389, Banca D´Italia.

DNB (2000): "Thr importance of financial structure for monetary transmission in Europe", *Quaterly Bulletin March,* 34-40.

DOAN, T.A. (1996): *RATS, User´s Manual Version 4.0*. Estima.

DORNBUSCH, R.; FAVERO, C., and GIAVAZZI, F. (1998): "Immediate Challenges for the European Central Bank", *Economic Policy 26,* 15-52.

EHRMANN, M. (1998): "Will EMU Generate Asymmetry? Comparing Monetary Policy Transmission Across European Countries". European University Institute, Florence, Italy.

EHRMANN, M.; GAMBACORTA, L.; MARTÍNEZ-PAGÉS, J.; SEVESTRE, P., and WORMS, A. (2001): "Financial Systems and the Role of Banks in Monetary Policy Transmission in the Euro Area", *Banco de España, Sevicio de Estudios, Documento de Trabajo N. 0118.*

FAVERO, C.A. and GIAVAZZI, F. (2001): "Monetary Policy Transmission in the Euro Area". *Economic Affairs Series ECON 110 EN/rev. 1,* Directorate-General for Research, European Parliament.

FISHER, J.D.M. (1999): "Credit Market Imperfections and the Heterogeneous Response of Firms to Monetary Shocks", *Journal of Money, Credit, and Banking,* Vol. 31, No. 2, May, 187-211.

GAMBACORTA, L. (2001): "Asymmetric Bank Lending Channels and ECB Monetary Policy", *Economic Modelling,* forthcoming.

GERLACH, S. and SMETS, F. (1995): "The Monetary Transmission Mechanism: Evidence From the G-7 Countries", *CEPR Discussion Paper* No. 1219.

GUISO, L., KASHYAP, A.K., PANETTA, F., and TERLIZZESE, D. (1999): "Will a Common European Monetary Policy Have Asymmetric Effects?", *FRB of Chicago Economic Perspectives,* 56-75.

KASHYAP, A.K. and STEIN, J.C. (1997a): "The Role of Banks in Monetary Policy: a Survey with Implications for the European Monetary Union", *Economic* Perspectives, Vol. 21, Issue 5, Sep/Oct, 2-15.

KASHYAP, A.K. and STEIN, J.C. (1997b): "What do a Millon Banks Have to Say about the Transmission of Monetary Policy?", *NBER Working Paper Series* No 6056.

KASHYAP, A.K.; STEIN, J.C. (1994): "Monetary Policy and Bank Lending". In N. Gregory Mankiw (ed.). *Monetary Policy*, National Bureau of Economic Research, Studies in Business Cycles, Volume 29, Chapter 7, 221-251.

KIELER, M. and SAARENHEIMO, T. (1998): "Differences in Monetary Policy Transmission? A Case not Closed", manuscript.

KING, S.K. (2002): "A Credit Channel in Europe: Evidence from Bank´s Balance Sheets", manuscript.

KISHAN, R. P., and OPIELA, T.P. (2000): "Bank Size, Bank Capital, and the Bank Lending Channel", *Journal of Money, Credit, and Banking,* Vol. 32, No. 1, February, 121-141.

LA PORTA, R.; LOPEZ-DE-SILANES, F.; SHLEIFER, A., and VISHNY, R.W. (1997): "Legal Determinants of External Finance", *The Journal of Finance,* Vol. LII, No. 3, July, 1131-1150.

McADAM, P. and MORGAN, J. (2001): "The Monetary Transmission Mechanism at the Euro-Area Level: Issues and Results Using Structural Macroeconomic Models". *Working Papers Series No. 93,* December, ECB.

McCALLUM, B.T. (1999): "Analysis of the Monetary Transmission Mechanism: Methodological Issues", manuscript.

MELTZER, A.H. (1995): "Monetary, Credit and (Other) Transmission Processes: A Monetarist Perspective". *Journal of Economic Perspectives,* Vol. 9, No. 4, Fall, 49-72.

MIHOV, I. (2001): "Monetary Policy Implementation and Transmission in the European Monetary Union", *Economic Policy,* forthcoming.

MISHKIN, F.S. (1995): "Symposium on the Monetary Transmission Mechanism". *Journal of Economic Perspectives,* Vol. 9, No. 4, Fall, 3-10.

MOJON, B. (2000): "Credit Channel(s) in the Euro Area: A Survey of the Distributional Effects of Monetary Policy", mimeo, ECB.

MOJON, B. (2000): "Financial Structure and the Interest Rate Channel of ECB Monetary Policy". *Working Papers Series No. 40,* November, ECB.

MOJON, B. and PEERSMAN, G. (2001): "A VAR Description of the Effects of Monetary Policy in the Individual Countries of the Euro Area". *Working Papers Series No. 92,* December, ECB.

MUNDELL, R. A. (1961): "A Theory of Optimum Currency Areas", *American Economic Review* 51, n. 4, September, 657-665.

PEEK, J. and ROSENGREN, E.S. (1995): "Bank Lending and the Transmission of Monetary Policy", *New England Economic Review,* Nov/Dec.

PEERSMAN, G. and SMETS, F. (2001): "The Monetary Transmission Mechanism in the Euro Area: More Evidence From VAR Analysis". *Working Papers Series No. 91,* December, ECB.

PETERSEN, M. and RAJAN, R. (1992): "The Benefits of Firm-Creditor Relationships: A Study of Small Business Financing". University of Chicago. Mimeo.

RAMASWAMY, R. and SLOEK, T. (1997): "The Real Effects of Monetary Policy in the European Union: What Are the Differences?", *IMF Working Paper 160*.

RAMEY, V. (1993): "How important is the credit channel in the transmission of monetary policy?", *Carnegie-Rochester Conference Series on Public Policy 39,* 1-45.

ROEGER, W. and IN'T VELD, J. (1997): "Quest II: A Multi Country Business Cycle and Growth Model". *Economic Papers No. 123,* European Commission, , Directorate-General for Economic and Financial Affairs, October.

ROMER, C.D. and ROMER, D.H. (1990): "New Evidence on the Monetary Transmission Mechanism". *Brookings Papers on Economic Activity 1:149-213.* Washington, D.C.: Brookings Institution.

SALA, L. (2001): "Monetary Transmission in the Euro Area: A Factor Model Approach", Mimeo, Universitè Libre de Bruxelles.

THORBECKE, W. and COPPOCK, L. (1995): "Monetary Policy, Stock Returns, and the Role of Credit in the Transmission of Monetary Policy", *SSRN Working Papers* No. 133.

WHITE, W.R. (1998): "The Coming Transformation of Continental European Banking?". BIS, Monetary and Economic Department, Basle.