

PP542

Inflation and Exchange Rates

Long Run and Short Run

- In the *short run*, the price level is fixed at some level.
 - ♦ the analysis heretofore has been a short run analysis.
- In the *long run*, prices of factors of production and of output are allowed to adjust to demand and supply in their respective markets.
 - ♦ Wages adjust to the demand and supply of labor.
 - ♦ Real output and income are determined by the amount of workers and other factors of production—by the economy's productive capacity—not by the supply of money.
 - ♦ The interest rate depends on the supply of saving and the demand for saving in the economy and the inflation rate—and thus is also independent of the money supply *level*.

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Long Run and Short Run (cont.)

- In the long run, the level of the money supply does not influence the amount of real output nor the interest rate.
- But in the long run, prices of output and inputs *adjust proportionally* to changes in the money supply:
 - ♦ Long run equilibrium: $M^s/P = L(R, Y)$
 - ♦ $M^s = P \times L(R, Y)$
 - ♦ increases in the money supply are matched by proportional increases in the price level.

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Money Neutrality

- All else equal, an increase in the level of a country's money supply causes a proportional increase in its price level in the long run.
- This is called *money neutrality* – it is another way of saying that an increase in money is not like an increase in production – it does not influence any “real” variables.

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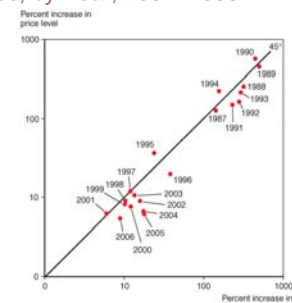
Long Run and Short Run (cont.)

- In the long run, there is a direct relationship between the inflation rate and changes in the money supply.
 - ♦ $M^s = P \times L(R, Y)$
 - ♦ $P = M^s/L(R, Y)$
 - ♦ $\Delta P/P = \Delta M^s/M^s - \Delta L/L$
 - ♦ The inflation rate equals growth rate in money supply minus the growth rate for money demand.

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Average Money Growth and Inflation in Western Hemisphere Developing Countries, by Year, 1987–2006

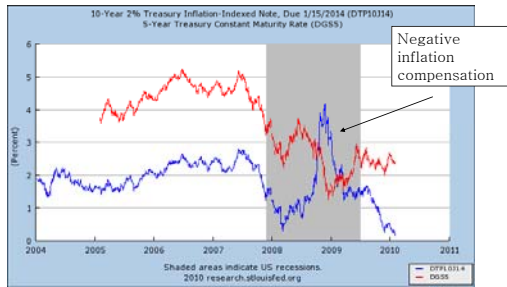


Source: IMF, *World Economic Outlook*, various issues. Regional aggregates are weighted by shares of dollar GDP in total regional dollar GDP.

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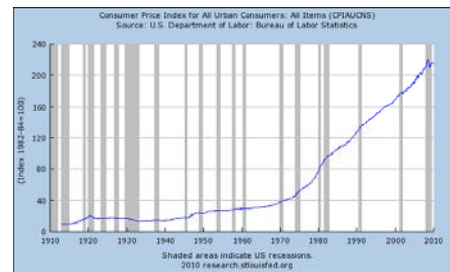
US Deflation Fears Subside



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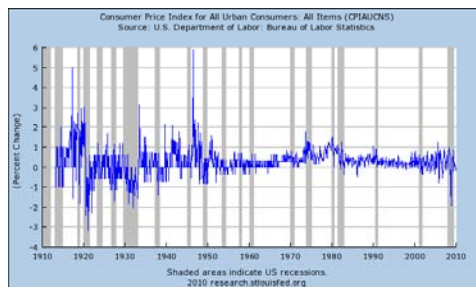
US CPI 1910-2010



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US CPI (% change)



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Money and Prices in the Long Run

- How does a change in the money supply cause prices of output and inputs to change?
1. **Excess demand:** an increase in the money supply implies that people have more funds available to pay for goods and services.
 - To meet strong demand, producers hire more workers, creating a strong demand for labor, or make existing employees work harder.
 - Wages rise to attract more workers or to compensate workers for overtime.
 - Prices of output will eventually rise to compensate for higher costs.

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Money and Prices in the Long Run (cont.)

- Alternatively, for a fixed amount of output and inputs, producers can charge higher prices and still sell all of their output due to the strong demand.
2. **Inflationary expectations:**
 - If workers expect future prices to rise due to an expected money supply increase, they will want to be compensated.
 - And if producers expect the same, they are more willing to raise wages.
 - Producers will be able to match higher costs if they expect to raise prices.
 - Result: expectations about inflation caused by an expected money supply increase leads to actual inflation.

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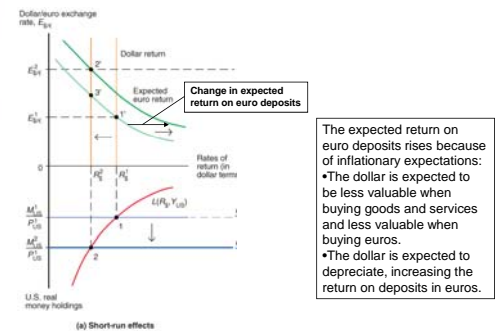
Money, Prices and the Exchange Rates and Expectations

- When we consider price changes in the long run, inflationary expectations will have an effect in the foreign exchange market.
- Suppose that expectations about inflation change as people change their minds, but actual adjustment of prices occurs afterwards.

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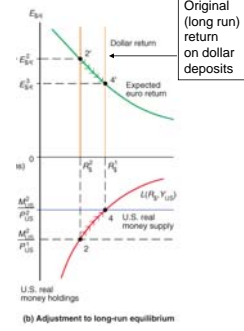
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Short-Run and Long-Run Effects of an Increase in the Money Supply (Given Real Output, Y)



The expected return on euro deposits rises because of inflationary expectations:
 • The dollar is expected to be less valuable when buying goods and services and less valuable when buying euros.
 • The dollar is expected to depreciate, increasing the return on deposits in euros.

Short-Run and Long-Run Effects of an Increase in the Money Supply (Given Real Output, Y)

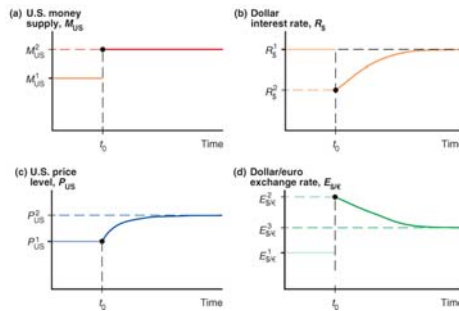


As prices increase, the real money supply decreases and the domestic interest rate returns to its long run rate.

Money, Prices and the Exchange Rates in the Long Run (cont.)

- A permanent increase in a country's money supply causes a proportional long run depreciation of its currency.
 - However, the dynamics of the model predict a large depreciation first and a smaller subsequent appreciation.
- A permanent decrease in a country's money supply causes a proportional long run appreciation of its currency.
 - However, the dynamics of the model predict a large appreciation first and a smaller subsequent depreciation.

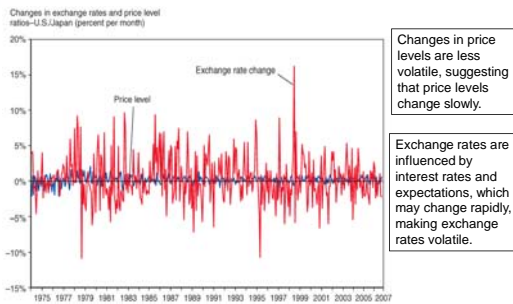
Time Paths of Economic Variables After a Permanent Increase in the Money Supply



Exchange Rate Overshooting

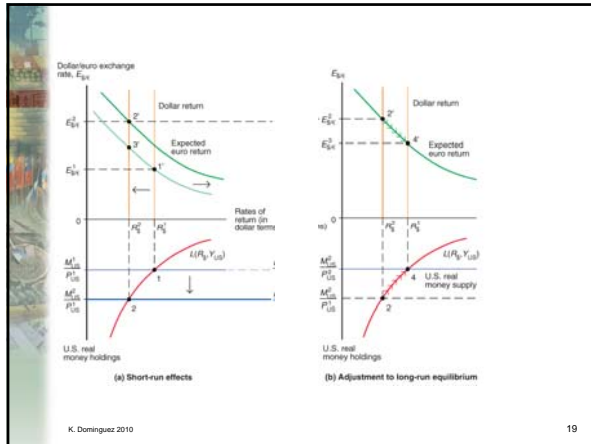
- The exchange rate is said to **overshoot** when its immediate response to a change is greater than its long run response.
- Overshooting is predicted to occur when monetary policy has an immediate effect on interest rates, but not on prices and (expected) inflation.
- Overshooting helps explain why exchange rates are so *volatile*.

Month-to-Month Variability of the Dollar/Yen Exchange Rate and of the U.S./Japan Price Level Ratio, 1974–2007



Changes in price levels are less volatile, suggesting that price levels change slowly.

Exchange rates are influenced by interest rates and expectations, which may change rapidly, making exchange rates volatile.



Policy Experiment: Permanent Decrease in the Home Country Money Supply

- Short run: defined as the time period over which the price level does not change.
- The home monetary authority contracts the home monetary base (holding money demand constant), leading to an excess demand for home money.
- All else equal, this will lead to an increase in the home interest rate (known as the liquidity effect).

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Policy Experiment: Permanent Decrease in the Home Money Supply (cont.)

- The increase in the home interest rate will, in turn, lead to a home-currency appreciation to keep home returns in line with foreign returns (assume foreign interest rates have not changed).
- Recall UIP:

$$i_{t+k} = i_{t+k}^* + \frac{S_{t+k}^e - S_t}{S_t}$$

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Policy Experiment: Permanent Decrease in the Home Money Supply (cont.)

- People know that although home prices have not changed today, they will decrease in the future to reflect the contraction in the home money supply.
- People expect the home currency to appreciate even further when prices do fall.
- Underlying assumption: *rational expectations*.

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Policy Experiment: Permanent Decrease in the Home Money Supply (cont.)

- If people expect the home currency to appreciate in the future, they will be unwilling to hold as much foreign currency today, leading to a foreign currency depreciation (home currency appreciation) today in anticipation of the home price level fall in the future.

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Policy Experiment: Permanent Decrease in the Home Money Supply (cont.)

- As we move from the short-run (defined as when prices are fixed) to the long run (defined as when prices have fully adjusted) prices will begin to fall.
- This, in turn, will lead the real money supply (M/P) to rise and the home interest rate to fall back to its original level.

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Policy Experiment: Permanent Decrease in the Home Money Supply (cont.)

- The fall in the home interest rate causes the home currency to depreciate back to its new level (depreciated relative to the short-run equilibrium but appreciated relative to its original level).
- In the long run, a permanent change in the home money supply affects only the home price level and the home currency value.
- The home interest rate, and importantly, home output are not affected.

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Why might a Government want to increase the money supply (M)?

- Governments can finance expenditures in three ways:
 - ◆ Taxes
 - ◆ Bonds
 - ◆ Printing Money
- Revenue raised by printing money is called *seignorage*

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Seigniorage

- The “revenue” raised from printing money is called **seigniorage** (pronounced SEEN-your-idge).
- The **inflation tax**: Printing money to raise revenue causes inflation. Inflation is like a tax on people who hold money.
- In the U.S. seigniorage accounts for less than 3% of government revenue. In Italy and Greece, seigniorage has often been more than 10% of total revenue. In countries experiencing hyperinflation, seigniorage is often the government’s main source of revenue, and the need to print money to finance government expenditure is a primary cause of hyperinflation.

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Hyperinflation

- def: $\pi \geq 50\%$ per month
- All the costs of moderate inflation described above become **HUGE** under hyperinflation.
- Money ceases to function as a store of value, and may not serve its other functions (unit of account, medium of exchange).
- People may conduct transactions with barter or a stable foreign currency.

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What causes hyperinflation?

- Hyperinflation is caused by excessive money supply growth:
- When the central bank prints money, the price level rises.
- If it prints money rapidly enough, the result is hyperinflation.

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A few examples of hyperinflation

	money growth (%)	inflation (%)
Israel, 1983-85	295	275
Poland, 1989-90	344	400
Brazil, 1987-94	1350	1323
Argentina, 1988-90	1264	1912
Peru, 1988-90	2974	3849
Nicaragua, 1987-91	4991	5261
Bolivia, 1984-85	4208	6515

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Why do governments create hyperinflation?

- When a government cannot raise taxes or sell bonds,
- it must finance spending increases by printing money.
- In theory, the solution to hyperinflation is simple: stop printing money.
- In the real world, this requires drastic and painful fiscal restraint.