Monetary Approach to Exchange Rates

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Absolute and relative PPP

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Absolute and relative PPP

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The question is: How are price levels determined?
We need a theory of price level.
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Money, output, and inflation

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Money market equilibrium

$$M_d = LPY$$

Supply of Money – by the central bank (Federal reserve system):

$$M_d$$ determines price level

$$P = MLY$$

In the long run, we assume prices are flexible and will adjust to put the money market in equilibrium.
Money, output, and inflation

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Exchange rate

- US price level

\[ P_{US} = \frac{M_{US}}{L_{US} \cdot Y_{US}} \]
Exchange rate

- US price level

\[ P^{US} = \frac{M^{US}}{L^{US} Y^{US}} \]

- EU price level

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- Exchange rate
  \[ E$_{\$/euro}$ = \frac{P^{US}}{P^{EU}} = \frac{M^{US}}{M^{EU}} \cdot \frac{L^{US} Y^{US}}{L^{US} Y^{EU}} \]
In the equation \( P = \frac{M}{L \cdot Y} \), \( L \) is a constant.
Money, output, and inflation

- In the equation $P = \frac{M}{L \cdot Y}$, $L$ is a constant.
- If $M$ changes by $\mu\%$ and $Y$ changes by $g\%$, by how much % does $P$ change?

\[
\pi = 4 \left( \frac{M}{L \cdot Y} \right) \mu \cdot g
\]

Thus, $\pi = \mu \cdot g$
Money, output, and inflation

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Question 1:

$5 - 3 = 2\%$
We already showed that

\[ \pi = \frac{\Delta P}{P} = \mu - g \]

All else equal, if the United States runs a looser monetary policy measured by a faster money growth rate, the dollar will depreciate more rapidly. If the U.S. economy grows faster in the long run, the dollar will appreciate more rapidly.

Question 2: \( \mu_{US} = 1.5; \mu_{EU} = 1; g_{US} = 3; g_{EU} = 1 \)

\[ (1.5)(1.3) = 1.95 \% \]
We already showed that

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Exchange rate from PPP

$$E_{\$ / euro} = \frac{P_{US}}{P_{EU}}$$
Money, output, and inflation, and exchange rates

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- Exchange rate from PPP
  \[ E_\$/euro = \frac{P_{US}}{P_{EU}} \]

- In \( P_{US} \) changes by \( x\% \) and \( P_{EU} \) changes by \( y\% \), we say that \( E_\$/euro \) changes by \((x - y)\%\). Using their symbolic notation, it means
  \[ \frac{\Delta E_\$/euro}{E_\$/euro} = \frac{\Delta P_{US}}{P_{US}} - \frac{\Delta P_{EU}}{P_{EU}} = \pi_{US} - \pi_{EU} = (\mu_{US} - g_{US}) - (\mu_{EU} - g_{EU}) \]
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\frac{\Delta E_{\$ / euro}}{E_{\$ / euro}} = \frac{\Delta P_{US}}{P_{US}} - \frac{\Delta P_{EU}}{P_{EU}}
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All else equal, if the United States runs a looser monetary policy measured by a faster money growth rate, the dollar will depreciate more rapidly.
Money market equilibrium

\[ P_{US} = \frac{M_{US}}{L_{US} Y_{US}} \]
Forecasting exchange rates – in levels

- Money market equilibrium

\[ P_{US} = \frac{M_{US}}{L_{US} Y_{US}} \]

- Question 3: \( P_{US} \) rises by 5%. No change in \( P_{EU} \). \( E_{$/euro} = \frac{P_{US}}{P_{EU}} \) also rises by 5%
Money market equilibrium

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Question 3: \( P_{US} \) rises by 5%. No change in \( P_{EU} \). \( E_{$/euro} = \frac{P_{US}}{P_{EU}} \) also rises by 5%.

Question 4: \( P_{US} \) declines by a factor of 1.05. Falls from \( P_{old} \) to \( P_{old}/1.05 \)

\[ \frac{\frac{1}{1.05} - 1}{1} = -0.048\% \]