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.

**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.

**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.
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.

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.

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.
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.

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.

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.
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).

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).
- 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.

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.
- 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.
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.

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.

Seignorage

- The "revenue" raised from printing money is called seignorage (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. seignorage accounts for less than 3% of government revenue. In Italy and Greece, seignorage has often been more than 10% of total revenue. In countries experiencing hyperinflation, seignorage 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.

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.

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.

A few examples of hyperinflation

<table>
<thead>
<tr>
<th>Country</th>
<th>Money Growth (%)</th>
<th>Inflation (%)</th>
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<tbody>
<tr>
<td>Israel, 1983-85</td>
<td>295</td>
<td>275</td>
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<tr>
<td>Poland, 1989-90</td>
<td>344</td>
<td>400</td>
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<td>Brazil, 1987-94</td>
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<td>Argentina, 1988-90</td>
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<td>Peru, 1988-90</td>
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<td>Nicaragua, 1987-91</td>
<td>4991</td>
<td>5261</td>
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<td>Bolivia, 1984-85</td>
<td>4208</td>
<td>6515</td>
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</tbody>
</table>
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.