Monetary Economics

Theory and Practice of Monetary Policy in Normal Times

Targets and Instruments of Monetary Policy

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Introduction

- The Objectives of Monetary Policy
- The Instruments of Monetary Policy
- The Intermediate Target Problem
- The Monetary Transmission Mechanism

Alan Blinder (1997) What Central bankers could learn from Academics and Viceversa"
William Poole (1970) "Optimal Choice of Monetary Instruments in a Simple Stochastic Macromodel"
Fredric Miskin (1996) "The Channels of Monetary Policy" (next week)

The Objectives of Monetary Policy

Most economists think in term of the following quadratic loss function

$$L = (u - u*)^2 + \alpha (\pi - \pi^*)^2$$

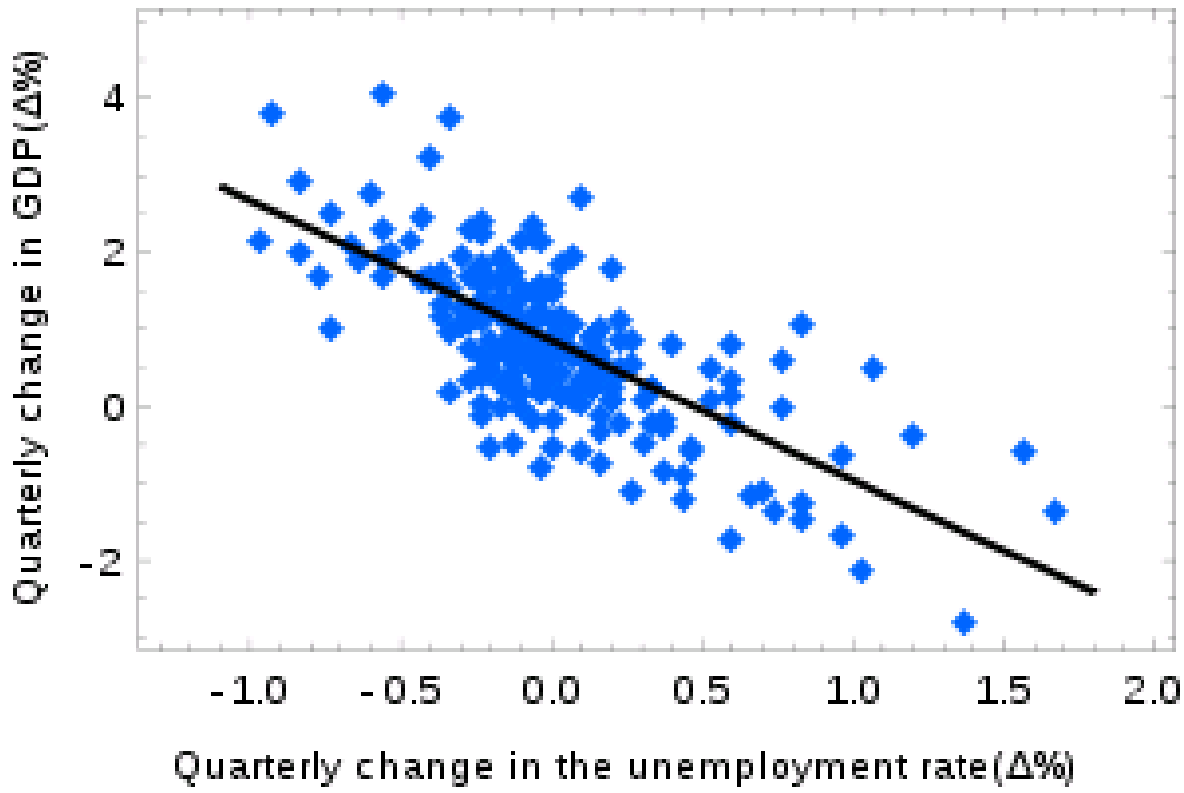
Where
u = unemployment rate
u^* = equlibrium unemployment rate
π = actual inflation rate
π^* = inflation target (or any inflation objective)
via the OKUN LAW we can express the objective of monetary policy in term of Output GAP - i.e. difference between actual and potential output

$$L = (y - \overline{y})^2 + \alpha (\pi - \pi^*)^2$$

Okun Law

Okun's law is an empirically observed relationship relating unemployment to losses in a country's production

$$y - \overline{y} = c\left(u - u*\right)$$



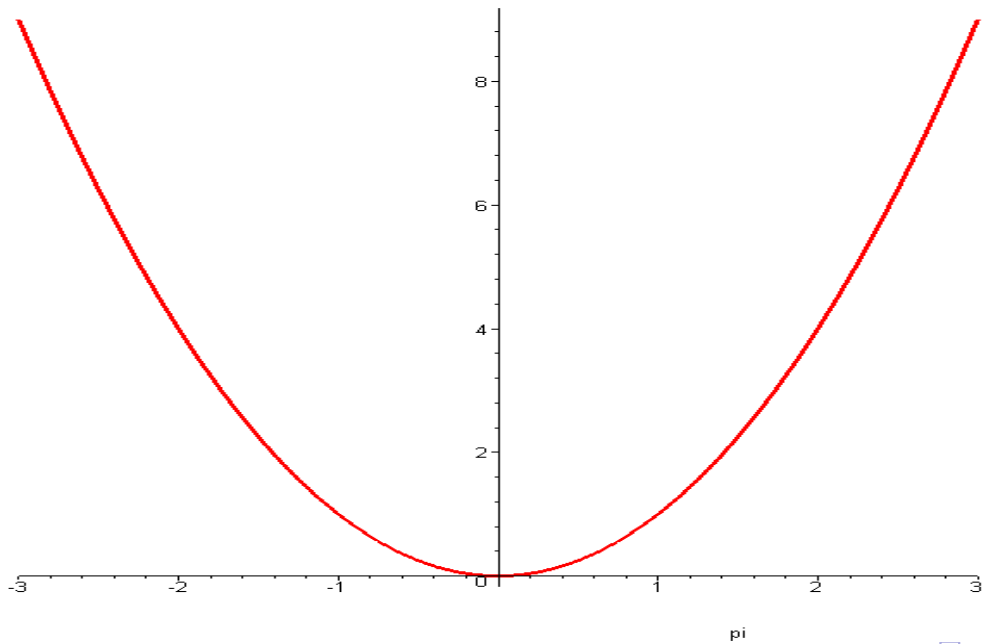
as long as this relation is true, targeting output or targeting employment is equivalent (is this always true?)

Linear Quadratic Problem

Why Quadratic loss function?

$$L = (y - \overline{y})^2 + \alpha (\pi - \pi^*)^2$$

- To penalise large deviations from the target more than small deviations (remeber the properties of a quadratic function)
- The first derivative of the loss function is linear - so that the policy rule is represented by a linear function (more of this later)



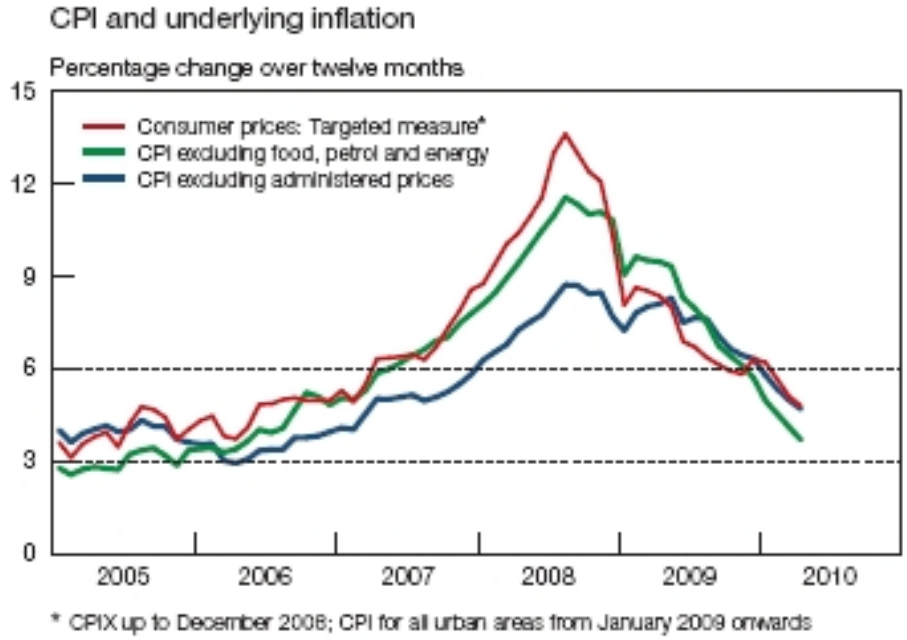
Linear Quadratic Problem

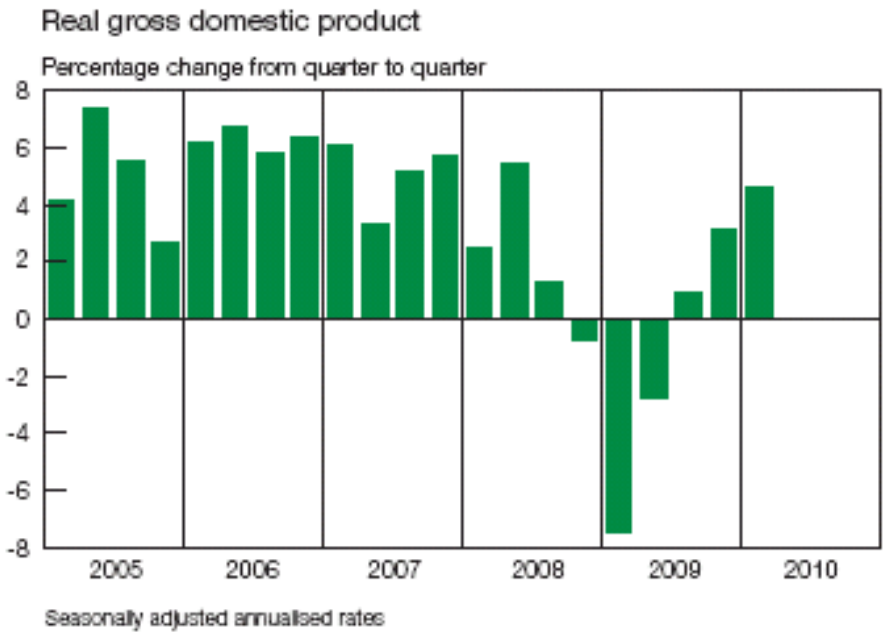
- As long as inflation is above its target, society suffers a loss proportional to the squared difference between actual and target inflation (simmetric for inflation below its target)
- As long as output is above (or below) its natual rate, society suffers a loss proportional to the squared difference between actual and potential output

Very simplified objectives - Questions:

- Why not more objectives?
- Why simmetric around the target?
- The problem of opportunistic disinflation (Blinder, page 5)

Example - Inflation and Output in South Africa





The Instruments of Monetary Policy

The bank has several tools for affecting private economic and financial behaviour: reserve requirements, financial regulations, open market operations

- The "instrument problem" of monetary policy arises because of the need to specify how the central bank will conduct its open market operations.T
- he instrument problem is the choice of a variable to be set directly by the central bank via buying and selling securities, and hence the value of which is to serve as the principal guide in carrying out that buying and selling function.
- Because open market operations are in essence a trading activity, the instrument variable used may be either a quantity or a price.

$$\text{Quantity} = \text{Money}$$
$$\text{Price} = \text{Interest Rate}$$

Poole (1970): Choice of Instrument under Uncertainty (1)

- The choice between quantity (Money) and price (Interest Rate) depends on parameters describing economic behavior and on the different sources of uncertainty affecting the economy
- Model: Simple IS-LM Structure (in log deviation from steady state) with Shocks

$$\begin{aligned} y &= -\alpha_1 r + u \\ m &= \beta_1 y - \beta_2 r + v \end{aligned}$$

where
$y = output, r = interest.rate, m = money$
$u, v = shocks$ with variances equalt to σ_u and σ_v
$\alpha_1, \beta_1, \beta_2 =$ parameters
Objective - minimize variance of output (Stabilize output)

$$L = (y - \overline{y})^2 = E\left(y^2\right) |_{r,m}$$

Poole (1970): Choice of Instrument under Uncertainty (2)

Instrument: Interest Rate (Interest Rate Fixed)

$$E\left(y^2\right)|_r = E\left(u^2\right) = \sigma_u^2$$

Instrument: Money Supply

$$\begin{aligned} y &= \frac{\beta_2 u - \alpha_1 v}{\alpha_1 \beta_1 + \beta_2} \\ m &= \beta_1 y - \beta_2 r + v = 0 \end{aligned}$$

$$E\left(y^2\right)|_r = E\left(\left(\frac{\beta_2 u - \alpha_1 v}{\alpha_1 \beta_1 + \beta_2}\right)^2\right) = \frac{\beta_2^2 \sigma_u^2 + \alpha_1^2 \sigma_u^2 - 2\alpha_1 \beta_2 \sigma_{uv}}{\left(\alpha_1 \beta_1 + \beta_2\right)^2}$$

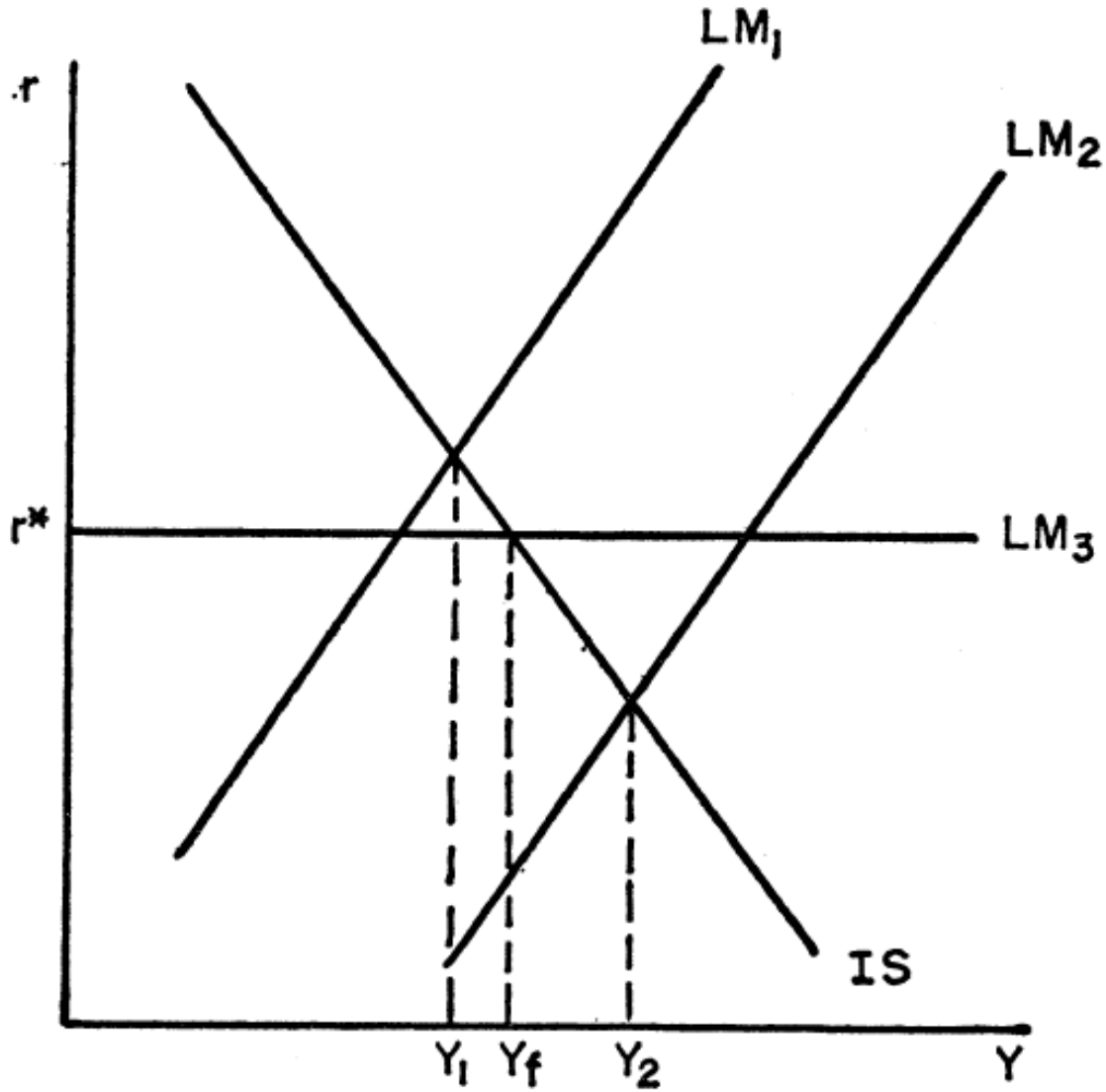
Poole (1970): Choice of Instrument under Uncertainty (2)

Optimal choice will be Interest Rate If

$$\sigma_u^2 < \frac{\beta_2^2\sigma_u^2 + \alpha_1^2\sigma_v^2 - 2\alpha_1\beta_2\sigma_{uv}}{(\alpha_1\beta_1 + \beta_2)^2}$$

- The nature of the shocks and the structure of the economy will define the best policy instrument - an empirical question
- Modern Central Banks - Interest Rate is the Choice Instrument because of instability of money demand
- At zero interest rate: interest rate is not usable anymore - quantitative easing a form of control of quantity of money

Poole (1970): Graphical analysis - Monetary Shocks



Poole (1970): Graphical analysis - IS Shocks

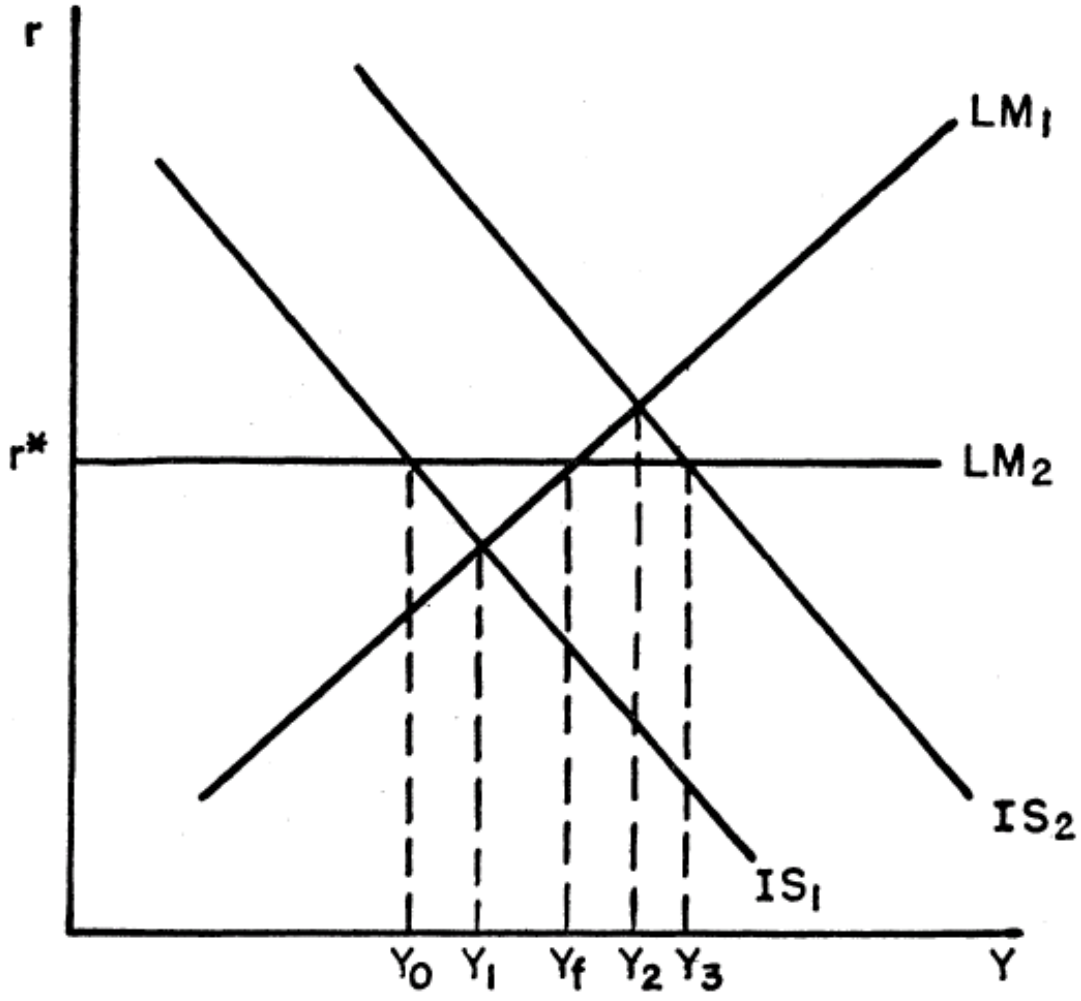
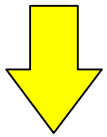


FIGURE III

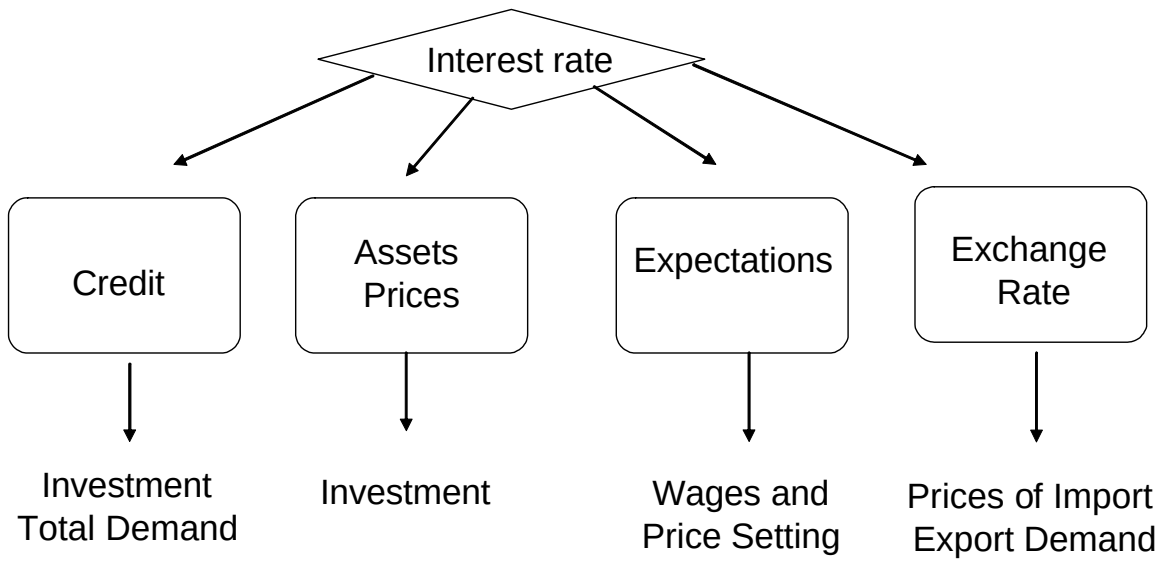
The Intermediate Target Problem

- Monetary Policy cannot affect directly inflation and output
- Target a variable that is directly linked to the ultimate objectives and that can be controlled
  - Broad Quantity of Money
  - Credit
  - Exchange Rate
  - Inflation Forecast
- The Choice of intermediate target is strictly dependent on the macroeconomic model a bank use

Monetary Policy in Practice

Instruments	=	Money Base or interest rates
		
Intermediate targets	=	Broad Money, Credit, Exchange Rate, Inflation Forecasts
Final objectives	=	inflation, output

Monetary Transmission Mechanism



Which Interest Rate? Real Interest Rate

- The Monetary Transmission Mechanism
  - how does monetary policy affect the economy?
- Traditional Interest Rate Channels
- Other Asset Price Channel
- Credit Channels

Fredrik Mishkin(1996) The Channels of Monetary Policy: Lessons for Monetary Policy
Bernanke and Gertler (1995) Inside the Black Box: The Credit Channel of Monetary Policy Transmission

Two Views

Mishkin

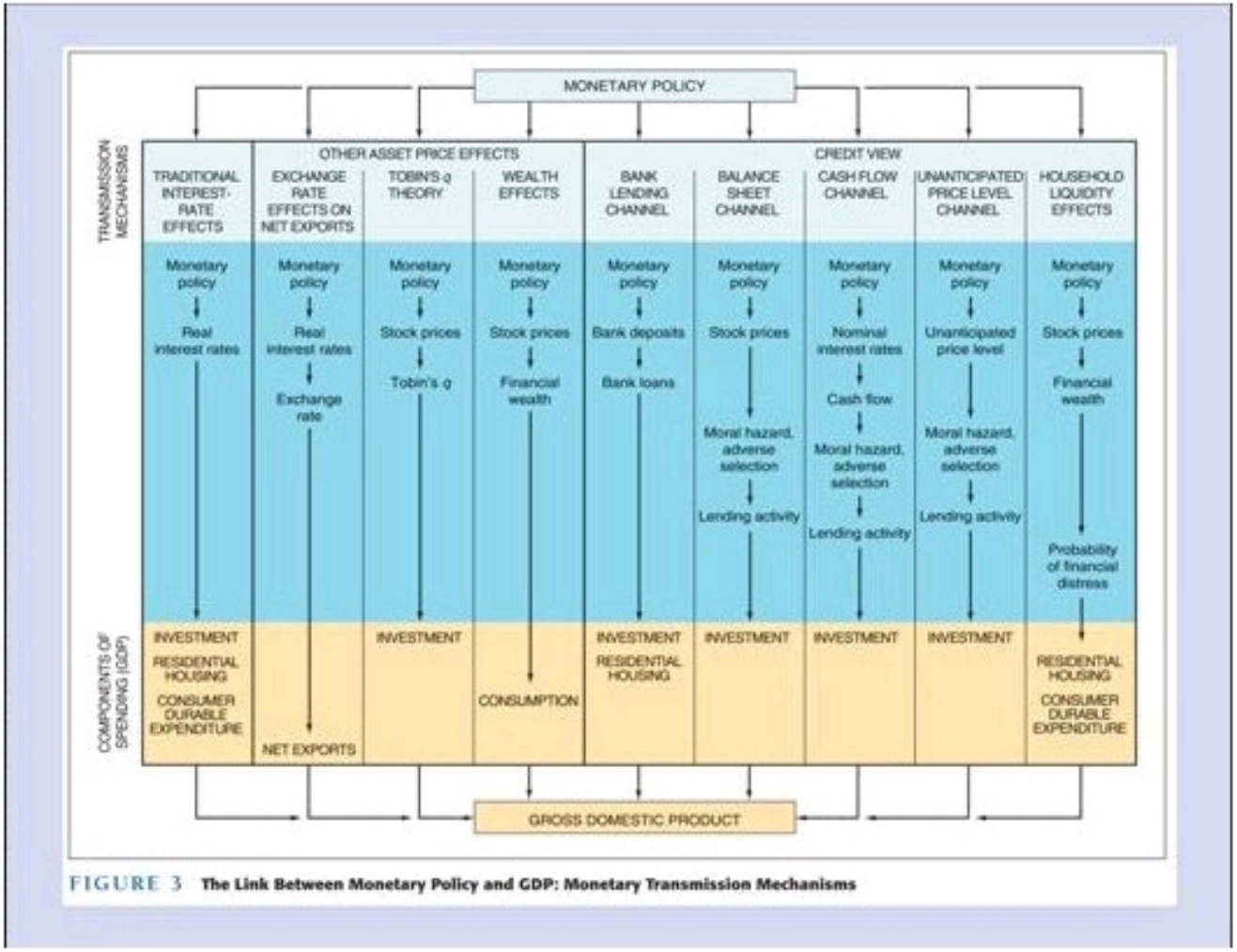
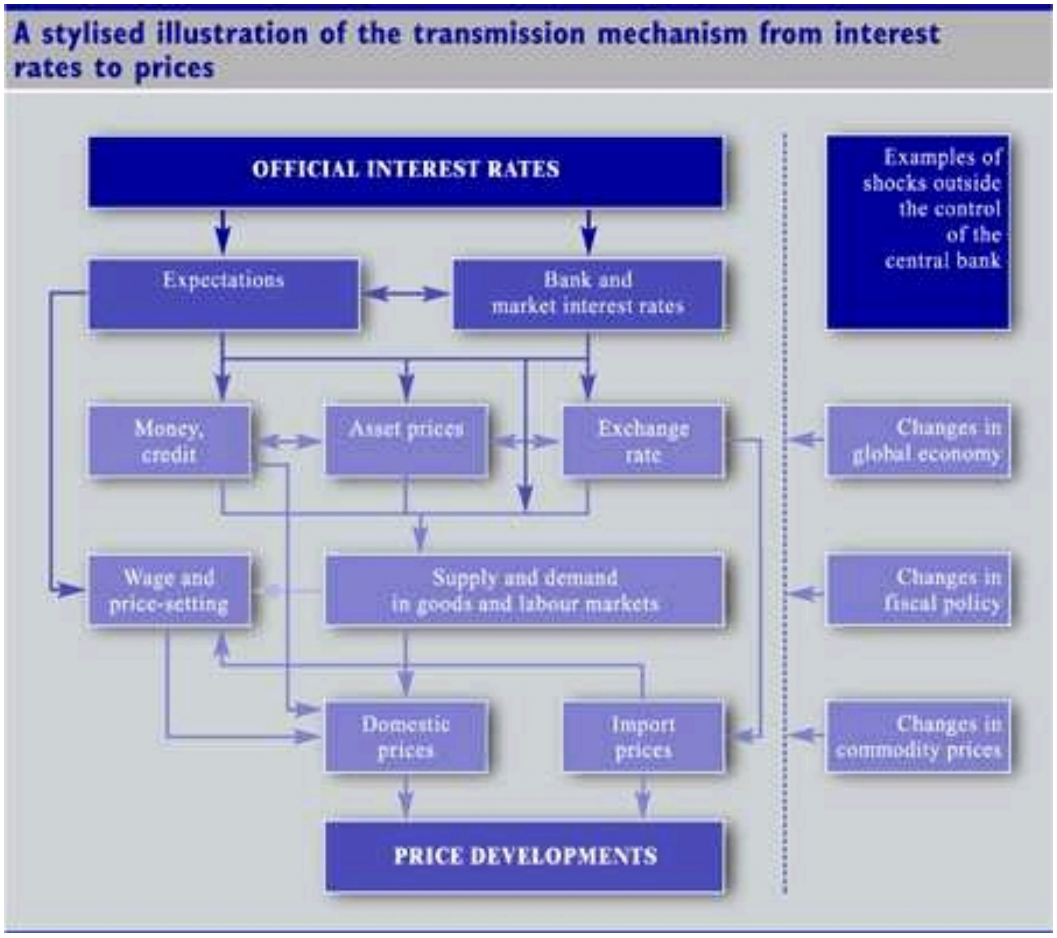


FIGURE 3 **The Link Between Monetary Policy and GDP: Monetary Transmission Mechanisms**

Source: Chapter 23, Frederic Mishkin, *Economics of Money, Banking and Financial Markets* (8/e).

Two Views

ECB



Do you see any difference? Controlling output and controlling prices is related by phillips curve relationship

Traditional Interest-Rate Channels

$$M \uparrow, i \downarrow, I \uparrow, Y \uparrow$$

- Traditional IS/LM channel
- What matter is the real interest rate, i.e $i_r = i_n - \pi^e$
- What matters more is the long term i_r - needs a theory linking short term and long term interest rate:expectation theory of the term structure

$$i_t^n = \frac{i_t^1 + E_t i_{t+1}^1 + E_t i_{t+2}^1 + .. + E_t i_{t+n-1}^1}{n}$$

- works only in the context of sticky prices.

Because is the real interest rate that matter, monetary policy can be effective even if the nominal interest rate is close to zero - increase in expected inflation can be beneficial in going out of depressions

$$M \uparrow, P^e \uparrow, \pi^e \uparrow, i_r \downarrow, I \uparrow, Y \uparrow$$

Other Asset Price Channels

- Exchange Rate Channel

$$M \uparrow, i \downarrow, (r - r_f) \downarrow, E \downarrow, NX \uparrow, Y \uparrow$$

- When the central bank increases the money supply, it lowers short-term nominal interest rates and thus lowers short-term real interest rates as well. Lower short-term real interest rates imply that domestic denominated assets are less attractive than foreign assets leading to a decrease in demand for domestic currency.
- The subsequent depreciation of the dollar makes domestic goods cheaper than foreign goods and leads to an increase in Net Exports, and therefore in GDP as well.
- For small open economies with flexible exchange rates, important channel of transmission.

Other Asset Price Channels

- Tobin's q

the amount of investment is positively related to the ratio (q) between market value of capital and its replacement cost

$$q = \frac{\text{Market value of installed capital}}{\text{Replacement cost of capital}}$$

- When q is high, firms will invest more either because adding capital is cheap or because the value of installed capital is high.
- Expansionary monetary policy can lead to a higher q - either because market interest rates are falling leaving people with less attractive alternatives or because they have more money to spend, therefore they buy more stocks.
- Higher stock prices (a higher market value) leads to a higher q and more investment.

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

Other Asset Price Channels

- Wealth Effects

- The increase in the price of stocks that follows a monetary expansion raises household wealth and leads individuals to spend more money. It could also be the case that higher demand for stocks increase the value of companies and enables companies to borrow and spend more freely as well.

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

Credit View

- Bank Lending

$M \uparrow$, deposits$\uparrow$, bank loans$\uparrow$, $I \uparrow$, $Y \uparrow$

- The bank lending channel arises because the banking system mediate between demand and supply of loans, overcoming information inefficiencies
- This channel become especially vital for small firms, which are unable to offer shares on the stock market or issue their own bonds to raise money.
- An expansionary monetary policy leads to more reserves and deposits at the bank, which in turn makes more loans available for investment.

Credit View

Net Worth, Adverse Selection and Moral hazard

- Lenders are concerned that borrowers may be unable to repay their loans.
- This problem is most acute for firms with low net worth: the lender has to wonder if the reason that a low net-worth borrower is coming to him is because no one else is willing to lend to a borrower who may go under at any time (the adverse selection problem).
- The lender also has to wonder whether giving an increased loan to a low net-worth firm may make that firm pursue risky investment projects, increasing the likelihood of project failure since the owner of the firm has little to lose if the firm goes under (the moral hazard problem).

Credit View

Net Worth, Adverse Selection and Moral hazard

- Expansionary monetary policy can affect the balance sheets of firms in numerous ways: lower interest rates which increases cash flow, higher equity prices, inflation that reduces value of liabilities, higher aggregate demand which raises business revenues and profits etc.
- Enhanced balance sheets reduce the moral hazard and adverse selection problems and lead to more access to funds for borrowing firms and therefore stimulates more economic activity.
- Balance sheet effects on households: consumer cash flow and balance sheets should improve when credit card, student loan, and mortgage interest rates fall, thus enabling consumers to invest more in items like consumer durables and housing which are generally considered to be illiquid and "big ticket" items to be avoided in times offinancial uncertainty.

Credit View

Net Worth, Adverse Selection and Moral hazard

- Balance-Sheet

$M \uparrow, Pe \uparrow$, adverse selection$\downarrow$, moral hazard$\downarrow$, lending$\uparrow$, $I \uparrow$, $Y \uparrow$

- Cash Flow

$M \uparrow, i \uparrow$, cash flow$\uparrow$, adverse selection$\downarrow$, moral hazard$\downarrow$, lending$\uparrow$, $I \uparrow$, $Y \uparrow$

- Unanticipated Price Level

$M \uparrow$, unanticipated P$\uparrow$, net worth$\uparrow$, adverseselection$\downarrow$, moralhazard$\downarrow$, lending$\uparrow$, $I \uparrow$, $Y \uparrow$

- Liquidity Effects - Household Balance Sheet Effects

$M \uparrow$, $P_e \uparrow$, value of financial assets $\uparrow$, likelihood of financial distress $\uparrow$, consumer durable and housing expenditure $\uparrow$, $Y \uparrow$

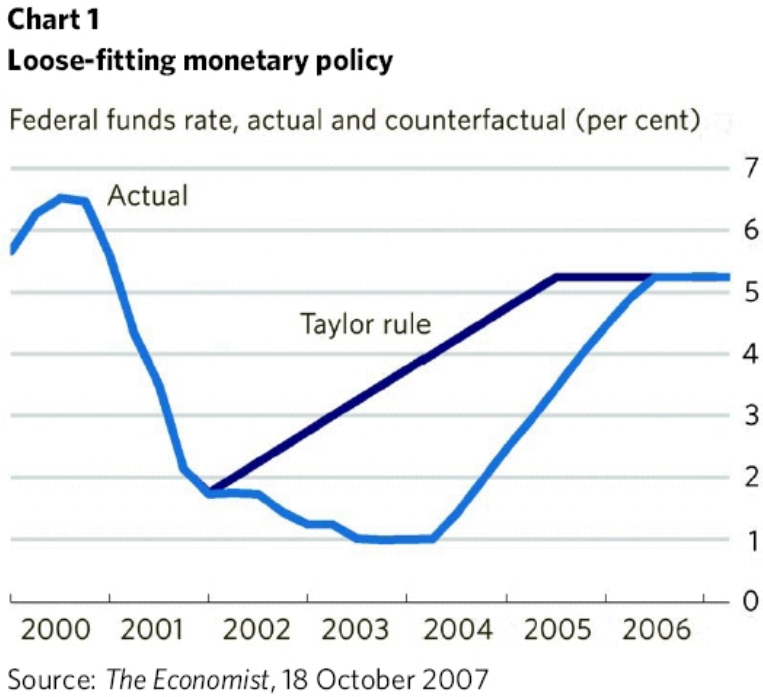
Lessons for Monetary Policy

1. Don't focus only on nominal interest rates
2. Asset prices are important indicators of the stance of monetary policy
3. Monetary policy can work even in a zero nominal interest rate environment
4. Price stability should be the goal of monetary policy makers.

Back to the Crisis - The Role of Monetary Policy

If monetary policy is so important, and works trough all these different channels, can we identify where it got it wrong?

Taylor (2008) - Monetary Policy was too loose



Discuss how a loose monetary policy would/could produce the crisis

Back to the Crisis - The Role of Monetary Policy

How do we evaluate if a policy is too loose or too contractionary?

Rule of thumb - The Taylor Rule

$$i_t = \overline{r} + 1.5\left(\pi_t - \pi^T\right) + 0.5\left(y_t - \overline{y}\right)$$

Read Taylor: Discretion versus Policy Rules in Practice - to be done next