Will a common European monetary policy have asymmetric effects?

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Introduction and summary

The launch of the euro has been accompanied by a vigorous debate. On the one hand, supporters of a common monetary policy (for example, Lamfalussy, 1997) have argued that the move to a single currency is necessary to fully exploit the obvious advantages of a single market. On the other hand, skeptics have argued that European Union (EU) economies are too dissimilar to be subjected to a common monetary policy. Feldstein (1997) goes so far as to predict that the political tensions created by the common monetary policy could lead to another European war.

The debate boils down to a disagreement over how hard it will be to effectively run a common monetary policy. There are at least three conditions that must be met for a common policy to succeed without causing frictions among the members of the coalition. First, members must agree on the ultimate goals to be achieved through monetary policy. This issue was formally settled through the 1992 Maastricht Treaty and the ensuing ratification process by national parliaments, leading to the adoption of a goal of price stability as the primary objective for the European Central Bank (ECB).

Second, the common policy will be easier to implement if the member countries' business cycles are aligned. Monetary policy instruments are macroeconomic variables that work across the board and, therefore, cannot simultaneously be tailored to diverging cyclical conditions in the area of their jurisdiction. However, if different countries or sizable regions are at different points in the inflation cycle, then assessing the appropriate monetary policy stance becomes a much more difficult task. Large countries such as the U.S. constantly confront this problem, but the degree of economic integration and the availability of alternative policy instruments to redistribute the burden of the adjustment are likely to be poorer in the euro area than in the U.S.[1]

A third and perhaps more subtle issue is whether the transmission mechanism operates in a similar fashion across all the countries in the union. In particular, even if shocks hit all countries equally, their business cycles are aligned, and there is no disagreement over whether a response is needed, differences in the transmission mechanism could mean that the appropriate size and timing of the response are difficult to assess. Moreover, if the burden of adjustment is not equally shared across countries, sizable distribution differences are likely to create political tension.

The issue of how much the transmission mechanism differs across the member states of the monetary union is just beginning to attract interest. One obvious difficulty with addressing the question is the possibility of a regime switch that could have occurred with the creation of the ECB. It is possible that all past evidence on the transmission mechanism is no longer relevant because beliefs about policy will now differ.

While we concede that this is possible, we doubt that this institutional change has brought about behavioral changes in a sharp, discontinuous fashion.

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There is abundant evidence that people adjust their behavior gradually. In this case, collecting evidence on how agents operated in the past regime should provide some information on how they will behave in the present one.

Even in the absence of structural breaks, however, trying to conduct the relevant cross-country aggregate comparisons in the transmission mechanism is fraught with difficulties. Research on how to identify the response of a single economy to monetary disturbances in a convincing and robust fashion is just becoming available for some countries. There has been very little work on doing this for multiple countries using a common framework. In particular, to study the effects of how a common monetary policy might matter, one needs to impose a uniform monetary policy reaction function across countries and to constrain exchange rate movements.

Our reading of the existing literature is that this type of study has yet to be done. As a result, we are left with a set of only partially comparable findings, which prevents us from drawing any strong conclusions about the similarities of the transmission mechanisms across European countries. A full investigation of this type would be quite valuable but is beyond the scope of this article.

We believe, however, that the evidence from studies conducted at the aggregate level should be supplemented by systematic comparisons at the micro level. The richness of the information available at the micro level should allow us to identify differences in behavior among different groups of agents in the same country and similar groups of agents in different countries. This is important because aggregate differences could arise for a variety of reasons. One possibility is that similar firms and individuals in different countries could behave differently. In this case, one might believe that as institutional arrangements converge, and the single market is fully realized, the differences could abate. Alternatively, similar firms and individuals might act similarly, but the mix of these agents across countries might differ.

Disentangling true behavioral differences from differences that are the result of compositional effects is important for several reasons: first, because doing so is likely to enhance our understanding of the causes of the differences; second, because this should lead to a better assessment of the likely persistence of any differences; and finally, because this might help identify policy actions that could be used to partially alleviate the differences. Of course, a full investigation of these issues will require several detailed studies. Here, we take a first step and present a sort of "feasibility analysis," aimed at assessing whether what appear to be large structural differences in the economic and financial structures of the various countries in the euro area can be expected to lead to differences in the transmission mechanism.

Our analysis follows three logical steps. First, we try to identify the types of microeconomic heterogeneity that different theories of monetary transmission suggest could be important. The goal here is not to compile any evidence on which of these theories is most important, but rather to use the union of the theories to guide our selection of which cross-country data we ought to compare.

Next, we collect a number of indicators available for multiple countries to demonstrate that, along the dimensions identified in the previous step, there are sharp cross-country differences in the underlying microeconomic landscape of the different EU countries. Theoretically, these firm-level and institutional differences could alter the aggregate impact of monetary policy.

Finally, having identified many potentially important factors suggestive of differences in the transmission mechanism, we turn to data on one specific country, Italy, to see what these factors say about business cycle dynamics and the response to monetary policy shocks in that country. If they were to possess explanatory power in one country, we would read this result as corroborating the basic idea that the structural characteristics of the various economies are relevant factors in explaining cross-country differences and similarities of the transmission mechanism. While the analysis is still preliminary and does not go much beyond a descriptive level, our findings suggest that microeconomic characteristics of Italian firms do seem to have considerable predictive power regarding cyclical fluctuations.

Summing up, we draw three main conclusions from our analysis. First, there are several good reasons why previous attempts to uncover the likely effects of the shift to the common monetary policy have been inconclusive. Second, looking at the micro data from different countries can help resolve some of the questions left unanswered by the studies that have focused on aggregate data. Finally, in the Italian recession that followed Italy's exit from the Exchange Rate Mechanism (ERM) in 1992, a number of suggestive differences in investment rates and profitability of different sets of firms emerge, in line with existing theories. The next step in our research will be to study these differences further by refining our indicators, controlling for the correlation among them, and dealing better with endogeneity problems.

Prior studies comparing monetary transmission mechanisms in Europe

A number of recent papers have attempted to gauge the differences and similarities among the monetary transmission channels of the EU countries. Almost all these studies rely on aggregate data and analyze the response to a monetary policy shock displayed by macroeconometric models of the different economies.[2]

An obvious, preliminary issue is whether anything at all can be learned from the past research. Indeed, it is certainly possible that the final move to European Economic and Monetary Union (EMU) is such a big regime shift that past experience is no longer a reliable guide.[3] However, there is no clear evidence—nor is it likely on *a priori* grounds—that the regime shift will lead to a sharp discontinuous break in relations in the economy. As behavior tends to adjust gradually, past relationships are likely to retain some of their predictive value for the near term.

Even in the absence of structural breaks, however, considerable care is required to translate the knowledge of the (past) differences and similarities among monetary policy transmission mechanisms in the EU countries into an assessment of the (future) transmission mechanisms of the single monetary policy in the different countries. The move to a single currency changes significantly the conditions under which monetary policy operates, making it difficult to interpret most of the empirical evidence on the past transmission mechanisms.

The "ideal" study, based on past experience, which would be informative about differences across countries in the transmission mechanism of a single monetary policy, would consider the response of the various EU economies to the *same temporal sequence of monetary policy shocks*, *holding fixed the exchange rate among them*. In addition, as stressed by Dornbusch, Favero, and Giavazzi (1998), in the ideal circumstances it should also be possible to test the statistical significance of any difference found in the transmission mechanism. With this benchmark in mind, we can survey the existing empirical literature on the European monetary transmission channel.

Studies based on large-scale macroeconometric models

The existing literature can roughly be classified into two main groups, depending on whether the evidence is obtained from models of the various economies that do or do not have a common structure. The primary findings involving models that do not necessarily have the same structure come from the comprehensive Bank for International Settlements (BIS) project on the transmission mechanisms in the principal industrialized countries (Bank for International Settlements, 1995). The project simulated the response of the central banks' macroeconometric models to a common, standardized monetary policy shock (an increase of the policy rate by 1 percentage point for two years, with the rate returning to the baseline path immediately afterwards).

Importantly, the BIS research protocol envisaged the simulations to be conducted both under unchanged exchange rates and allowing the exchange rates to react to the move in the interest rate. In the latter case, two variants were agreed upon: one allowing for an independent response of each currency and a second involving a coordinated response of the ERM currencies, with a common pattern of the exchange rate vis-à-vis the rest of the world. Thus, in principle, the evidence produced within the BIS study complies with the two main requirements of the "ideal" experiment.

Unfortunately, however, not all countries in the study implemented the protocol in its strict form. Specifically, the variant corresponding to a coordinated response of the ERM countries—precisely the exercise that would have been necessary to comply with the "ideal" defined above—is missing for Germany, Spain, and the UK.[4] In addition to this limitation, since the BIS study makes use of "traditional" large-scale macroeconometric models, it is subject to the standard criticisms of those models.

In particular, the sheer size of the models and the lack of fully articulated and consistent foundations in optimizing behavior can lead to simulation results that are difficult to interpret. Moreover, one can argue that many of the equations in these models would fail statistical tests aimed at assessing their specification. Similarly, the modeling of the instruments of monetary policy is often done in an ad hoc way. Collectively, these problems could distort the picture of how monetary policy operates. Finally, the BIS study does not allow formal statistical testing of the differences found, since the models are estimated independently.

Bearing these caveats in mind, the evidence from the BIS study—summarized for the main euro area countries in table 1[5]—points to some differences, particularly among large and small countries. In particular, the gross domestic product (GDP) response is considerably more pronounced in the larger countries. Among them, Italy exhibits a slightly larger and definitely longer lasting response. A second relevant difference concerns the price response, which is initially non-negligible only in Italy, the Netherlands, and Belgium; in Germany, it becomes sizable only after the first two years, and keeps increasing over the period; in Austria, the price response is basically nil.

TABLE 1

Compilation of simulation data from BIS study

		First year	Second year	Peak effect	Last year (7th)
Italy	GDP	–0.18	–0.44	–0.44	–0.12
	PGDP	–0.13	–0.38	–0.51	0.07
France	GDP	–0.18	–0.36	–0.36	0.05
	PGDP	–0.04	–0.19	–0.31	–0.21
Germany[a]	GDP	–0.15	–0.37	–0.37	0.11
	PGDP	0.03	–0.02	–0.53	–0.53
Netherls.	GDP	–0.10	–0.18	–0.18	0.02
	PGDP	–0.08	–0.36	–0.47	–0.16
Belgium	GDP	–0.03	–0.12	–0.23	0.02[b]
	PGDP	–0.13	–0.51	–0.84	–0.55[b]
Austria	GDP	–0.08	–0.14	–0.14	0.01
	PGDP	0.02	–0.01	–0.05	0.00

[a]German data are not strictly comparable because the exchange rate was not handled in exactly the same way as for the other countries.

[b]Fifth year after the shock.

Note: Responses of real GDP and the GDP deflator (PGDP) to a 100 basis point increase in the policy rate for two years, followed by return of the rate to the normal level (fixed exchange rate vis-à-vis ERM countries; deviations from baseline in percentage points).

Source: Bank for International Settlements (1995).

Overall, given that the BIS study comes somewhat close to satisfying two of the three conditions characterizing the "ideal" empirical study, the differences identified in this study should be taken seriously. Moreover, the model used in the BIS study (central banks' models) represents the "insider wisdom" of the monetary policy authorities, which is interesting in itself. However, the lack of a common structure in the models raises the question of whether any differences one observes are simply an artifact of different and arbitrary modeling choices.

Studies imposing a common structure on the models for different countries

The second group of papers studying the transmission channels in Europe is more heterogeneous. These studies include evidence from structural vector autoregressions (Gerlach and Smets, 1995; Barran, Coudert, and Mojon, 1996; Ehrmann, 1998; Kieler and Saarenheimo, 1998; Ramaswamy and Sloek, 1998; and Dedola and Lippi, 1999); from small structural models with a common structure (Britton and Whitley, 1997); from relatively large multicountry models (the U.S. Federal Reserve multicountry model in the BIS study; the models in International Monetary Fund [IMF], 1996, and the European Commission; and Roeger and In't Veld, 1997); and from prediction equations for output, estimated for different countries (Dornbusch, Favero, and Giavazzi, 1998; and Peersman and Smets, 1998).

The papers using structural vector autoregressions (SVAR) all try to determine how a change to one of the variables being analyzed influences the other variables under consideration (for instance, how interest rates might influence investment).[6] These papers run into two problems in this context. First, the shocks to the models typically differ across countries, both in terms of size and time path. These differences make it impossible to make legitimate comparisons among the responses. This problem is exacerbated because most models embody different assumptions about the way in which the monetary authority responds to new developments (that is, the endogenous component of monetary policy). Thus, even on the off-chance that the same initial disturbance is analyzed, the monetary policy responses would not be harmonized so that a symmetric response across countries would not be expected. Instead, the differences in the assumed monetary reactions would generate different economic responses, even if the underlying structure of the economies were similar.[7]

The second problem in the SVAR literature is a failure to properly account for the lock-in of the parities among the currencies in the euro area, which implies a common response of the exchange rate. Indeed, the SVARs often do not include the exchange rate; when they do, the shocks are often inferred in dubious manner. For instance, the studies we have seen always assume that a disturbance to interest rates does not simultaneously influence exchange rates (or vice versa). Such shocks are hard to imagine since they imply a "free lunch," whereby investors could move money towards high-interest countries without expecting to see some of the interest rate gains eroded by changes in exchanges rates. With the shocks having been identified in this fashion, it is very likely that the so-called "monetary policy shock" is in fact a combination of shocks, including the endogenous response to movements of the exchange rate.

As a result of these two problems, much of the evidence produced by the SVAR literature is of only limited relevance for the issue at hand, as it does not appropriately represent the situation that is likely to prevail in the monetary union. A vivid example of the difficulties in interpreting the SVAR results is the Gerlach and Smets (1995) study, in which the

responses to both a one standard deviation, one-period shock (reported in table 2 as variant 1), and a 100 basis point, two-year sustained increase of the interest rate (variant 2) are presented. In the first case the response of GDP looks similar across Germany, France, and Italy, while in the second case, German output moves by almost twice as much as that of the other two major countries of the euro area; in the latter case the German result is also much more persistent (although this is masked in the table).

Even taking the SVAR evidence at face value, the results are often ambiguous.[8] While many of the studies tend to conclude that the differences in the transmission mechanism are not large, the differences they identify do not seem to be particularly robust: As summarized in table 2, different studies present somewhat different rankings of the potency of monetary policy.

The main regularities that do seem to emerge are that Germany is almost always the country in which monetary policy is most powerful, often followed by France, and that monetary policy is always seen as being more potent in Germany than in Italy, where monetary policy appears to have the mildest effect on output. These conclusions are almost the opposite of the findings from the aforementioned BIS project. One potential reconciliation is offered by Kieler and Saarenheimo (1998), who show the extreme indeterminacy of the SVAR results: A very large set of widely different responses of output to monetary policy, each equally supported by the available data, can be produced by varying the assumptions used to identify shocks. Restricting the identifying assumptions to those that yield impulse responses bounded within a sort of "window of plausibility" (for example, the initial output and price response to a contractionary shock should not be too positive) still leaves open a very wide range of possibilities.

Looking at small structural models and multicountry models, both with essentially the same structure across countries, none of the studies quite comply with the requirements set out above. In particular, the common response of the exchange rate has not been implemented. The evidence extracted from simulations of these models points to relatively small differences in the transmission channels across countries. Aside from the U.S. Federal Reserve multicountry model (which generates a much stronger initial response for Germany and France than for Italy), the other models show little or no difference in the impact on GDP. Of course, the identifying assumptions that underlie these models are subject to the same criticisms leveled at the national macroeconometric models.

Finally, the studies based on "prediction equations for output" have the advantage of having been devised precisely to provide the sort of ideal evidence described above. The estimated equations allow the path of both the monetary policy shock and the exchange rate to be common across countries, and the estimation is done jointly so that formal statistical testing is possible. On the other hand, the ad hoc nature of these equations limits one's ability to interpret the results, and doubts can be raised about the identification of the monetary policy shock. Dornbusch, Favero, and Giavazzi (1998) jointly estimate an equation for output growth in each country. The specifications predict output growth in each country as a function of its past own values and of past and present values of growth in the other countries, expected and unexpected components of interest rates,[9] and the bilateral exchange rates with the dollar and the deutschemark (DM). The specification of the

TABLE 2

Effect of monetary policy on output, using SVARs

Study	Effect on GDP one year after shock						Strength of responses[a]
	Germany	France	Italy	UK	Sweden	Netherlands	
Ramaswamy and Sloek (1998)	–0.6	–0.4	–0.5	–0.5	–0.3	–0.6	S<F<I=UK<G=NL
Barron, Coudert and Mojon (1996)	–0.6	–0.4	–0.3	–0.4	–0.4	–0.3	I=NL<F=UK=S<G
Gerlach and Smets (1995), variant 1	–0.3	–0.2	–0.2	–0.6	n.a.	n.a.	I=F<G<UK
Gerlach and Smets (1995), variant 2	–1.0	–0.5	–0.5	–0.7	n.a.	n.a.	I=F<UK<G
Ehrmann (1998)	–0.9	–0.5	–0.1	0.2[b]	–0.1	0.0	NL<I=S<F<G
Dedola and Lippi (1999)[c]	–2.2	–1.4	–1.1	–1.4	n.a.	n.a.	I<UK=F<G

[a]These orderings rank the responses according to their magnitude in each study.
[b]Data are not comparable.
[c]Figures refer to the maximum elasticity to the shock of industrial production.
n.a. indicates data not available.

output equations in Peersman and Smets (1998) is similar, but they include the German real interest rate and the differential with the German real rate instead of the expected and unexpected components of interest rates, and they replace the bilateral exchange rate against the dollar with the bilateral exchange rate between Germany and the U.S.; in addition, they allow no contemporaneous relationships. While the quantitative results differ in the two papers, they both point to significant differences in the output responses of Italy, on one side, and Germany and France, on the other. In particular, the Italian response is stronger, a result that is similar to that in the BIS study but sharply in contrast with the SVAR evidence.[10]

Summary

The main lesson we draw is that the evidence so far available is not quite appropriate to assess whether the single monetary policy will have a differential impact on the euro area countries. Moreover, the results are not robust: Methodological differences (such as which variables are included in the models and how shocks are identified) change the conclusions quite substantially. With the relevant exception of the "output equations," one regularity is that models with a similar structure tend to yield small differences in the transmission mechanisms, whereas models with a more idiosyncratic structure tend to show larger differences. However, it is unclear whether, on the one hand, the similarities in the former case are forced by the choice to impose the same structure on (truly) different economies or whether, on the other hand, the differences in the latter case result from the choice of modeling as different economies that are (truly) similar. It should nonetheless be acknowledged that, though far from being conclusive, the two pieces of evidence that most closely comply with the requisites for the "ideal" experiment—namely the BIS study and the output equations—provide roughly consistent results and point to noticeable differences in the transmission mechanisms.

Microeconomic evidence on the structure of European economies

The ambiguity of the macroeconometric findings on differences in the transmission mechanism undoubtedly stems, at least in part, from the poor design of the existing studies. Further work to remedy these problems should help to substantially clarify matters. We believe, however, that one additional reason for the inconclusive findings of these studies is their reliance on aggregate data. Relevant differences in the response to a monetary shock might be observed among different groups of agents in the same country, similar groups of agents in different countries, or both. However, the relative weights of these groups could differ across countries, in which case aggregation problems will confound attempts to make sense of the evidence.

Therefore, we propose to supplement the macro-level analysis with an exploration conducted at the micro level. Focusing on micro data has two further advantages. First, by identifying the behavioral responses of sets of agents that have been grouped according to different structural characteristics, this approach provides the information needed to uncover the causes of whatever differences might be present at the macro level. Second, it might help identify possible policy interventions or natural mutations which, by altering the "microeconomic landscape" in the relevant ways, could lead to more uniform effects of the common monetary policy.

We consider four different theories of how monetary policy can affect the economy. These theories identify the characteristics of the various economies that should determine the potency of monetary policy. While we recognize that these theories of monetary transmission share some common features—for instance, most require that prices do not instantly adjust to changes in monetary conditions—we consider it useful to highlight the differences among the theories rather than the similarities. Once we have identified the salient characteristics, we can see whether the member countries of the monetary union differ along these dimensions.

Theories of monetary policy transmission

The textbook model of monetary transmission supposes that open market operations matter because, in the presence of temporarily fixed prices, altering the mix of money and bonds changes the real value of the money supply. This leads to a shift in interest rates to clear the money market and, subsequently, to changes in spending on interest sensitive items. Since this mechanism operates in a host of models ranging from the IS/LM to cash-in-advance or limited-participation models, we refer to it as the *conventional* mechanism. We take its central prediction to be that the potency of monetary policy across countries will depend on the cross-country variation in the interest sensitivity of spending (see Kakes, 1999, for further discussion).

A second theory of monetary transmission builds on the interest rate mechanism by assuming that financing difficulties can amplify the impact of the initial change in interest rates. Capital market distortions induce lenders to require collateral before they will make funds available. Because any interest rate increase lowers the value of future cash flows, collateral is

influenced by open market operations, and this is assumed to alter the availability of funds and ultimately spending. We call this the *borrower-net-worth* mechanism (see Bernanke and Gertler, 1995). We take the central prediction of this theory to be that debt capacity will depend on borrowers' net worth and this will drive spending.[11]

A third, and closely related, theory emphasizes the role of banks. This theory posits that an open market sale matters because it removes reserves from the banking system; this in turn impairs banks' ability to make loans. For some customers a cut in bank lending is assumed to translate into reduced spending. Thus, the theory requires that both banks and bank customers have financing problems that are exacerbated when a monetary tightening is undertaken—see Stein (1998) for a formal model and Kashyap and Stein (1997) for a discussion in the context of the EMU. This channel is really a special case of the borrower-net-worth channel since it focuses on the importance of the availability of funds from banks; to highlight this we call it the *bank-lending* channel. We take its central prediction to be that the potency of monetary policy will depend on the degree to which banks are able to raise alternative funds to offset reserve fluctuations and the extent to which consumers and firms must rely on banks for their financing.

A final mechanism, which has a long history in discussions of monetary policy transmission, focuses on the non-price methods of allocating credit. For instance, Roosa (1951) argued that monetary policy could be quite potent without moving interest rates by influencing the availability of credit. The net-worth and bank-lending mechanisms described above are special cases of this theory, in that they assume that contracting difficulties influence credit allocations in a particular way. Alternative versions of the *credit-rationing* hypothesis would permit factors beyond net worth and collateral to influence credit availability.

For example, in the seminal Stiglitz and Weiss paper (1981), equilibria in which credit is rationed are possible because of asymmetric information between borrowers and lenders that leads to problems of moral hazard and adverse selection. Williamson (1987) studies the implications for lending of an imperfect ability to monitor borrowers. He shows that a rationing equilibrium may exist in which interest rates are no longer allocative; instead lenders adjust to shocks by changing the amount of credit they extend.

Working out the precise implications for monetary policy transmission is difficult because the credit allocations can differ depending on the modeling assumptions. However, one robust prediction from these models is that credit rationing becomes increasingly likely and widespread in economies with less efficient legal systems, more "opaque" borrowers' activities, and weak enforcement of contracts.[12] Thus, we also report data comparing the economies along these dimensions.

Microeconomic data describing different economies in Europe

Collectively, these theoretical considerations suggest a number of structural features that would be useful to compare across the European economies that are operating with a common monetary policy (or, in the case of the UK, are considering joining the union). Finding comparable data on the relevant indicators for all 11 countries that adopted the euro is quite difficult, so our preliminary exploration focuses on seven countries with readily available data.[13] The proxies shown in table 3 are intended to provide some evidence on the differences in interest sensitivity, collateral positions, importance and availability of bank loans, and the costs of contract enforcement. First, we review the findings for the different indicators. Then we draw some tentative conclusions about individual countries.

One factor that is common to all the theories is some form of imperfect price adjustment. If prices adjust more quickly to monetary impulses in some countries rather than others then this would lead to different patterns of output adjustment. Thus, an obvious starting point for comparisons would be the degree of price rigidity across countries.

A major problem with this tack is the uncertainty over how pricing practices may change once prices in the euro area are quoted in the same units. One of the benefits often cited by the advocates of the single currency is that it will increase competitiveness of product markets, which will tend to equalize prices and price-setting practices across countries. To the extent this is true it raises questions about how much faith to put in past evidence on pricing policies—this is one case where a sharp change in behavior seems possible.

Nevertheless, we can probably gain some insight into the price rigidity issue by looking at labor market frictions. Labor costs account for a major portion of total costs and it is generally agreed that legislation governing the hiring and firing of workers in Europe makes wages relatively rigid. Moreover, the move to a single currency will not directly (or immediately) change the contractual framework governing the labor market. Thus, we report data on labor markets as a first measure of structural differences.

The first row in table 3 shows summary information on employment protection legislation in different countries. Taken from the June 1999 Organization for Economic Cooperation and Development (OECD) *Employment Outlook*, the data represent a weighted average of indicators pertaining to

TABLE 3

Selected characteristics for European countries

	Country						
Variable	**UK**	**Germany**	**Italy**	**France**	**Spain**	**Netherlands**	**Belgium**
Employment protection[a]	0.9	2.6	3.4	2.8	3.1	2.2	2.5
(rank, 26 OECD countries)	(2)	(20)	(23)	(21)	(22)	(13)	(16)
Capital output ratio[b]	1.99	4.0	3.2	3.0	n.a.	n.a.	3.0
(Investment/GDP)	(0.154)	(0.223)	(0.180)	(0.191)	(0.212)	(0.197)	(0.181)
Fraction of financing that is short term[c]	0.960	0.593	0.838	0.893	0.925	0.620	0.882
Exports outside EU-15 relative to GDP[d]	0.47	0.44	0.45	0.38	0.29	0.25	0.29
Firms' leverage (median) %[e]	63.1 (60.5)	52.0 (61.0)	52.3 (62.5)	46.3 (49.1)	53.5 (56.4)	43.9 (63.7)	51.4 (58.4)
Median number of employees per firm[f]	1,128	406	251	357	267	205	363
Household indebtness[g]	1.020	0.779	0.314	0.510	0.580	0.649	0.415
Months to repossess[h]	12	15	48	11	36	2.5	24
Repossession cost as % of house value[i]	4.75	6	19	15	10	11	19.5
% of firms with single bank[j]	22.5	14.5	2.9	4	1.5	14.3	0
Market capitalization relative to GDP[k]	1.65	0.48	0.46	0.65	0.69	1.53	0.94
Average bank size, billions of dollars[l]	24.9	12.8	12.3	20.1	10.2	32.1	22.3
% of total deposits in 5 largest banks[m]	27.0	14.0	40.4	68.8	39.8	81.3	61.0

[a]OECD (1999b), summary indicators of strictness of employment protection, table 2.5.

[b]Stock of capital at current prices divided by value added at current prices in 1996. The stock of capital is computed by the perpetual inventory method from OECD, 1999; the investment to GDP ratio is calculated from the IMF's International Financial Statistics, using the reported data on gross investment and GDP, in current dollars, averaged from 1992 to 1996.

[c]Ratio of current liabilities to total liabilities minus equity in 1996 from Enria (1999).

[d]Openness of EMU members from Favero and Giavazzi (1999)

[e]Firms' leverage is total debt divided by total debt plus net capital in 1996 using the sample of firms from Amadeus from Enria (1999).

[f]Median of the mean of industry-level employment built by Kumar, Rajan, and Zingales (1999) using raw data from Eurostat.

[g]1994 total household liabilities as a fraction of disposable income from BIS (1995).

[h]Number of months (as of 1990) necessary to repossess collateral in case of default on a mortgage from European Mortgage Federation.

[i]Legal costs to repossess collateral in case of default on a mortgage as a percentage of the value of the house in 1990 from European Mortgage Federation.

[j]Share of firms entertaining only one bank relation from Ongena and Smith (2000).

[k]Market value of firms listed on major exchanges as of year-end 1998 divided by GDP from Federation of European Stock Exchanges Annual Report, with GDP data from the OECD.

[l]IBCA *Bankscope* database for European banks; figures pertain to total assets as of 1997 year-end.

[m]Share of deposits of five biggest credit institutions in 1996 from European Central Bank (1999).

n.a. indicates data not available.

regular labor contracts, temporary contracts, and collective dismissals. The levels of these averages therefore have no direct economic interpretation, but the rankings for the main 26 OECD members are informative.

The data confirm the well-known finding that labor market institutions in the UK are much more flexible than in the rest of Europe. The amount of employment protection in the other countries (except possibly in the Netherlands) is fairly similar. If one believes that labor market frictions are going to be a key determinant of future cross-country differences in wage and price flexibility, it would appear that the differences among the continental economies will not be too large.[14]

Turning to the specific theories, trying to find evidence on interest sensitivity of spending one runs into many of the same econometric difficulties discussed in the last section. In particular, determining whether results are driven by ad hoc specification choices or true behavioral differences is not easy. Therefore, the evidence we provide should only be considered a first pass at the issue. We try, however, to assess the robustness of any inferences that we might draw by providing several indicators that should be closely related to interest sensitivity.

One measure we consider is the ratio of fixed capital to output. Countries with high levels of capital to output will (assuming they are close to a long-run desired level) have higher investment requirements. We expect that interest rate changes should matter more in high-investment countries. Looking at the data in the table we find three groups of countries: Germany, which has a very high level of capital; the UK, which has a relatively low level; and the remaining countries, which lie in between (although they are closer to Germany than to the UK). The numbers in parentheses below the capital-to-output ratio are average levels of investment to GDP between 1992 and 1996 from national income account data. These numbers essentially confirm that the British and German differences are not due to the vagaries involved in estimating the stock of capital. By this metric, monetary policy should have strong output effects in Germany, while it should have much more modest effects in the UK. The other countries, except possibly the Netherlands, should be in between.

As a second indicator, we look at data on the maturity structure of debt. Countries with mostly short-term debt can expect changes in interest rates to affect borrowing costs more rapidly than countries with mostly long-term debt. The data again show that Germany and the UK are the two polar cases, although the ranking of monetary policy potency is reversed, with German firms having much more long-term debt than British firms.[15] Aside from the Netherlands, which also has a relatively low fraction of short-term debt, most of the other countries' debt-maturity structures are closer to the UK than to Germany.

The negative correlation between the debt maturity and the capital-to-output ratio is not too surprising. If there are any frictions in borrowing and lending, then it may be desirable to match the maturity of any debt to the life of the asset. Therefore, it makes sense that in Germany, with its higher level of fixed (long-term) assets, the fraction of long-term debt is also higher.

A slight extension of the conventional model would allow interest rates to be important because of their impact on exchange rates. With a single monetary policy this channel no longer directly matters for trade within the euro area. However, it will retain its relevance if there are differences in trading patterns with countries outside the euro area. Data on the ratio of exports to GDP outside of the 15 countries in the EU are reported in table 3. It appears that the four large countries are much more likely to trade outside of the EU than the smaller countries. This pattern is probably going to persist and should mean that, all else equal, monetary policy should have more potency in the larger countries than in the smaller countries.[16]

The net-worth channel suggests that we look for differences in collateral levels. We consider three proxies. One measure is the leverage of firms—in particular, the ratio of debt to debt plus equity. The data in the table show that there is relatively little variation across countries in this dimension. Except for France, the median firm has a leverage ratio of between 0.56 and 0.64. The French firms have less debt, and one possible interpretation of this observation is that they have more borrowing capacity. Alternatively, the lack of debt may reflect problems with contract enforcement; we discuss this interpretation below.

The data on leverage are for a sample of large firms, including those listed on public stock markets. It is quite plausible that borrowing frictions are more important for smaller, non-publicly traded companies. Therefore, we also report data from Kumar, Rajan, and Zingales (1999) on firm size (in which firms are weighted according to the total employment in enterprises of a given size).[17] In terms of the size of the median firm, there are three groups of countries. The typical UK enterprise is much larger than those found on the Continent. The Italian, Dutch, and Spanish firms are relatively small, while the remaining countries have middle-sized firms. These figures suggest that collateral considerations should be strong in Italy, the Netherlands, and Spain and much weaker in the UK.

The last of the proxies we consider is household debt levels, more specifically the ratio of household liabilities to disposable income. Once again, the UK stands out, with borrowing levels far exceeding those found elsewhere. Italy stands out as the country with the lowest household borrowing, although Belgium also shows quite low levels.

One possible interpretation of these data is that Italian and Belgian households should at least be able to borrow to make up any income shortfalls. But the alternative interpretation is that households in these countries are less willing to borrow. Past research analyzing cross-country savings patterns, however, favors the former interpretation (Jappelli and Pagano, 1989, and Guiso, Jappelli, and Terlizzese, 1994).

Furthermore, two proxies related to contract enforcement suggest these patterns reflect differences in the efficiency of credit markets, rather than differences in households' willingness to borrow. One of these indicators is the number of months needed to repossess collateral in the event of a default. The second measure is the estimated legal costs of repossessing a house in the event of a mortgage default (expressed as a percentage of the value of the house). Both variables suggest that enforcement costs are high in Italy and low in the UK.

Thus, one would expect much less mortgage debt in Italy than in the UK and, hence, much lower overall borrowing. These considerations lead us to interpret the debt data as a measure of the depth of local capital markets. On the one hand, the Italians are less able than the British to smooth out shocks to consumption, since their capital markets are not as well developed and will not be able to rely as much on borrowing. On the other hand, being less leveraged than the British, the Italians are less vulnerable to shocks to interest rates.

Belgium and, to some extent, Spain also appear to be countries where contract enforcement is relatively costly. Interestingly, the Belgian, Italian, and Spanish legal systems are all derived from the French legal system. As La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) note, creditors' rights to reorganize or liquidate firms are relatively weak in the French system. In contrast, Germany appears to be relatively efficient by these measures—which also accords with La Porta et al.'s findings. This suggests that credit rationing is more likely to occur in Belgium, Italy, and Spain than in Germany or the UK. However, as mentioned earlier, this could strengthen or weaken the impact of monetary policy.[18]

Finally, as proxies for the bank lending channel we report several measures of bank loan demand and loan supply (see Cecchetti, 1999, for further data). Our data show that in all the countries, it is typical for large firms to have several banks. This should help insulate them from a credit crunch that might result if an individual bank gets into trouble. Smaller firms appear to be more likely to rely on a single bank, although, to the best of our knowledge, it is not possible to get comparable data for small firms. Therefore, the previously described data on the variation in average firm size will be relevant for the lending channel too. From the lending channel perspective, this suggests that the reliance on bank funding is likely to be highest in Belgium, Italy, and Spain and lowest in the UK.

A second indicator of the importance of banks for the funding of businesses is the size of the capital market. Judging by the ratio of the value of shares traded on the major public stock exchanges to GDP, there is striking variation in the depth of capital markets across countries. Particularly in the UK, but also in the Netherlands, there are many huge publicly traded companies. These companies almost always have access to some types of nonbank finance. In contrast, in Germany and Italy the stock market capitalization is relatively low, a feature supporting the commonly held view that the banks dominate the financial system in these countries.

In terms of bank loan supply, Kashyap and Stein (1999) find that in the U.S. smaller banks' lending is more closely tied to monetary policy than that of large banks. This suggests that shifts in bank loan supply are more likely if a country's banking system consists mostly of small rather than large banks. One way to make this comparison is to look at differences in the absolute size of banks in the different countries. Table 3 shows the average size of the banks in the IBCA *Bankscope* database for European banks in each country in 1997. This database provides information on the largest banks in each country, covering institutions that grant between 80 percent and 90 percent of domestic credit. By this yardstick the Belgian, British, Dutch, and French banks are best positioned to insulate borrowers from changes in credit availability; the German, Italian, and Spanish banks are relatively small and therefore may not be so well able to guarantee funding for their clients.

The data in table 3 also show the share of total banking deposits in the top five banks. Focusing on concentration may be appropriate if one believes that the lack of integration of the banking markets is likely to persist, and if the largest banks in each country are expected to be able to attract funds during a credit squeeze, even if some of the banks may not be large

in an absolute sense. Interestingly, except for the UK, this size measure suggests the same classification of countries as implied by the absolute measure of size; in the UK the many nonbanking financing options and the large absolute size of the leading British banks lead us to suspect that shifts in bank loan supply would be relatively less important.

Summary

Obviously, the data in table 3 are open to multiple interpretations, and the connections between some of our proxies and the ideal variables suggested by theory are sometimes loose, but we feel that several general conclusions are warranted. First, there do seem to be fairly strong differences across the countries in several respects. Moreover, the indicators do not seem likely to change quickly. Therefore, if these features do matter for monetary transmission, it seems likely that the differences will be in place for several years.

The Italian economy appears to be one in which several of the theories would predict a strong effect of monetary policy on the economy. In relative terms, Italy has a fairly high fixed-capital stock, poor contractual enforcement, lots of small firms, rigid labor markets, and many small banks operating within a financial system that has been bank-dominated. All of these factors suggest comparatively strong effects of monetary policy.

The UK looks to be almost the opposite of the Italian case. There is relatively little fixed capital, good contract enforcement, very flexible labor markets, and many large firms with genuine alternatives to nonbank financing. The only common feature between the two countries is that they both do a significant amount of trading with non-European countries.

Most of the other countries sit in the middle, with characteristics that, according to which theory of monetary transmission one considers, indicate stronger or weaker effects of monetary policy. For instance, in Germany firms are relatively large and contract enforcement is pretty good, which should help to insulate firms from monetary policy. However, Germany also has a high level of investment, fairly rigid labor markets, and exports a significant amount of goods to countries outside of Europe. France has more large banks and a more developed stock market than Germany, but corporate leverage and household borrowing in France are much lower, and it is fairly costly to repossess collateral.

Cross-firm differences in cyclical performance in Italy

Ultimately, it will take a number of studies and a considerable amount of work to determine which of the factors identified above are most important for the transmission of monetary policy. As a first step, with the intent of providing a sort of benchmark and, at the same time, assessing whether the characteristics highlighted above do indeed matter, we explore how firms that differ along those dimensions have fared in the wake of a monetary tightening. We focus on the one country, Italy, in which *a priori* we are most likely to observe strong effects of monetary policy. We believe that subsequent work can try to narrow the alternatives and, more importantly, pinpoint whether the factors that may have been significant in Italy are also relevant in other countries.

Macroeconomic conditions in Italy in the 1990s

Before we investigate the microeconomic evidence in Italy it is necessary to describe the macroeconomic environment. Table 4 shows a set of macroeconomic indicators for 1989–97, the period for which we have good firm-level data. The period is marked by considerable volatility, much of which is attributable to the developments leading up to the adoption of a common monetary policy. The year 1992 was a watershed year. Growth in the three preceding years had been relatively rapid, although the economy was gradually slowing down. While the primary deficit had improved, the overall deficit was still around 10 percent of GDP. In 1991 the total deficit deteriorated slightly and reached 10.8 percent in 1992. This situation put downward pressure on the exchange rate (which was fixed as part of the ERM).

Over the next year a number of policy changes aimed to help ease the pressure on the lira. In July the government adopted a 30,000 billion lire (about 2 percent of 1992 GDP) fiscal tightening, which ultimately proved to be insufficient to ease pressure on the exchange rate. In September, the government decided to abandon the attempt to maintain parity with the DM and the exchange rate started floating freely: It jumped from 756 lire to the DM in August to 806 lire in September and 882 in October, a devaluation of 15 percent from the previous central parity. From then on the exchange rate continued to fall, though the devaluation had, overall, relatively small effects on the price level.

To stabilize the exchange rate, interest rates were sharply increased and (perhaps more importantly) a second, remarkably large set of fiscal measures were announced at the end of 1992. Collectively, these changes reduced spending by approximately 92,000 billion lire (6 percent of GDP). The fiscal adjustment marked a clear break: In 1993 the primary deficit climbed to 2.6 percent of GDP. This was also a year of deep recession, with industrial production falling

TABLE 4

Macroeconomic conditions in Italy, 1989 to 1997

Variable	1989	1990	1991	Full year 1992	October 1992	1993	1994	1995	1996	1997
Lira/DM exchange rate	729.7	741.6	747.7	790.0	881.92	950.7	994.7	1,138.0	1,026.3	982.2
(% depreciation)	(–1.54)	(1.63)	(0.82)	(5.67)	(16.1)	(20.33)	(4.63)	(14.41)	(–9.82)	(–4.29)
Real GDP growth, %	2.9	2.2	1.1	0.6	n.a.	–1.2	2.2	2.9	0.7	1.5
3-month Treasury bill rate, %	12.65	12.28	12.66	14.48	15.51	10.47	8.84	10.73	8.61	6.40
Domestic credit growth, %	14.85	13.14	12.67	11.71	11.75	7.60	6.22	5.10	4.68	4.21
Government primary deficit/GDP, %	1.1	1.7	–0.1	–1.9	n.a.	–2.6	–1.8	–3.9	–4.5	–6.7
Total government deficit/GDP, %	9.8	11.1	10.1	9.6	n.a.	9.5	9.2	7.7	6.6	2.7

Notes: The exchange rate devaluation in October 1992 is with respect to the exchange rate in August 1992. Credit growth for October 1992 is relative to October 1991. n.a. indicates not applicable.
Sources: Bank of Italy, 1997 and 1992, *Annual Report*.

by 2.4 percent and GDP down 1.2 percent. However, recovery began quickly; in 1994 industrial production increased by 5.2 percent and GDP by 2.2 percent.

Due to the combination of the sharp devaluation (which greatly benefited export-oriented firms) and the tight fiscal policy (which heavily affected firms with a domestic market), the recession and the subsequent recovery were unevenly distributed. This is relevant in interpreting some of the latter results. As table 4 makes clear, 1993 also saw a marked slowdown in credit availability. Total credit to the economy grew by 7.6 percent, almost two-thirds its growth rate in the previous year. Though this slowdown can partly be explained by a reduction in demand, it is likely that access to credit became more difficult.[19] The recovery continued in 1995, while at the same time the exchange rate depreciated sharply. As the dollar tumbled in the wake of the Mexican crisis, and concerns arose over the domestic political situation, the lira depreciated sharply in February and March. Interest rates were then increased temporarily. The two subsequent years saw a marked slowdown followed by a mild recovery. At the same time, under pressure to fulfill the Maastricht criteria for admission to the monetary union, the government tried to speed up Italy's fiscal adjustment and, in 1997, the primary surplus reached 6.7 percent of GDP, allowing a total deficit of 2.7 percent.

Firm-level comparisons over the last ten years in Italy

To further examine the potential importance of microeconomic heterogeneity in the monetary transmission mechanism we report some simple diagnostics about investment and profitability for different sets of Italian firms. On the one hand, this task is complicated by the odd mixture of shocks, described above, that have hit the Italian economy since 1992. On the other hand, the shocks were very large and, therefore, have the potential to yield some clearly visible results. Ultimately, much more work will be needed to carefully identify and quantify these disturbances and to keep track of their impact on firms' performances. In the meantime, we hope that these exploratory tabulations may provide some guidance about which contrasts deserve further investigation.

The data that we analyze are drawn from the Italian Company Accounts Database, a large dataset collecting balance sheet information and other items on a sample of over 30,000 Italian firms. The data, available since 1982, are collected by Centrale dei Bilanci, an organization established in the early 1980s jointly by the Bank of Italy, the Association of Italian Banks, and a pool of leading banks to gather and share information on borrowers. Besides reporting balance-sheet items, the database contains detailed information on firm demographics (including year of foundation, location, type of organization, ownership status, structure of control, and group membership), employment, and flow of funds. It also reports a firm's credit score, computed directly at the Centrale dei Bilanci to help banks in screening borrowers. Balance sheets for the banks' major clients (defined according to the level of their borrowing) are collected by the banks.

The focus on the level of borrowing skews the sample toward larger firms (which also means that trade and service sector firms are underrepresented, while manufacturing firms are overrepresented). Furthermore, because most of the leading banks are in the northern part of the country, the sample has more firms headquartered in the North than in the South. Finally, since banks are most interested in firms that are creditworthy, firms in default are not in the dataset, so the sample is also tilted towards higher than average quality borrowers. Despite these biases, the sample still has much broader coverage than most datasets analyzed by economists since it includes thousands of unlisted companies and many very small firms—for example, the median firm in the sample in the early 1990s had only 26 employees.

The first panel in table 5 shows the evolution of investment and return on assets (ROA) for the median firm in the full sample. The major macroeconomic developments described in the last section are clearly reflected in this Company Accounts Database. In particular, profitability and investment were highest in the late 1980s and early 1990s. The 1993 recession also is easy to spot, as investment plunged and profitability sagged. By the end of the period investment had recovered, although profitability remained depressed.

However, the data for the median firm mask some stark differences across segments of the economy. The "size" panel in the table contrasts small firms (defined as having fewer than 50 employees) and large firms (more than 500 employees). Small firms generally have higher profit rates, as measured by return on assets (ROA), than large firms—this is not surprising given the larger failure rates of such firms. The smaller firms also have a lower investment rate, partly because these firms are less likely to be in capital-intensive industries.

For our purposes, however, the differences around the 1993 recession are most relevant. For large firms the recession was rather mild; the investment rate fell by about 20 percent and profitability dipped slightly. For small firms the declines were much steeper: Investment dropped by more than 40 percent and ROA also declined by more than 1 percentage point. As late as 1996, small firms' ROA had not returned to the 1992 level, whereas large firms' profitability had recovered by 1995. Thus, it appears that smaller firms fared worse than larger firms in this episode.

The "export propensity" panel of the table compares firms based on their exports as a fraction of their sales. Interestingly, prior to 1992 there was virtually no difference in profitability (ROA) between the high export sensitivity firms (whose exports account for more than 30 percent of sales) and the low export sensitivity firms—although the investment rates were higher for the high-export firms. The two groups, however, fared quite differently during the recession. For the typical low-export firm, investment virtually ceased in 1993 and was down nearly 25 percent in 1994; profits also dropped sharply. For the 10 percent of firms that were heavily export-oriented, profits were unchanged and investment dropped a bit but had fully recovered by 1994.

Given the large devaluation it is not too surprising that the exporters outperformed the domestic sellers, but we find the magnitude of these differences surprising. We explore these differences further below. Note that the strong exchange rate effects reinforce the concerns raised earlier about the importance of properly accounting for the impact of the single currency on the exchange rate when studying the transmission mechanism.

Another obvious contrast to consider is the degree to which firms are dependent on banks for their funding. The interest rate spike in the fall of 1992 and the subsequent recession severely affected the strength of Italian banks' balance sheets. For instance, the percentage of nonperforming loans rose from about 14.6 percent in 1992 to 22.5 percent in 1993 and then peaked at 31.1 percent in 1994, before dropping back to pre-crisis levels. Given the degree of the banking problems and the usual lending channel considerations, studying borrowers' bank dependence seems particularly appropriate.

Unfortunately, the institutional arrangements in Italy make developing a measure of bank dependence difficult. The standard approach in most studies is to compare firms that have access to public capital markets (for example, firms that are listed on a stock exchange or have publicly traded bonds) with firms that have little or no access. However, the underdevelopment of Italian capital markets means that essentially all firms have been bank dependent (for example, less than 0.5 percent of the firms in the sample are listed and these firms account for less than 8 percent of total sales in the sample). Thus, any measure of the amount of bank borrowing scaled by firm size tends to uncover relatively profitable and creditworthy firms rather than high-risk firms that are extremely reliant on banks. One challenge for further work on monetary transmission in Italy and other countries with underdeveloped capital markets will be to find better proxies to study bank dependence.[20]

The bank-dependence indicator we use in this study is whether a firm belongs to a corporate group. These alliances are quite important in Italy. Our

working definition of a group member is whether the firm reports that it is controlled by a holding company. The holding companies for these groups typically have access to reliable funding through large banks and the capital markets, and operate an internal capital market for their group members. For instance, Bianco et al. (1999) find that member firms' investment is less sensitive to cash flow than that of nonmember

TABLE 5

Investment and profitability for different sets of Italian firms
(data for median firm)

Category		1988	1989	1990	1991	1992	1993	1994	1995	1996
All firms	NF	34,379	36,009	37,436	37,326	36,883	39,280	42,814	34,772	32,114
	I/A	2.29	2.02	2.05	2.07	1.77	1.12	1.43	2.00	2.30
	ROA	8.52	8.52	8.14	7.35	7.39	6.44	6.22	7.18	6.53
Size										
Small	NF	23,933	25,330	26,312	26,023	25,618	27,178	29,828	21,421	18,849
	I/A	1.62	1.37	1.55	1.59	1.35	0.77	1.06	1.41	1.66
	ROA	8.62	8.72	8.38	7.60	7.67	6.60	6.33	7.27	6.63
Large	NF	780	804	797	842	793	782	780	798	847
	I/A	4.83	4.74	4.18	3.85	3.43	2.79	2.84	3.74	3.72
	ROA	7.88	7.36	6.53	6.16	6.00	5.76	5.58	6.43	6.17
Export propensity										
High	NF	3,656	4,153	4,363	4,243	3,608	3,438	4,259	4,380	4,744
	I/A	3.98	2.82	2.63	2.73	2.40	2.33	2.75	3.83	3.41
	ROA	8.49	8.49	8.03	7.37	7.59	7.63	7.50	8.95	7.32
Low	NF	30,723	31,856	33,073	33,083	33,275	35,842	38,555	30,392	27,370
	I/A	2.20	1.91	1.98	1.99	1.70	0.10	1.30	1.75	2.10
	ROA	8.53	8.52	8.15	7.35	7.37	6.31	6.05	6.92	6.39
Group membership										
Nonmember	NF	6,764	7,753	8,633	9,091	9,762	10,616	11,131	8,930	8,415
	I/A	3.14	2.62	2.58	2.53	2.09	1.62	2.06	2.84	2.79
	ROA	9.39	9.16	8.78	7.86	7.88	6.91	6.69	7.90	6.95
Member	NF	5,184	5,683	6,344	6,732	7,134	7,906	8,383	8,003	7,385
	I/A	3.15	3.03	2.75	2.53	2.17	1.53	1.76	2.20	2.36
	ROA	8.36	8.21	7.48	6.69	6.54	5.74	5.78	6.76	6.25
Interest coverage										
High	NF	28,701	29,585	29,641	28,451	27,032	29,156	34,141	27,910	25,765
	I/A	2.59	2.31	2.36	2.40	2.12	1.37	1.72	2.43	2.67
	ROA	9.41	9.41	9.08	8.41	8.60	7.53	7.08	8.18	7.43
Low	NF	5,678	6,424	7,795	8,875	9,851	10,124	8,673	6,862	6,349
	I/A	1.02	0.99	1.04	1.19	0.97	0.57	0.57	0.71	1.08
	ROA	2.04	2.63	2.53	1.85	2.17	1.42	1.01	1.70	1.79
Interest sensitivity										
High	NF	10,189	10,653	11,118	11,092	11,046	11,140	11,643	8,826	7,831
	I/A	2.51	2.32	2.28	2.23	1.76	1.30	1.52	2.31	2.58
	ROA	8.54	8.72	8.38	7.61	7.48	6.50	6.10	7.11	6.54
Low	NF	11,070	11,459	11,894	11,823	11,598	12,170	13,440	11,168	10,358
	I/A	3.11	2.74	2.72	2.69	2.35	1.51	1.90	2.37	2.71
	ROA	8.19	8.05	7.70	7.07	7.14	6.41	6.15	6.84	6.22
Location										
North	NF	23,247	24,279	24,931	24,828	24,801	26,465	29,254	24,486	22,988
	I/A	2.57	2.32	2.36	2.29	1.94	1.27	1.58	2.27	2.50
	ROA	8.85	8.72	8.23	7.34	7.34	6.54	6.38	7.54	6.70
South	NF	4,590	4,958	5,193	5,120	4,943	5,212	5,567	4,203	3,648
	I/A	1.57	1.24	1.42	1.57	1.19	0.63	0.94	1.21	1.70
	ROA	7.47	7.66	7.25	6.72	6.78	5.36	5.03	5.28	5.53

Notes: I/A is investment in fixed capital during the year divided by year-end assets; ROA is return on assets; and NF is the number of firms. Sample splits are defined in the text.

Source: Authors' calculations based on data from the Italian Company Accounts Database.

firms. Thus, group membership may be an indirect proxy for firms that are not susceptible to a bank credit crunch. Conversely, the firms that classify themselves as independent are likely to be highly reliant on bank financing.

The "group membership" panel in table 5 compares member firms with nonmember firms.[21] In terms of investment, the typical member and nonmember firms are almost identical until 1993; only in the last three years of the sample do any differences appear and in these years the member firms invest less. The member firms also show consistently lower ROA than the nonmember firms. However, it does not appear that the member/nonmember distinction explains very much of the movement in ROA around the 1993 recession. For both sets of firms, ROA drops (by fairly similar percentages) and recovers by 1995. Overall, it does not appear that splitting the sample based on group membership is very informative.

One reading of the borrower-net-worth theory is that balance-sheet conditions should determine the cyclical sensitivity of different firms. We separated the firms whose required interest payments exceed their operating income (and operating income is positive)—the most extreme evidence of an impaired financial condition.[22] When we compare them with the remaining firms, the distressed firms show low levels of investment and ROA—undoubtedly these firms have some real problems with operating efficiency beyond their financial troubles. The recession was particularly harsh for the firms that had interest coverage problems. Investment dropped by more than 40 percent, while profitability was down by more than one-third. Certainly, this is consistent with the predictions of the net-worth models, but these firms having been hit by real shocks (perhaps the same ones driving the business cycle) might also be a plausible explanation.

According to the traditional theory of monetary transmission, interest sensitivity is the key indicator of which firms will adjust the most during a monetary tightening. As a crude proxy for interest sensitivity, we sort firms according to their industry. We classify firms in the construction sector or that produce capital goods, durable goods, and intermediate goods used in the production of investment goods as highly interest sensitive. The low interest sensitivity firms produce nondurable consumption goods or intermediate goods needed for nondurable consumption goods. We exclude agricultural firms, service sector firms, utilities, and other firms for which we could not make a clear classification based on their industrial code.

The "interest sensitivity" panel in table 5 shows investment and profitability for these firms. There do not appear to be noticeable differences for these two sets of firms around the recession. For both types of producers, investment and ROA drop noticeably in 1993. In percentage terms, the drop in investment is larger for the low-sensitivity firms, but the opposite is true for ROA. Furthermore, in the next year investment recovers more for the nondurables producers, while the ROA drop is again bigger for the durable good producers. By 1996, investment for both sets of firms had moved back to early 1990s levels. Overall, we see no clear pattern to the changes for these firms.

The "location" panel of table 5 compares firms based on whether their headquarters are in the northern or southern part of the country.[23] The southern firms are generally considered to operate in an environment that is less conducive to efficiency, are more generally dependent on government subsidies, and are typically less export-oriented. We would expect the combination of the fiscal contraction and high interest rates during the recession to have a more potent effect in the South than the North. The data confirm our conjectures. The southern firms begin with lower ROA and a lower investment rate, and show extreme drops in investment and profitability in 1993. The ROA for the southern firms remains low through 1996.

While these simple comparisons can be misleading, we believe we can safely draw several overall conclusions from table 5. First, information on export sensitivity seems essential to understand the 1993 Italian recession. More than any other factor, export sensitivity appears to isolate the firms that suffered the most. In addition, firm size appears to be important. In line with many theories, small firms had a more difficult time managing the recession. Similarly, firm location seems to matter. For the other factors, we consider the results rather mixed.

The obvious next step is to jointly control for the various features that we have identified. A full-blown regression analysis will eventually be needed; at this point, we prefer to keep the analysis simpler and shorter. As a robustness check and first step towards simultaneously allowing for alternative factors, we report several four-way sample splits. We first control for export propensity and then separate the firms along other dimensions. These tabulations allow us to see the extent to which all the table 5 results may be driven by export patterns.

The results in table 6 confirm that while exports are indeed important, they do not seem to be the whole story—to save space the table only shows the

four years around the recession. In particular, we draw five conclusions from this table. First, in all but one case (discussed further below) the high-export firms do noticeably better than comparable low-export firms. Second, among the low exporters, small firms fare worse than large firms. Hence, size is not simply standing in for exporting tendencies. Third, the previous ambiguous results involving the comparisons of durable goods and nondurables producers do not become any clearer after controlling for exports. Among the domestically focused firms, both the interest-sensitive and interest-insensitive firms experience comparable declines in investment and ROA. Fourth, the group membership results remain mixed. Perhaps one can conclude that the low export group member firms did slightly worse than comparable nonmember firms; however, these differences are not very pronounced.

Finally, table 6 indicates that the results for interest coverage appear to involve more interesting interactions with exporting patterns than the other comparisons. The high-export firms with coverage problems actually underperform the non-exporters in terms of ROA, though their investment is less affected by the recession. Also, the drop in investment among non-exporting firms is not too different in percentage terms between the high- and low-coverage firms. Further study of this interaction is needed.

Conclusion

Our three main findings are as follows. First, the existing attempts to assess the likely effects of the shift to a common monetary policy are not very informative. The main problem is that no one has conducted a careful examination of what would happen if the euro system countries were subjected to the same temporal sequence of monetary policy shocks, holding fixed the exchange rate among them. This is the key constraint that will be imposed by the common monetary policy, and we simply do not know how different the responses would be across countries. Some work to fill this gap in the literature would be quite valuable.

TABLE 6

Investment and profitability, controlling for export propensities
(data for median firm)

Category		1991	1992	1993	1994
Size					
Small firms					
High export	NF	2,191	1,932	1,612	1,861
	I/A	1.80	1.68	1.52	1.88
	ROA	7.69	7.98	8.23	7.90
Low export	NF	23,832	23,686	25,566	27,967
	I/A	1.56	1.32	0.72	1.00
	ROA	7.59	7.64	6.49	6.22
Large firms					
High export	NF	178	111	161	202
	I/A	4.91	3.96	3.36	3.63
	ROA	4.20	4.46	5.83	6.92
Low export	NF	664	682	621	578
	I/A	3.62	3.42	2.64	2.51
	ROA	6.39	6.29	5.73	5.22
Interest sensitivity					
High					
High export	NF	1,786	1,519	1,441	1,768
	I/A	2.84	2.36	2.27	2.52
	ROA	7.60	7.66	7.55	7.40
Low export	NF	9,306	9,527	9,699	9,875
	I/A	2.10	1.67	1.14	1.35
	ROA	7.62	7.45	6.32	5.86
Low					
High export	NF	1,502	1,529	1,148	1,472
	I/A	2.57	2.47	2.26	2.75
	ROA	7.19	7.57	7.71	7.72
High export	NF	10,321	10,339	11,022	11,968
	I/A	2.71	2.33	1.42	1.78
	ROA	7.03	7.05	6.22	5.95
Group membership					
Nonmember					
High export	NF	1,278	1,175	1,216	1,478
	I/A	3.13	2.66	2.56	2.92
	ROA	7.77	8.07	7.94	7.73
Low export	NF	7,813	8,587	9,400	9,653
	I/A	2.40	2.01	1.51	1.95
	ROA	7.88	7.85	6.78	6.53
Member					
High export	NF	976	835	970	1,321
	I/A	3.26	2.81	2.72	3.07
	ROA	6.90	7.13	7.10	2.38
Low export	NF	5,756	6,299	6,936	7,062
	I/A	2.41	2.05	1.37	1.50
	ROA	6.76	6.47	5.53	5.52
Interest coverage					
High					
High export	NF	3,655	3,164	3,156	3,983
	I/A	2.96	2.54	2.44	2.86
	ROA	8.04	8.17	8.17	7.87
Low export	NF	26,261	27,201	29,349	32,318
	I/A	2.27	1.9	1.16	1.49
	ROA	8.32	8.32	7.26	6.84
Low					
High export	NF	588	444	282	276
	I/A	1.43	1.29	1.21	1.42
	ROA	–0.99	–1.23	–2.84	–2.52
Low export	NF	6,822	6,074	6,493	6,237
	I/A	1.11	0.90	0.46	0.46
	ROA	1.34	–0.03	–1.05	–0.30

Notes: I/A is investment in fixed capital during the year divided by year-end assets; ROA is return on assets; and NF is the number of firms. Sample splits are defined in the text.

Source: Authors' calculations based on data from the Italian Company Accounts Database.

Second, there are good reasons to believe that looking carefully at microeconomic data across countries might provide some insights about the transmission mechanism. Looking at some of the microeconomic structural differences among several European countries, these countries appear to differ significantly along many dimensions that are potentially relevant for the transmission of monetary policy. For instance, conditions in Italy and the UK look to be very different.

Finally, drawing on micro data for a specific country during a particular episode, we find that differences among firms that are related to the observed differences across countries do matter for the cyclical pattern and the response to shocks, including monetary shocks. Our analysis is mainly descriptive. Further work needs to be done to improve the methodology and obtain better measures of a number of relevant firm characteristics. However, our exploratory findings suggest that similar exercises using micro data—possibly extended to households—from other countries could be quite valuable in helping us to understand the nuances of the monetary transmission mechanism.

NOTES

[1]See Kouparitsas (1999) and Carlino and DeFina (1998) for some statistical evidence on this point. Supporters of the monetary union argue that the launch of the euro will result in an increase in the degree of synchronization of the business cycles of the member countries. However, there are theoretical arguments suggesting that synchronization could increase or decrease. For example, Krugman (1991) shows how synchronization can depend on productive specialization. If the monetary union makes it easier for countries to specialize in production for certain sectors then countries may become less harmonized. Alternatively, if intra-industry trade increases this can lead to greater synchronization.

[2]Surveys of the literature can also be found in Kieler and Saarenheimo (1998), Dornbush, Favero, and Giavazzi (1998), Gambacorta (1999), and Kouparitsas (1999).

[3]For an interesting version of this argument, see Frankel and Rose (1998), who discuss how the changing trade linkages that might follow a shift to a single currency could alter the output correlations across countries.

[4]We include the UK in the analysis since it may join the union at a later date. The lack of comparable data forced us to drop Greece from the analysis.

[5]Data for Germany are not strictly comparable, as they refer to an experiment in which the exchange rate moves vis-à-vis all countries. However, owing to the specific pattern for the exchange rate assumed in the "ERM-coordinated" experiment, the changes in the effective exchange rate are roughly the same as in the other countries (stronger in the last years of the experiment). Spain is not included in table 1 as the changes in the effective exchange rate in the experiments performed are not comparable with those of the other countries.

[6]The SVAR relates a set of variables to lags of the variables. For instance, investment and interest rates could be assumed to be determined by past values of investment and interest rates. See Kouparitsas (1999) for a further discussion of how the inference is conducted.

[7]The article by Gerlach and Smets (1995), among the first on the subject, explicitly recognizes this point and complements the standard impulse responses with responses to a prespecified path for the interest rate (this is equivalent to hitting the model with a sequence of shocks appropriately chosen). However, aside from Kieler and Saarenheimo (1998), subsequent papers have ignored the issue. As we argue below, this can be quite important.

[8]We focus here on the output comparisons mainly for convenience; the price responses are often not reported. We would not, however, expect them to be any more uniform than the patterns for GDP.

[9]In the preferred equation, only the expected part of interest rates is retained. The expected rate is constructed to be near a target level which is a function of exchange rate, GDP, and inflation deviations from "target levels" that vary across countries.

[10]Peersman and Smets find the response in Belgium is also stronger than in other countries, contradicting the BIS study.

[11]This theory is sometimes called the credit channel (or the broad credit channel) of monetary transmission.

[12]It is possible that a monetary policy contraction will be more potent in countries with poor legal enforcement. For instance, in the Williamson (1987) setup, low monitoring costs increase the possibility that the equilibrium involves no rationing, and in these equilibria interest rates on loans change but quantities do not respond to monetary policy. In rationing equilibria, which are more likely with high monitoring costs, a tightening will affect loan quantities but not prices.

[13]See Cecchetti (1999) for a similar exercise that focuses more on financial and legal differences.

[14]There is considerable pressure and a countervailing strong amount of resistance to reforming labor market institutions in most European countries, including Spain, Italy, France, and Germany. Reform is moving slowly so that in relative terms the European labor markets are still fairly rigid. One factor for the slow adjustment is the tendency to temporarily suspend a general practice in a particular set of circumstances rather than completely rolling back the general practice.

[15]Rajan and Zingales (1995) show that the German treatment of pension obligations can inflate the liabilities figures for German firms. We do not believe that this effect is very important for this sample.

[16]For all the countries, the fact that some primary commodities are priced in dollars could mean that a change the euro/dollar exchange rate could cause fluctuations in input prices—of course, this has been true historically as well.

[17]These data are the medians across industries in each country. The industry average levels of employment are calculated by weighting firm size by the fraction of industry employment in each firm.

[18]Cecchetti (1999) conducts an intriguing exercise in which he relates the La Porta et al. measures of shareholder rights, creditor rights, and the ability to enforce contracts on measures of the impact of interest rates on output and inflation. He finds that variation in the legal code does seem to partially explain why the potency of monetary policy varies. One difficulty for our purposes is that the interest rate sensitivities he uses come from models that do not account for the exchange rate restrictions discussed in the last section. These correlations also involve non-European countries. Nevertheless, the findings suggest that enforcement costs and legal structure do matter for monetary transmission.

[19]An annual Bank of Italy survey on a sample of manufacturing firms collects information on the access to bank credit. Specific questions are asked as whether firms applied for loans and were rejected by the bank(s), even if they were willing to pay the market rate and possibly even accept an increase in the cost of credit. Guiso (1998) shows that the share of firms that were turned down at the end of 1992 and 1993 were 9 percent and 12.8 percent, respectively, compared with an average of about 3 percent in the previous years.

[20]One proxy that we experimented with is the number of banks with which a borrower has contact. In Italy it appears that firms with a single bank do exhibit the characteristics that one might expect for bank dependent borrowers. However, the propensity to use multiple banks is very high, so it is possible that this screen may not generalize to other countries. Within Italy using this variable is also complicated by the need to merge the company accounts data with another data source, which means many firms end up being dropped from the analysis.

[21]Unfortunately, many firms do not classify themselves as either belonging to a group or as being independent, so we exclude these firms from the comparison.

[22]The exact classification is that low-coverage firms have a positive level of gross operating margin, but a ratio of gross operating margin which is less than the interest payments on their outstanding debt.

[23]Northern firms are located in one of the following regions: Valle d'Aosta, Piemonte, Liguria, Lombardia, Veneto, Trentino Alto Adige, Friuli Venezia Giulia, and Emilia Romagna. Southern firms are from the following regions: Abbruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, and Sardegna. The remaining firms are in the central region and are excluded from this comparison.

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