Financial Structure and Monetary Transmission in Europe: A Cross-Country Study

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Citation for published version (APA):

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Download date: 19 Dec 2018
2 CREDIT AND ASYMMETRIC EFFECTS OF MONETARY POLICY IN SIX EU COUNTRIES: AN OVERVIEW

2.1 Introduction

Since the seminal work of Friedman and Schwarz (1963) and Friedman and Meiselman (1963) the monetary transmission process - the way how monetary policy decisions are transmitted into real economic activity - has been and still is an important topic in monetary economics. For a long time there has been a debate about the relation between money and income (see for a survey Fase, 1987). More recently a large body of literature has returned to the classic empirical question 'What are the real effects of monetary policy?', by analysing not only money and income, but also the prices of different financial assets and the role of banks (see, among many others, Stock and Watson, 1989, and Friedman and Kuttner, 1993a and 1993b). Most monetary authorities and economists now agree that monetary policy can significantly affect real economic activity, at least in the short run. Considerable debate remains, however, about how exactly monetary policy affects the real economy (Friedman, 1995).

This chapter gives an overview of the channels of monetary policy transmission, with special attention to credit and asymmetric effects of monetary policy in Europe. The focus is on three aspects in particular. The first aspect is to provide a brief introduction and decomposition of the channels of monetary policy transmission. The second aspect is to take a closer look at two debates in the monetary transmission literature, which have shown a revival of interest in the past decade. The first strand of the literature addresses the issue whether banks' liabilities (money) and/or assets (credit) play a role in the monetary transmission process. The second debate focuses on the asymmetric effects of monetary policy. Both debates have far-reaching implications for monetary policy decisions, e.g. Is money, or are both money and credit, useful information variables? Are monetary expansions effective as anti-recession policies or are contractionary monetary policies only effective to slow down economic growth? The third aspect concerns a survey of the main findings of empirical research for Europe over the past five years in the light of the above-mentioned monetary transmission debates. Because virtually all recent surveys of monetary transmission research - see e.g. Gertler (1988), Gertler and Gilchrist (1993), Bernanke and Gertler (1995), Meltzer (1995), Peek and Rosengren (1995), and Mishkin (1996) - focus primarily on the US, the present survey examines six European countries: Germany, France, Italy, the United Kingdom, Belgium, and the Netherlands. The first four are the most important
European Union (EU) member states in terms of the size of their economies, while Belgium and the Netherlands are two small and open economies of the EU. Understanding the differences and similarities in the monetary transmission mechanisms across these six EU countries is of crucial importance for the appropriate design and implementation of a common monetary policy within the EMU context. Monetary authorities need to be able to continuously reinterpret the monetary transmission channels. Moreover, the more the transmission channels differ between EMU countries the more likely it is that a change in the stance of a common monetary policy leads to unwanted distortions in the domestic economy.

The remainder of the article is organised as follows. In Section 2.2 the wide spectrum of monetary transmission channels is introduced. Section 2.3 highlights the money-versus-credit debate and the discussions about the asymmetric effects of monetary policy. Section 2.4 reports the main empirical findings of recent studies analysing credit and asymmetric effects of monetary policy in the six EU countries. Finally, Section 2.5 provides concluding remarks.

2.2 Monetary transmission channels: an introductory note

Monetary transmission channels can be divided into five different channels, as illustrated in Figure 2.1 (Boeschoten and Van Els, 1995, and Mishkin 1995 and 1996). For the sake of simplicity, Figure 2.1 abstracts from feedback mechanisms between the real economy and monetary policy and from the fact that monetary transmission channels can be closely interrelated.

The first monetary transmission channel distinguished is direct monetary transmission. An increase in the money supply results in a surplus of cash balances and over time in an expansion of aggregate spending. The second group of monetary transmission channels consists of interest rate channels. The monetary authorities directly control official interest rates, which determine the money market rates. An expansionary monetary policy corresponding with a decrease in real interest rates affects aggregate spending in different ways. Lower interest rates lead to lower costs of capital, especially important for investment decisions. Consumption expenditures increase, because lower rates favour current consumption over future consumption (saving), called the substitution effect. Interest rates also affect disposable income through interest and dividend receipts and payments, the so-called income effect. The direction and magnitude of the income effect depend on the net asset position of firms and households.
Figure 2.1 Monetary transmission channels

**Direct monetary transmission**
- Money

**Interest rate channels**
- Real interest rate
  - Costs of capital
  - Substitution effect
  - Income effect

**Asset price channels**
- Equity, house, land, etc. prices
  - Tobin's Q
  - Wealth
- Exchange rate
  - Net exports, Foreign prices

**Credit channels**

Bank lending channel
- Loan supply
  - External finance premium

Balance sheet channel
- Net Worth
  - External finance premium

**Expectations and uncertainty**
- Expectations (inflationary)
  - Real interest rate
- Uncertainty
  - Moral hazard & adverse selection problems

Credit and asymmetric effects
Besides changes in money and interest rates, monetary policy decisions are transmitted into real economic activity via asset prices, such as the exchange rate, equity (stock and bond) prices, prices of houses, land, etc. All these transmission channels are called asset price channels. The exchange rate channel works as follows. An expansionary monetary policy will lead to a fall in domestic interest rates relative to foreign rates which results in a depreciation of the domestic currency. This causes a rise in net exports and hence in output. For the other asset price channels, Tobin’s q and wealth effects are relevant. Tobin (1969) defines q as the market value of firms divided by the replacement costs of capital. According to this view a high value of q implies that companies can issue stock at a favourable price compared to the costs of new plant and equipment. Therefore, investment is attractive when q is high. On the other hand, if q is low, it is attractive to buy another firm cheaply to acquire old capital. Investment spending will then be low. The framework of Tobin’s q also applies straightforwardly to other assets like houses and land. The wealth effect implies that increases in asset prices raise the wealth of the economic agent holding that specific asset, which will in turn increase spending possibilities.

The seminal paper of Bernanke and Blinder (1988) reveals the existence of an additional transmission channel through credit: credit channels. It focuses on financial market imperfections as an essential factor of propagation and amplification of an initial monetary policy shock. This phenomenon is referred to as the financial accelerator effect. Frictions on credit markets create imperfect substitutability between different sources of financing. The cost spread between self-financing and credit, called the external finance premium, reflects the cost due to financial imperfections. According to the credit channel theory any shock to the external finance premium affects borrowers’ decisions, and therefore influences their activities. The external finance premium is affected by monetary policy in two ways: the bank lending channel and the balance sheet channel. They are the two sub-channels of credit channels in a broad sense.

The bank lending channel has two clear parts. First, bank credit is special. There is no perfect substitute for bank loans, both on the asset side of banks’ balance sheets and on the liability side of borrowers. Especially, households and small firms lack access to other forms of credit than bank loans. Second, monetary policy changes have a direct effect on loan supply. Following a monetary tightening which drains deposits from the banking system, banks have to readjust their portfolio by reducing their supply of loans, given the imperfect substitutability between loans and other assets. Loan supply being reduced, banks generally increase their lending rate. Thus a
reduction in the supply of loans is accompanied by a rise in the external finance premium for bank-dependent borrowers whose activity is reduced. Instead of raising the interest rate on loans, banks can ration credit, as pointed out by Stiglitz and Weiss (1981). Recent theoretical models of rationing suggest that lenders will most likely ration the least creditworthy loan applicants or those whose creditworthiness has declined.

The balance sheet channel emphasizes the potential impact of monetary shocks on borrowers’ financial position. The financial position of borrowers, their net worth, can be determined from their balance sheets and income accounts. The idea is that any shock affecting borrowers’ financial position modifies the external finance premium and the overall terms of credit which borrowers face. Monetary policy actions can affect borrowers’ net worth in different ways. An expansionary monetary policy strengthens borrowers’ net worth by a rise in equity, house, land or other asset prices or by a rise in firms’ cash flow caused by the decline in nominal interest rates. Also, an unanticipated rise in the price level raises net worth. It decreases the burden of debt, because debt payments are contractually fixed in nominal terms. Although borrowers’ net worth can change by asset price movements, the balance sheet channel should not be confused with the wealth effect mentioned before. The balance sheet channel is an additional transmission channel since the focus is on how a change in borrowers’ net worth modifies the external finance premium and the overall terms of credit which borrowers face.
Both sub-channels of the credit channels of monetary policy are illustrated in Figure 2.2, based on Gilchrist and Zakrajšek (1995). The dd line represents the demand for funds by the firm. It is a downward-sloping function of the cost of funds. The ss line represents the supply of funds. Up to the point W, the firm’s net worth, banks face very little risk of opportunistic behaviour and are willing to lend at the risk-free interest rate, that is the opportunity cost of self-finance, \( r^{nt} \). Beyond W, however, banks charge a premium over the risk-free interest rate to compensate for the increased probability of opportunistic behaviour on the part of borrowers. Because of this external finance premium – the difference between the interest rate with respect to external funds, \( r^{ext} \), and the risk-free interest rate – the supply of funds curve for the individual firm is upward-sloping, leading to an investment level \( I' \), below the perfect markets level, \( I^p \). As the risk-free interest rate increases, default probabilities rise and the firm’s net worth deteriorates, causing banks to increase the premium on external funds (a leftward shift in the ss curve). An increase in the external finance premium puts firms at even greater risk of default. This leads to an increase in the required premium that is much larger than the rise in the risk-free interest rate. The initial shock is magnified through its effect on the external finance premium or, in other words, credit market frictions amplify the initial monetary policy shock.

The fifth and last monetary transmission channel distinguished relates to expectations and uncertainty. The impact of monetary policy actions depends on the extent to which they have been anticipated by financial markets. Unanticipated changes will have relatively strong effects. Monetary authorities’ control over monetary conditions is determined by their ability to influence financial market expectations, inflationary expectations in particular. The formation of expectations crucially depends on policy credibility. Changes in credibility may alter the ultimate real and nominal effects of monetary policy. Another aspect concerns uncertainty about the payoffs from debt contracts. Increased uncertainty in a recession, as a result of a contractionary monetary policy, makes it harder to distinguish between good and bad credit risks. The increase in uncertainty therefore makes information in financial markets even more asymmetric and the adverse selection and moral hazard problems more severe, which impedes lending and thus causes a decline in economic activity.
2.3 Monetary transmission debates: a closer look

2.3.1 Credit effects debate

The credit effects debate is a debate about the money-versus-credit view of monetary transmission. Unfortunately, this terminology has created a great deal of confusion. The money view can be referred to as the traditional view of monetary transmission to real activity, as described in its simplest version in standard IS-LM models. The credit view can be termed as the financial market imperfections approach. The credit view is based on the assumption that the same informational and agency problems that explain many aspects of financial structure (see for an overview De Bondt, 1998a) also play a role in monetary transmission. This theoretical framework suggests the possibility that the incidence of monetary policy may differ substantially across agents in the economy. In other words, monetary policy actions can have distributional consequences. A striking difference between the two approaches is that the IS-LM model assumes the existence of only two assets (money and bonds) while models based on financial market imperfections generally require a richer menu of assets. The financial market imperfections approach suggests two transmission channels above and beyond the standard IS-LM type effects: the bank lending channel and the balance sheet channel (see for example, Hubbard, 1995, and Cechetti, 1995). At the risk of oversimplifying the central issue, the credit effects debate seems to boil down to the question whether the traditional money view channels (direct monetary transmission and interest rate channels) are augmented by credit channels.

It is worthwhile mentioning, that asset price channels and the expectations channel have been ignored in the money-versus-credit debate. In contrast to the money view, the credit view takes the transmission channel with respect to uncertainty into account, since moral hazard and adverse selection problems play a key role within the credit channel theory. Another issue is that the credit view should not be confused with credit rationing. The basic idea of credit rationing is that individuals who are willing and able to pay market rates are constrained from obtaining credit. Several authors, e.g. Bernanke (1993), Friedman and Kuttner (1993b), and Gertler and Gilchrist (1993), have pointed out that credit rationing is not strictly necessary to motivate the credit view. In credit view models, it is not necessarily the case that banks limit the availability of credit regardless of price.

10 Other authors, e.g. Thornton (1994), use a narrow definition of the credit view consisting of only the bank lending channel.
2.3.2 Asymmetric effects debate

Three broad theoretical arguments in the literature have been offered to explain asymmetric effects of changes in the stance of monetary policy (Evans, 1986, De Long and Summers, 1988, Cover, 1992, and Morgan, 1993).

First, the asymmetric nature of the financial accelerator effect enhances the asymmetric effects of monetary policy. Referring to Figure 2.2, a leftward shift in the supply of funds curve due to an increase in the risk-free interest rate (contractionary monetary policy) is more pronounced than the corresponding rightward shift in the supply of funds curve due to a decrease in the risk-free interest rate (expansionary monetary policy), given the same absolute change in the risk-free interest rate. As the economy is booming, a shock to the risk-free interest rate will have very little magnification effect through the external finance premium. As the economy slows down and balance sheet positions weaken a large number of firms, however, find themselves saddled with large debt, high interest payments, and low cash flow. In such precarious financial positions, these firms will face strict overall terms of credit. This works through high external finance premiums, credit rationing, or more severe non-price contract terms such as restrictive debt covenants. Bemanke and Gertler (1989) formalise the idea that the financial propagation mechanism is asymmetric over the business cycle. Informational asymmetries between borrowers and lenders in credit markets vary in degree over the business cycle. In periods of expansion informational asymmetries are relatively mitigated. Credit constraints are likely to bind across a wider group of small firms in recessions than in booms (Gertler and Gilchrist, 1994). Moreover, banks can fail, with the corresponding negative macroeconomic effects, but there are no effects on the positive side if banks remain healthy.

Secondly, a convex short-run aggregate supply curve and a linear aggregate demand curve imply that shifts in aggregate demand caused by monetary policy have asymmetric effects on output. A main argument for a convex supply curve is that prices (wages) are less flexible downward than upward. Since prices are sticky downward, a fall in aggregate demand reduces output substantially. Conversely, a rise in demand has a relatively small absolute effect on output, because prices adjust more quickly.

Thirdly, asymmetric effects of monetary policy result if firms and households are more pessimistic during recessions than they are optimistic during booms, or if producer and consumer
confidence and expectations matter more during recessions. If firms are pessimistic about their business prospects, low interest rates need not stimulate investment. Similarly, if labour market prospects are bleak, an easing of monetary policy will not boost consumer spending.

2.4 Empirical findings

2.4.1 Introduction

Measurement of the effects of monetary policy on the real sector of the economy is hampered by the lack of a universally accepted analytical framework. The main problem that plagues empirical researchers when evaluating the effects of monetary policy is the issue of identifying exactly the monetary policy shifts. Therefore and due to the rich diversity of monetary transmission channels, the scope and number of empirical studies regarding the monetary transmission process are enormously wide and large, respectively. Here, the focus is on empirical studies analysing the credit channels of monetary policy (Section 2.4.2) and the asymmetric effects of monetary policy (Section 2.4.3). Four aspects of recent empirical monetary transmission literature are reviewed. First, the main findings of empirical studies examining the external finance premium, reflecting the costs due to financial market imperfections, are described. These studies analyze the timing patterns of interest rate differentials between bank lending rates and money market and official interest rates. Secondly, results from studies analysing the impact of the external finance premium on output are discussed. Thirdly, studies focusing on the distributional consequences of the credit channels of monetary policy transmission are reviewed. Through the bank lending and balance sheet channel, the impact of a change in the stance of monetary policy may differ between households and firms, types of firms and groups of banks. These differences arise from differences in the extent of information asymmetries, the degree of bank-dependence, firms’ access to external finance, and banks’ customers and funding opportunities. Finally, the main empirical findings of studies analysing the asymmetric effects of monetary policy are described. In addition, own empirical results of the asymmetries of monetary policy are presented and discussed.
2.4.2 Studies analysing credit channels of monetary policy

2.4.2.1 External finance premium

Bank lending interest rates rarely equal official interest rates and seldom move *pari passu* with them. Only under the strong assumptions that there are perfect substitutes for bank assets and liabilities will this equivalence of official and commercial bank interest rates be guaranteed. Once imperfect substitutability between bank assets and liabilities is recognised - a necessary condition for credit channels to exist - a wedge will be driven between official and money market rates, on the one hand, and bank lending rates, on the other. This wedge is a proxy for the external finance premium. One way to examine the credit channels of monetary policy transmission is to look at the time profiles of interest rate differentials between bank lending and money market and policy rates. The intensity of monetary transmission is linked to the speed with which and degree to which the interest rate controlled by monetary authorities affects bank lending rates. Bank lending rates respond to changes in policy and money market rates by overshooting or undershooting. Overshooting means that bank lending rates adjust by more than the corresponding money market rate change. Hence the power of monetary policy is enhanced. On the other hand, it is also conceivable for loan rates to change by less than money market rates, thus reducing the leverage of monetary policy. This happens especially if bank competition is weak, if strong bank-client relations exist and high costs of switching between different forms of finance, and if banks have weak balance sheets. Furthermore, overshooting and undershooting are likely to co-exist, but for different sets of agents. For example, the overshoot scenario is more likely for new borrowers. If banks increase the interest rate on loans by only exactly one-to-one to a rise in the policy and money market rate they will attract a more risky class of borrower. As a result, banks increase the loan-rate premium charged. The undershoot case is more readily applicable to existing borrowers. Existing loans, subject to contractual arrangements, are less likely to be quickly terminated, lessening competitive pressure and insulating bank loan rates.

Table 2.1 shows the short-run (immediate or one month) and long-run (one to three years) effects of changes in the policy and three-month money market rates on short-term bank lending rates. On average, there is undershooting in the short run and almost no undershooting or overshooting in the long run. Only in the United Kingdom and the Netherlands does the passthrough tend to be complete in the short run. One argument is a relatively high stock market capitalisation, resulting in more alternative means of finance. In Germany and Italy, the short-run sluggishness of bank
Table 2.1 Response of short-term bank lending rate to 100 basis point change in policy and three-month money market rate.

<table>
<thead>
<tr>
<th>Country</th>
<th>Short run</th>
<th>Long run</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a)</td>
<td>b)</td>
</tr>
<tr>
<td>Germany</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>87</td>
<td>82</td>
</tr>
<tr>
<td>Belgium</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Netherlands</td>
<td>52</td>
<td>52</td>
</tr>
</tbody>
</table>

Explanatory notes: a) Cottarelli and Kourelis (1994), model 2 (estimates in first differences), Table 1, p. 599, changes in money market rate; b) Cottarelli and Kourelis (1994), model 1 (estimates in levels), Table 1, p. 599, changes in money market rate; c) Borio and Fritz (1995), Table 4, p. 125; d) BIS (1994), Table 5, p. xvii.

Lending rates is relatively high. One interpretation for this finding, among others, is that relationship banking is relatively strong in Germany (house banks) and in Italy (local banks) (De Bondt, 1998a).

The (upward) stickiness of lending rates has also been the central implication of credit rationing. Although credit rationing is a key part of the transmission mechanism, most of the empirical research on credit rationing is US-oriented (see for a survey of credit rationing studies Stokman, 1994 and 1995, and Kroes, 1996). Evidence about credit rationing in European countries is mixed. Empirical evidence supporting temporary and permanent credit rationing for Germany, but not for the United Kingdom is given by Kugler (1987). Winkler (1995) finds that the interest rate on the German credit market is sluggish and that credit rationing in Germany may not be excluded. Results of Martin (1990) show that the proportion of firms facing credit rationing in the United Kingdom is quite low. In the Dutch credit market, rationing seems rather unlikely according to the conclusions of Kroes (1996). Results from an interview study of bank behaviour in the Netherlands show, however, that the majority of banks claim to ration the most risky borrowers in reaction to a tight monetary policy (Swank, 1994).

A difficulty of the bank lending rates used in the empirical analyses above is that they are only a proxy of the costs of external finance. A wide variety of terms and conditions on loans may affect

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A confirmation of loan rate stickiness is, however, not sufficient to establish the existence of credit rationing.
the costs of bank finance. Fase (1990) suggests that the small influence of interest rates on the demand for bank loans could be due to the way the price of credit is measured. More generally, for borrowers who are unreliable to obtain finance from outside banks or who are quantity-rationed by banks, the shadow price of credit will differ sharply from the observed price. To counteract this problem, Fase (1995b) presents a demand function for the Dutch market for short-term bank loans, whereby the lending rate is observed as a zone rather than as a unique and directly measurable market price.

2.4.2.2 Impact of external finance premium on real output

Some studies have examined to what extent movements in the external finance premium lead or explain movements in real output, by means of Granger causality tests. Granger causality tests are a natural extension of the money-income causality studies and provide insight in the potential overall importance of the external finance premium and other financial variables. Table 2.2 shows whether a variable has marginal predictive power for real output. Both studies consider, besides the external finance premium, a monetary aggregate, short-term and long-term interest rate, the difference between both interest rates, called the term spread and credit. Barrán (1996) also takes the exchange rate channel of monetary policy into account. A significant marginal predictive power of the external finance premium is found for Belgium, but not for Germany and the United Kingdom. In all three cases, an insignificant contribution of the aggregate credit variable in explaining output is found. The short-term interest rate and the term spread significantly Granger cause output, according to Table 2.2. The results are more mixed for the other financial variables.

Table 2.2 Variables explaining output according to Granger causality tests

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Variable</th>
<th>External finance premium</th>
<th>Credit</th>
<th>Money</th>
<th>Interest rate</th>
<th>Term spread</th>
<th>Exchange rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Short</td>
<td>Long</td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Germany</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>***</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td></td>
<td>United Kingdom</td>
<td></td>
<td></td>
<td>-</td>
<td>*</td>
<td>***</td>
<td>*</td>
<td>***</td>
</tr>
<tr>
<td>b)</td>
<td>Belgium</td>
<td></td>
<td></td>
<td>***</td>
<td>*///</td>
<td>***</td>
<td>*</td>
<td>**</td>
</tr>
</tbody>
</table>

Explanatory notes: * significance level above 10%; ***, ** and * indicate significance at the 1, 5 and 10 percent level, respectively; a) Tsatsaronis (1995), recent samples, Table 1a and 1c, p. 170 respectively p. 172; b) Barrán (1996), Table 1, p. 40.
Other studies use vector autoregressive models to take, besides output, financial spreads (Davis and Henry, 1994, Barrán, 1996, and Kroes, 1996) or both money market interest rates and short-term bank lending rates (Buttiglione and Ferri, 1994, and Cudeville and Candelon, 1996) into account as proxies - although not always explicitly mentioned - of the external finance premium. All in all, these studies find evidence in favour of credit channels: the external finance premium rises after a monetary contraction and this increase in the costs of borrowing leads to a small decrease in real output.

2.4.2.3 Distributional consequences of credit channels

Empirical exercises focusing only on aggregate lending patterns have little to say about the relevance of the credit channels of monetary policy, as some groups of borrowers face financial market imperfections, while others do not or to a lesser extent. For this reason, another evidence for monetary policy transmission through the bank lending and balance sheet channel is provided by studies examining the distributional consequences of the credit channels of monetary policy. These studies analyze the different impact of monetary policy for households against firms, types of firms and groups of banks. These differences arise from differences in the extent of information asymmetries, degree of bank-dependence, firms’ access to external finance, and banks’ customers and funding opportunities.

The differences in the monetary transmission mechanism between bank-dependent households and firms with (partial) access to securitised capital markets is investigated for the United Kingdom by Dale and Haldane (1993 and 1995). They find that in the United Kingdom firms raise both borrowing and deposits after a monetary tightening in the short run, while households increase deposits and reduce bank borrowing. These results support the existence of credit channels and imply that credit is superior to money as an indicator of the transmission mechanism for small borrowers (households), and deposits (money) for large borrowers (firms). Barrán (1996) presents sectoral differences in the monetary transmission process for Germany and France. The impact of monetary policy tightening is qualitatively similar in the two countries: sectoral credit and final demand decrease after monetary tightening. In Germany, however, investment and credit to firms start to decrease only three quarters after the monetary policy shock. This delay in the German corporate sector is very similar to the one found by Dale and Haldane (1993 and 1995) for the United Kingdom. Credit commitments and the increase of credit
demand to finance unexpected increases in inventories during recessions may explain this behaviour.

Because of financial market imperfections, the degree to which a firm must rely on bank loans rather than on some other form of finance can be influenced by firm characteristics (bank lending channel) and the financial position of firms may influence the size of the external finance premium and therefore their investment decisions (balance sheet channel). Several authors exploit the cross-section characteristics of firm-level panel data in order to test whether the investment behaviour of (specific groups of) firms is influenced by financial constraints. The main findings of these studies are summarised in Table 2.3. Three conclusions emerge from the table. First, small firms in Germany and Italy face more financial constraints than large firms. Large firms have access to a large menu of external finance. In general large firms are mature firms, which have gained experience with the suppliers of external finance. Moreover, the costs of gathering information about these mature firms are low. Secondly, firms in the United Kingdom and the Netherlands, which pay no or low dividend have binding financial constraints. A low dividend payout, or high retention of earnings, indicates firms have to rely on internal finance in financing.

Table 2.3 Investment behaviour and financial constraints

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Period</th>
<th>Number of firms</th>
<th>Financial constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Germany</td>
<td>1983-1987</td>
<td>80</td>
<td>For less solvent firms</td>
</tr>
<tr>
<td>b)</td>
<td>Germany</td>
<td>1968-1985</td>
<td>138</td>
<td>For small firms since the mid-1970s</td>
</tr>
<tr>
<td>c)</td>
<td>Italy</td>
<td>1976-1987</td>
<td>43</td>
<td>For small firms</td>
</tr>
<tr>
<td>d)</td>
<td>Italy</td>
<td>1964-1988</td>
<td>52</td>
<td>For small privately-owned firms</td>
</tr>
<tr>
<td>e)</td>
<td>United Kingdom</td>
<td>1974-1986</td>
<td>626</td>
<td>For low-payout or no dividend-payout firms</td>
</tr>
<tr>
<td>f)</td>
<td>Netherlands</td>
<td>1984-1990</td>
<td>76</td>
<td>For firms without organizational relationship with a bank</td>
</tr>
<tr>
<td>g)</td>
<td>Germany</td>
<td>1968-1984</td>
<td>138</td>
<td>For firms without bank ownership</td>
</tr>
<tr>
<td>h)</td>
<td>Belgium</td>
<td>1984-1992</td>
<td>436</td>
<td>For firms not associated with a coordination center</td>
</tr>
</tbody>
</table>

Explanatory notes: a) Frisse et al. (1993); b) Audretsch and Elston (1994); c) Galeotti et al. (1994); d) Rondi et al. (1994); e) Bond and Meghir (1994); f) Van Ees and Garretsen (1994); g) Elston (1996); h) Barrán (1996); i) Van Ees et al. (1996).
their investment, suggesting a high external finance premium. Thirdly, firms with a close relationship with banks (Germany and the Netherlands) or with co-ordination centers (Belgium) have relatively better access to external finance. The existence of these ties between banks or co-ordination centers and firms mitigate moral hazard and adverse selection problems, reducing the external finance premium.

Data of banks of different size classes are used by Angeloni et al. (1995) to test the existence of credit channels for Italy. They find not only that their proxy for the external finance premium rises after a monetary tightening, but also that large banks and banks with large loans tend to tighten credit conditions more than other banks following a monetary contraction. *Prima facie*, the last finding contradicts the credit view. It implies a comparatively smaller impact of monetary policy on small firms, since bank size and borrower size are positively correlated. An argument compatible with the credit view can, however, be given. Smaller banks may refrain from fully adjusting their lending rates because of the existence of customer relationships and because of their monopoly power in local markets. This argument is supported by Table 2.1, which shows that in the short run Italian bank lending rates react sluggish on a change in the policy and money market rate.

2.4.3 Studies analysing asymmetric effects of monetary policy

The asymmetric effects of monetary policy have been examined by Karras (1996a) for a group of 38 countries, including European countries. The results show that negative money supply shocks have a larger effect on output than positive shocks. The effects of money shocks on prices are, however, symmetric. For a group of 18 European countries, Karras (1996b) finds strong empirical evidence for asymmetric effects of both money supply and interest rate shocks on output, consumption (the largest component of output), and investment (the most volatile component of output). For the United Kingdom, Sensier (1996) tests the existence of asymmetric effects of monetary policy in three different ways, following the US studies of Thoma (1994), Morgan (1993), and Karras (1996b). The results presented show asymmetric effects of monetary policy, but in the wrong direction. Contradicting theory, negative monetary shocks (unanticipated decreases in the money supply and interest rate rises) have a smaller effect on output than positive shocks. Using a two-state Markov switching model to separate recessions and expansions in

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12 Coordination centers are regional headquarters of multinational firms playing the role of intermediary between the parent company in the original country and her subsidiaries in a particular region.
Germany, and three different monetary policy indicators, Kakes (1999a) finds strong evidence of asymmetric monetary policy over the business cycle. Asymmetric effects of monetary policy can also be induced because the passthrough of interest changes is asymmetric. Borio and Fritz (1995) have empirically investigated this case. In general, they find no evidence for an asymmetric response of short-term bank lending rate to changes in policy and money market rates. The main exception is Germany, where the response is relatively fast with respect to increases in interest rates.

To provide further insight into cross-country differences in asymmetric effects of monetary policy, the empirical framework of Morgan (1993) is followed. The six EU countries are analysed for the ERM-period 1979:04-1996:12. The empirical methodology consists of a two-step OLS procedure. In the first stage, the level of the short-term interest rate \( r \) is regressed on its own lagged values, on current and lagged values of production growth \( y \) and inflation \( p \) plus a constant and a trend variable \( t \).

\[
\begin{align*}
\begin{align}
   r_t &= \alpha_1 + \beta_1 t + \sum_{\tau=1}^{12} \gamma_{1\tau} r_{t-\tau} + \sum_{\tau=0}^{12} \delta_{1\tau} y_{t-\tau} + \sum_{\tau=0}^{12} \phi_{1\tau} p_{t-\tau} + \varepsilon_{1t} \\
\end{align}
\end{align}
\]

(2.1)

Here, it is assumed that the variation in the short-term interest rate not explained by production growth and inflation reflects the stance of monetary policy as argued by Morgan (1993). The residuals from eq. (2.1) are saved and split into positive and negative components \( \varepsilon^+ \) and \( \varepsilon^- \). The positive residuals represent tight monetary policy because the residuals measure how much the current short-term interest rate exceeds the level predicted by current and lagged values of production and inflation. The negative residuals in turn reflect a relatively easy monetary policy. In the second stage, the growth of real industrial production is regressed on a constant, trend, lagged production growth, and lagged values of positive and negative residuals of eq. (2.1).

\[
\begin{align*}
\begin{align}
   y_t &= \alpha_2 + \beta_2 t + \sum_{\tau=1}^{12} \gamma_{2\tau} y_{t-\tau} + \sum_{\tau=0}^{12} \delta_{2\tau} \varepsilon^+ - e_{t-\tau} + \sum_{\tau=0}^{12} \phi_{2\tau} \varepsilon^- + \varepsilon_{2t} \\
\end{align}
\end{align}
\]

(2.2)

The central hypothesis to test is whether in eq. (2.2) the sum of the coefficients on the positive residuals of the first-stage regression differs significantly from the sum of the coefficients on the

\footnote{One could also argue that eq. (2.1) represents a monetary policy reaction function, where the interest rate responds to output and inflation gaps. In that case, the residuals reflect deviations from systematic policy.}
negative residuals. The first column of Table 2.4 shows no statistical evidence of this strict form of asymmetric effects of monetary policy. Based on the other columns of Table 2.4 you may conclude, however, that a weak form of asymmetric effects of monetary policy exists in France, Italy and Belgium. In these countries the sum of the coefficients corresponding with tight monetary policy is significantly different from zero and has the expected negative sign, while the sum of the coefficients on the negative residuals are not significantly different from zero. For the other countries, there is no empirical evidence at all for any asymmetric effects of monetary policy. Based on this empirical analysis, it is hard to say anything about the underlying causes of the asymmetric effects of monetary policy found for France, Italy and Belgium. It is, however, striking that all three countries are often mentioned to have a relatively weak banking sector compared to the other countries considered, suggesting that in these three EU countries the asymmetric behaviour over the business cycle of the financial accelerator effect is a factor of importance.

2.5 Concluding remarks

In conclusion, three final remarks are made based on this overview and decomposition of monetary policy transmission channels and the main findings of recent research on credit and asymmetric effects of monetary policy in the six EU countries considered.

Firstly, (European) monetary policy is confronted with a wide spectrum of transmission channels. Therefore, monetary policy design and the process of policy preparation should not focus

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Table 2.4 Asymmetric effects of short-term interest rates on production

<table>
<thead>
<tr>
<th>Country</th>
<th>Probability F statistic sum of coefficients = 0</th>
<th>Sum of coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$e^+ - e^-$</td>
<td>$e^+$</td>
</tr>
<tr>
<td>Germany</td>
<td>0.135</td>
<td>0.240</td>
</tr>
<tr>
<td>France</td>
<td>0.814</td>
<td>0.006***</td>
</tr>
<tr>
<td>Italy</td>
<td>0.165</td>
<td>0.042**</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.331</td>
<td>0.407</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.127</td>
<td>0.011**</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.567</td>
<td>0.793</td>
</tr>
</tbody>
</table>

Explanatory notes: *** and ** indicate significance at the 1 and 5 percent level, respectively.
exclusively on direct monetary transmission and interest rate channels, but also on the other transmission channels via asset prices, credit, and expectations and uncertainty.

Secondly, the main implication for monetary policy from the money-versus-credit debate is that an initial change in the stance of monetary policy can be augmented by a bank lending or balance sheet channel. Both channels work through the external finance premium, reflecting the costs due to financial market imperfections. Empirical studies find that in the short run a wedge will be driven between official and money market rates (proxy for the opportunity cost of self-finance), on the one hand, and bank lending rates on the other (proxy for the cost of external finance), especially in Germany and Italy. Other empirical research shows that the external finance premium rises after a monetary contraction and that this increase in the costs of borrowing leads to a small decrease in real output. The existence of credit channels implies that monetary policy has distributional consequences: the impact of monetary policy differs across (specific groups of) borrowers. Empirical studies for Germany, France, and the United Kingdom confirm the existence of differences in monetary transmission mechanisms for households and firms. The results from these studies suggest, that for the purpose of monetary policy, credit is an useful information variable with respect to households, while money contains more useful information with respect to firms. In addition, certain groups of firms face financial market imperfections, while others do not or to a lesser extent. Firm-level panel data studies show that especially the investment behaviour of small firms, firms with a high retention ratio, and firms without close ties with financial intermediaries is affected by financial constraints. Moreover, the reaction of banks on a change in the stance of monetary policy may differ, since bank and borrower size are positively related.

Thirdly, monetary authorities should be aware of the possibility of asymmetric effects of monetary policy. A contractionary monetary policy can be more effective in slowing down economic growth than an expansionary monetary policy in boosting the economy. Based on the empirical evidence presented here, a weak form of asymmetric effects of monetary policy exists in France, Italy and Belgium. For the other EU countries considered, no empirical evidence has been found in support of asymmetric effects of monetary policy.