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ABSTRACT

Available studies on asymmetries in the monetary transmission mechanism within Europe are invariably based on macro-economic evidence: such evidence is abundant but often contradictory. This paper takes a different route by using micro-economic data. We use the information contained in the balance sheets of individual banks (available from the BankScope database) to implement a case-study on the response of banks in France, Germany, Italy and Spain to a monetary tightening. The episode we study occurred during 1992, when monetary conditions were tightened throughout Europe. Evidence on such tightening is provided by the uniform squeeze in liquidity, which affected all banks in our sample. We study the first link in the transmission chain by analysing the response of bank loans to the monetary tightening. Our experiment provides evidence on the importance of the "credit" channel in Europe, and thus on one possibly important source of asymmetries in the monetary transmission mechanism. We do not find evidence of a significant response of bank loans to the monetary tightening, which occurred during 1992, in any of the four European countries we have considered. However, we find significant differences both across countries and across banks of different dimensions in the factors that allow them to shield the supply of loans from the squeeze in liquidity.

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1 Introduction

This paper studies the monetary transmission mechanism in Europe, a topic that has attracted new attention following the start of the EMU. Asymmetries in the monetary transmission mechanism across the members of the monetary union could be a critical factor in determining the effects of the single monetary policy. Consider, as an example, an EMU-wide symmetric inflationary shock. The ECB would respond by raising short-term interest rates. If the consequences of the monetary contraction were different from one country to another--both in terms of the timing and the magnitude of the responses of the relevant real variables--the output cost of maintaining price stability could be quite unevenly distributed across EMU.

We consider a potentially important channel for such asymmetries, related to the response of bank lending to monetary policy. When looking, in Europe, for asymmetries in the monetary transmission mechanism, it is natural to start from banks. As it is well known, banks are at the center of financial intermediation in continental Europe. The share of bank loans in total debt liabilities of non-financial firms is 85 per cent in Germany, 80 in France, 95 in Italy and 77 in Spain—by contrast, in the U.S., this share is about 30 per cent.

In this paper we use balance sheet information from a sample of 651 banks from four EU states (France, Germany, Italy and Spain) to study how bank lending responded to an episode of monetary tightening. The episode we investigate occurred during 1992. As opposed to the four continental countries, British monetary policy was looser in 1992 than it had been in 1991: this is the reason why we excluded the UK from our sample of large EU states.

When the central bank tightens monetary policy by squeezing bank reserves, it can generate a corresponding reduction in the supply of bank loans. There are two ways in which a bank can prevent this from happening. It can change the composition of its liabilities by issuing instruments not subject to a reserve requirement (such as CD's or interbank loans); alternatively it can sell bonds. If this does not happen, and the supply of loans is reduced, the monetary contraction will affect the real economy, unless firms can substitute at no cost bonds and commercial paper for loans. This effect (known as the "credit channel", see *e.g.* Bernanke and Gertler, 1995) works on the supply side and amplifies the more traditional "money channel"--*i.e.* the demand effect of a monetary contraction, which affects new marginal spending by modifying

borrowing conditions and by affecting asset prices, and thus the market value of wealth.

Our use of micro data to study the transmission of monetary policy from the central bank to banks is motivated by the well-known observation that macroeconomic time-series are ill-suited to identify a "credit" channel from a "money" channel: the money channel works through banks' liabilities, and the credit channel works through their assets, but assets and liabilities are tightly related by accounting identities, thus posing a difficult identification problem. For this reason the evidence proposed by macroeconomic studies which look at output and price fluctuations in response to shifts in the quantities of loans and deposits is rarely decisive (see Bernanke and Blinder, 1992). On the contrary, micro-economic data allow one to identify the presence of a credit channel by testing the specific empirical implication of the credit view: namely that the responses of banks (and firms) to a shift in monetary policy should differ depending on their characteristics. Small banks, for instance, find it more difficult to insulate their loans' portfolio from a squeeze in central bank liquidity because they typically cannot substitute CD's and interbank loans for deposits at no cost. Moreover, Kashyap and Stein (1997b), and Kashyap, Stein and Wilcox (1993) show that, in the case of the U.S., small banks are typically "weak" (that is their share of cash+securities+reserves over total assets is low) and are thus unable to use their liquid assets as a buffer.

So far, tests of the credit channel based on the importance of bank characteristics in determining the response of loans to a shift in monetary policy have been limited to U.S. data. Our paper is the first study of this kind concerning Europe. The result of our analysis is a new twist in the study of asymmetries in the monetary transmission mechanism in Europe. In this area too, macroeconomic data, have been unable to detect significant asymmetries in the transmission mechanism [1]. Studies based on macroeconomic data typically look at the impact of a shift in interest rates on inflation and output country-by-country. Such evidence, however, is hardly decisive. First, the standard errors are often large, so that one can seldom reject the hypothesis of symmetry even if the point estimates are very different across countries. Second, the estimates are not robust to the 'Lucas critique' since they are based on samples

[1] See Gerlach and Smets 1995, Ramaswamy and Sloek 1997, Barran, Coudert and Mojon 1997, Britton and Whitley 1997, Dornbusch, Favero and Giavazzi 1998, Kieler and Saarenheimo 1998, Cecchetti 1999.

from a pre-EMU monetary regime--and one of the main effects of EMU is precisely that of changing the way European monetary policy is conducted. More importantly, the macroeconomic evidence on asymmetries in monetary transmission is mute to the question of which are the sources of the observed asymmetries--thus providing no guidance for policymakers who wish to do something to reduce them.A first attempt at using micro data to document the asymmetries in the monetary transmission mechanism has been provided by Maclennan et al. (1998) who examine the European housing market.

A limit of this paper is that, by concentrating on banks, we can study just the first link in the chain of monetary policy transmission. An obvious extension would investigate the response of European firms to a similar monetary tightening (see, for example, Kashyap et al.,1993 for the US case). This will be the object of a separate paper.

The evidence reported in this paper also sheds light on the possibility that the ECB may run into a "liquidity trap". There is widespread concern, at the start of EMU, that the ECB may face a period of deflation, that is a situation in which monetary policy may become ineffective. In the traditional IS-LM framework the liquidity trap occurs when the LM curve is flat and monetary policy thus becomes powerless. If, however, monetary policy also works through a credit channel, then an expansion will shift the IS curve outward (more precisely, the CC, credit and commodities, curve in the notation of Bernanke and Blinder, 1988) via the effect of bank liquidity on the supply on loans, and thus on consumption and investment. Finding that the credit channel is important inside EMU would thus be good news for the ECB, were it to face conditions of deflation.[2]

The paper is organised as follows. We start explaining why we chose 1992 for our case study. We then describe our data, our econometric specification and our results, both with respect to the empirical relevance of the credit channel, and to the induced asymmetries in the transmission mechanism across the EMU.

[2] Note, however, that the credit channel is not the only mechanism which could avoid a liquidity trap: any situation in which monetary policy can shift the IS curve would produce such result. An obvious alternative are wealth effects in the consumption function.

2 The case study

Our empirical strategy runs as follows. We first identify an episode of synchronised shift in monetary policy: the EMU-wide tightening of monetary conditions which occurred during 1992. As an indicator of the stance of monetary policy we use a measure of bank liquidity: cash plus reserves. This variable is affected by the intervention of the central bank in the market for bank reserves, but varies across individual banks. Looking at thisvariable, we document an important shift in the supply of banks' liquidity during 1992. The next step consists in identifying the impact of the squeeze in liquidity on the supply of loans by individual banks: we do this by testing whether the observed differences across banks are consistent with their characteristics, in particular with their size and with the strength of their balance sheet.

We started by considering data for banks in six European countries: two core EMU states (France and Germany), two peripheral EMU states (Spain and Italy), plus Sweden and the UK. As we shall explain later on, the final analysis was restricted to the four continental countries.

Our micro-data come from BankScope, a financial database covering 9,400 world banks.[3] The database contains financial information collected from the banks' annual reports and re-classified in a standard format in order to make them comparable across countries. The data are available in panel format from 1988. We have used unconsolidated balance sheet information for the following banking categories: commercial banks, saving banks, cooperative banks, real estate mortgage banks, medium and long term credit banks. The Bankscope panel is not balanced: we therefore reduced the size of the sample excluding those banks for which some observations on one or more of the relevant variables were missing.

3 Measuring monetary policy in Europe

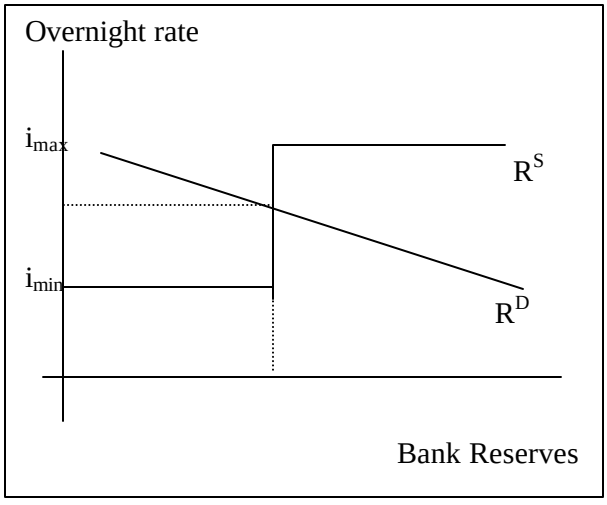
Our case study depends crucially on a correct identification of the shift in monetary policy. It is by now well established (see, for example, Christiano, Eichenbaum and Evans, 1999) that monetary policy is best identified by concentrating on the market for bank reserves because this is the market where the central bank intervenes

[3] BankScope is collected by Bureau van Dijk, a private institution and IBCA, an international rating agency.

directly. Moreover, wider monetary aggregates are contaminated by demand shocks. In Figure 1 we give a very stylised representation of the market for bank reserves in Europe.

The demand schedule is determined by the behaviour of banks. It is negatively sloped: the demand for reserves depends on the quantity of bank deposits, which are negatively related to the opportunity cost of holding money. The supply schedule is piecewise: it includes two flat sections and a vertical one. The interest rates on the two standing facilities provide an upper and a lower bound to the overnight rate. Banks can deposit funds with the central banks at the deposit rate, i^{min}, and borrow funds from the central bank at the marginal rate, i^{max}. Therefore, the overnight rate cannot be lower than the deposit rate, nor can it be higher than the marginal lending rate: it fluctuates inside a corridor. The upward sloping segment of the supply schedule is vertical, consistently with a central bank that fixes the volume of bank reserves by using open market operations, independently of the overnight rate.

Figure 1: **The Market for Bank Reserves in Europe**



If the central bank targets the overnight interest rate, exogenous monetary policy shocks will be reflected in fluctuations of the overnight rate, while movements in bank reserves will mainly be driven by demand shocks. This is because the impact of demand shocks on the overnight rate would be sterilized by the central bank so that shifts in this variable would reflect only shocks on the supply side. Conversely, if the

central bank targets the level of bank reserves, exogenous monetary policy shocks will be reflected in movements in reserves (see Bernanke and Mihov, 1998).

It is well established that the Bundesbank and the other European central banks in our sample have followed an interest rate targeting rule[4]. This explains why interest rates are the variable traditionally used to measure the stance of monetary policy in studies of the transmission mechanism based on macro data. However, using, as we do, cross-sectional data on banks from different countries, interest rates cannot be very informative: here fluctuations in interest rates would simply represent country dummies. On the other hand, we have plenty of variation in the level of reserves, which we observe at the individual bank level. We thus extract a measure monetary policy from fluctuations in reserves, by identifying those fluctuations which are supply driven. We do this by analysing simultaneously movements in reserves, in real interest rates [5] and in output gaps. The variables are observed at the end of the year and are reported in Table 1.

We note two major shifts in real interest rates, occurring in 1992 and 1993, respectively. 1992 is a year of monetary tightening; 1993 is one of monetary loosening. However, only in 1992 we can attribute the shift in reserves to monetary policy: during this year interest rates and reserves move in opposite directions, and output gaps do not signal any major fluctuation in the cycle. During 1993, instead, real interest rates and reserves move in the same direction, and the output gap signals a recession: the contraction in bank reserves that we observe in 1993 is thus likely to be the result of demand shocks.

Table 1 also shows the behaviour of bank reserves[6] for all banks in our sample, in each of the six countries: the value of reserves is expressed in US dollars at 1991 exchange rates.[7] We note immediately that the shift in bank reserves during 1992 wasrather homogeneous across continental Europe. Sweden and the UK, instead, are

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[4] Policy reaction functions for European Central Banks are estimated by Bernanke and Mihov 1997, Clarida and Gertler 1996. Dornbusch et al., 1998.

[5] As a proxy for policy rates we use three-month Euro-rates; real rates are built using the realised CPI inflation rate.

[6] Our measure of monetary policy is affected by changes in the compulsory reserves coefficients. In practice we have only one occurence of such a modification: in France, where in 1992 the reserve coefficient on sight deposits was reduced from four per cent to one per cent. We have dealt with this case by considering the shift in reserves net of the effect of the change in the compulsory reserves regime.

[7] We use constant exchange rates because current exchange rates would bias our measure of the change in monetary policy, being affected by the fluctuations of the U.S. dollar against all the European currencies which occurred during 1992.

different in that there is no evidence of a monetary tightening in 1992—in fact UK monetary policy was looser in 1992. Moreover, we have very few observations (15) for Sweden. For these reasons we limit our empirical analysis to the four continental European states, and we studythe effects of monetary policy during 1992 only. We thus do not exploit the panel dimension of the data set: rather, we concentrate on a cross-section for a single year.

We further selected our sample by excluding those banks whose lending activity was marginal (defined as banks featuring a loans-to-total assets ratio of less than 20 per cent at the end of 1991) and those likely to have been involved in a merger (defined as banks whose total assets increased by more than 50 per cent in the course of 1992). Table 2 summarizes the properties of our selected sample. This includes 156 French banks out of a total of 1823, 221 German banks out of 3716, 153 Italian banks out of 368, 121 Spanish banks out of 323. Medium-size and large banks are well represented in the sample (the sample includes over 90 per cent of all banks with total assets in excess of 100 million U.S. dollars) but very small banks are under-represented [8]. However, a comparison with the universe of banks covered by the OECD shows that the banks in our sample account for a very large fraction of the overall banking industry, as measured by total loans: 81 per cent in France, 70 per cent in Germany, 84 in Italy and 92 per cent in Spain.

4 Identifying the "lending channel"

Since output gaps remain relatively flat between 1991 and 1992, we interpret the shift that we observe in the quantity of loans as a movement along an unchanged demand curve, driven by a shift in supply.

As discussed above, the main empirical prediction of the lending view is that the effects of monetary policy on banks depend on their characteristics, and are thus heterogeneous. We aim at capturing these cross-sectional differences by using two variables: the 'strength' and the 'size' of a bank's balance sheet.

Following Kashyap and Stein (1997b) we measure the strength of a balance sheet by the sum of three items, cash, securities and reserves, as a fraction of total

[8] Based on the average number of branches per bank, Cerasi et al. (1998) conclude that BankScope is a good approximation of the German and French commercial banking systems, but it slightly over-represents big banks for the other major European countries.

assets. The idea is that a balance sheet is 'strong' when it is liquid, thus allowing a bank to insulate the supply of loans from fluctuations in monetary policy.

Banks of similar size might have balance sheets of different strength, thus inducing them to respond differently to monetary policy. Size, moreover, can capture elements of the lending view that are not related to the strength of the balance sheet: larger banks might find it easier to issue a variety of market instruments (such as certificates of deposit) which also can shelter their lending from shifts in monetary policy.

We thus divide our sample in ten deciles. The deciles are constructed using the distribution of banks' total assets for all countries in our sample. Table 3 reports this distribution. By construction the total number of banks in each decile is constant at 65. In each cell of Table 3 we report, country by country, the number of banks in the decile and the percentage of those banks over total banks within each country. If the distribution of banks in each country was equal to the European distribution, such number would be 0.10. Higher values indicate a higher concentration of banks in that decile for that particular country. We observe a rather uniform distribution of banks across the four countries:there is no evidence of asymmetries in the size distribution of banks acrossthe four European countries included in our sample. To make our analysis comparable with that of Kashyap and Stein (1997b) consider that in their sample banks are divided in three groups: the 95th percentile defines 'small' banks, that is banks with total assets less than U.S.$ 1 million; medium-size banks are those contained in the 95^{th} to 99^{th} percentiles, and large banks are in the top percentile. The European banks in our sample are larger than the U.S. banks considered by Kashyap and Stein: the 3^{rd} decile in our sample contains banks with assets between U.S.$ 615 and 950 million.

As regards the relative 'strength' of the banks in our sample we observe (see Table 4) a rather homogeneous distribution within countries, with the only exception of the German banks belonging to the upper two deciles of the distribution—which are relatively "weaker" than smaller German banks. Across countries we note that banks in Italy and Spain are relatively stronger—possibly a consequence of the large stocks of public debt issued in these countries, and of the significant bank holdings of such debt.

To provide a first visual impression of the relevance of the lending channel we show, in Table 5, the monetary tightening and the response of bank loans for each decile of our

sample. First we note that the monetary tightening was rather uniformly distributed, across banks of different size, in France and Spain, while in Germany and Italy it is concentrated among larger banks. The response of loans to the monetary tightening is uniformly very low.

We explore further this first evidence in the next section by implementing an econometric analysis of the responses of bank loans to monetary policy.

5 Econometric evidence

We estimate, separately for each country, the following equation:

$$\Delta Loans_i = a + \left[\sum_{j=1}^{10} b_j DECILE_j + \left(\sum_{j=1}^{10} c_j DECILE_j \right) * STRENGTH_i \right] * \Delta Reserves_i + u_i$$

where *DLoans* denotes the percentage change in loans from 1991 to 1992; *DReserves* denotes the percentage change in bank reserves over the same period;. *Strength* is our measure of balance sheet strength [(cash+securities+reserves)/total assets] at the end of 1991; $DECILE_j$ are ten dummy variables discriminating banks by decile of the distribution on total assets of *all* four countries in our sample for 1991.

The parameters in these equations provide information on the presence of a credit channel by describing the response of bank loans to the shift in monetary policy, allowing for the possibility that such response be non-linear and a function of both the size and the strength of a bank. The regression measures $\partial Loans^2 / \partial Reserves \partial Size$ and $\partial Loans^3 / \partial Reserves \partial Size \partial Strength$. Under the null that the credit channel operates both effects should be significant. The size effect should be positive but declining from the lower to the upper decile of the distribution; the strength effect should be negative. The estimation method is OLS with heteroscedasticity-consistent standard errors. Each equation also includes dummies to take account of outliers: 6 dummies for Germany, 5 for France, 3 for Spain and 5 for Italy [9]. Our results are shown in Figures 2 and 3 that are based upon the estimates reported in Table 6.

[9] Outliers are defined as banks with residual larger, in absolute value, than twice the standard error of the regression. The outliers are Caixabank, Banco Mapfre, Banco de Credito Finanzia in Spain; Euromobiliare SpA, Credito Romagnolo, Credito Italiano, Banca Internazionale Lombarda, Banca di Credito di Trieste SpA in Italy; Volksbank Bad Reichenhall, Svenska Handelsbanken (Niederlassung Frankfurt), Ost-West Handelsbank AG, Deutsche Handelsbank AG, Credito Italiano Bank, Bank

Overall we find no evidence for a lending channel of the transmission of monetary policy in the four EMU countries we study. The test for this hypothesis, namely of a zero response of loans to a change in reserves, (reported in Table 6) confirms the visual impression reported in Table 5 above: the null is never rejected.

From the viewpoint of understanding the possible role of the lending channel in determining asymmetries in the monetary transmission mechanism inside EMU one could stop here: asymmetries cannot be ascribed to a difference across countries in the response of bank loans to monetary policy—at least in the four countries we consider, and at least based on the evidence from our case study. This result, however, is obtained from the aggregation of banks of different size and strength: the way these two variables combine to produce the total impact on bank loans of a change in reserves differs interestingly both across banks of different size and strength, and across different countries.

We shall comment our results by country, starting from France. France is the only country where the aggregate result is confirmed decile-by-decile: neither the total impact, nor its components are significant, with the possible exception of the third decile which displays a positive and significant impact of monetary policy on loans, cancelled by the compensating effect of balance sheet strength.

For Germany our results show that the largest banks (those belonging to the upper 40 percent of the distribution) use their strength to shield their loans from the effects of monetary. Notably, as shown in Table 4, the average strength of large German banks is relatively small: one interpretation of this result is that strength is important, the more so, the 'weaker' a bank's balance sheet. The effects are non significant in all other deciles of the distribution, with the exception of the first. The smallest German banks respond to the squeeze in liquidity by expanding their loans--contrary to the prediction of the credit view—and this impact is compensated by a positive effect of the strength of their balance sheet—again, contrary to what the credit view would predict. The analysis of individual bank balance sheets belonging to this percentile shows that small banks, holding a small amount of securities, respond to the cut in reserves by expanding their loans--probably to reap the benefit of the increase in intermediation margins that accompany higher interest rates. The expansion in loans is financed through an increase in deposits—an option that is only available to banks that hold excess reserves. Consider, for example, the case of

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Kreiss AG in Germany; SBT - Batif SA, National Bank of Kuwait (France) SA, Caisse Nationale de Crédit Agricole CNCA, Banque Révillon, Banque de Réalisations de Gestion et de Financement in France.

Bankhaus Carl F. Plump & Co. from Bremen: between 1991 and 1992 reserves fall by 20 per cent, while loans increase by 9 per cent and deposits by 5 per cent.

The same behaviour of small banks characterizes Italian and, to a lesser extent, Spanish banks. On the contrary, neither the size, nor the strength of banks are significant in determining the response of loans to monetary policy for large banks in these countries.

6 Conclusions

So far, the available empirical evidence on asymmetries in the monetary transmission mechanism across Europe was mostly limited to studies based on macroeconomic data. This literature often suggests that the credit channel could be one important factor lying behind the observed asymmetries (see *e.g*. Kashyap and Stein, 1997b, 1997c.)

Our case study of the monetary tightening of 1992 in Europe finds no evidence of a lending channel in the response of bank loans to monetary policy. Such result is explained by different behaviour of banks across different deciles of the European distribution and across different countries. Small banks in Germany, Italy and France, use their excess liquidity to expand deposit and loans in presence of a monetary policy restriction. Large German banks use the strength of their balance sheets to insulate loans from monetary policy fluctuations; loans of banks in other deciles do not react to monetary policy in any country.

The apparent absence of a credit channel in France is consistent with the evidence suggesting that the French financial market is the most "anglo-saxon" among the continental European markets [10]. Interestingly this also holds for bank-centred financial systems such as Germany and Italy. The underdevelopment of financial markets (and thus the difficulty that firms face when attempting to substitute out of bank loans) could still be a serious problem if the absence of a response of total loans hides a shift in their composition, *i.e.* a reallocation of loans from small to large firms.

Kashyap and Stein (1997a) try to assess the importance the lending view for Europe simply by looking at summary statistics, without running regressions. They look at banks and firms separately. Their analysis of banks is based on two indicators: the importance of small banks, and the health of banks. Based on these two indicators, they assign grades to countries: the extremes are grade A--which denotes countries where the sensitivity of the lending channel to monetary policy is weak--and grade C, which denotes

[10] For instance securities represent 15 per cent of total liabilities of French non-financial enterprises. The same percentage is 20 in the U.S., 19 in the U.K., 6 in Germany, 5 in Italy, 9 in Spain. The data

a strong sensitivity of the lending channel. The grades are as follows (as reported in Table 6 of Kashyiap and Stein, 1997a) the first grade refers to the importance of small banks, the second to bank health): B-C for France, C-B for Germany, B-C for Italy and B-B for Spain. These rankings do not show significant asymmetries across countries—although our econometric results indicate a uniform A-grade for all countries. Interestingly, however, when they consider, along with the bank factors, two firm-related factors--the relative importance of small firms, and the availability, to firms, of non-bank finance--that is when they consider the second link in the lending channel chain, they come up with a ranking that is closer to ours, except for Italy: Italy C-, France B/C, Germany B, Spain B. This evidence confirms the need to complement the findings in the present paper with an analysis of firms' response to a shift in the supply of bank loans.

Finally, our results provide a new framework for thinking about the effects of the ongoing consolidation of the European banking industry. Strength is the key factor in determining the response of large banks to monetary policy—very significantly in Germany where, as discussed above, large banks are relatively weak. The strength of the large Spanish and Italian banks in our sample could be related to the high level of public debt in those countries, and to the large bank holdings of such debt—a factor that is likely to become less important over time. If the large German banks provide a benchmark for the consolidation of the industry, then strength will become a much more important factor in shaping the response of European banks to monetary policy.

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Table 1: The monetary tightening as measured by the change in banks' liquidity (cash + reserves)

Country	Year	Number of Banks	Bank Liquidity		Output Gap	Real ST Interest Rate
			Absolute Values ($ Millions)	Difference (%)		
France	1991	156	1,626		0.2	7.2
	1992	156	1,099	-32.4	-0.6	9.6
	1993	156	1,148	4.4	-3.5	4.3
	1994	151	1,121	-2.3	-2.4	4.5
	1995	147	1,321	17.8	-2.1	2.9
	1996	140	1,689	27.9	-2.5	1.7
Germany	1991	221	314		3.6	4.4
	1992	221	283	-9.7	2.8	5.4
	1993	221	258	-9.1	-0.6	1.7
	1994	221	240	-6.8	-0.3	2.7
	1995	212	254	5.8	-1.1	2.0
	1996	207	285	12.3	-1.6	1.8
Italy	1991	153	1,272		1.4	6.5
	1992	153	1,158	-9.0	0.2	8.4
	1993	152	735	-36.5	-2.6	4.0
	1994	151	876	19.2	-2.3	5.1
	1995	141	1,000	14.1	-1.1	4.9
	1996	136	993	-0.6	-2.3	4.3
Spain	1991	121	426		4.1	7.5
	1992	121	397	-6.8	2.1	10.0
	1993	121	374	-5.7	-1.3	4.1
	1994	121	414	10.6	-1.4	4.0
	1995	119	417	0.6	-1.3	5.0
	1996	117	448	7.5	-2.1	3.2
Sweden	1991	15	1,482		1.9	5.5
	1992	15	1,491	0.6	-0.6	8.8
	1993	15	1,529	2.6	-3.8	3.0
	1994	15	1,333	-12.8	-2.2	5.6
	1995	15	3,027	127.1	-0.9	6.4
	1996	15	2,795	-7.7	-1.5	4.5
UK	1991	77	581		-0.7	6.6
	1992	77	1,229	111.5	-2.7	4.4
	1993	77	1,225	-0.3	-2.9	3.5
	1994	76	1,326	8.3	-0.8	3.7
	1995	75	1,695	27.8	-0.4	3.3
	1996	71	1,678	-1.0	-0.2	4.0

Note: Balance sheet data are converted from national currencies into US dollars using a constant (1991) exchange rate. Bank liquidity is equal to reserves. The Output Gap is the deviation of actual GDP from potential GDP as a percentage of potential GDP. The Real Short-Term Interest Rate is the Three-month euro-rates *minus* annual CPI inflation. All data observed at the end of period.

Source: Bank Liquidity: Authors' computation on data from the BankScope Data-set (by Bureau Van Dijk and IBCA).

Exchange Rate: IMF, IFS, November 1997 (end of period market exchange rate).

Output Gap: OECD, Economic Outlook, December 1998.

Table 2: Assets and Number of Banks in OECD statistics, BankScope and our sample (1991).

	OECD	Bankscope	Our Sample
France			
Number of banks	1823	183	156
Total assets as percentage of total assets of all OECD recorded banks	100	82.2	80.6
Germany			
Number of banks	3716	248	221
Total assets as percentage of total assets of all OECD recorded banks	100	74.4	70.1
Italy			
Number of banks	368	161	153
Total assets as percentage of total assets of all OECD recorded banks	100	87.8	83.6
Spain			
Number of banks	323	138	121
Total assets as percentage of total assets of all OECD recorded banks	100	93.2	91.6

Note: BankScope sample (see source below) is limited to banks with no missing observations in the relevant variables in 1991. Our sample is limited to banks with: (i) a ratio loans/assets > 20%; (ii) a variation in assets between 1992 and 1991 < 50%.

Source: Authors' computation on data from the BankScope Data-set (by Bureau Van Dijk and IBCA); IMF, IFS, November 1997 (end of period market exchange rate).
OECD, *Bank Profitability*, 1998.

Table 3: Distribution of the 651 Banks in Our Sample by Total Assets in 1991.

	1st decile <315$ mil.	2nd decile <615$ mil.	3rd decile <950$ mil.	4th decile <1,500$ mil.	5th decile <2,080$ mil.	6th decile <3,000$ mil.	7th decile <4,500$ mil.	8th decile <7,500$ mil.	9th decile <17,000$ mil.	10th decile <307,200$ mil.	Total
France											
number	22	19	18	12	12	13	15	13	12	20	156
%	0.14	0.12	0.12	0.08	0.08	0.08	0.10	0.08	0.08	0.13	1
Germany											
number	18	23	23	27	20	20	18	28	24	20	221
%	0.08	0.10	0.10	0.12	0.09	0.09	0.08	0.13	0.11	0.09	1
Italy											
number	9	15	14	14	22	17	17	14	13	18	153
%	0.06	0.10	0.09	0.09	0.14	0.11	0.11	0.09	0.08	0.12	1
Spain											
number	16	8	10	12	11	15	15	10	16	8	121
%	0.13	0.07	0.08	0.10	0.09	0.12	0.12	0.08	0.13	0.07	1
Total											
number	65	65	65	65	65	65	65	65	65	66	654
%	0.41	0.39	0.39	0.39	0.40	0.41	0.41	0.38	0.40	0.40	

Note: Deciles are computed on total assets of *all* countries in 1991.
Source: Authors' computation on data from the BankScope Data-set (by Bureau Van Dijk and IBCA).

Table 4: Average Relative Strength of Banks for Each Decile of our Sample.

	1st decile <315$ mil.	2nd decile <615$ mil.	3rd decile <950$ mil.	4th decile <1,500$ mil.	5th decile <2,080$ mil.	6th decile <3,000$ mil.	7th decile <4,500$ mil.	8th decile <7,500$ mil.	9th decile <17,000$ mil.	10th decile <307,200$ mil.	Total
France	0.42	0.44	0.44	0.43	0.47	0.41	0.38	0.40	0.34	0.45	0.42
Germany	0.43	0.46	0.43	0.38	0.35	0.40	0.45	0.37	0.24	0.32	0.38
Italy	0.52	0.55	0.49	0.51	0.50	0.54	0.47	0.51	0.42	0.51	0.50
Spain	0.47	0.46	0.45	0.40	0.54	0.46	0.41	0.48	0.44	0.45	0.45

Note: Deciles are computed on total assets of *all* countries in 1991. Relative Strength denotes: (Cash+Securities+Reserves)/Assets.
Source: Authors' computation on data from the BankScope Data-set (by Bureau Van Dijk and IBCA).

Table 5: Change in: Bank Liquidity, Loans, Securities, and Deposits for Each Decile of our Sample in 1992 .

	1st decile <315$ mil.	2nd decile <615$ mil.	3rd decile <950$ mil.	4th decile <1,500$ mil.	5th decile <2,080$ mil.	6th decile <3,000$ mil.	7th decile <4,500$ mil.	8th decile <7,500$ mil.	9th decile <17,000$ mil.	10th decile <307,200$ mil.	Total
France											
Bank Liquidity	-0.360	-0.542	-0.331	-0.276	-0.351	-0.280	-0.406	-0.469	-0.322	-0.317	-0.324
Loans	0.013	0.033	-0.091	-0.007	0.042	-0.053	0.069	0.071	0.070	-0.072	-0.051
Securities	0.039	0.075	0.031	0.073	0.125	0.204	0.068	0.047	0.243	0.418	0.382
Deposits	0.048	0.136	-0.023	0.081	0.160	0.147	0.074	0.076	0.117	0.138	0.132
Germany											
Bank Liquidity	-0.116	0.177	0.055	0.119	0.143	0.101	0.266	0.052	-0.186	-0.143	-0.097
Loans	0.065	0.061	0.020	0.095	0.046	0.091	0.043	0.098	0.059	0.027	0.041
Securities	0.215	0.181	0.069	0.093	0.027	0.034	0.067	0.127	0.276	0.260	0.224
Deposits	0.112	0.117	0.034	0.094	0.026	0.056	0.041	0.125	0.399	0.199	0.187
Italy											
Bank Liquidity	0.008	-0.016	0.029	0.015	-0.042	0.100	0.078	-0.185	-0.093	-0.103	-0.090
Loans	0.108	0.218	-0.016	0.106	0.090	0.069	0.093	0.093	0.089	0.105	0.100
Securities	0.016	0.082	0.080	0.109	0.062	0.107	0.166	0.189	0.163	0.239	0.213
Deposits	0.048	0.155	0.089	0.098	0.063	0.091	0.115	0.135	0.115	0.189	0.167
Spain											
Bank Liquidity	-0.337	0.106	-0.412	-0.191	-0.199	-0.176	-0.210	-0.220	-0.187	0.057	-0.068
Loans	0.167	0.204	0.021	0.112	0.117	0.109	0.118	0.038	0.105	0.081	0.090
Securities	0.033	0.150	0.128	0.151	0.080	0.155	0.109	0.181	0.182	0.201	0.182
Deposits	0.063	0.216	0.054	0.122	0.099	0.137	0.107	0.134	0.131	0.152	0.139

Note: Deciles are computed on total assets of *all* countries in 1991. Bank liquidity is equal to reserves.
Source: Authors' computation on data from the BankScope Data-set (by Bureau Van Dijk and IBCA).

Table 6: Estimation Results: response of loans to a change in bank liquidity (b_j and c_j coefficients)

	N	F	R^2	constant	1st decile <315$ mil.		2nd decile <615$ mil.		3rd decile <950$ mil.		4th decile <1,500$ mil.		5th decile <2,080$ mil.		6th decile <3,000$ mil.		7th decile <4,500$ mil.		8th decile <7,500$ mil.		9th decile <17,000$ mil.		10th decile <307,200$ mil.	
					coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*	Coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*	coeff.	*st. err.*
France	156	134.3	0.53	0.025	-0.034	*0.010*	0.063	*0.030*	-0.009	*0.034*	-0.005	*0.004*	0.002	*0.006*	-0.005	*0.013*	0.002	*0.018*	0.001	*0.013*	0.005	*0.003*	-0.009	*0.019*
				0.021	0.036	*0.024*	-0.079	*0.036*	0.023	*0.033*	0.011	*0.012*	-0.004	*0.009*	0.010	*0.018*	-0.006	*0.030*	-0.010	*0.018*	-0.007	*0.005*	0.021	*0.028*
Germany	221	549.5	0.51	0.076	-0.020	*0.005*	0.009	*0.010*	-0.034	*0.028*	0.005	*0.009*	-0.021	*0.017*	0.023	*0.014*	0.008	*0.007*	0.013	*0.004*	0.021	*0.007*	0.023	*0.010*
				0.009	0.019	*0.003*	-0.007	*0.006*	0.015	*0.024*	-0.001	*0.006*	0.027	*0.018*	-0.035	*0.021*	-0.009	*0.004*	-0.004	*0.003*	-0.024	*0.021*	-0.014	*0.010*
Italy	153	60.9	0.59	0.114	-0.063	*0.007*	-0.238	*0.134*	0.359	*0.079*	0.115	*0.118*	0.056	*0.067*	-0.091	*0.034*	0.011	*0.011*	-0.031	*0.047*	-0.017	*0.030*	-0.018	*0.009*
				0.009	0.056	*0.007*	0.254	*0.125*	-0.357	*0.075*	-0.091	*0.118*	-0.033	*0.054*	0.060	*0.026*	-0.029	*0.021*	0.034	*0.043*	0.011	*0.028*	0.026	*0.014*
Spain	121	95.2	0.69	0.127	-0.026	*0.054*	0.000	*0.004*	0.035	*0.029*	-0.010	*0.019*	-0.039	*0.087*	0.092	*0.027*	-0.098	*0.087*	0.092	*0.091*	0.081	*0.093*	-0.141	*0.049*
				0.016	0.030	*0.056*	-0.012	*0.011*	-0.004	*0.017*	0.026	*0.016*	0.012	*0.070*	-0.098	*0.021*	0.107	*0.102*	-0.064	*0.075*	-0.055	*0.081*	0.113	*0.043*

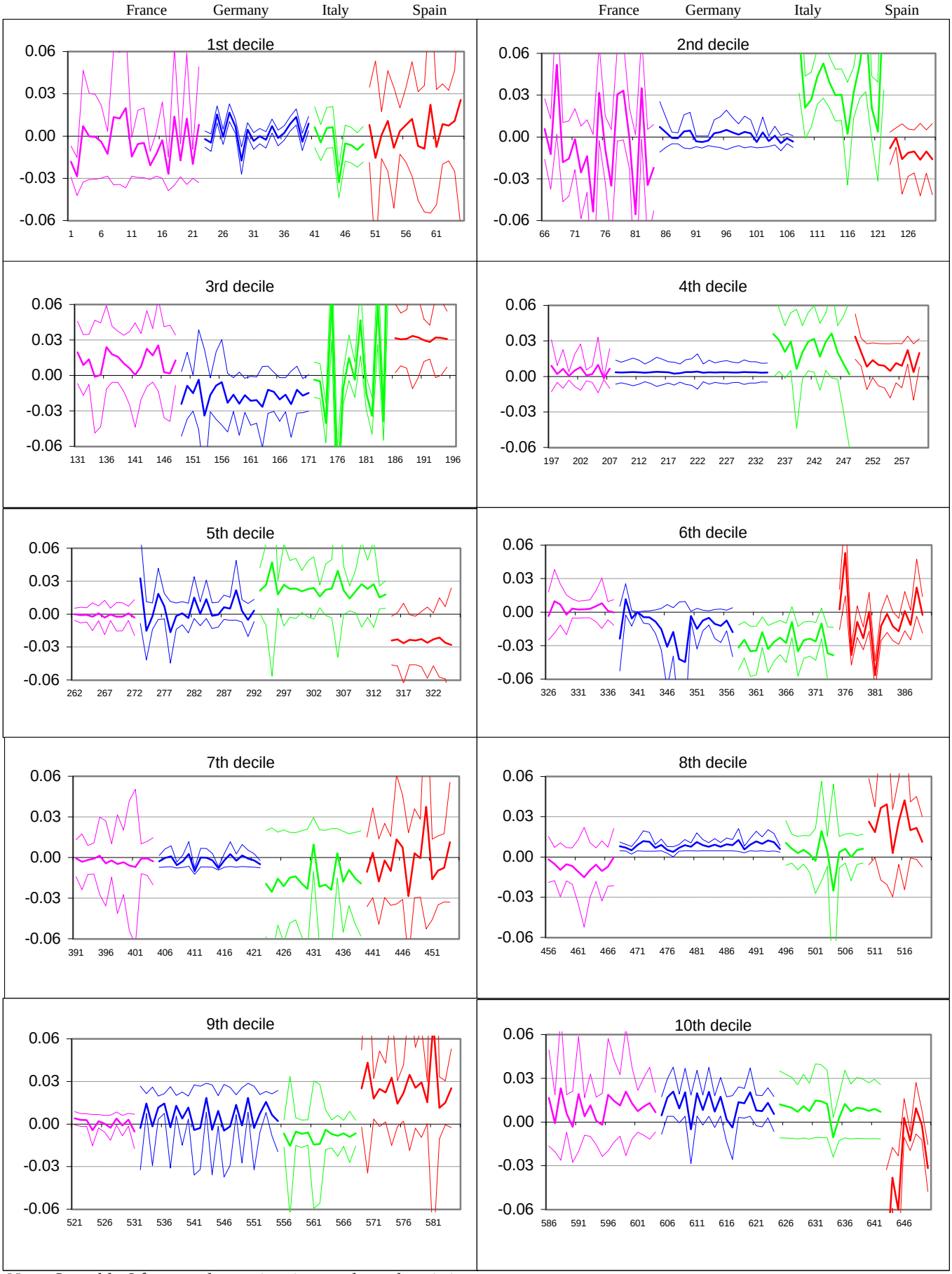
The following equation has been estimated by OLS. The table reports a, b_j and c_j coefficients, where j identifies the decile. Standard errors (in *italics*) are heteroscedasticity consistent (White). Dummy variables are added to each equation to control for outliers (defined as observation with residuals larger than 2 standard errors. We have five occurrences for France, six for Germany, five for Italy and three for Spain.)

$$\Delta Loans_i = a + \left[\sum_{j=1}^{10} b_j DECILE_j + \left(\sum_{j=1}^{10} c_j DECILE_j \right) * STRENGTH_i \right] * \Delta Reserves_i + u_t$$

DLoans = (LOAN92 -LOAN91)/LOAN91 *DReserves* = (M92-M91)/M91
LOAN92 = total loans at the end of 1992 *LOAN91* = total loans at the end of 1991
M92 = reserves in 1992 *M91* = reserves in 1991
STRENGTH = cash+securities+reserves at the end 1991
$DECILE_j$ = dummy variables discriminating banks by decile of the distribution on total assets of *all* countries in 1991.

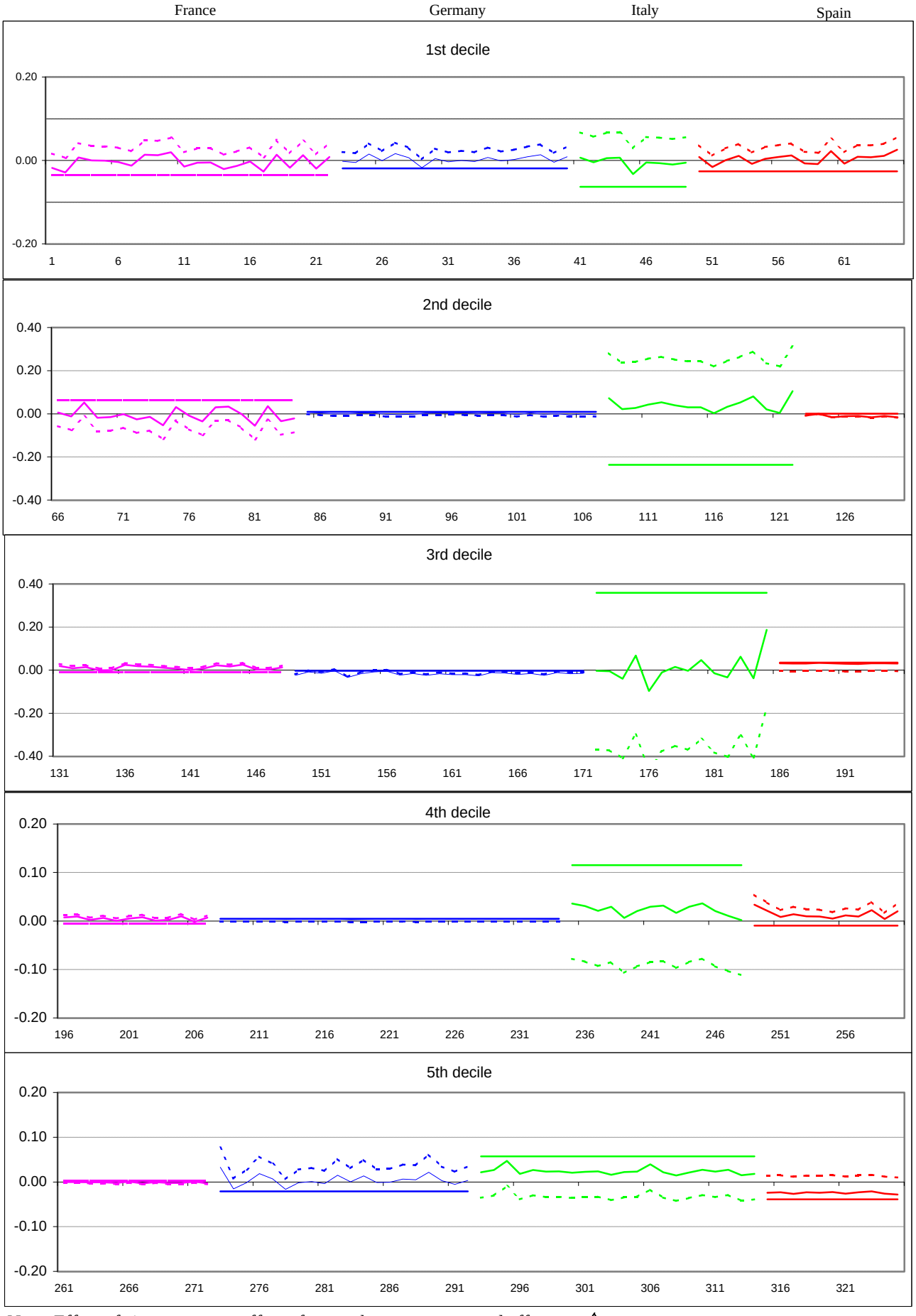
Wald Test for *DLoans/DReserves = 0*, Chi-square (20): France (0.05, prob. 0.82), Germany (0.28, prob. 0.59), Italy (0.18, prob. 0,67), Spain (1.19, prob. 0.21.)

Fig. 2: Response of Loans to Monetary Policy in our Sample: Point Estimation and 95% Confidence Interval.



Note: See table 6 for complete estimation results and statistics.

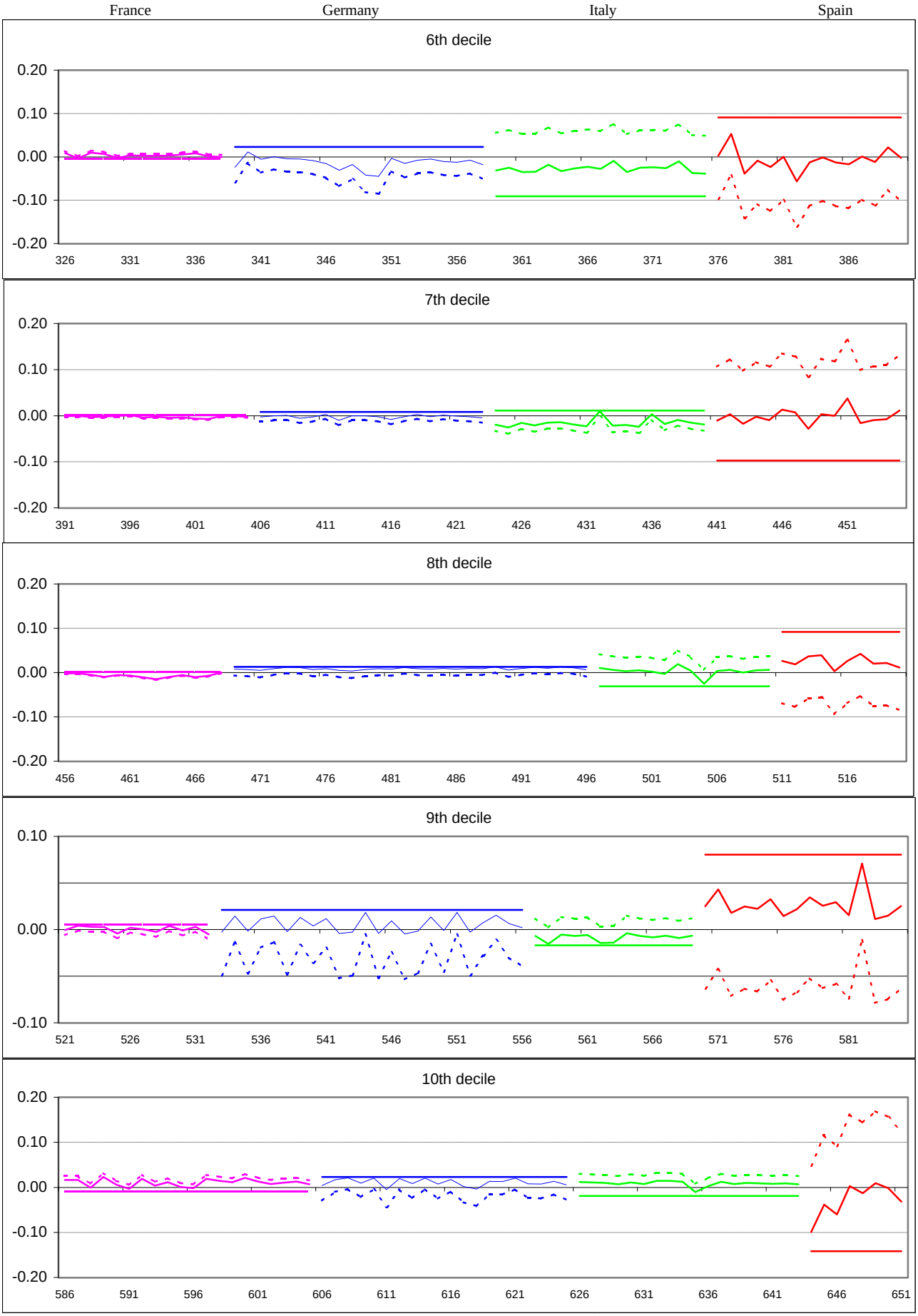
Fig. 3a: The Response of Loans to Monetary Policy in our Sample: the effect of "Size" and "Strength".



Note: Effect of size: —— ; effect of strength ····· ; total effect /\

See table 6 for complete estimation results and statistics.

Fig. 3b: The Response of Loans to Monetary Policy in our Sample: the effect of "Size" and "Strength".



Note: Effect of size: —— ; effect of strength ····· ; total effect /\

See table 6 for complete estimation results and statistics.