

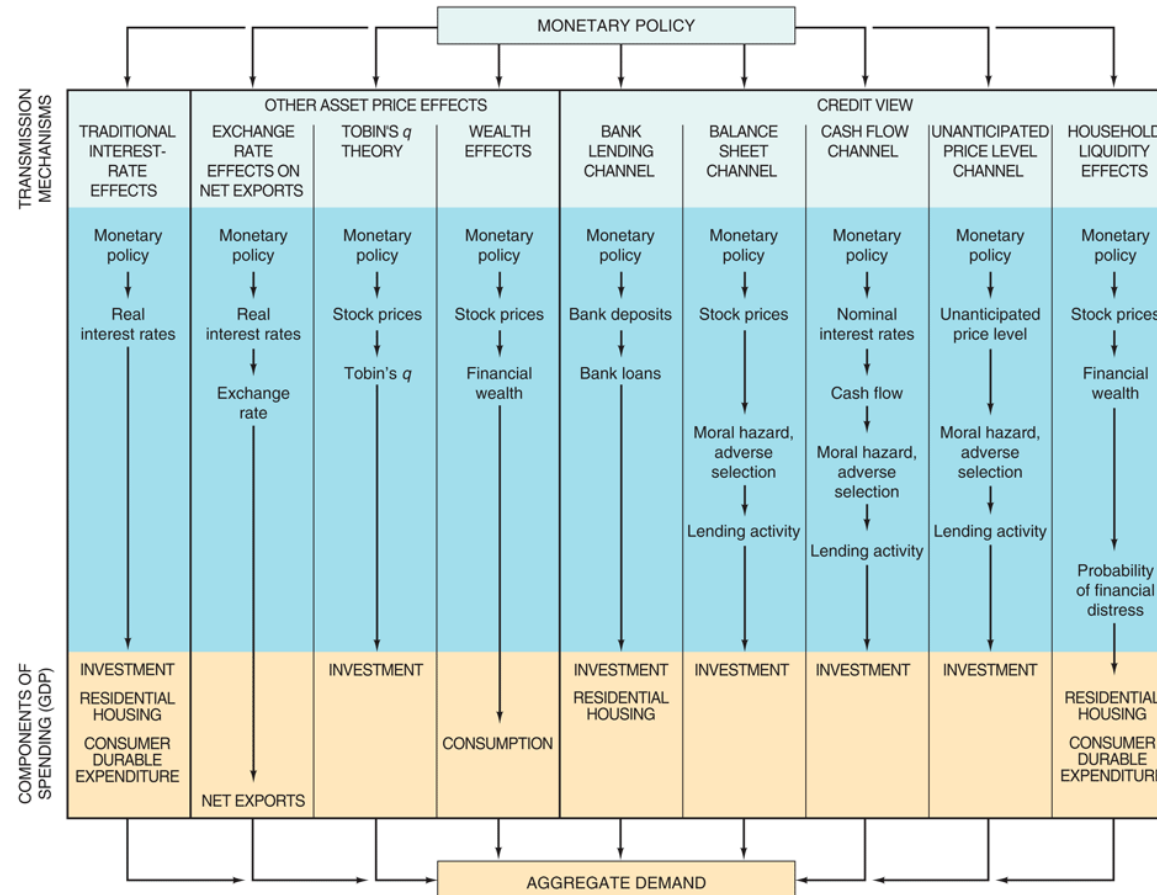
Channels of Monetary Policy Transmission

- Discusses the transmission mechanism of monetary policy, i.e. *how changes in the central bank policy rate are transmitted through the economy, affecting aggregate demand, inflation expectations and the rate of inflation*
- The reason that central banks can affect interest rate formation in the economy is that they have monopoly power in supplying money in the economy, i.e. base money which comprises notes and coin in circulation and the reserves of financial institutions in the central banks
- Central bank interest rate decisions affect short and long-term interest rates, liquidity in the financial system, the quantity of money and bank credit, exchange rates, other asset prices and, last but not least, market expectations about the future development of all these variables
- All these, in turn, influence *consumption* and *investment* decisions of *individuals* and *firms*, and thereby aggregate demand and, ultimately, inflation

The Channels of Monetary Policy Transmission

- Four channels of transmission of monetary policy have been identified in modern financial systems:
- The **Interest Rate Channel**, through the direct interest rate effects; which affect not only the cost of credit but also the cash flows of debtors and creditors
- The **Asset Price Channel** through the impact of monetary policy on domestic asset prices; such as bond, stock market and real estate prices
- The **Exchange Rate Channel** (will not be discussed)
- The **Credit Channel**; which includes the **Bank Lending Channel** and the **Balance Sheet Channel**

The Link Between Monetary Policy and Aggregate Demand: Monetary Transmission Mechanisms



The Interest Rate Channel

Direct interest rate effects: cost of credit

- In the most conventional model of monetary transmission, a shift in policy leads to a change in the money supply that, for a given money demand, leads to a change in money-market interest rates
- Changes in policy and interbank rates lead, in turn, to changes in bank loan rates for borrowers, which may affect investment decisions, and in deposit rates, which may affect the choice between consuming now and later
- A key issue in this channel of transmission is the extent to which a policy-induced change in the interest rate most directly under the central bank's control (usually an over night interbank rate) affects all short-term money market interest rates, and in turn spreads to the entire spectrum of interest rates
- In particular the long-term interest rates most relevant to investment (including housing) or to purchases of durable goods

- The present value of durable goods is inversely related to the real interest rate. A lower rate of interest increases the present value of such goods and thus increases demand. In this framework, interest-rate-sensitive spending is affected by changes in the marginal cost of borrowing
- Changes in interest rates also lead to changes in average rates on outstanding contracts, and these changes increase over time as old contracts come up for renegotiation. Similarly, marginal adjustments in deposit rates will over time change the average deposit rate
- These changes in average interest rates will affect the income and cash flow of borrowers and lenders

Monetary Transmission Mechanisms

- Traditional Interest-Rate Channels: $M \uparrow, i_r \downarrow, I \uparrow, Y \uparrow$
- The interest rate channel of monetary transmission applies equally to C
- Also, it places emphasis on i_r rather than i
- Moreover, it is the long-term i_r and not the short-term i_r that is viewed as having the major impact on C and I spending
- With sticky P , an \uparrow in M leads to a \downarrow in short term i and also \downarrow short term i_r .
- According to the expectations hypothesis of the term structure of interest rates, this also \downarrow long-term i_r .
- The \downarrow in short and long-term i_r leads to an \uparrow in C and I spending

Note: The interest rate transmission mechanism is effective even when i has already been driven to zero by the MA during a deflationary period. With $i = 0$,

$$M \uparrow, P^e \uparrow, \pi^e \uparrow, i_r \downarrow, C \text{ and } I \uparrow, Y \uparrow$$

Asset prices channel

Indirect effects of interest rates via other asset prices

- Policy-induced interest rate changes also affect the level of asset prices, principally those of bonds, equities and real estate
- Another means by which asset price changes triggered by monetary policy actions can affect aggregate demand is described by the so-called Tobin's q
- With a tighter monetary policy stance, equity prices may fall, lowering the market price of firms relative to the replacement cost of their capital
- This will increase the effective cost of capital, as newly issued equity can command a lower price relative to the cost of real plant and equipment
- A decline in asset prices may have particularly strong effects on spending when the resultant change in debt-to-asset ratios prevents households and firms from meeting debt repayment obligations

- it can have similar effects if it raises fears about the ability to service debts in the future. A substantial fall in stock and bond prices for instance, may reduce the value of liquid assets available to repay loans
- As households and firms thus become more vulnerable to financial distress, they may attempt to rebuild their balance-sheet positions by cutting spending and borrowing
- The effects of monetary policy actions on aggregate demand, working through asset prices and balance sheets, may become amplified as the pace of economic activity begins to respond
- For example, increases in interest rates that depress asset prices and weaken balance sheets may lead to an initial decline in output and income
- This initial decline in economic activity , in turn, reduces the cash flow of households and firms, further heightening their vulnerability to financial distress, and leading to a second round of expenditure reduction

Other Asset Channels

Tobin's q Channel:

$$q = \frac{MVF}{RCC}$$

where MVF = market value of firms and RCC = replacement cost of capital.

- If q is high, MVF is high relative to RCC , and new plant and equipment capital is cheap relative to the market value of firms
- In this case, companies can issue stock and get a high price for it relative to the cost of the facilities and equipment they are buying
- $I \uparrow$ because firms can buy a lot of new investment goods with only a small issue of stock
- The transmission mechanism for monetary policy is

$$M \uparrow, P_e \uparrow, q \uparrow, I \uparrow, Y \uparrow$$

where P_e is the price of equity (not the expected price level)

Other Asset Channels

Wealth Channel:

- introduced by Franco Modigliani in his famous “life cycle hypothesis of consumption”, arguing that the most important transmission mechanism of monetary policy involves consumption
- Considering that an expansionary monetary policy \uparrow stock prices, the wealth transmission mechanism works as follows:

$$M \uparrow, P_e \uparrow, W \uparrow, C \uparrow, Y \uparrow$$

Note: Tobin’s q and wealth mechanisms allow for a general definition of equity that includes housing and land. For example, an \uparrow in house prices, which \uparrow their value relative to replacement cost, \uparrow Tobin’s q for housing, thereby stimulating its production. Also, an \uparrow in housing and land prices $\uparrow W$, thereby $\uparrow C$ and Y .

The Credit Channel

Credit View

- Dissatisfaction with the conventional stories that interest-rate effects explain the impact of monetary policy on expenditures on durable assets has led to a new explanation based on the problem of **asymmetric information** in financial markets that leads to **financial frictions**
- *Adverse selection* is an asymmetric information problem that occurs *before* the transaction occurs: potential bad credit risks are the ones who most actively seek out loans
- *Moral hazard* arises *after* the transaction occurs: the lender runs the risk that the borrower will engage in activities that are undesirable from the lender's point of view
- This explanation, referred to as the *credit view*, proposes that two types of monetary transmission channels arise as a result of financial frictions in credit markets: those that operate through effects on bank lending and those that operate through effects on firms' and households' balance sheets
- **Bank Lending Channel**: based on the analysis demonstrating that banks play a special role in the financial system because they are especially well suited to solve asymmetric information problems in credit markets
- **Balance Sheet Channel**: like the bank lending channel, the balance sheet channel arises from the presence of financial frictions in credit markets
- *Cash Flow Channel*: another balance sheet channel operates by affecting cash flow, the difference between cash receipts and cash expenditures

The credit channel

- the **bank lending channel (or net worth)** emphasizes the special role of bank loans, particularly for “bank-dependent” borrowers (e.g. small firms), while the **balance-sheet channel** operates through the balance-sheet positions of business firms
- the credit channel is not really an independent alternative to the traditional interest rate mechanism but rather an amplifying mechanism.

The Balance Sheet Channel

The Balance Sheet Channel

- Define the **External Finance Premium** (EFP) as the wedge (difference) between the corporation's or household's cost of funds raised externally (by imperfectly collateralising borrowing, for example) and the opportunity cost of internal funds
- This premium is very similar to the spread charged by banks between borrowing and lending rates and it is an important determinant of investment and spending decisions
- It has been recognized in the literature that monetary policy affects not only the interest rate but also the EFP
- Based on the theoretical prediction that *the EFP a borrower faces should depend on borrower's financial position, then the greater is the borrower's net worth, the lower the external finance premium should be*
- Since borrower's financial position affect the EFP, and thus the overall terms of credit that they face, *fluctuations in the quality of borrowers balance sheets should affect their investment decisions*

- The balance-sheet channel of monetary policy transmission arises because rising interest rates, following the adoption of a tighter monetary policy, directly increase the interest expenses of those non-financial firms
- Higher for those who rely more heavily on short-term debt to finance inventories and working capital, reducing their net cash flows and weakening their financial positions
- Furthermore, rising interest rates are also associated with falling asset prices, which indirectly erode the value of the firms' collateral
- These effects lead to a reduction in the firms' net worth, thereby raising the premium for external finance
- Small borrowers such as small firms are most likely to face a proportionately larger premium for external finance

the balance-sheet channel

- With a rise in the policy rate, the net worth of individuals diminishes since their balance sheets have deteriorated
- Such circumstances exacerbate the problems of adverse selection and moral hazard
- By reducing the banking system's willingness to lend, this reduces individuals' spending ability
- In general lending ability within the banking system also diminishes, since the interest rate rise has the same effect on its net worth and access to new credit. Monetary policy can also affect individuals' willingness to borrow through a liquidity channel, because a rise in interest rates can increase the probability of financial distress later on

Balance Sheet Channel:

- The lower the net worth (NW) of firms (and therefore the lower the collateral that they have for their loans), the more severe the adverse selection and moral hazard problems in lending to these firms
- In fact, a \downarrow in NW , \uparrow the adverse selection and moral hazard problems and leads to a \downarrow in lending and hence in I
- Monetary policy can affect firms' balance sheets in several ways. For example, expansionary monetary policy, $\uparrow P_e$ (along lines discussed earlier) and \uparrow the NW of firms and so leads to an \uparrow in I and Y .
- The monetary policy transmission is:

$M \uparrow, P_e \uparrow, \text{adverse selection } \downarrow, \text{moral hazard } \downarrow, \text{lending } \uparrow, I \uparrow, Y \uparrow$

Cash Flow Channel

- This is another balance sheet channel operating through its effects on cash flow, the difference between cash receipts and cash expenditures
- Expansionary monetary policy, $\downarrow i$ and raises cash flow.
- The \uparrow in cash flow causes an improvement in firms' balance sheets, because it \uparrow liquidity and makes it easier for lenders to know if the firm will be able to pay its obligations
- This \downarrow adverse selection and moral hazard problems, leading to an \uparrow in lending
- Hence, $M \uparrow$, $i \downarrow$, cash flow \uparrow , adverse selection \downarrow , moral hazard \downarrow , lending \uparrow , $I \uparrow$, $Y \uparrow$

Note: In this transmission mechanism it is the short-term i (not i_r) that affects cash flow. Hence, this interest rate mechanism is different from the traditional interest rate mechanism

The Bank Lending Channel

The Bank Lending Channel

- Monetary policy may also affect the external finance premium by **shifting the supply of bank credit**
- A reduction in the supply of bank credit, relative to other forms of credit, is likely to increase the external finance premium and to reduce real activity
- For this channel to work it is sufficient that contractionary monetary policy increases bank's cost of funds. An increase in the cost of funds would decrease the supply of funds
- The main thrust of the bank lending channel rests on the idea that firms facing more severe informational frictions in financial markets, must rely primarily on bank loans for external finance because it is prohibitively expensive for these borrowers to issue securities in the open market

- When bank loans are of special importance for bank-dependent firms, the effects of a monetary contraction may be amplified through the following two channels beyond those working through the interest rate channel:
- the direct channel operates through the reduced **willingness of banks to lend** at the going market interest rates (this channel is direct because it does not depend on the extent to which market interest rates rise)
- The indirect channel becomes operative when the increase in market interest rates following a monetary contraction raises loan rates enough both to cover the increase in lenders' cost of funds as a result of the higher interest rates and to compensate them for the higher default risk.
- Banks also tend to **tighten other non-price terms of lending**, such as collateral requirements and the maturity of loans
- When either of these two bank lending channels operates, *the banks are forced to reduce their total lending*, and in most cases firms which rely primarily on banks for credit must curtail their spending on investment

- Hence, in response to increases in the cost of credit, *banks are likely both to raise loan interest rates and to tighten creditworthiness standards, leading to declines in the supply of credit along with increases in its price*
- Even borrowers whose creditworthiness has not been affected will face less favorable terms for their loans during periods of recession and at times of financial distress, because banks may be unable to distinguish fully between borrowers who have been adversely affected and those who have not
- This phenomenon is called **Credit Rationing** and is likely to hit more **financially opaque** borrowers particularly hard because of the high cost of gathering information about them

- Changes in the creditworthiness of bank customers and in the financial condition of banks themselves will induce changes in credit rationing only if the banks perceive themselves to be facing hard budget constraints
- It has been argued that banking firms may be subject to the same sort of capital market imperfections as their non-financial counterparts
- According to this view, if a bank lending channel is effective, a monetary contraction should have a disproportionately large impact on the lending behavior of smaller banks, which are more likely to experience difficulties offsetting a loss of reserves by expanding non-deposit sources of external finance
- Consequently, such banks wish to cut loan supply by relatively more than do large banks

From the financial system to spending decisions

Firms

- Firms relying on bank financing, or other types of credit funding linked to domestic short-term interest rate developments, are affected directly
- Increased borrowing costs reduce their profit and raise the required return on all new investments
- The willingness and ability to embark on new projects is therefore diminished, other things being equal
- Likewise, higher interest rates increase firms' inventory costs, which are often financed with short-term credit.
- Higher interest rates also affect the demand for labour, by reducing their willingness to hire new staff. Firms might even reduce employment or hours worked
- Monetary policy also affects the cost of capital through its temporary impact on long-term real interest rates. Thus a rise in the policy rate should also prompt a temporary rise in the required return on new projects, making it more likely for firms to postpone or simply abandon such plans

- Another effect of monetary policy on firms' spending decisions is through the asset price channel
- As mentioned above, a rise in the policy rate usually leads to a fall in equity prices, causing the market value of firms to fall relative to the replacement cost of capital (a fall in the Tobin's q)
- Accordingly, it becomes relatively more expensive for firms to issue new equity to finance new investments
- Firms experience a wealth effect, since higher interest rates reduce their net worth and their cash flow worsens, as well as lowering the price of assets which can be used as collateral
- Adverse selection and moral hazard problems increase accordingly, making the banking system even less willing to lend
- This applies particularly to more financial opaque firms, which lack easy access to other sources of financing outside the banking system

Households and individuals

- Monetary policy has an effect on individuals' behaviour through various channels
- One of the most important effects of monetary policy is probably through disposable income. By influencing market interest rates, monetary policy affects the interest rate on savings, as well as on outstanding short-term liabilities (for example borrowing on credit cards and overdrafts)
- A **rise** in the policy rate thus **reduces disposable** income of net debtors, which in turn affects their spending decisions
- All things being equal, **individuals' consumption expenditure ought to contract when interest rates rise**

- Monetary policy also affects the **timing of consumption decisions**, since interest rates in effect represent the price of current consumption relative to that in the future
- When *interest rates rise*, *current consumption becomes more expensive compared to future consumption*, i.e. current saving. Individuals should therefore reduce their current consumption by a corresponding amount
- Monetary policy also affects individuals' wealth. As discussed above, a rise in interest rates generally leads to a fall in stock and housing prices. Since these assets constitute an important part of individuals' aggregate wealth, their consumption expenditure should decrease, since they are no longer as wealthy
- Likewise, their access to credit becomes more difficult, because housing is often used as collateral for loans. Since the market prices of their assets has fallen, their borrowing capability decreases
- Monetary policy affects consumption expenditure of individuals through their access to credit (especially for financing expenditure on consumer durables such as housing and motor vehicles)

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