Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism

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O ver the past decade, the countries of central Europe have become more alike in many ways. As the new members of the European Monetary Union (EMU) prepared for the birth of the euro on January 1, 1999, their economic policies became substantially more uniform. All eleven countries in the new euro area have virtually eliminated inflation and taken serious steps toward fiscal consolidation.[1] As their monetary and fiscal policies have adjusted to meet these common goals, the countries' business cycle fluctuations appear to have become more synchronized as well.[2] While this makes the job of the Eurosystem (the European Central

Bank plus the central banks of the eleven monetary union member countries) easier, numerous difficult challenges remain. Primary among these is the making of policy in the face of the possibility that it will have differential impacts across the countries of the euro area.

The task facing the Eurosystem is even more complex than that facing countries with stable monetary regimes, where the measurement of the national and regional impact of policy has already proved to be extremely difficult. The creation of the Eurosystem constitutes a regime shift in virtually every sense of the term. The introduction of the euro seems sure to prompt adjustments in the economies of the member countries, and these adjustments will probably alter the relationship between the actions of the central bank and the real economy. That is, the monetary transmission mechanism of the countries in the euro area will change, making the job of the new European Central Bank even more difficult than it is already. But how quickly will it change, and what will it become?

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To answer these questions, we must understand the fundamental determinants of the impact of policy actions on output and inflation. For insight into these determinants, I turn to the modern views of the monetary transmission mechanism, which assign a central role to financial structure. Kashyap and Stein (1997) provide a

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starting point; they focus on the importance of the banking system and go on to emphasize the distributional effects of monetary policy changes. The conventional wisdom has always been that some industries are more sensitive to interest rate changes than others, and so changes in policy-controlled interest rates have differential effects across industries. The view based on financial structure both formalizes this reasoning and takes it one step further by noting that some firms are more dependent on banks for financing than others, and that this is true both across and within industries. According to this "lending view" of the transmission mechanism, monetary policy actions change the reserves available to the banking system, thereby affecting the willingness of banks to lend and, ultimately, the supply of loans. How this mechanism will affect individual firms depends on the financing methods available to them. Monetary policy has a bigger impact on firms that are reliant on banks for their financing. Furthermore, healthier banks will be able to adjust to the policy-induced reserve changes more easily than other banks will.

The distributional effects implied by the lending view of monetary policy transmission have clear implications for the euro area and the Eurosystem. Countries in which firms are more bank dependent and banking systems are less healthy will be more sensitive to the Eurosystem's decisions to change interest rates. This brings me to the first question I will address in this paper: Is there evidence

that the impact of monetary policy innovations varies across countries with the strength and scope of the banking system?

With this in mind, I examine differences in the size, concentration, and health of national banking systems, as well as in the availability of nonbank sources of finance. I find, consistent with the most casual observation, that banking system characteristics vary dramatically across the countries of the European Union (EU). Furthermore, these differences do seem to be related to estimated differences in the impact of interest rate changes on output and inflation. Countries with many small banks, less healthy banking systems, and poorer direct capital access display a greater sensitivity to policy changes than do countries with big, healthy banks and deep, well-developed capital markets.

But this is just the first question. The more important issue facing the Eurosystem is whether the national banking systems, and the implied sensitivity of each country's real economy to monetary policy shocks, will change now that there is monetary union.

It is easy to assert that European banks will soon look like U.S. banks, exhibiting a financial structure and transmission mechanism similar to the American models. After all, the euro area does resemble the United States, at least superficially. It has a slightly larger population—292 million for the eleven members of the monetary union relative to 270 million for the United States—and nearly as high a level of GDP—$6.8 trillion compared with $8.1 trillion in 1997. The euro area also has a similar degree of openness to trade, with imports accounting for slightly more than 10 percent of GDP. These parallels, along with the fact that financial technology is easily transferable across national boundaries, have led a number of observers to conclude that the introduction of the euro may act as a catalyst, speeding the rate at which financial relationships in Europe become like those in the United States. For example, while Dornbusch, Favero, and Giavazzi (1998, pp. 48-9) do note the possibility for EU-wide asymmetries resulting from differences in financial structure, they assert that "the euro will change the way financial markets work, inducing corresponding changes in the monetary mechanism. In addition to pervasive

deregulation already under way and innovation, the introduction of the euro will revolutionize the financial structure of Europe. Europe will in a short period become more nearly like the USA." McCauley and White (1997, p. 17) suggest that there may be an acceleration in the rate at which securities replace loans on the asset side of bank balance sheets and commercial paper replaces deposits on the liability side. They point to a "dramatic potential for assets to be stripped out of the banking system" and for securities markets to absorb as much as one-third of the corporate loans now originated in European banks.[3] Overall, these

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commentators are speculating that the increased liquidity of European financial markets brought about by monetary union will lead to significant consolidation of banks, with mergers at both the national and the international level, as well as a direct substitution of traded equities and bonds for bank loans.

Why should we believe that the European financial structure will quickly be transformed into one that mirrors the one in the U.S. model? Without an explanation for the evolution of these countries' national financial structures that is based on their existing differences, such claims are unconvincing. What accounts for the variation in the financial intermediation systems across countries? Traditionally, we look to taxes and regulation for an explanation, and Dornbusch, Favero, and Giavazzi (1998) as well as White (1998) do mention these. Danthine, Giavazzi, Vives, and von Thadden (1999) identify a number of barriers to change in national financial structure and note the importance of the historical path that has brought each country's banks to their current state. Danthine et al.

then go on to assert that "legal differences between EU states, in particular the lack of some form of 'European corporate law,' also remain important and constitute an additional factor of market segmentation" (p. 45). Such disparities in legal structure can explain important economic patterns, and they can be maintained for long periods of time, significantly delaying the harmonization of national banking systems.[4]

It is my main contention that the differences in financial structure across the countries of Europe are a consequence of their dissimilar legal structures. My argument draws on the work of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998), who focus on the relationship between legal structures and finance. They argue that the structure of finance in a country depends on the rights accorded shareholders and creditors by the laws of that country, as well as on the degree to which these laws are enforced. The nature of the laws is, in turn, a product of the legal tradition on which the civil codes of a country are based. La Porta et al. establish that the character of a country's financial markets depends on the country's legal structure. Putting their arguments together with the lending view of the monetary transmission mechanism leads to the possibility that it is the legal system in a country that forms the basis for the structure of financial intermediation and, hence, for the impact of monetary policy on output and prices.

Table 1 reports the empirical findings that support the basic conclusion of the paper. After classifying countries by the origin, or "family," of their legal structure, I calculate for each family the average level of an index of monetary policy's likely effectiveness (based on banking system size, concentration, and health, with a higher value implying greater effectiveness) and the estimated impact of an interest rate change on output and inflation (from a small-scale structural model). The results suggest that a country's legal structure, financial structure, and monetary transmission mechanism are interconnected. The clear pattern is that the predicted effectiveness and its measured impact vary systematically based on the origin of a country's legal system. Countries with better legal protection for shareholders and debtors (countries with a legal

Legal Family	Index of Effectiveness of Monetary Policy	Impact of Policy	
		On Output	On Inflation
English	1.1	-0.45	-0.21
Scandinavian	1.8	-0.52	-0.22
French	2.1	-0.70	-0.20
German	2.4	-1.25	-0.49

Notes: The index of effectiveness of monetary policy, from Table 5, is based on financial structure variables described in the text under the heading "Likely Strength of the Transmission Mechanism," with higher values implying a larger expected impact of interest rate changes on output and prices. The impact of policy on output and inflation, from Table 6, is a measure of the maximum response, in percentage points, to an interest rate movement of 100 basis points, estimated using a small-scale structural model. Countries are classified by the origin, or family, of their legal structure, and group means are reported based on data for Ireland, the United Kingdom, and the United States (English common law); Denmark and Sweden (Scandinavian common law); Belgium, France, Italy, Portugal, and Spain (French civil law); and Germany (German civil law).

structure based on English common law) have financial structures in which the lending channel of monetary transmission is expected to be less potent; for these countries, the measured impact of an interest rate change on output and inflation is lower.

The implication is that unless the laws governing shareholder and creditor rights and the enforcement of those laws are harmonized across the members of the European Monetary Union, monetary policy will continue to have a differential impact. Put slightly differently, it is my belief that the financial structures in the countries of the euro area will not converge into one large U.S.-style system unless there are dramatic legislative changes. If such legal harmonization occurs—that is, if the civil codes protecting shareholders and creditors are made uniform across the countries that have entered the monetary union—then the regional variation in the impact of interest rate changes on output and inflation should decrease.[5] But if legal convergence does not occur, financial structure will remain heterogeneous, and so will the monetary transmission mechanism, and the job of the Eurosystem will be to construct appropriate policy that takes these asymmetries into account.[6]

The remainder of this paper provides the building blocks for this argument. In the next section, I provide a brief survey of the theories of the monetary transmission mechanism, focusing on the importance of financial structure to an understanding of monetary transmission. The following section assesses the national banking systems, including measures of overall size, concentration, health, and the relative importance of nonbank finance. Overall, this analysis allows me to evaluate the likely strength of the lending channel across countries. Subsequently, I report estimates, for a set of ten countries, of the impact of an interest rate increase on output and inflation. These estimates follow the pattern that is expected: Countries where financial structure data suggest that the lending channel should be strong exhibit more sensitivity to monetary policy movements. Following the discussion of these findings, I present the data and arguments from La Porta et al. (1997, 1998) on the relationship between legal and financial structures. This allows me to test the prediction that countries with poor shareholder and creditor protections and poor law enforcement will have less developed financial systems and greater sensitivity of output and

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inflation to interest rate changes. While far from being definitive, the results are consistent with my main hypothesis: Differences in legal systems give rise to variations in national financial structures, and these variations in turn lead to divergences in monetary transmission mechanisms. So long as the legal systems of the euro area countries remain distinct, the impact of interest rate changes across these countries will differ.

THEORIES OF THE TRANSMISSION MECHANISM

A number of comprehensive surveys of the theories of the monetary transmission mechanism have appeared in recent

years. These include Bernanke (1993), Gertler and Gilchrist (1993), Kashyap and Stein (1994, 1997), Hubbard (1995), and my own survey, Cecchetti (1995). As a result, I will be brief.

All theories of how interest rate changes affect the real economy have a common starting point. A monetary policy action begins with a change in the level of bank reserves. For this to have any real effects at all, there must be nominal rigidities in the economy. Otherwise, a change in the nominal quantity of outside money cannot have any impact on the real interest rate. While the ability of the central bank to change the level of bank reserves is not in question, the source of the nominal rigidity that allows the change in reserves to alter short-run real rates of return has been under debate for decades. The current state of this discussion is well summarized by Christiano, Eichenbaum, and Evans (1997). They distinguish three sets of theories: one set based on sticky wages, a second set based on sticky prices, and a third set built on the idea of limited participation. The sticky wage and sticky price models, which are the most familiar, rest on the idea that there are costs to nominal price and wage changes, and so adjustments are infrequent. In limited participation models, introduced in Rotemberg (1984), individuals (households) are unable to adjust their cash balances sufficiently rapidly in response to changes in the environment—that is, households have a limited ability to participate in financial markets, and so must commit themselves to certain portfolio holdings for relatively long periods of time.[7]

The sources of nominal rigidities are relatively unimportant for the discussion of the mechanism by which interest rate changes have short-run effects on output and prices, and so I will move directly to a discussion of the current theories of the transmission mechanism.[8] Our current views are based on the work of Bernanke (1983), Bernanke and Blinder (1992), and Bernanke and Gertler (1989, 1990). These authors distinguish between the traditional money view, in which interest rate movements affect the level of investment and exchange rates directly, and the *lending view*, in which financial intermediaries play a prominent role in transmitting monetary impulses to output and prices. I will describe each of these views in turn.

The traditional view, which is largely the foundation for the textbook IS-LM model, is based on the notion that reductions in the quantity of outside money raise real rates of return. This outcome has two effects, the first directly from interest rates to investment and the second through exchange rates. An interest rate increase reduces investment, as there are fewer profitable projects available at higher required rates of return. A policy action induces a movement along a fixed marginal-efficiency-of-investment schedule. This interest rate channel will be more powerful the less substitutable outside money is for other assets. The exchange rate channel is also familiar from textbook models. Here, an interest rate increase results in a real appreciation of the domestic currency, reducing the foreign demand for domestically produced goods. Regardless of whether the transmission mechanism occurs through the interest rate channel or the exchange rate channel, there is no real need to discuss banks. In fact, there is no reason to distinguish any of the "other" assets in investors' portfolios. This is a simple two-asset model.

An important implication of this traditional model of the transmission mechanism concerns the incidence of the investment decline. Since there are no externalities or market imperfections, only the least socially productive projects, those with the lowest rates of return, go unfunded. As a result, the capital stock is marginally lower, but, given that a decline is going to occur, the allocation of the decline across sectors is socially efficient.

As most of the surveys cited earlier emphasize, the lending view has two parts, one that focuses on the impact of policy changes on borrower balance sheets and another that focuses on bank loans. In both, the effectiveness of policy depends on capital market imperfections that make it easier for some firms to obtain financing than others. Information asymmetries and moral hazard problems, together with bankruptcy laws, mean that the state of a firm's balance sheet has implications for its ability to obtain external finance.[9] By reducing expected future sales and by increasing the cost of rolling over a given level of nominal debt, policy-induced increases in interest rates (which are both real and nominal) cause a deterioration in the firm's net worth. Furthermore, there is an asymmetry

of information in that borrowers (firms) have better information about the potential profitability of investment projects than do creditors (banks). As a result, as the firm's net worth declines, the firm becomes less creditworthy because it has an increased incentive to misrepresent the

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riskiness of potential projects—an outcome that will lead potential lenders to increase the risk premium they require when making a loan. The asymmetry of information makes internal finance of new investment projects cheaper than external finance.

More important for the transmission mechanism per se is that some firms are dependent on banks for finance and that monetary policy affects bank loan supply. A reduction in the quantity of reserves forces a reduction in the level of deposits, which must be matched by a fall in loans. Nevertheless, lower levels of bank loans will have an impact on the real economy only insofar as there are firms without an alternative source of investment funds.

Substantial empirical evidence supports the importance of both capital market imperfections and firm dependence on bank financing. Kashyap and Stein (1997) provide a summary of two types of studies. The first type suggests that banks rely to a large extent on reservable-deposit financing and that, for this reason, a contraction in reserves will prompt banks to contract their balance sheets, reducing the supply of loans. The second type establishes that there are a significant number of bank-dependent firms that are unable to mitigate the shortfall in bank lending with other sources of finance. Overall, recent research does imply the existence of a lending channel.[10]

Models of monetary policy transmission based on financial structure suggest a natural place to begin looking for sources of cross-country differences in the monetary transmission mechanism. The prediction is that overall, the transmission mechanism will be stronger in those countries where firms are more bank dependent, and where the banking system is less healthy and less concentrated. In the first instance, firms that have less direct access to capital markets are unable to blunt the effect of a contraction in bank loans. In the second, banks themselves have restricted access to nonreservable deposits and are forced to contract their balance sheets by more for a given change in policy. In the next section of the paper, I examine data on national financial structure and try to rank countries based on the likely strength of the transmission mechanism. To the extent that these cross-country differences are present, then the lending view implies that they will persist until the financial structures become more uniform.[11]

Likely Strength of the Transmission Mechanism

In assessing the likely impact of an interest rate change on output and prices in the various countries of the EMU, I follow the recent work of Kashyap and Stein (1997) and assemble data on the size and concentration of the banking systems, along with measures of banking system health, the importance of bank financing, and the size of firms. The indicators are chosen to conform as closely as possible to the economic quantities that the lending view suggests should be important. The balance sheets of large, healthy banks are not as sensitive to policy, because reserve contractions can be readily offset with alternative forms of finance that do not attract reserve requirements. In addition, I examine measures of the development of equity and debt markets in the EMU countries. Firms with ready capital market access, which are more likely to be found in countries with extensive secondary securities markets, will be better insulated from bank loan-supply contractions. Combining these measures, I construct an index of the probable strength of the monetary transmission mechanism.[12]

To assess the importance of small banks in a country's financial system, Table 2 reports the number of banks, the number of banks per million population, and measures of concentration for all of the EU countries plus Japan and the United States.[13] The data reveal that Austria and Finland have many more banks per capita—126 and 68 per million people, respectively—than any of the other countries. The remaining countries fall into roughly three groups: The United Kingdom, Japan, and the southern European countries of Spain, Portugal, and Greece have less than 10 banks per million; the United States and Germany have 40 or slightly more; and the remaining countries have between 13 and 25.

Turning to the concentration measures in the fourth column of the table, it is interesting to note that countries with more banks do not necessarily have less concentrated banking systems. France, for example, with 1,373 banks and just under 60 million people, has a fairly high concentration ratio: the top five French banks account for a sizable 40 percent of total banking system assets and the top ten for nearly two-thirds. Overall, Denmark and Germany have the least concentrated banking systems in Europe. By contrast, large banks clearly dominate Sweden, Finland, Belgium, the Netherlands, and Greece. The remaining countries are somewhere in between.

What do these findings imply for the strength of the transmission mechanisms in the countries examined? Austria, Germany, and the United States have systems composed of a network of small banks, and so one would expect the lending channel to be relatively strong in those countries. At the other end of the spectrum, Belgium, Finland, Ireland, the Netherlands, Portugal, Sweden, and the United Kingdom all have banking industries dominated by a small number of relatively large banks, with a modest periphery of small institutions. The remaining countries—Denmark, France, Greece, Italy, and Japan—fall in a middle group.

The weaker a nation's banking system, the stronger the expected impact of policy movements. With this in mind, I have collected a set of standard gauges of banking system health—return on assets, loan loss provisions, net interest margin, and operating costs—and I have calculated a summary rating of overall system soundness (Table 3). Focusing primarily on the return on assets and the average Thomson ratings in Table 3 leads to the following rankings: Ireland, the United Kingdom, and the United States have the healthiest banks; Austria, Belgium, Germany, the Netherlands, Spain, Denmark, and Greece are second; Finland, France, Italy, Portugal, and Sweden are third; and Japan is alone at the bottom.

Finally, I turn to the availability of nonbank finance for firms in EU and other countries. The relevant data are reported in Table 4. Following Kashyap and Stein (1997) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997), I examine the number of publicly listed firms, the extent of secondary equity and debt markets, and the ratio of bank loans to all forms of finance. Although these are crude measures of access to external finance, they are informative. As in the case of Table 2, the countries can be divided into three groups. Austria, Ireland, Italy, Portugal, and Greece appear to have the least well developed external capital markets. They have small equity and bond markets,

Table 2
SIZE AND CONCENTRATION OF THE BANKING INDUSTRY, BY COUNTRY, 1996

Country	Number of Credit Institutions	Banks per Million People	Concentration Ratios: Top Five Banks
Monetary union members			
Austria	1,019	126	48
Belgium	140	14	57
Finland	350	68	78
France	1,373	24	40
Germany	3,517	43	17
Ireland	62	18	41
Italy	937	16	25
Netherlands	172	11	79
Portugal	51	5	76
Spain	313	8	44
Members of the EU not in EMU			
Denmark	117	22	17
Greece	20	2	71
Sweden	124	14	90
United Kingdom	478	8	28
Other countries			
Japan	556	4	30
United States	10,803	40	17

Sources: See the Data Appendix.

Note: Concentration ratios are calculated as the percentage of each country's bank assets accounted for by the five largest banks.

Table 3
MEASURES OF BANKING INDUSTRY HEALTH, BY COUNTRY, 1996
Percent

Country	Return on Assets (1)	Loan Loss Provisions (2)	Net Interest Margin (3)	Operating Costs (4)	Average Thomson Rating (5)
Monetary union members					
Austria	0.38	0.59	1.67	2.45	2.38 (4)
Belgium	0.52	0.17	1.41	1.67	2.00 (6)
Finland	0.50	0.78	2.07	3.05	2.83 (3)
France	0.36	0.24	1.43	1.84	2.28 (16)
Germany	0.44	0.18	1.24	2.19	1.97 (19)
Ireland	1.57	0.17	3.36	3.32	1.83 (3)
Italy	0.33	0.62	2.32	3.19	2.57 (15)
Netherlands	0.75	0.26	2.06	2.48	2.10 (5)
Portugal	0.91	0.42	2.60	3.80	2.30 (5)
Spain	0.76	0.32	2.20	2.69	1.79 (11)
Members of the EU not in EMU					
Denmark	0.91	0.11	1.28	0.97	2.33 (3)
Greece	1.11	0.18	1.98	2.77	2.50 (6)
Sweden	1.28	0.25	1.90	1.77	2.50 (5)
United Kingdom	1.28	0.18	2.15	2.42	2.04 (23)
Other countries					
Japan	0.01	0.75	1.17	1.03	3.32 (44)
United States	1.42	0.10	2.68	3.51	1.73 (344)

Sources: See the Data Appendix.

Notes: Except for the Thomson ratings, all figures in the table are calculated as a percentage of total bank assets. In column 5, the number of banks rated by Thomson in each country and used to compute the average appears in parentheses.

Table 4
IMPORTANCE OF EXTERNAL AND BANK FINANCE BY COUNTRY, 1996

Country	Number of Publicly Traded Firms (1)	Publicly Traded Firms per Capita (2)	Market Capitalization as a Percentage of GDP (3)	Corporate Debt as a Percentage of GDP (4)	Bank Loans as a Percentage of All Forms of Finance (5)
Monetary union members					
Austria	106	13.15	15	46	65
Belgium	139	13.68	45	60	49
Finland	71	13.87	50	34	39
France	686	11.75	38	49	49
Germany	681	8.32	29	58	55
Ireland	76	21.59	18	13	80
Italy	217	3.78	21	37	50
Netherlands	217	13.97	96	48	53
Portugal	158	16.11	23	19	62
Spain	357	9.09	42	11	58
Members of the EU not in EMU					
Denmark	237	45.06	41	105	25
Greece	245	23.44	20	3	48
Sweden	229	25.90	99	73	32
United Kingdom	2,433	41.39	150	45	37
Other countries					
Japan	2,334	18.56	67	39	59
United States	8,479	31.94	111	64	21

Sources: See the Data Appendix.

Notes: Market capitalization is the year-end value of firms listed on major exchanges. For the United States, three exchanges are used; for Japan, eight; and for each of the remaining countries, one.

and bank loans account for a high percentage of firm financing. By contrast, Belgium, Denmark, Sweden, the United Kingdom, and the United States all have substantial secondary capital markets, and banks are a less important source of finance. The remaining six countries are somewhere in between these two groups.

Table 5 summarizes the material in Tables 2-4 and suggests the overall relative strength of monetary policy in the fourteen EU countries, Japan, and the United States. The final column, "Predicted Effectiveness of Monetary Policy," reports a measure of the effects of monetary policy on output and inflation, where higher values suggest a stronger lending channel and therefore a larger impact. Overall, the pattern is very similar to the one reported in Kashyap and Stein (1997, Table 6). Most important, the predicted effects of interest rate movements vary greatly across countries. For example, looking at the EMU countries, one would expect that a given interest rate change would have the most impact in Austria and Italy, countries

in which small banks are relatively important, the banking systems are less healthy, and firms have little access to non-bank sources of finance. The opposite is true of Belgium, Ireland, and the Netherlands, where the banking systems are large and healthy and nonbank finance is readily available; in these countries, interest rate movements would be expected to have a more muted impact.[14]

The conclusions of this section could be criticized as applying only to the pre-EMU period. But will the introduction of the euro be a catalyst for the harmonization of financial structure across the EMU? I take this question up in more detail later, but at this point I will simply mention that the recent European Central Bank (1999) report *Possible Effects of EMU on the EU Banking Systems in the Medium to Long Term* provides very little evidence to suggest that an increase in either international banking competition or securitization and disintermediation will occur quickly.

MEASURING THE IMPACT OF POLICY ON OUTPUT AND PRICES

Testing the proposition that the banking system's concentration, health, and importance have a material impact on the monetary transmission mechanism requires an estimate of the effects of an interest rate change on output and prices. Numerous studies report such estimates for some or all of the countries of the EU. These include Gerlach and Smets (1995), who estimate a three-variable structural vector autoregression based on long-run restrictions; de Bondt (1997), who presents estimates of the impact of policy on output and prices for Germany, France, Italy, the United Kingdom, Belgium, and the Netherlands that are based on the work of other authors; Dornbusch, Favero, and Giavazzi (1998), who report estimates of the impact of policy on output and prices derived from both small vector-autoregressive models and large structural models, for Italy, Germany, France, Spain, Sweden, and the United Kingdom; Kieler and Saarenheimo (1998), who study France, Germany, and the United Kingdom, concluding that the transmission mechanism is not significantly different across the three countries; and Vlaar and Schuberth

Table 5
SUMMARY OF FACTORS AFFECTING THE STRENGTH OF THE MONETARY TRANSMISSION MECHANISM

Country	Importance of Small Banks (1)	Bank Health (2)	Availability of Alternative Finance (3)	Predicted Effectiveness of Monetary Policy (4)
Monetary union members				
Austria	3	2	3	2.67
Belgium	1	2	1	1.33
Finland	1	3	2	2.00
France	2	3	2	2.33
Germany	3	2	2	2.33
Ireland	1	1	3	1.67
Italy	2	3	3	2.67
Netherlands	1	2	2	1.67
Portugal	1	3	3	2.33
Spain	2	2	2	2.00
Members of the EU not in EMU				
Denmark	2	2	1	1.67
Greece	2	2	3	2.33
Sweden	1	3	1	1.67
United Kingdom	1	1	1	1.00
Other countries				
Japan	2	4	2	2.67
United States	3	1	1	1.67

Notes: Column 1 is based on Table 2; column 2, on Table 3; and column 3, on Table 4. Column 4 is an average of columns 1, 2, and 3.

(1998), who examine money demand functions for fourteen EU countries; Ehrmann (1998), who estimates structural vector autoregressions for thirteen countries and finds considerable differences in the intensity of the response of

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Testing the proposition that the banking system's concentration, health, and importance have a material impact on the monetary transmission mechanism requires an estimate of the effects of an interest rate change on output and prices.

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output and prices to monetary shocks across countries; and Cecchetti and Rich (1999), who look at a simple two-variable system for Australia, Canada, France, Italy, Switzerland, the United Kingdom, and the United States, and find large differences in the implied impacts.

Each of these studies has advantages and disadvantages. Overall, I have chosen to examine the results reported by Ehrmann (1998). The appeal of Ehrmann's approach is that it yields a series of estimates, all based on the same methodology, for nearly the full set of EU countries. Ehrmann uses techniques devised by King, Plosser, Stock, and Watson (1991). In effect, he identifies monetary shocks using a combination of long-run and short-run restrictions. The methods are described both in his paper and in Cecchetti, McConnell, and Perez Quiros (1999). For each country, the model has either four or five variables, including output, inflation, and an interest rate, and—with the exception of Germany—an exchange rate. When a fifth variable is present, it is either a second interest rate or a commodity price index.[15]

The chart plots the responses of output and inflation to an interest rate movement of 100 basis points for ten EU countries and the United States.[16] These ten countries are the ones for which Ehrmann is able to generate consistent and plausible results.[17] As is clear from these plots, the point estimates of the impulse response functions

vary dramatically across countries. Looking at the impact of interest rate movements on output, note that for France and Germany, the peak impact is nearly twice what it is in the remaining European countries, and fifteen times the estimated impact in the United States. The impact of policy on inflation also varies substantially.
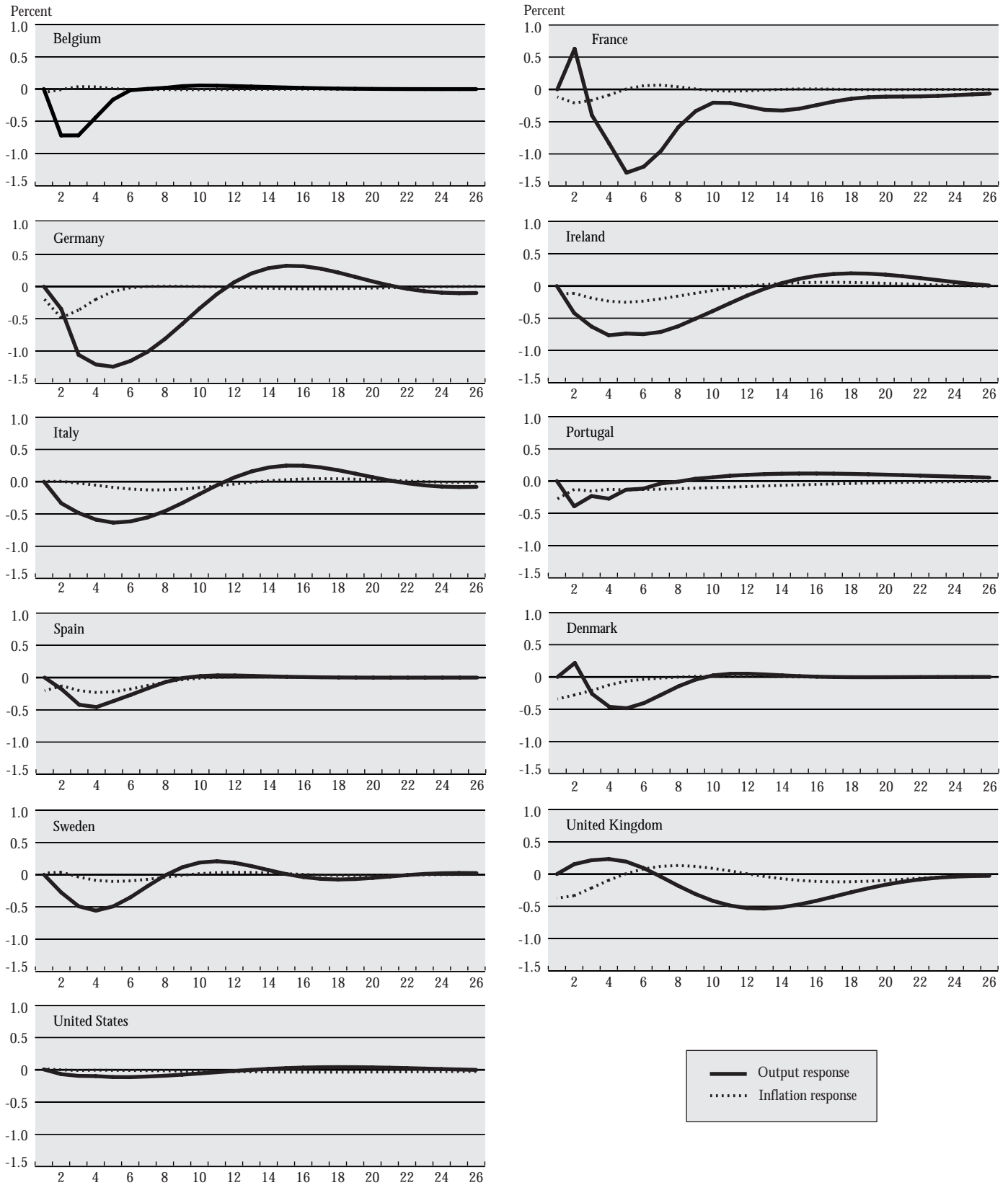
Table 6 reports the maximum impact of a 100-basis-point monetary contraction on output and inflation for all of the countries for which I have estimates. I also include a measure of the timing of the impact—the quarter at which the maximum effect occurs. The final column in the table presents a measure of the ratio of the average output response to the average inflation response. This measure is related to the sacrifice ratio because it is roughly the output loss for an inflation decline of 1 percentage point over a horizon of approximately three years. Unfortunately, these estimates are not terribly precise, a point that is clear from the results in Ehrmann's paper,[18] and so we should not take some of the numbers too seriously.

SYSTEMATIC DIFFERENCES IN NATIONAL LEGAL SYSTEMS

If differences in financial systems are creating the cross-sectional variation in the transmission mechanism, it is natural to look for the causes of these differences. As noted earlier, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997, 1998) have examined the relationship between a country's legal system and its financial system. The premise of their work is that investors provide capital to firms only if the investors have the ability to get their money back. For equity holders, this means that they must be able to vote out directors and managers who do not pay them. For creditors, this means that they must have the authority to repossess collateral. In addition to having nominal legal rights, these groups must also have confidence that the laws will be enforced.

La Porta et al. (1997, 1998) collect data on the legal systems in forty-nine countries. They show that all of these legal systems belong to one of four families: English common law, French civil law, Scandinavian civil law, and German civil law. With regard to shareholder rights—specifically, the ability of shareholders to vote

Reaction of Output and Inflation to an Interest Rate Increase of 100 Basis Points

Quarterly by Country

Sources: Cecchetti (1996); Cecchetti, McConnell, and Perez Quiros (1999).

IMPACT ON OUTPUT AND INFLATION OF A 100-BASIS-POINT INCREASE IN INTEREST RATES

Country	Output Maximum Impact (1)	Quarter of Maximum Impact (2)	Inflation Maximum Impact (3)	Quarter of Maximum Impact (4)	Approximate Sacrifice Ratio (5)
Monetary union members					
Austria	—	—	—	—	—
Belgium	-0.72	2	-0.05	1	-45.29
Finland	—	—	—	—	—
France	-1.30	5	-0.21	2	-12.07
Germany	-1.21	5	-0.48	2	-5.83
Ireland	-0.76	4	-0.25	5	-3.45
Italy	-0.64	5	-0.25	9	-5.01
Netherlands	—	—	—	—	—
Portugal	-0.39	2	-0.28	1	-0.58
Spain	-0.46	4	-0.23	4	-1.34
Members of the EU not in EMU					
Denmark	-0.48	5	-0.34	1	-1.69
Greece	—	—	—	—	—
Sweden	-0.56	4	-0.11	5	-5.61
United Kingdom	-0.53	13	-0.37	1	-2.57
Other countries					
Japan	—	—	—	—	—
United States	-0.07	6	-0.017	12	-3.27

Sources: Estimates for the United States are from Cecchetti (1996); those for the remaining countries are from the estimation of Ehrmann's model in Cecchetti, McConnell, and Perez Quiros (1999).

directors out—English common law countries have the best protections and French civil law countries have the worst. The pattern is similar for creditor rights, which entail the right to reorganize or liquidate a firm. The pattern for enforcement is a bit different: Scandinavian civil law countries have the most rigorous law enforcement, while French civil law countries have the most lax.

Table 7 reproduces a portion of Table II from La Porta et al. (1997). The column labeled "Shareholder Rights" reports an index that is higher when shareholders find it less costly and difficult to vote directors out. The column labeled "Creditor Rights" reports an analogous index that is lower when creditors experience less difficulty gaining possession of property that has been used to collateralize a bond or loan. Enforcement is an assessment of countries' rigor in carrying out their laws, with a higher score implying more aggressive enforcement. Finally, the table reports the legal family from which each country's laws are derived.

SHAREHOLDER RIGHTS, CREDITOR RIGHTS, AND ENFORCEMENT, BY COUNTRY

Country	Shareholder Rights (1)	Creditor Rights (2)	Enforcement (3)	Legal Family (4)
Monetary union members				
Austria	2	3	10.00	German
Belgium	0	2	10.00	French
Finland	2	1	10.00	Scandinavian
France	2	0	8.98	French
Germany	1	3	9.23	German
Ireland	3	1	7.80	English
Italy	0	2	8.33	French
Netherlands	2	2	10.00	French
Portugal	2	1	8.68	French
Spain	2	2	7.80	French
Members of the EU not in EMU				
Denmark	3	3	10.00	Scandinavian
Greece	1	1	6.18	French
Sweden	2	2	10.00	Scandinavian
United Kingdom	4	4	8.57	English
Other countries				
Japan	3	2	8.98	German
United States	5	1	10.00	English

Source: La Porta et al. (1997), Table II.

Using these data to examine the relationship between shareholder rights, creditor rights, and enforcement on the one hand, and the concentration of ownership and the availability of external finance on the other, La Porta et al. (1997, 1998) come to two conclusions. First, corporate ownership is more concentrated in countries where shareholders and creditors are poorly protected by both the substance of the law and its enforcement. Second, and more germane to the current discussion, countries with weaker legal rules and less rigorous law enforcement have smaller and narrower capital markets. Overall, English common law countries have the least concentration of corporate ownership and the largest and deepest capital markets. French civil law countries have the most concentrated ownership and the smallest capital markets. La Porta et al. (1997) conclude that the "differences in the nature and effectiveness of the financial systems around the world can be traced, in part, to differences in investor protection against expropriation by insiders, as reflected by legal rules and the quality of their enforcement" (p. 1131). Their findings are confirmed by the data in Table 4, which show clearly that the United States and the United Kingdom have much more extensive capital markets than France and Italy.

RELATIONSHIP OF THE LEGAL ENVIRONMENT TO THE IMPACT OF POLICY

Following the demonstration in La Porta et al. (1997, 1998) that the systematic variation in systems of corporate governance and finance across countries can be tied to the differences in the countries' legal systems, I ask if the variation in the predicted strength of the lending channel and the estimated impact of interest rate movements on output and inflation can be traced to these same legal differences.[19] To address this question, I combine the data from Table 5 on the predicted strength of the lending channel of monetary transmission and from Table 6 on the size of the impact of interest rate movements on output and inflation with the measures of cross-country differences in legal organization from Table 7. In Table 8, I report the results of two straightforward exercises. The first separates the

countries by the origin of their legal system and constructs group averages for the effectiveness and impact of monetary policy from column 4 of Table 5 and columns 1 and 3

The countries in which the lending channel is expected to be strongest have the biggest sacrifice ratios and show the largest impact of interest rate movements on output.

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of Table 6 (Table 8, top panel). The results follow the pattern predicted by the index of lending channel effectiveness as the impact of policy on output and the approximate sacrifice ratio vary systematically—and as expected—with the origin of a country's legal system.

We can learn a bit more from the data than is recovered from the simple averages reported in the top panel of Table 8. The question of greatest interest is whether the cross-country heterogeneity in the real effects

Legal Family	Predicted Effectiveness of Monetary Policy	Impact of Policy		Approximate Sacrifice Ratio
		On Output	On Inflation	
		Group Mean		
English	1.1	-0.45	-0.21	-3.1
Scandinavian	1.8	-0.52	-0.22	-3.7
French	2.1	-0.70	-0.20	-4.8[a]
German	2.4	-1.25	-0.49	-5.8
		Instrumental Variables Regression		
Coefficient	—	-0.46	0.05	-10.4
Standard error	—	(0.22)	(0.08)	(10.4)

Notes: "Predicted Effectiveness" is drawn from column 4 of Table 5; the "Impact of Policy," from columns 1 and 3 of Table 6. The instrumental variables regression is of columns 1 and 3 of Table 6 on column 4 of Table 5, with columns 1, 2, and 3 of Table 7 as instruments. All of the results in this table use only the eleven countries for which there are estimates in Table 6 : Ireland, the United Kingdom, and the United States (English common law); Denmark and Sweden (Scandinavian common law); Belgium, France, Italy, Portugal, and Spain (French civil law); and Germany (German civil law).

[a]Average excludes Belgium.

of monetary policy can be explained by differences in the countries' financial systems, which have their source in the strength of shareholder and creditor rights and the rigor with which these rights are enforced. We can do this without fully accounting for all of the variation in the transmission mechanism if we assume that the La Porta et al. (1997) measures are valid instruments for the financial variables in a simple regression that has the impact of policy on the left-hand side and the overall measure of the lending channel's effectiveness on the right-hand side. That is, I assume that the shareholder, creditor, and enforcement variables are exogenous, while the measure of the effectiveness of the lending channel may not be.

The results of these two-stage least squares regressions are reported in the bottom panel of Table 8. Again, we see that the countries in which the lending channel is expected to be strongest have the biggest sacrifice ratios and show the largest impact of interest rate movements on output. The latter of these relationships has a t-ratio of 2.1, and so it may even be significantly different from zero. The results for inflation are much less satisfactory: the measures of financial structure appear to be uncorrelated with the impact of policy on prices. Because of the small size of the sample (eleven countries), the estimates are all fairly imprecise, and so I treat them as being only suggestive.

CONCLUDING REMARKS

Among the many challenges facing the new Eurosystem is the possibility that the regions of the euro area will respond differently to interest rate changes. In this paper, I have suggested that differences in financial structure are a proximate cause for these national asymmetries in the monetary policy transmission mechanism. Moreover, I have proposed that these differences in financial structure are likely a result of the EU countries' diverse legal structures. The evidence, although circumstantial, is consistent with this view. Most economists believe that the monetary transmission mechanism will vary systematically across countries with differences in the size, concentration, and health of the banking system, and with differences in the availability of primary capital market financing. The countries of the EU differ quite dramatically in all of the dimensions that would seem to matter, leading to the prediction that the impact of interest rates on output and prices will not be consistent across countries. While the estimates of the impact of interest rate changes on output and inflation tend to be quite imprecise, they do differ, and in the way that is predicted by the state of the countries' financial systems. Finally, we can trace differences in financial structure, the size and scope of capital markets, and the availability of alternatives to bank financing to differences in the countries' legal structures.

What does this mean for the future of financial markets and monetary policy in the euro area? Will the European banking system become more like that of the United States? The arguments presented here suggest that unless legal structures are harmonized across Europe, financial structures will remain diverse, and so will monetary transmission mechanisms. It will not be enough to make regulatory structures more similar, since such a change will not, in and of itself, alter the structure of capital markets. In other words, I do not view regulatory competition as a force to eliminate the asymmetries in the financial intermediation systems of the EU.[20] As the European Central Bank (1999) report makes clear, this force has been very weak in the past and is expected to be weak in the future. While we may see cross-border mergers and acquisitions of financial sector firms that take advantage of the expertise of those already doing business in a region,[21] only a decision to change the existing legal structures so that shareholders and creditors in all EU countries enjoy the same rights will force the movement to a U.S.-style financial structure.

The data sources for Tables 2-4 in this paper are identified below.

TABLE 2

Number of institutions and concentration ratios: For all countries, concentration is calculated as the assets of the top five banks as a percentage of total bank assets.

Population: International Monetary Fund, *International Financial Statistics* (January 1999), country report tables, l. 99z, midyear estimates for all countries.

Austria: Austrian National Bank web pages http://www.oenb.co.at/stat-monatsheft/tabellen/2001p.htm, Ingesamt, Hauptanstalten, for number of institutions; and http://www.oenb.co.at/stat-monatsheft/tabellen 2000_5p.htm, Alle Sektoren, Summe Aktiva (Ohne Rediskonte), for total assets; Austrian National Bank, Economic Analysis Division, for assets of top five and top ten banks.

Belgium: OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, p. 36, l. 37 (under supplementary information), for number of institutions; Bank of Belgium, Financial and Economic Statistics Division, for total assets of credit institutions and for share of top five banks.

Finland: Bank of Finland, *Financial Statistics Desk*, for all figures.

France: Bank of France, Monetary Research and Statistics Division (DESM-SASM) for all figures on credit institutions.

Germany: Deutsche Bundesbank, *Monthly Report* (May 1998), p. 16, Table IV.1, column 1, for number of institutions; Deutsche Bundesbank, Department of Controlling, Accounting and Organisation, Division C-2, for share of top five banks.

Ireland: Central Bank of Ireland, *Monetary Policy and Statistics*, for number and total assets of all credit institutions (which include licensed banks, building societies, state-sponsored financial institutions, and savings banks); IBCA Bank-Scope database, for assets of top five banks.

Italy: Bank of Italy, Research Department, for all figures.

Netherlands: OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, p. 192, l. 37 (under supplementary information), for number of institutions; De Nederlandsche Bank, *Annual Report* (1997), Tables 1, 2.1, and 2.2, for assets of top five banks and for total assets of monetary institutions.

Portugal: Bank of Portugal web page http://www.bportugal.pt/publish/frpublish_e.htm, Chart VIII.1 and Table VIII.2, for number of institutions and share of top five banks. OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, p. 231, l. 25, for total assets of commercial banks.

Spain: OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, p. 236, l. 37 (under supplementary information), for number of banks; Bank of Spain, *Statistical Bulletin* (June 1998), Tables 61.1 (p. 271), 62.1 (p. 281), 63.1 (p. 291), sum of column 1 in all tables, for total assets of banks, savings banks, and credit co-operatives; IBCA Bankscope database, for assets of top five banks.

Denmark: OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, p. 64, l. 37 (under supplementary information), for number of institutions; Denmark National Bank web page http://www.nationalbanken.dk/nb/nb.nsf/all-docs/F15D9E8CF275ED1A2412565B4003E8BD5, for total assets; IBCA BankScope database, for assets of top five banks.

Greece: Hellenic Bank Association, *The Greek Banking System* (April 1998), p. 87, for number of institutions, total assets, and assets of top five banks.

Sweden: Sveriges Riksbank, *Statistical Yearbook (*1996), p. 17, Table 6, for number of banks; Sveriges Riksbank, Financial Statistics Department, for share of top five banks.

United Kingdom: British Bankers Association, *Annual Abstract of Banking Statistics* (1997), Table 1.04, for number of institutions; Bank of England, MFSD, for shares of top five banks (data relate to all banks and building societies operating in the United Kingdom and so include the business of foreign-owned affiliates in the United Kingdom).

Japan: Bank of Japan, International Department, for all figures for banks and other deposit-taking institutions, end of fiscal year 1996 (March 1997).

United States: Federal Financial Institutions Examination Council (FFIEC), Reports of Condition (call reports database), for all figures for commercial banks.

TABLE 3

Bank data: McCauley and White (1997), Table 1. Federal Reserve Bank of New York staff calculations for Austria, Belgium, Greece, Ireland, Italy, and Portugal, based on ranking of asset size from IBCA BankScope database. In each country, banks were chosen according to 1997 assets. Return on assets, loan loss provisions, net interest margin,

and operating cost are drawn from IBCA BankScope database.

Thomson ratings: Thomson BankWatch database.

TABLE 4

Number of publicly traded firms and market capitalization: International Finance Corporation, *Emerging Stock Markets Factbook* (1997), pp. 17 and 23 (also available on the *Wall Street Journal* web site http://update.wsj.com/public/resources/documents/gi-tab5.htm).

Population: See sources for population data in Table 2.

Privately issued debt: Bank for International Settlements, *International Banking and Financial Market Developments* (February 1998), pp. 46-7, Tables 14 and 15, amount outstanding, December 1996 figures; sum of figures from Table 14 (international debt securities) and Table 15 (domestic debt securities).

GDP: International Monetary Fund, *International Financial Statistics* (January 1999), country report tables, l. 99b.c for all countries. Year-average exchange rates used for conversion into U.S. dollars (local currency per U.S. dollar, l. rf for all countries).

Bank loans: OECD, *Bank Profitability: Financial Statements of Banks* (1998), country reports on bank balance sheets, l. 16 on pp. 27, 35, 63, 67, 91, 115, 143, 159, 163, 167, 191, 231, 235, 251, 259, 263, 303, 307, and 315.

ENDNOTES

1. Throughout the paper, I refer to the eleven countries of the Eurosystem but provide information on only ten. Luxembourg is not included.

2. See Angeloni and Dedola (1998).

3. Similar points are made by White (1998), who suggests that competition in banking may be about to increase in Europe, stimulated by the introduction of the euro. In addition, a recent European Central Bank (1999) study suggests that European Monetary Union may speed up the process of disintermediation and lead to a more geographically diversified and internationalized banking system.

4. For example, within the United States, more than 10 percent of firms with assets exceeding $1 million have chosen to incorporate in Delaware, a state with less than ½ of 1 percent of the country's population. Why is this? The answer can be found by considering how the development of Delaware's legal structure has differed from the development of the legal structure in other states. Originally, large firms were incorporated in New Jersey because the state, in exchange for incorporation fees and franchise taxes, had liberalized its corporation law to allow various mergers and cross-holdings that were disallowed elsewhere. State law also gave very strong power to corporations' directors (Grandy 1989). Delaware copied New Jersey's statutes and then benefited from changes made to New Jersey's law by Governor Woodrow Wilson in 1913. As this example suggests, the economic structure has its source in the legal structure.

5. I should note that firms in countries that act slowly will be put at a competitive disadvantage, and so they might pressure their governments to speed up the legal changes. The potential strength of such regulatory competition is an open issue.

6. There is an alternative. A company may move to a country where the financial system better suits its needs. The La Porta et al. measures, reported in Table 7, suggest that the United Kingdom is the best country in the European Community in which to issue both bonds and stocks, and so firms that wish to have ready access to primary capital market financing may tend to concentrate there. But for this strategy to be successful, firms would have to reincorporate *and* move assets into the alternative jurisdiction. The assets must move to provide the proper guarantees to investors. All of this seems unlikely.

7. In addition to the differences in the type of nominal rigidity, there are variations in the way in which the rigidites are modeled. These variations are more than formal; they have very different implications for the dynamic effects of nominal shocks on real variables. Different modeling strategies are based on differences in the timing of price- or wage-change decisions. There are three basic schemes used, based on Fischer (1977), Taylor (1980), and Calvo (1983), and they create very different dynamic responses of real variables to nominal shocks. Fischer, for example, assumes prices are predetermined, meaning that at some time agents set prices for some number of future periods; the level of prices set on the decision date can differ for the different periods before the next decision date. In this model, the impact of a nominal shock lasts for only as long as it takes for all price setters to have a chance to reset their price schedules. In the Taylor model, prices or wages are assumed to be fixed, meaning that their nominal value does not vary between decision dates. When prices or wages are fixed, nominal shocks die out only asymptotically. In Calvo's model, price setters change their prices according to a poison process, leading to a variety of possible dynamics.

8. Longer run considerations, such as the potential costs or benefits of modest levels of inflation, critically depend on understanding the sources of nominal rigidity. For example, Akerlof, Dickens, and Perry (1996) and Groshen and Schweitzer (1997) consider whether small positive levels of aggregate inflation can facilitate real adjustments in the presence of an aversion to nominal wage declines, suggesting that the long-run goal for inflation might be positive. But Feldstein (1996) contends that the tax distortions created by inflation reduce the level of output permanently, an argument that suggests that the optimal level of inflation may even be negative. Overall, most economists now seem to agree that inflation leads to lower levels of real output and may even retard long-run growth. See Feldstein (1999) for a summary.

9. As emphasized by Kashyap and Stein (1994), this assertion applies to both financial and nonfinancial firms.

10. This is not to say that the traditional mechanisms, operating through interest rates and exchange rates, are not present as well. Unfortunately, it has proved to be very difficult to disentangle the individual importance of the various channels of transmission.

11. It is important to note that there can be significant cyclical and secular changes in the strength of the lending channel as the health and concentration of the banking system change, and as capital markets become deeper and broader.

12. After I collected the data for this section, the European Central Bank issued its report *Possible Effects of EMU on the EU Banking Systems in the Medium to Long Term*. The appendix tables in that report contain much of the same information presented here.

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13. Throughout the analysis, I omit Luxembourg.

14. A significant failing of this analysis is the assumption that these relative rankings are not changing over time. Surely, if I had chosen different dates to measure the relative health and concentration of countries' banking systems, I would have created a different set of rankings for the first two indicators. It is entirely possible that both the relative importance of small banks and the health of the banking system will become increasingly uniform across countries, leaving only differences in external finance.

15. See Appendix A in Ehrmann (1998) for additional details.

16. The results for the United States are derived from Cecchetti (1996).

17. Although he reports estimates for thirteen countries, the estimates for three of these countries appear to be difficult to interpret. In the case of Finland, for example, the impact of monetary tightening is to *increase* output, not decrease it. For Austria and the Netherlands, we have not been able to replicate the results in the current version of Ehrmann's paper.

18. Figures 1-13 in Ehrmann (1998) show that the impulse response functions are rarely significantly different from zero. The same point is made in Cecchetti (1998) and Cecchetti and Rich (1999).

19. White (1998) makes a related point when he notes that the legal, tax, regulatory, and supervisory frameworks within which financial institutions operate differ significantly across the various countries of the EU. All of these differences make direct competition more complex and less appealing. He goes on to focus on differences in the EU countries' labor laws and in the regulatory restrictions the countries place on the types of financial products that can be offered. These effects are surely complementary to the ones I address here.

20. It is also extremely unlikely that these difficulties will be overcome by the issuance of debt and equity in a jurisdiction that offers sufficient investor protections. But unless firms have assets within these jurisdictions, I do not see this as a solution.

21. Such developments would be similar to what has happened with the relaxation of interstate branching regulations in the United States, where banks in one state have purchased a bank in another state in order to obtain the legal and regulatory knowledge to do business in that state. Interstate branching has not meant opening new branches of an existing bank in another region.

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