

FETP/MPP8/Macroeconomics/Riedel

# **The Macro Economy and Macro Policy under Fixed Exchange Rates**

# INTRODUCTION

Previous lectures explained how the equilibrium exchange rate is determined in the market for foreign exchange and how the macro economy responds to various shocks and how government can use monetary and fiscal policy to maintain macro stability when the exchange rate is market determined. This lecture considers the implications of a policy of fixing (or pegging) the exchange rate how fixing the exchange rate influences the effectiveness of monetary and fiscal policy.

Government fixes (or pegs) the exchange rate by standing ready to buy or sell foreign currency whenever there is an excess supply or demand in the foreign exchange market.

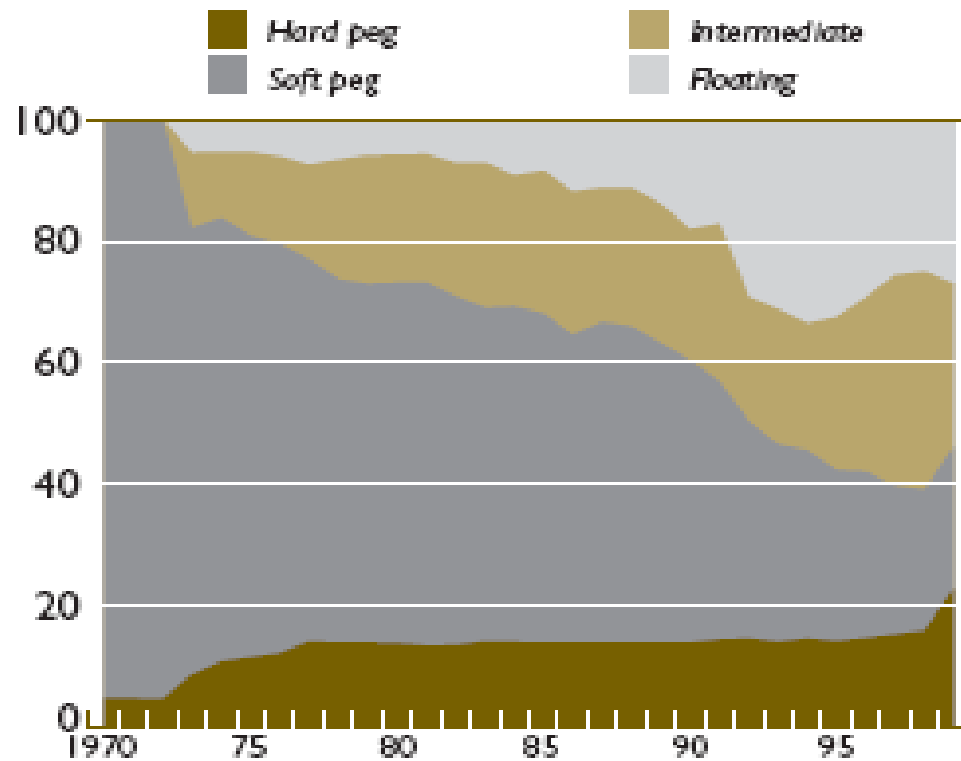
Foreign exchange purchases (sales) go into (out of) the central bank's holdings of official foreign reserves. Since foreign reserves are a component of base money, the money supply (e.g. M2) is influenced by the central bank's intervention in the foreign exchange market.

Previous chapters treated the money supply as exogenous and the exchange rate as endogenous. In this chapter, the exchange rate is exogenous and the money supply endogenous. In other words, when a country fixes its exchange rate, it gives up monetary policy. **Fixing the exchange rate is a monetary policy!**

# Exchange Rate Regimes

## Exchange Rate Policy de jure

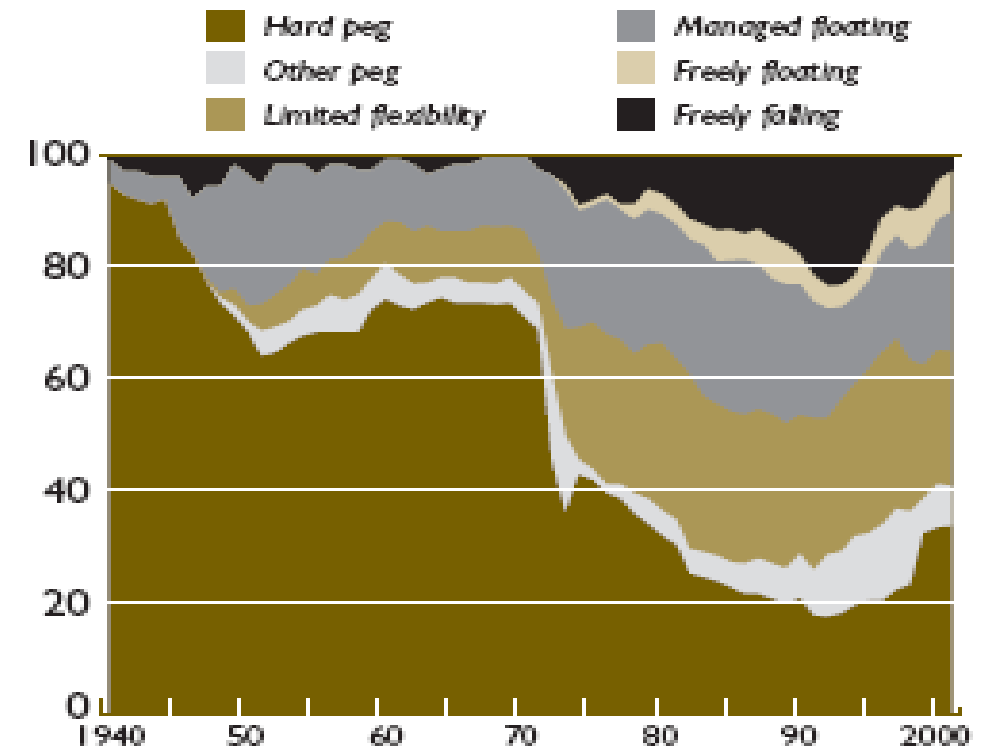
**Figure 2.4. De Jure Regime Distribution**  
(In percent of annual observations)



Sources: Ghosh, Gulde, and Wolf (2003); and IMF staff estimates.

## Exchange Rate Policy de facto

**Figure 2.3. Natural Classification Regime Distribution**  
(In percent of annual observations)



Sources: Reinhart and Rogoff (2004); and IMF staff estimates.

# THE MONEY SUPPLY PROCESS

Central Bank		Commercial Banks		Household & Firms	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Reserves (R)	Currency in Circulation (CC)	Loans	Deposits	Deposits	Loans
Claims on the Government, known as Domestic Credit (D)	Commercial Bank Required Reserves (RR)	RR	Equity	CC	Other Liabilities
				Other Assets	

Money supply = Currency in circulation (CC) *plus* bank deposits (DEP)

Base money (B) = Liabilities of the central bank = Assets of the central bank

Liabilities of the central bank = CC + commercial bank reserves (RR + ER)

Assets of the central bank = Foreign assets (foreign exchange reserves, R) plus domestic assets (D).

# MONEY MULTIPLIER AND INSTRUMENTS OF MONETARY POLICY

The money supply is a multiple of base money. The ratio of the money supply (e.g. M2) to base money is the money multiplier (mm):

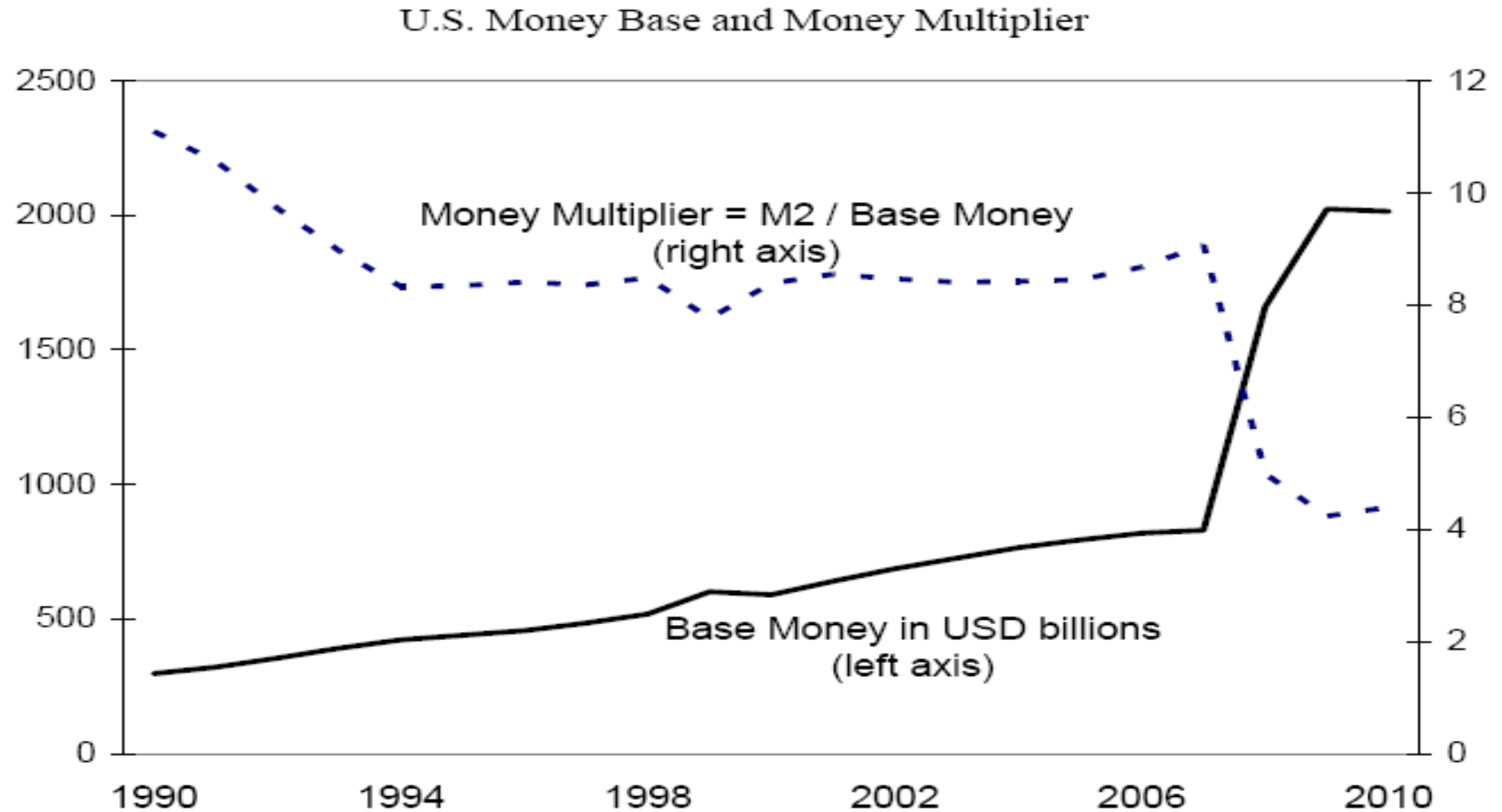
$$mm = \frac{M}{B} = \frac{CC + DEP}{CC + RR + ER}$$

$$mm = \frac{CC/DEP + DEP/DEP}{CC/DEP + RR/DEP + ER/DEP} = \frac{cc + 1}{cc + rr + er}$$

The central bank conducts monetary policy by changing the size of its balance sheet ( $\Delta B = \Delta R + \Delta D$ ) and by adjusting the money multiplier (mm), principally by changing the reserve requirement ratio (rr).

- When the central bank increases or decreases its asset holding, the money supply rises or falls.
- When the central bank borrows from or lends to commercial banks through its discount window, the money supply goes up or down.
- When the central bank raises or lowers reserve requirement ratio the money supply goes down or up.

# BASE MONEY AND THE MONEY MULTIPLIER IN THE U.S.: 1990-2010



# Base Money and its Components in Vietnam: 2005-2011

Figure 3: Level of Base Money and its Components (VND billions)

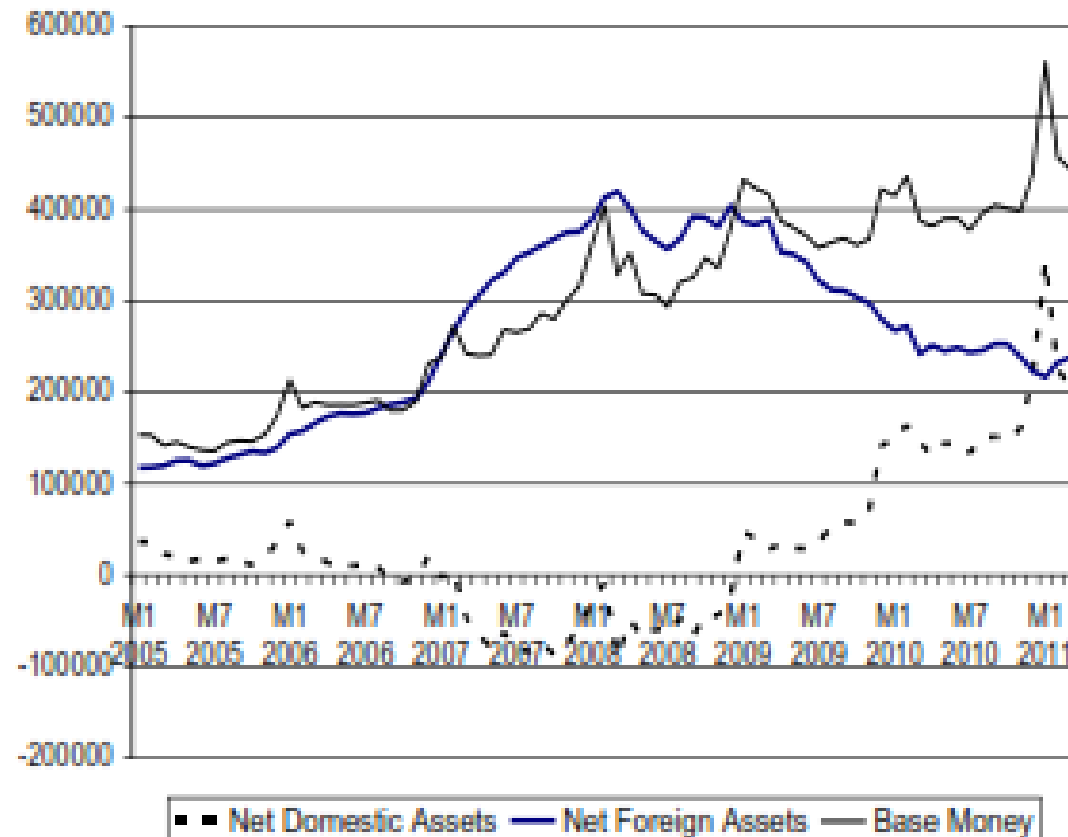
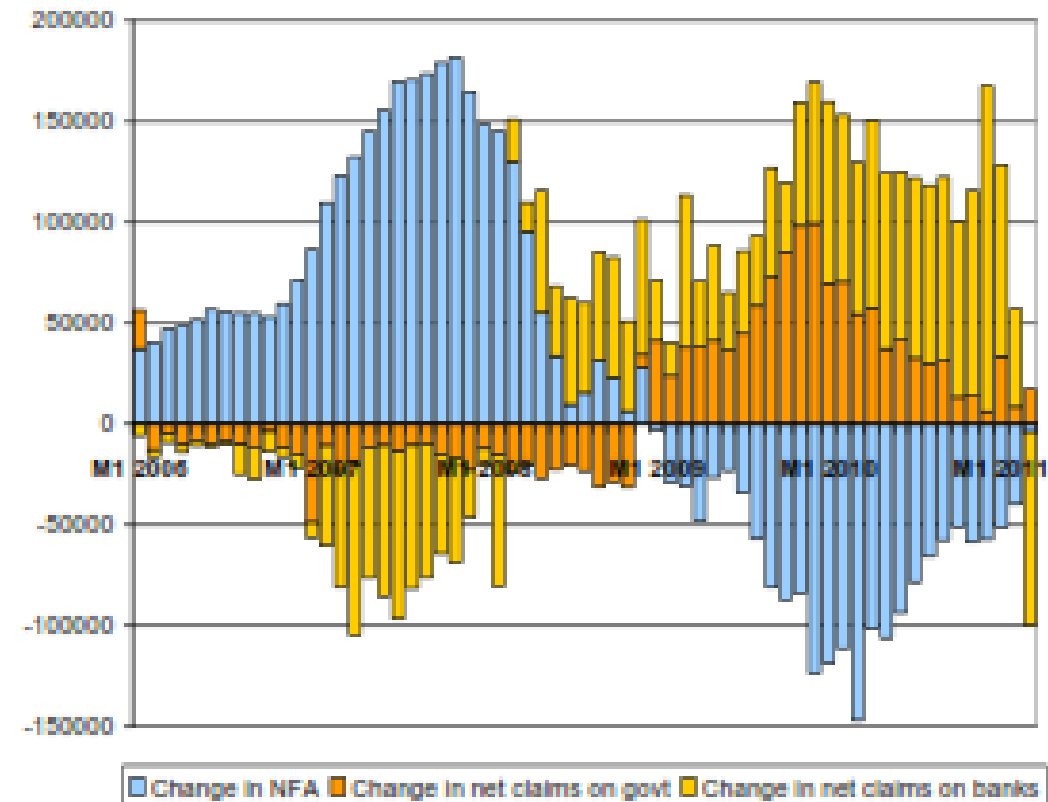


Figure 4: Change (YOY) in Base Money and its Components (VND billions)



Source: IMF, International Financial Statistics, online

Source: Pham and Riedel, 2012, "On the Conduct of Monetary Policy in Vietnam, Asia Pacific Economic Literature, 2012

# The Money Multiplier in Vietnam

Figure 5: Rate of Growth of Base Money and M2: Jan. 2006 thru October 2010 (%)

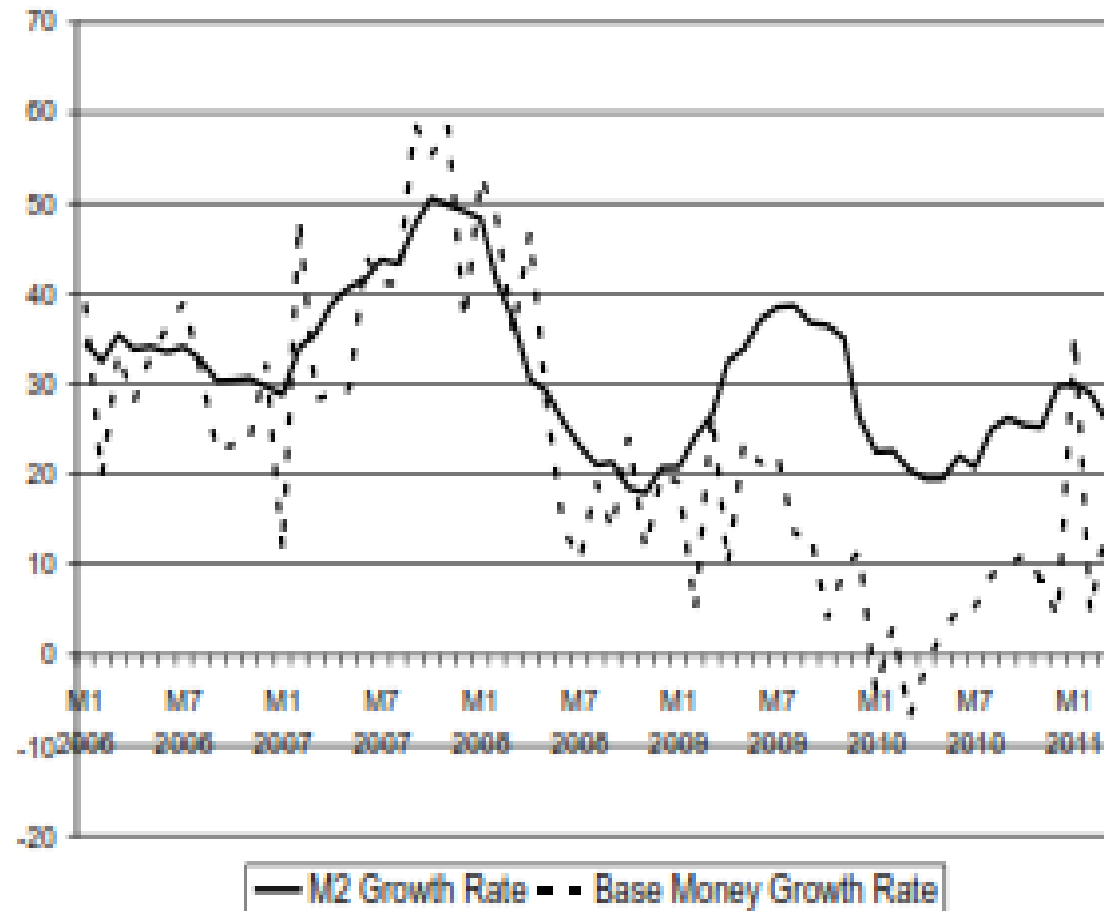
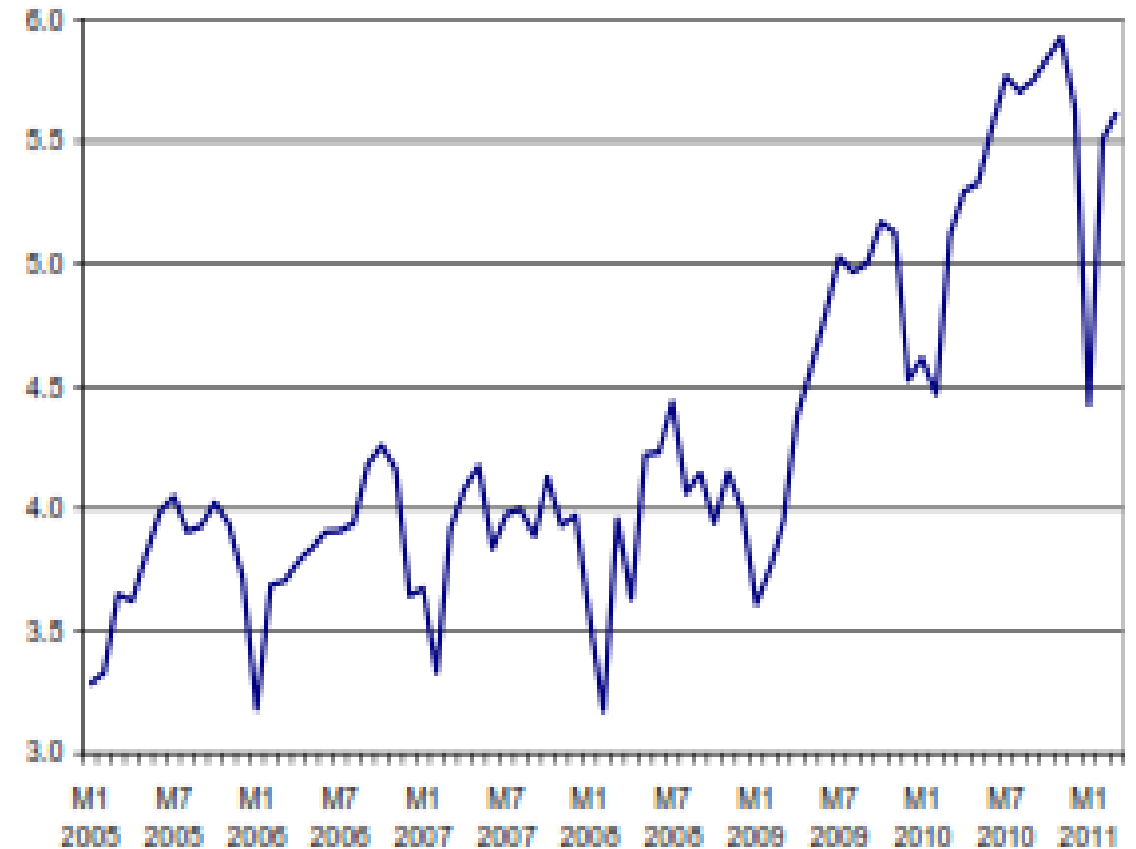


Figure 6: The Money Multiplier: Jan. 2005 thru Oct. 2010



Source: IMF, International Financial Statistics, online

Source: Pham and Riedel, 2012, "On the Conduct of Monetary Policy in Vietnam, Asia Pacific Economic Literature, 2012



# Key Determinants of the Money Multiplier in Vietnam

Figure 7: Currency/Deposit Ratio:  
Jan 2005 to Oct. 2010

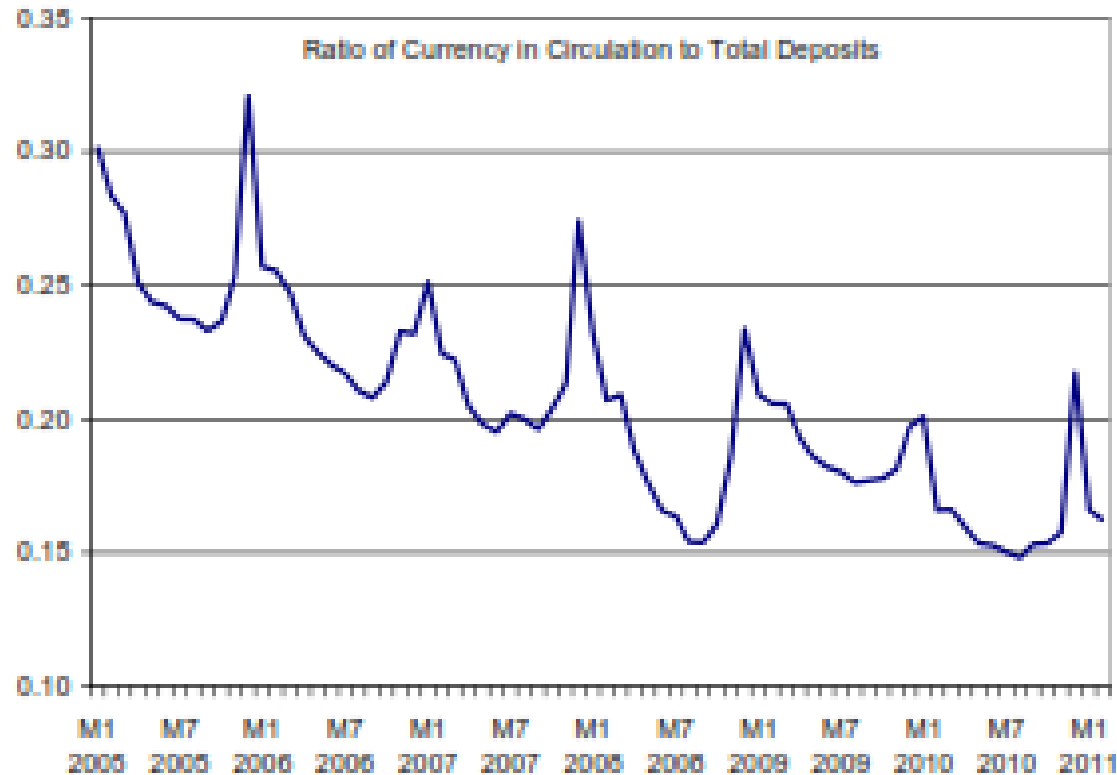
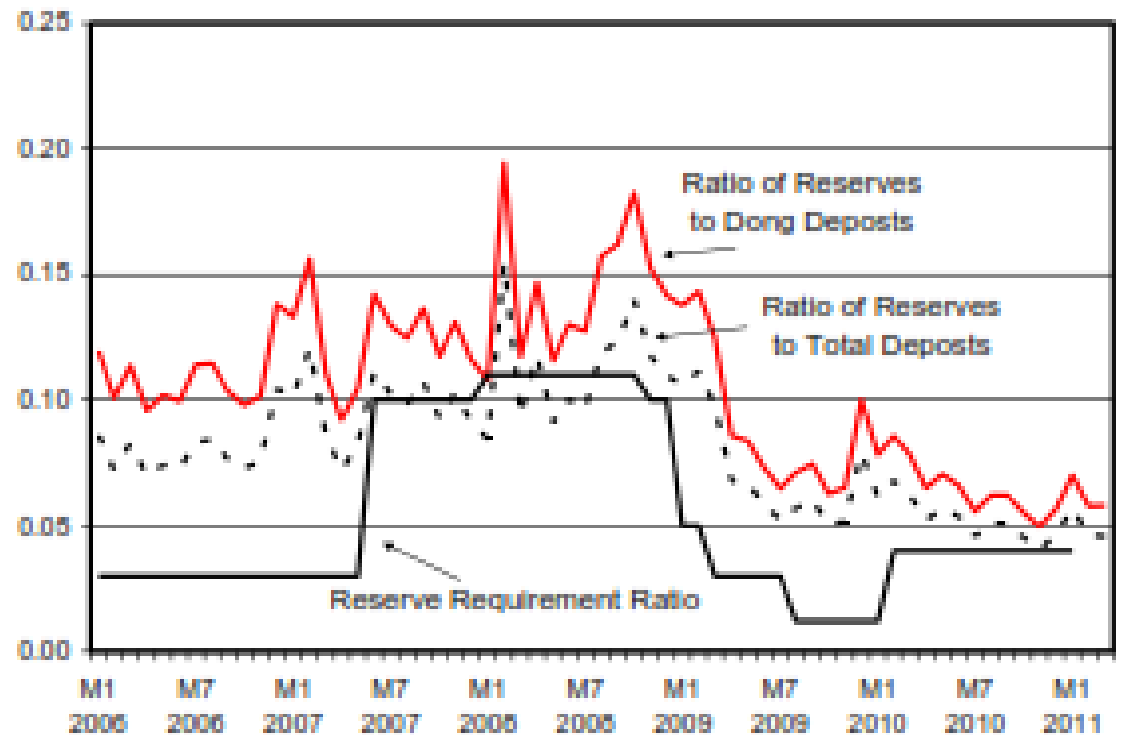


Figure 8: Ratio of Reserves to Dong and Total Deposits and the Reserve Requirement Ratio



Source: IMF, International Financial Statistics, online; State Bank of Vietnam, online.

# Foreign Exchange Market Equilibrium under Fixed Exchange Rates

Recall the foreign exchange market equilibrium condition:

$$\frac{E' - E}{E} = R - R^*$$

where  $R$  and  $R^*$  are bank deposit rates of interest at home and abroad, respectively. If the exchange rate is fixed at  $E^0$  then  $E' = E^0$  and therefore  $\frac{E^0 - E}{E} = 0$  and  $R = R^*$ .

If  $R = R^*$ , then the domestic money market equilibrium condition is:

$$\frac{M^S}{P} = L(R^*, Y)$$

which implies that for given values of  $P$  and  $Y$  the domestic money supply is fully determined by the foreign interest rate ( $R^*$ ).

This means that by fixing the exchange rate, a country gives up the ability of conduct an independent monetary policy. The fixed exchange rate is a monetary policy!

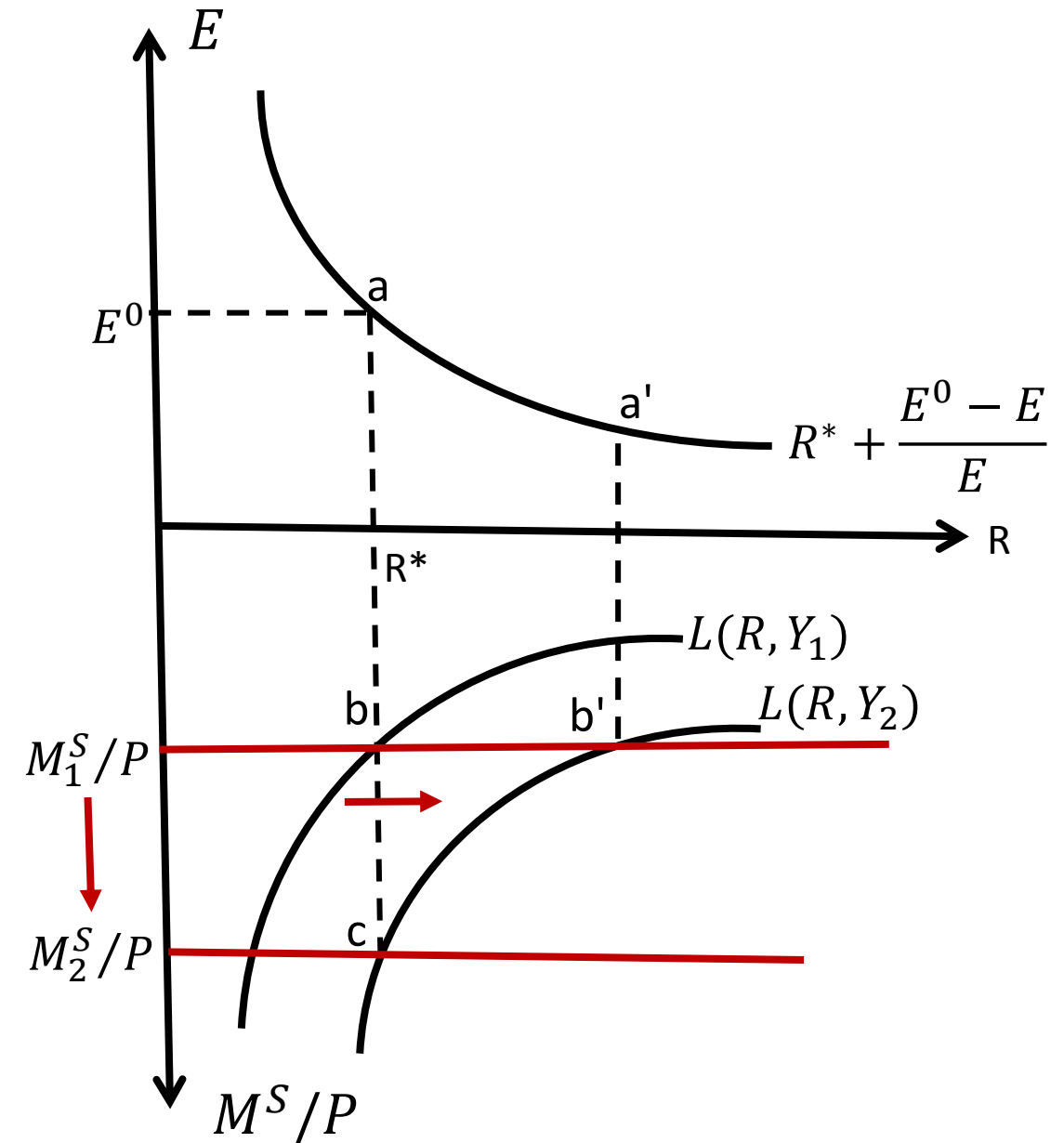
# Foreign Exchange Market Equilibrium under Fixed Exchange Rates

## Response to an increase in income ( $Y \uparrow$ )

If income rises, the demand for real money deposits rises, putting upward pressure on the domestic interest rate ( $R$ ) and on the value of the domestic currency ( $E \downarrow$ ).

The central bank in this case must buy foreign assets in the foreign exchange market—in effect exchanging domestic money for foreign money—increasing the domestic money supply ( $M^S \uparrow$ ) and reducing interest rates until equilibrium is restored at the fixed exchange rate ( $E^0$ ).

The increase in income puts pressure on the currency to appreciate, but instead of appreciating, foreign reserves increase.



# Foreign Exchange Market Equilibrium under Fixed Exchange Rates

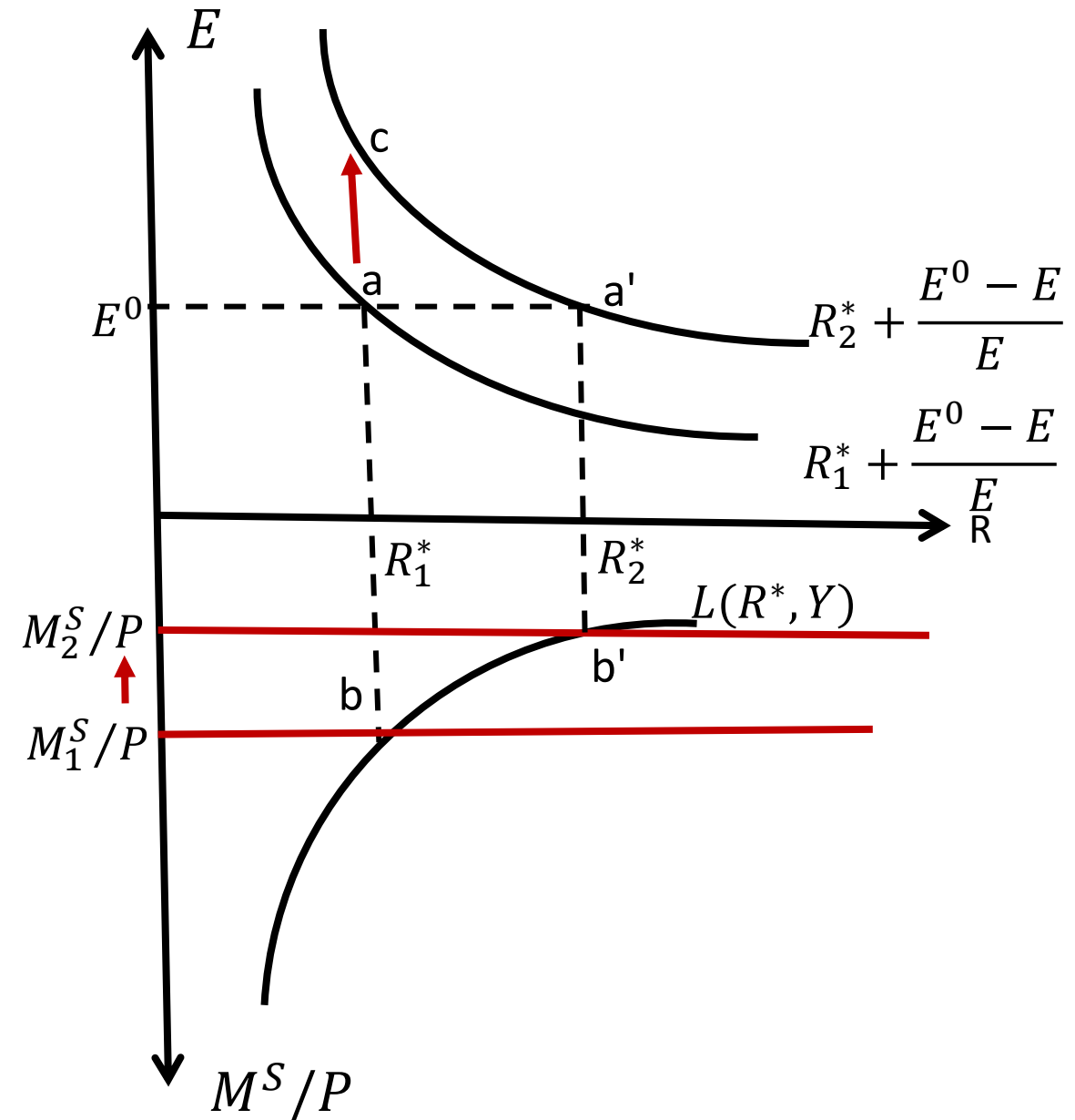
## Response to an increase in the Foreign Interest Rate ( $R^* \uparrow$ )

A rise in the foreign interest rate raises the demand for foreign exchange, creating pressure on the currency to depreciate.

But, the central bank stands ready to sell foreign exchange at the fixed rate ( $E^0$ ). To meet the increased demand for foreign exchange the central bank is forced to draw down its holding of official foreign reserves.

As the central bank's foreign reserves fall, the money supply falls and the domestic interest rate rises to the level of the higher foreign interest rate ( $R = R_2^*$ ).

Note, the domestic money supply is influenced by foreign monetary policy

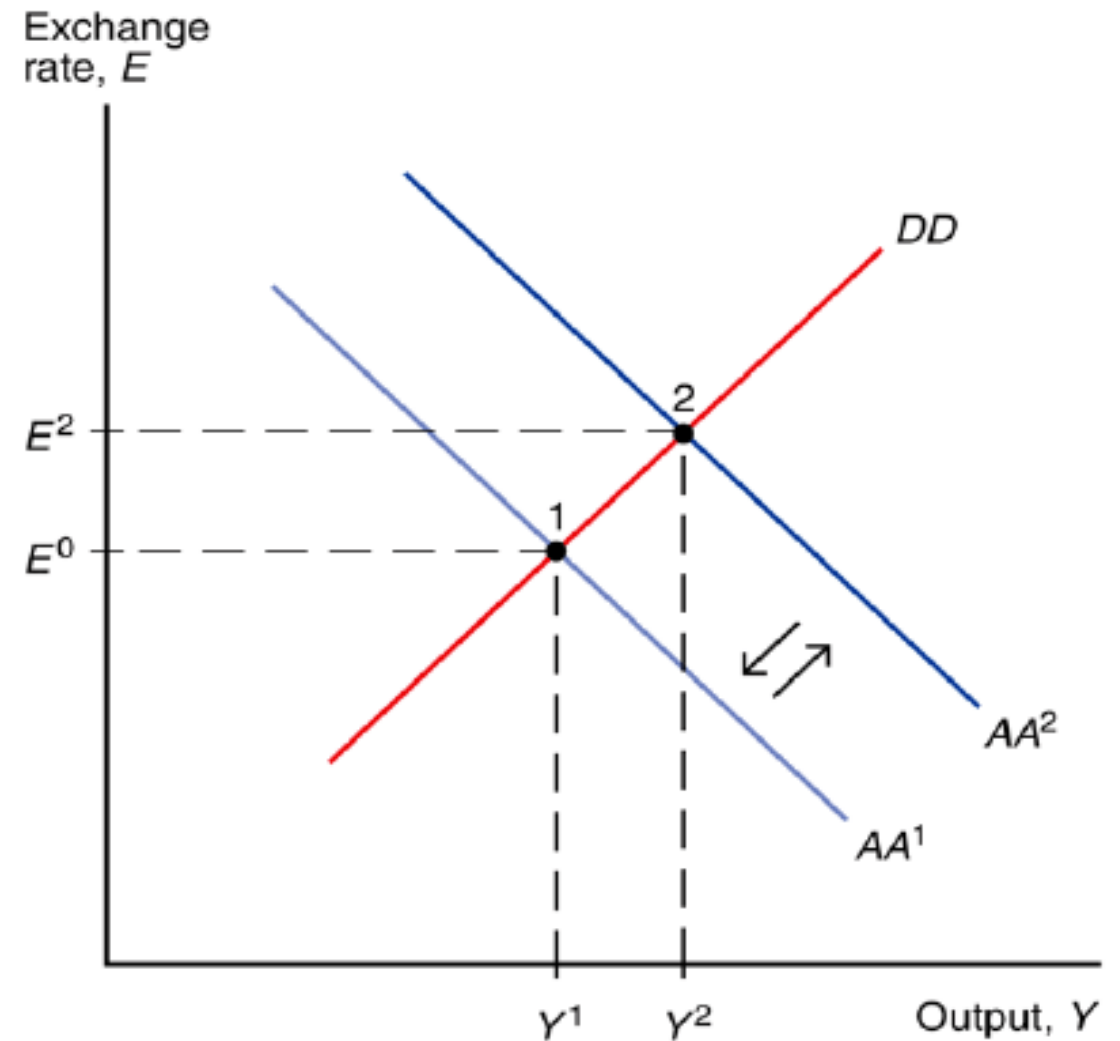


# The Ineffectiveness of Monetary Policy under Fixed Exchange Rates

Suppose the government wants to use monetary policy to stimulate output and employment.

We know that a monetary expansion will push down the domestic interest rate and the value of the domestic currency (exchange rate depreciation).

Under a fixed exchange rate policy, the central bank is obliged to prevent depreciation by selling foreign exchange from its reserves, which serves to reduce the money supply and push interest rates and the value of the currency back up. Thus the monetary stimulus policy is defeated by the fixed exchange rate policy.

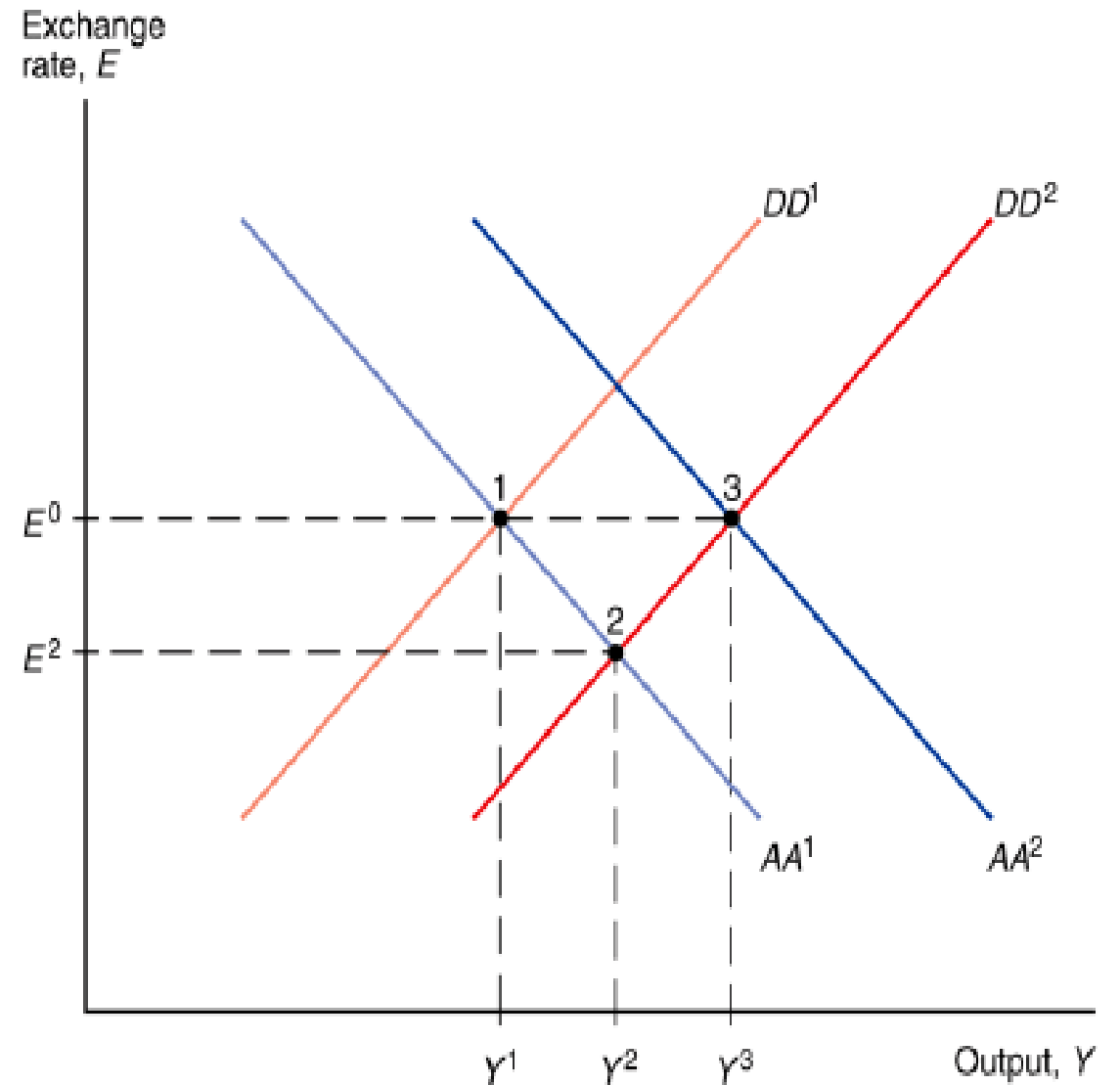


# The Effectiveness of Fiscal Policy under Fixed Exchange Rates

While monetary policy is ineffective under fixed exchange rates, fiscal policy is doubly effective.

As illustrated, an increase in government spending under floating rates raises income from  $Y^1$  to  $Y^2$ , but under fixed exchange rates raises income to  $Y^3$ .

The additional stimulus under fixed rates comes from the monetary expansion induced by the central bank's intervention in the foreign exchange market, exchanging domestic money for foreign exchange to avoid the appreciation that would otherwise occur if the central bank did not intervene.

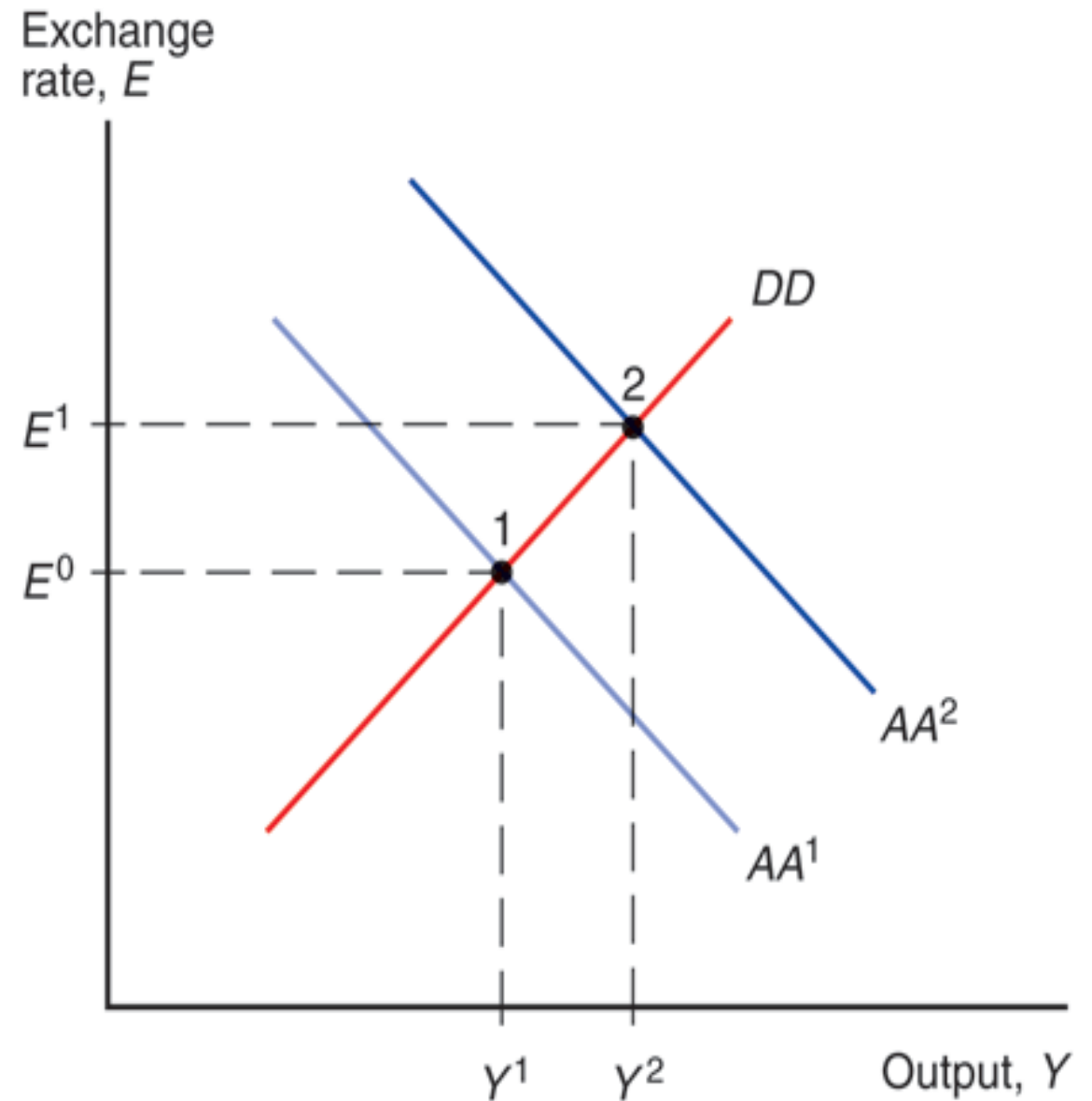


## Devaluation and Revaluation

A country that fixes its exchange rate may from time to time wish to change the rate at which it fixes the exchange rate. When the central bank raises (lowers) the price of foreign currency it is DEVALUING (REVALUING) the domestic currency

For a devaluation to occur, the central bank buys foreign assets, thereby increasing the domestic money supply and lowering the interest rate. As a result of the fall in the interest rate, the currency is devalued ( $E$  rises).

The effect of the devaluation is to make domestic goods more price competitive, leading to higher output, and to increase the nation's stock of foreign reserves.



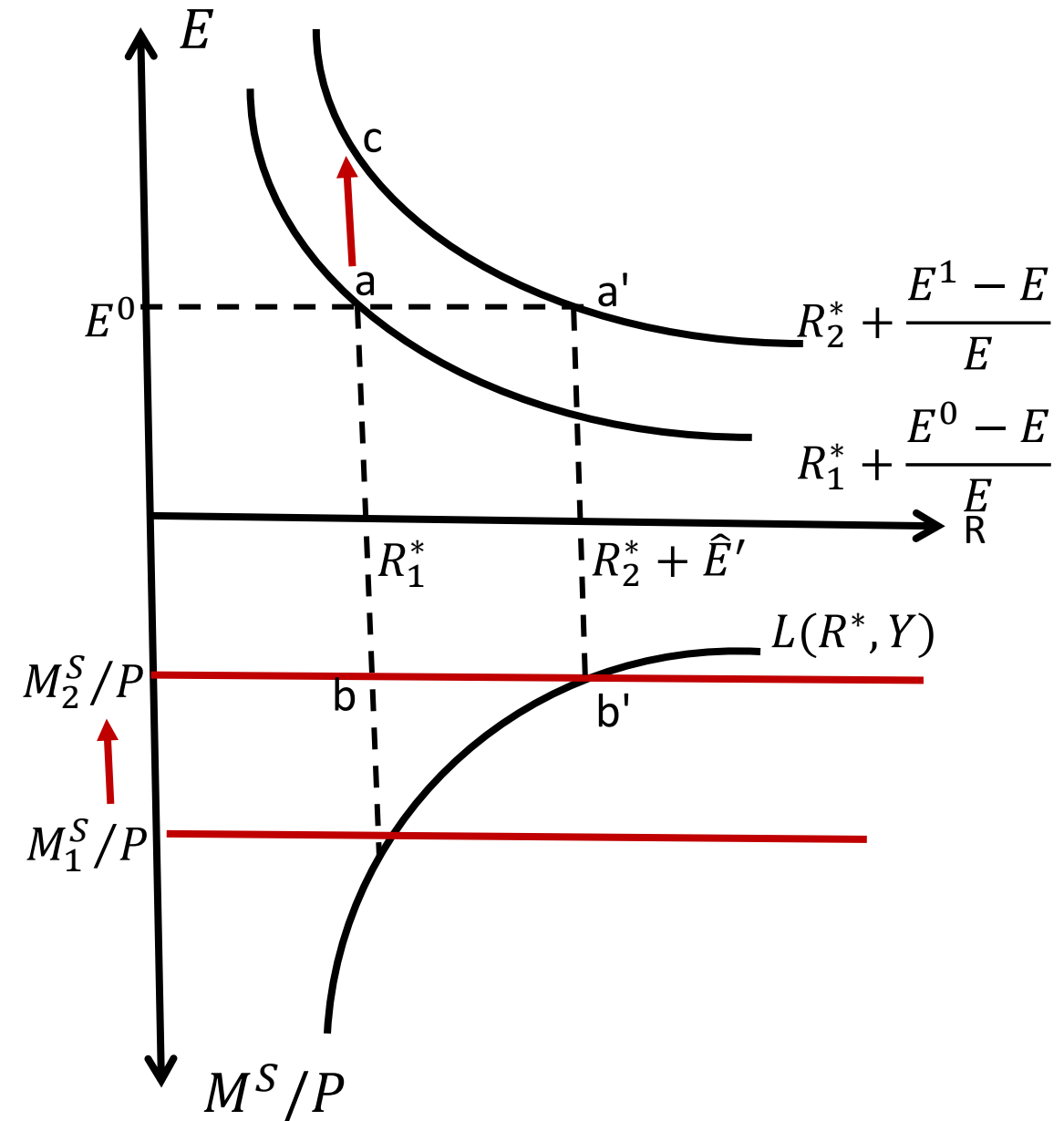
# Foreign Exchange Market Equilibrium under Fixed Exchange Rates

**The effect of a loss of confidence in the central bank's ability to defend the exchange rate.**

When the market questions the ability and/or willingness of the central bank to defend the exchange rate, usually the game is over—a run on the currency often follows.

The change in the expected change rate puts pressure on the central bank to sell off its foreign reserves, which only make the market's confidence the central bank weaker.

The monetary contraction that is required to defend the currency creates political pressures as well as economic ones, which also undermines market confidence in the fixed exchange rate policy.





# Three Generations of Currency Crises

## First generation models of a currency crisis (Krugman, 1979)

When a central bank tries to fix the exchange rate below the market-clearing price by selling foreign reserves, the level of reserves will eventually fall to a level that will induce a speculative attack leading to a massive monetary contraction, soaring interest rates and a decline in output and employment.

Not many good examples.

## Second generation models of a currency crisis (Obstfeld, 1994)

Sometimes a crisis erupts, not from dwindling reserves, but when governments find that their commitment to a fixed exchange rate interferes with other domestic objectives (e.g. full employment). When speculators realize the inconsistency between the fixed exchange rate of other policy objectives they may attack the currency, pushing up interest rates ( $R$ ) and forcing the government to abandon the currency peg.

Best example is the European Monetary System Crisis in 1992

# Three generations of models

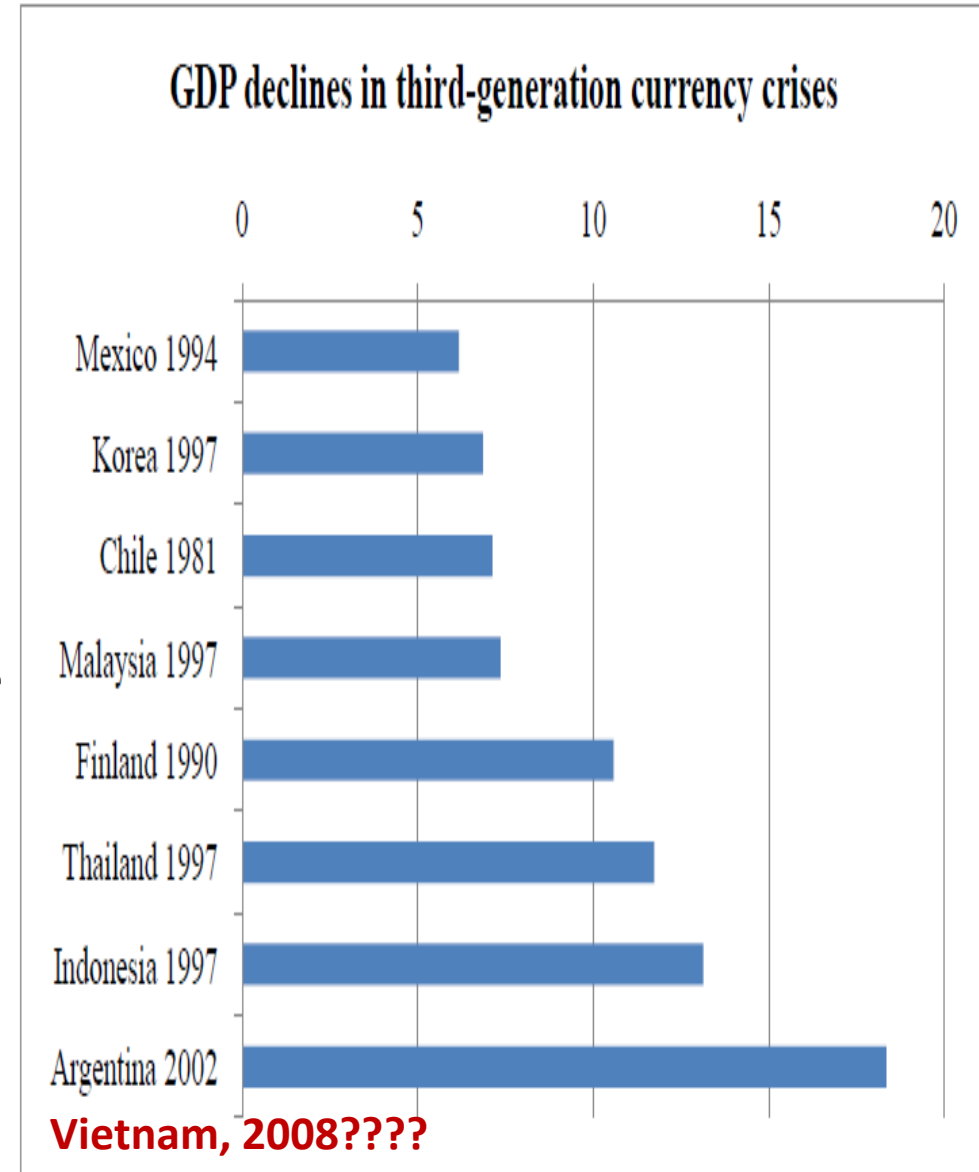
## Third generation models of a currency crisis

These models were inspired by the Mexican crisis (1994), Asian crisis (1997) and Argentinian crisis (2002).

The problem usually begins with a financial bubble financed by foreign capital inflows. Eventually there is an attack on the currency and a resulting large-scale devaluation.

These models emphasize the impact of the devaluation on the balance sheets of banks and firms that hold a large stock of foreign debt. The decline in the net assets of firms and especially banks, leads to a massive contraction of credit and a fall in investment, output and employment, which fuel further devaluation.

The impact of 3<sup>rd</sup> generation crises is typically very large.



# Macro Crises: Crisis and Reform

## Do economic crises induce economic reform?

My study of *Macroeconomic Crises and Long-term Growth in Turkey* (World Bank, 1993) found that they do. Severe macroeconomic crises erupted at the end of each decade (1959, 1969, 1979), leading repeatedly to a coup d'état, a new package of reforms and after a year or two the return of democratic civilian government, then ...

Drazen and Easterly (2001) find evidence, based on data for 156 countries over a 45 years period, that crises induces reform when inflation and black market premium on the exchange rate are extremely high. They do not find evidence that moderate inflation, black market premium, high current account deficits, high budget deficits or negative growth induce reform.

Why not? Because when conditions are moderately bad, countries get an ODA bailout, but when they are extremely bad they get cut off from ODA and have to reform.

Was Đổi Mới motivated by economic/political crisis?

Where Deng Xiao Ping's reforms in the early 1980 and 1990s motivated by crisis?

# The Policy Trilemma

The theory discuss above indicates that:

1. Under floating rates, monetary policy is powerful, but fiscal policy is weak because of crowding out effects
2. Under fixed exchange rates, fiscal policy is especially powerful, but monetary policy is ineffective

These results suggest a Policy Trilemma. If international economic integration is desired, then a country must choose either to:

1. Fix the exchange rate and give up an independent monetary policy
2. Float the exchange rate and retain monetary policy for domestic policy objectives

