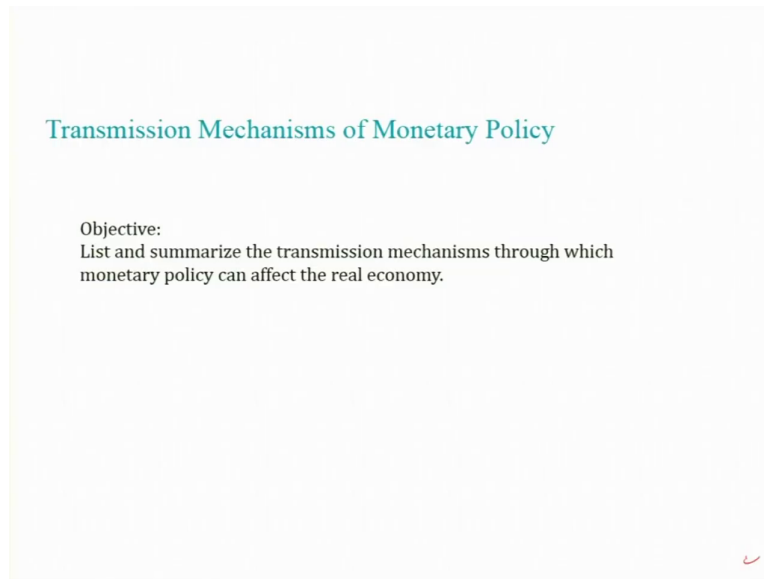**Economics of Banking and Finance Markets**
Prof. Sukumar Vellakkal
Department of Economic Sciences
Indian Institute of Technology, Kanpur

Lecture - 60
Monetary Policy: Transmission Mechanism

(Refer Slide Time: 00:17)

Hi everyone, welcome in this session. We are going to examine the Monetary Policy Transmission Mechanism. The main objective is to list and summarize the transmission mechanism through which monetary policy can affect the real economy.

Transmission Mechanisms of Monetary Policy

- Examines whether one variable affects another by using data to build a model that explains the channels through which the variable affects the other.
- **Transmission mechanism**
  - The change in the money supply affects interest rates.
  - Interest rates affect investment spending.
  - Investment spending is a component of aggregate spending (output).

The transmission mechanism examines whether one variable affects another by using data to build a model that explains the channel through which the variable affects the other. In overall, the transmission mechanism looks like the change in the money supply affects interest rate, interest rates affect investment spending. This is what we know overall, this is our general understanding about the conventional monetary transmission mechanism.

So, in this session, we will discuss the conventional channel in little bit detail. Then we will also discuss what are the other mechanisms of monetary policy transmission.

Monetary policy transmission

- Monetary policy transmission is the process through which changes in monetary policy affect economic activity including GDP, employment etc.
- Most central banks use the short-term interest rate (E.g. Fed fund rate, repo rate etc.) as the policy instrument for the conduct of monetary policy.
- Monetary policy transmission is thus the process through which a change in the policy rate (E.g. Fed fund rate, repo rate etc.) is transmitted first to the short-term money market rate and then to the entire maturity spectrum of interest rates covering the money and bond markets as well as banks' deposit and lending rates.
- These in turn impact investment decisions, and consumption which would affect aggregate demand and output and inflation.
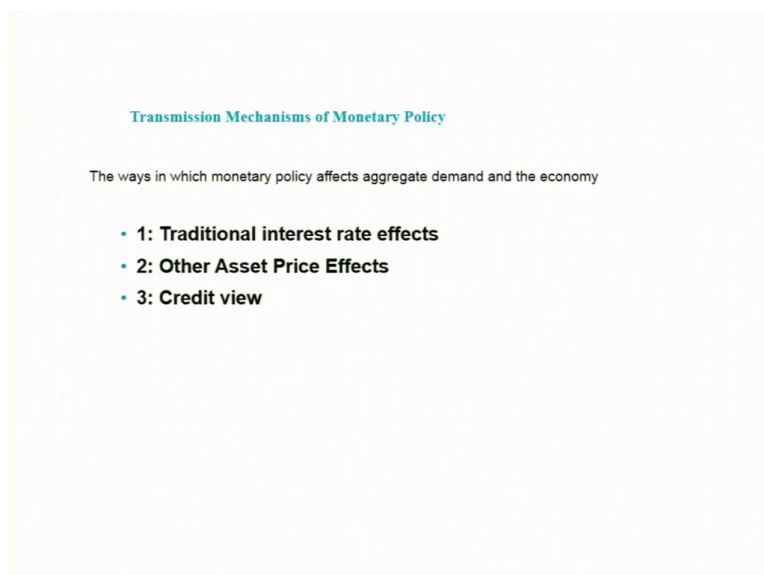
Let me define what is monetary policy transmission? So, monetary policy transmission is the process through which changes in monetary policy affect economic activity including aggregate demand GDP, employment etcetera.

So, about the monetary policy, by now, you are familiar what are the tools central bank use to conduct the monetary policy; what are the tools they use. We have seen that most central bank use short term interest rate (fed fund rate in the US). For example, repo rate in India. These are the short-term interest rate; these are the policy instruments in the conduct of monetary policy.

Then what we are going to look that the monetary policy transmission is the process through which a change in the policy rate, for example, fed fund rate and repo rate, is transmitted first to the short-term money market rate and then to the entire maturity spectrum of interest rate, including long-term covering the money and bond market, both money market as well as the capital market as well as banks deposit and lending rates.

So, these are the initial stages of the transmission, and subsequently we are trying to link this to the other important economic variables. So, this in-turn impact investment decisions and consumptions which would affect aggregate demand and output inflation.

(Refer Slide Time: 02:55)

Transmission Mechanisms of Monetary Policy

The ways in which monetary policy affects aggregate demand and the economy

- 1: Traditional interest rate effects
- 2: Other Asset Price Effects
- 3: Credit view

So, there are several ways in which monetary policy affects the economy, and these are mainly through the aggregate demand and the economy. There are various channels through which the monetary policy affects aggregate demand and the economy.

The first one is the traditional interest rate effects, that is one, then the 2nd one is other asset price effects and finally, the thirdly, the credit view channel.

(Refer Slide Time: 03:31)

So, let us discuss one by one; coming to the first one, I think you are familiar with this one, this is called the traditional interest rate mechanism.

Traditional interest rate mechanism: the traditional view of the monetary policy transmission mechanism is that a change in the money supply affects interest rate. Suppose if the monetary policy strategy is, for example, money supply targeting that the monetary aggregates targeting. If the central bank targets the money supply and then this would lead to changes in rate of interest rate. If the money supplies increase, then you know that rate of interest is decreasing, that is one starting point. The other one is changes in short-term interest rate that you are well familiar now, the FFR and repo rate; that means, initially the starting point itself is changes in rate of interest if the strategy is interest rate targeting.

Suppose a reduction or cut in the rate of interest and then you know that this would be affecting the short-term interest rate, which in turn will be affecting the long-term interest

rate, based on the theories that we covered in the previous sessions, clearly show that there is high correlation between short-term interest and long-term interest rate.

So, an important feature of the interest rate transmission mechanism is its emphasis on the real interest rates, rather than on the nominal interest rates as the rate that affects consumer and business decisions. So, let us put in the more schematically.

Moreover, as we have seen here that, the real long-term interest rate is viewed as having major impact on spending. So, here more schematically: interest rate affects investment spending.

And you know that investment spending is a component of aggregate spending; because in the macro economic framework, the aggregate spending, the aggregate demand is equal to consumption plus investment plus government expenditure in a closed economy. So, here a decline in rate of interest would lead to an increase in investment spending.
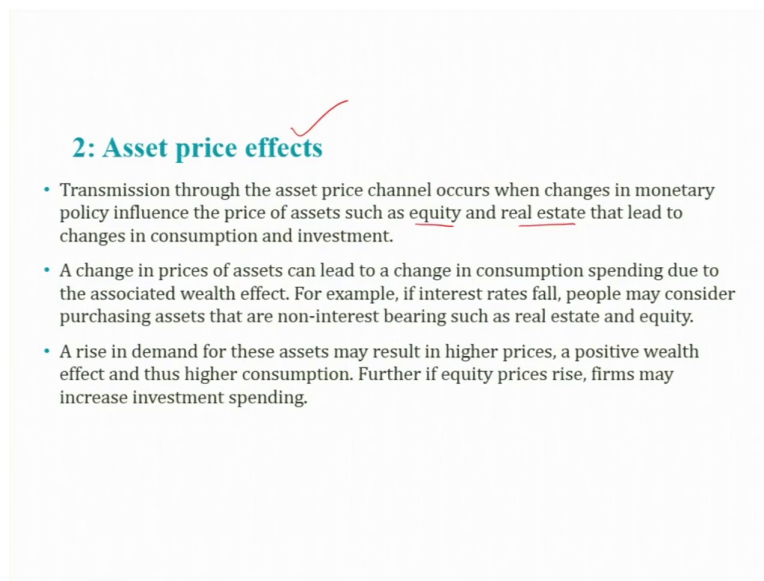
Let us see the schematic presentation. So, that an easing monetary policy; that means, an expansionary monetary policy leads to a fall in interest rate, this one a fall in real interest rate causing a rise in investment spending. Then, this would lead to an increase in investment spending you know the reason because decline in rate of interest means the cost of borrowing for the firms decrease, the cost of production decrease, so that means, they will increase their investments in capital goods. That means, firms set up new factory, buy new machines and then they will be hiring more laborers and that means, they are expanding the production process; that means, as a result you know that aggregate demand will increase, and this would lead to more production and more employment in the economy.

This is the investment, just now what we discussed was, the investment made by firms. So, the same way the investment made by consumers, that is to buy houses and consumer durable expenditure is also can be considered as one kind of investment decision. Not only firms, if the rate of interest decline, then you can see that the demand for housing and consumer durables also increase.

So, both contribute to increase in aggregate demand, as a result you can see aggregate demand is increasing. So, the GDP will increase as a result, and subsequently employment also increases. So, this is one of the channels. This is the conventional (traditional) interest rate mechanism which leads to increase in GDP.

However, some economists for example, Ben Bernanke former chair of the FED and Mark Gertler of New York university, they believe that the empirical evidence does not support the strong interest rate effects that operate through the real cost of borrowing. So, as a result indeed these researchers see the empirical failure of a traditional interest rate monetary transmission mechanisms as having provided the stimulus for the search for other transmission mechanism of monetary policy.

(Refer Slide Time: 09:01)

Accordingly, the search for other transmission mechanisms led to the identification of two broad categories, one is those operating through the price effects, and the other one is the credit view channel.

The asset price channel transmission: when the monetary policy transmission happens through the asset price channel, when changes in monetary policy influence the price of assets, the price of assets such as equity real estate that lead to changes in consumption and investment.

So, a change in price of assets can lead to a change in consumption spending due to associated wealth effect. For example, if interest rates fall, people may consider purchasing assets that are known interest bearing such as real estate and equity. Further, a rise in demand for these assets may result in higher prices, a positive wealth effect and thus higher consumption. Further, if equity price rise, firms may increase investment spending.

Let us examine the asset price effect one by one. The first channel that affects the monetary policy through the asset price effects is the exchange rate effects on net exports. So, especially with the growing internationalization of economies throughout the world and the advent of flexible exchange rate, more attention has been paid to how monetary policy affects exchange rates, which in turn affect net exports and aggregate demands.

The monetary policy transmission through asset price effects occurs when changes in monetary policy impacts the interest rate differential between domestic and foreign rates, leading to capital flows, that is inflow and outflow which in turn affects the exchange rate and hence the relative demand for exports and imports.

For example, the foreign exchange rate channel also involves the interest rate effects. For instance, an expansionary monetary policy leading to fall in domestic real interest rate will make the domestic currency assets less attractive relative to assets denominated in foreign currencies. As a result, you know there will be a capital outflow.

As a result, you know when there is an increase in capital outflow as well as decrease in capital inflow because there is more demand for foreign currency, the value of domestic assets as compared to the foreign currency assets fall, and the domestic currency depreciation happens.

For example, if the real interest rate in India declines because of expansionary monetary policy, as a result there will be capital outflow as well as decline in capital inflow. Because now it is worth for the investors to invest in other country instead in India because the rate of interest is low in India, there will be capital outflow then as a result the demand for Indian currency declines and there will be depreciation of Indian currency.

So, when the depreciation happens; that means, the lower value of domestic currency makes domestic goods cheaper than foreign goods, you know that, then our goods and services become cheaper causing a rise in net exports; that means, the demand for our exports increase as compared to the imports. So, as a result the net exports increase, hence aggregate demand increase.

So, the schematic presentation of this one is that a decline in the real rate of interest would lead to depreciation in the exchange rate; that means, as a result demand for our goods, that is, our exports increase, and import decrease; that means, net exports increases.

Net exports increases mean there is increase in aggregate demand. When the aggregate demand increases then the GDP increases and as a result the employment also increases. So, overall GDP increases means the level of economic activity increases, this is the channel related to the exchange rate effects.

(Refer Slide Time: 14:09)

Another effect is through the Tobin's q theory. James Tobin developed this theory which is widely known as Tobin's q theory. The Tobin's q theory explain how monetary policy can affect the economy through its effects on valuation of equities. Before going further let me explain what Tobin's q theory is. Tobin defines q as the market value of firms divided by the replacement cost of capital.

So, we can write q is equal to the market value of a firm divided by the replacement cost of a capital. Replacement cost of capital means the actual cost to buy the machines and the equipment that means, how much is required to buy the factory and all the machines and equipment? We can also call it as the replacement cost; that means, if you want to replace all the machines and factories, then how much it costs.

For example, let us assume that this is 100 billion. Let us just assume that this is the replacement cost. It also sees that this is the value for buying the machines and equipment if you want to replace. But you know that due to this the stock price of this firm (the equity market value) because of the good prospects of this company the profit is earning, because of the strong economic fundamentals, the market is valuing this company worth 200 billion. So that means, the Tobin's q ratio, accordingly. you know that this one is 2, that is greater than 1.

So, what does it mean? So, it means if the q is high the market price of firms is high relative to the replacement cost of capital and new plan and equipment capital is cheap relative to the market value of firms. So, it means the firms, the companies, can issue stock and get high price for it relative to the cost of facilities and equipment they are buying.

So that means, since the market is valuing them more than their actual investment cost, their investment spending will rise because, firms can buy a lot of new investment goods with only a small issue only a small issue of stock.

Suppose if they increase this one to 100 suppose if they make it to 150 billion, if they spend and then actually when they issue the stock, let us make it $\Delta 50$ billion they are additionally issuing, that is the actual purchasing cost of the machine, but the market is going to give them $\Delta 100$ billion. So that means, they can raise more capital.

So, this will incentivize the firm to raise more capital through IPO. So, conversely, we can also see that if the q is low; that means, the firms will not purchase new investment goods because the market value of firms is low relative to the cost of capital. Suppose if the when

the q is less than 1; that means, the market valuation of the investment is less than the replacement cost of this capital.

So, the let us come to the crux of this discussion, what is the main point here, suppose there is an expansionary monetary policy then you can see that the rate of interest declines; that means, low rate of interest, low interest rates on bonds means that the expected return on this alternative asset that is alternative to stock falls.

When the rate of interest declined, we have discussed in the previous sessions that when the rate of interest decline; that means, a lower real interest on bonds means that the expect return on this alternative to stock falls. So, as a result the stock price will increase.

So, when the stock price will increase; that means, Tobin's q ratio will increase. So that means, for most firms the Tobin's q ratio will increase. So, now this one will become for example, 300 suppose Tobin's q stock price increase that the market price market valuation of the equity increase.

Then the Tobin's q ratio is going to be 3, the firms will increase their investment activities; that means, the investment will increase, aggregate demand will, the GDP also increase; that means, overall economic activity will increase. The level of economic activity will increase.

So, this is through the Tobin's q ratio, this is the schematic presentation, schematic pathway of how expansionary monetary policy would lead to increase in economic activity through the Tobin's q ratio.

(Refer Slide Time: 19:50)


Then comes the wealth effects; in the wealth effects an important component of consumers lifetime resources is their financial wealth. A major component of which is common stocks.

When stock price rises the value of financial wealth increases thereby increasing the lifetime resources of consumers and consumption should rise. So, as a result you know that the consumption, the present consumption also depends on the lifetime resources available for the consumers. So, when the rate of interest decline then you know that, again the schematically, the stock price increases, and you know that consumers hold a large share of the common stocks.

So, as a result when the rate of interest decline when the stock price increase; you can see that the consumers wealth increases; that means, the lifetime resources available with them increases and the consumption increases; we have seen that aggregate demand is equal to C plus I plus government expenditure. So that means, here consumption increases mean aggregate demand also increases.
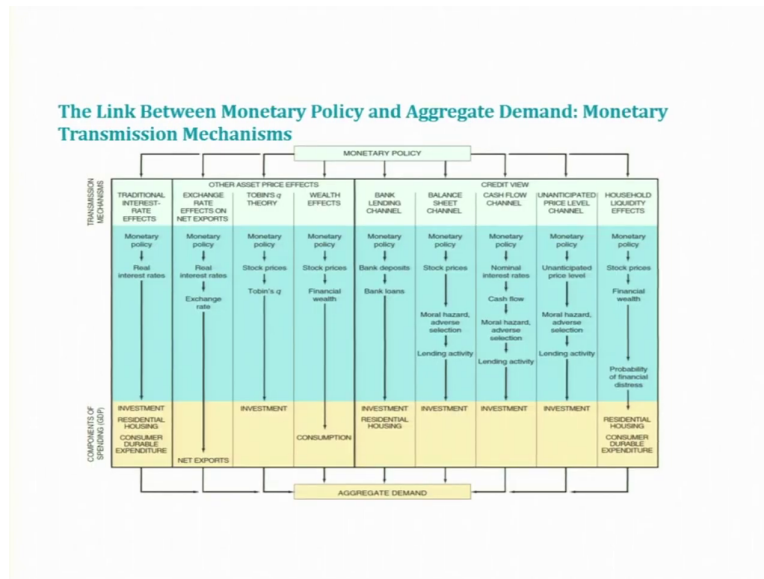
So, let us present this one, what are the channels that we discussed, this is the diagrammatic presentation of this one and their transmission mechanism, this one we have already discussed, exchange rate also we have discussed, Tobin's q ratio we have discussed, wealth effects just now we have covered here means monetary policy it affects the stock prices, that means, stock price increase, financial wealth increase, then as a result consumption also increases.

So, let us use this framework to explain the remaining aspects of the monetary transmission mechanism that is under discussion.

Here another channel is called a credit view; credit view means the transmission through the credit channel if monetary policy influences the quantity available for credit. So, this may happen if the willingness of financial institutions to lend changes due to change in monetary policy.

Based on the analysis that demonstrate that banks play a special role in the financial system because they are especially well suited to solve asymmetric information problems in the credit markets. So, we have discussed this issue in detail how banks are well trained, how well expertise they have in addressing the asymmetric information problem.

So, let see the credit view channel where the monetary policy can affect the aggregate demand.

The first one is bank lending channel. So, here an expansionary monetary policy increases the bank resources, you know that when an expansionary monetary policy, be it open market operation or lending through discount window, the bank resource will be increasing.

As a result, the quantity of bank loans available. So, because many borrowers are dependent on bank loans to finance their activities and increase in loans causes investment spending to rise.

So, not only consumers, but also it will have greater impact on expenditure by smaller firms because the smaller firms are more dependent on bank loans than the larger firms. Because, we have seen in our previous sessions that large firms can raise their capital through the market, through the bond market. They can easily borrow from the bond market, and they can easily raise through IPO's as compared to small firms mainly because of the asymmetric information issue.

So, you can see that if expansionary monetary policy through this channel, not only consumers benefit bank loans, but the firms also benefit. As a result, you can see that investment expenditure will increase and aggregate demand also increase.

Then another channel is the balance sheet channel. Balance sheet channel of the firms arises because the presence of financial friction in the credit markets. So, the debt obligations of businesses may also change due to change in the interest rate.

For instance, if the policy rate falls, debt obligation of firms may decrease, thus strengthening their balance sheets. Due to low rate of interest, the financial institution may be more willing to lend to businesses and thus increasing investment spending.

The important thing here is that, because of the balance sheet channel when the rate of interest declines, we can see that the stock price is increasing, firms' net worth is also increasing. Then when you know that higher the net worth means lenders in effect have more collateral for their loans.

So, their potential losses from adverse selection will be lower. And similarly; that means, there will be less adverse selection and there will be less moral hazard because the net worth of the firms increases. So that means, this would incentivize the financial firms and financial institutions to lend, and as a result investment increases and aggregate demand also increases.

Then the other channels are cash flow channels. The cash flow means the difference between firm's cash receipts and cash expenditure. When the rate of interest decreases due to expansionary monetary policy, firms cash flow increases; the rate of interest decrease means the only the nominal rate of interest is decreasing here the rate of interest is when than the rate of interest decrease you can see that the real payment, the debt burden of the firms decreases; that means, improvement in firms balance sheet because it raises cash flow.

So, an increase in the cash flow increases the liquidity of the firm, it easier for lenders to know whether the firm will be able to pay its bills. So, here, importantly you can see that when the cash flow increases, the scope for adverse selection and moral hazard decrease, lending increase, investment increase, aggregate demand also increases.
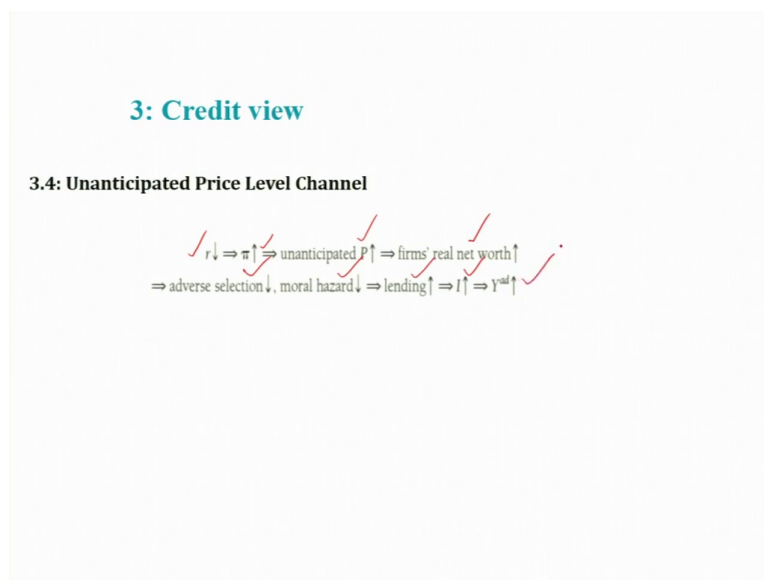
(Refer Slide Time: 26:41)
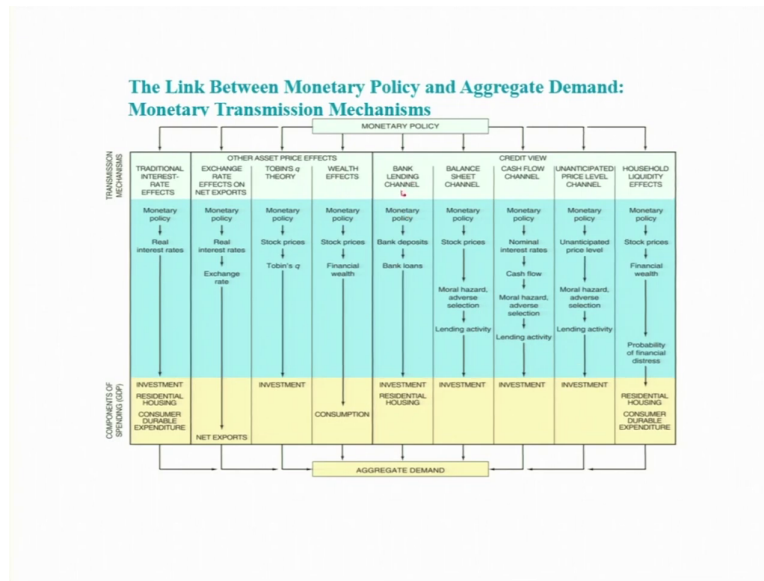
We have discussed this one; bank lending channel we covered. Balance sheet channel we covered, cash flow channel we covered. Then the remaining two or unanticipated increase in price level and another is household liquidity effects.

(Refer Slide Time: 26:57)

And coming to unanticipated price level effects, the mechanism is through here. Because in industrialized countries, debt payments are contractually fixed in nominal terms and unanticipated rise in price level lowers the value of firm's liabilities in real terms; that means, this would reduce the burden of the debt.

So, you know that when there decline in rate of interest due to monetary policy, this would increase the price level; suppose it is unanticipated, then you know that this will lead to price level increase; that means, the firms real net worth increase because the firms price level lowers the value of firms liabilities in real term, that is, decline in the burden of the debt; adverse selection declines, moral hazard decline, lending increases, investment increases and aggregate demand also increases.

(Refer Slide Time: 27:57)

And remaining channel is the household liquidity effects. So, the household liquidity effects here, clearly, if the rate of interest decreases, and what we have already seen that this will lead to decrease in rate of interest rate, and increase in stock price; that means, value of household financial assets increases.

It means when consumers have a large amount of financial assets related to their debt, because the increase in stock price, their estimate of the probability of financial distress is low and they are willing to purchase more consumer durables or housings etcetera. As a result, you can see that increase in financial assets would decrease financial distress; they will be buying more consumer durables, that is, more consumer expenditure and aggregate demand.

Why Are Credit Channels Likely to Be Important?
- Key are three reasons to believe that credit channels are important monetary transmission mechanisms:
    1. A large body of evidence on the behavior of individual firms supports the view that financial frictions of the type crucial to the operation of credit channels do affect firms' employment and spending decisions.
    2. There is evidence that small firms (which are more likely to be credit-constrained) are hurt more by tight monetary policy than large firms
    3. The asymmetric information view of credit market imperfections at the core of the credit channel analysis is a theoretical construct that has proved useful in explaining many other important phenomena, such as why many of our financial institutions exist, why our financial system has the structure that it has, and why financial crises are so damaging to the economy.

And these credit channels are very important.

Monetary Policy Transmission Framework

Source: P Dual (2020)
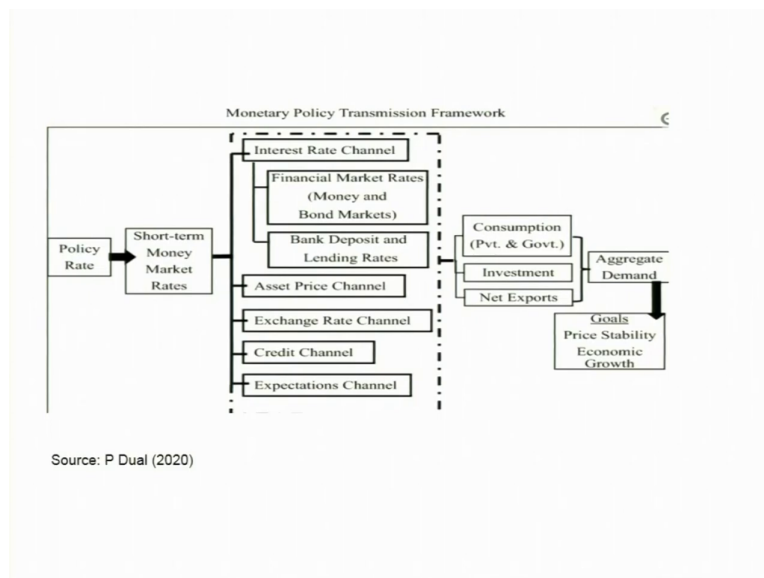
This is an overall; because this is the framework, I have shown, this is mainly from Mishkin test book, and other researchers also have shown different channels framework, but it is almost same; you can see that these are the framework that they have used.

(Refer Slide Time: 29:16)
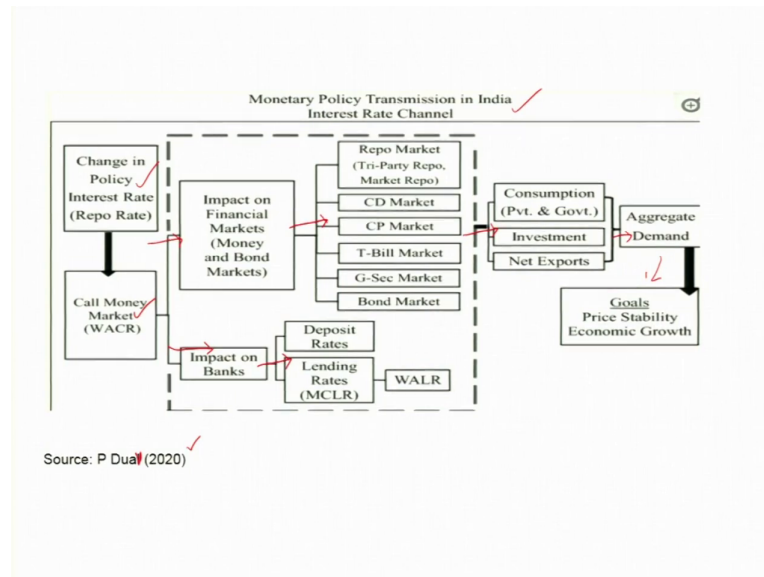
And another channel, especially coming to Indian scenario this is the monetary policy transmission channel that we can outline; this I have taken from P Dua.

Suppose there change in policy interest rate; suppose the repo rate declines. So, you can see that the weighted average call money rate declines. So, this will have impact on the banking system, also on the other money markets; then this will affect all these variables as well as these rates as well. Then this will affect consumption, investment, and net exports, then affect aggregate demand, then finally, this affects the price stability and economic growth.

So, in this session, we had covered mainly the monetary policy transmission channels and we had discussed what are the main channels, and how it affects different sectors or different important variables of the economy, and finally, how it finally affects the key economic variables. Thank you for watching this video.

Thank you.

Keywords: Monetary policy transmission mechanism, conventional channel, stock price, rate of interest, asset price channel, Tobin q ratio, bank lending channel, balance sheet channel, cash flow channel, credit view channel, household liquidity effects, unanticipated price level