

Exchange Rates and International Macro

Spring 2026
Econ 256, College of the Holy Cross
Prof. Josh Abel

Money Around the World



Currencies

- Hard to believe (for me, anyway) but the fact that people in different countries use money with different faces on them actually has important implications for macroeconomics.
- Foreign exchange (FX) markets are financial markets where people trade currencies. Participants include:
 1. Tourists, who want a medium of exchange when they visit a new place
 2. Investors, who want a local currency to invest in a local asset
 3. Speculators, who think they can predict currency price movements
 4. Governments, minters of the currency who might have a special interest in the market

Nominal Exchange Rates

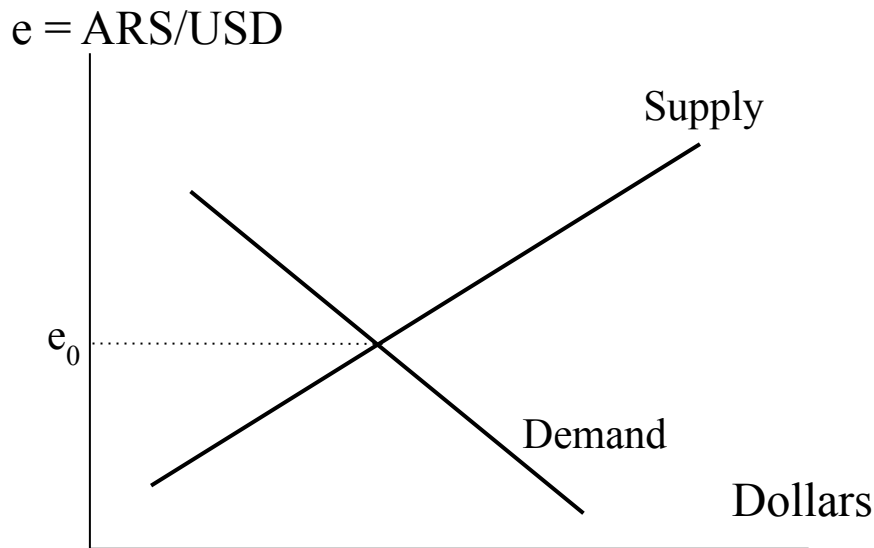
- The price in a currency market is called the “nominal exchange rate”
 - Or to non-economists, the “exchange rate”
- Exchange rates can be baffling because the economics profession is split on which currency is in the denominator vs the numerator
- In this class (as in your book), we will put the home currency (typically USD) in the denominator:

$$e = \text{ARS/USD}$$

- If $e = 10$, you can get 10 Argentine pesos for 1 USD
- When e goes up, we call that a currency “appreciation” (uppreciation)
 - USD “strengthened” against ARS; \$1 can now get more Argentinian pesos

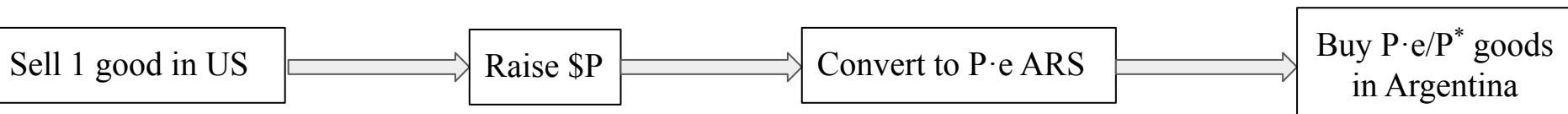
Nominal Exchange Rates as Prices

- Consider a bilateral currency market of USD and ARS
 - The “Supply Curve” is people who trade USD for ARS
 - The “Demand Curve” is people who trade ARS for USD
 - (We could of course flip their roles if we defined the exchange rate in the reverse way.)



The Real Exchange Rate

- Nominal exchange rate: if you give up \$1, you get e ARS
- What if you sell 1 “good” in the US; how many goods can you buy in Argentina?
- Define P to be the price level in the US and P^* to be the price level in Argentina.
 - In this slide deck, $*$ means “foreign,” not “target.”
- Then:



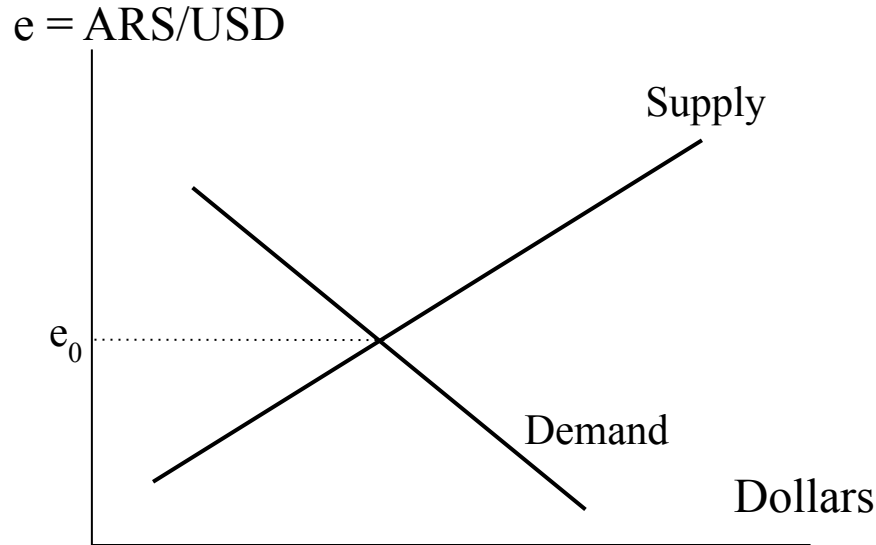
- So the real exchange rate corrects for price differences in the two countries, i.e. puts the currencies on a level playing field

$$\varepsilon = e \cdot P / P^*$$

- So when ε is high, American goods are expensive; when ε is low, they are cheap

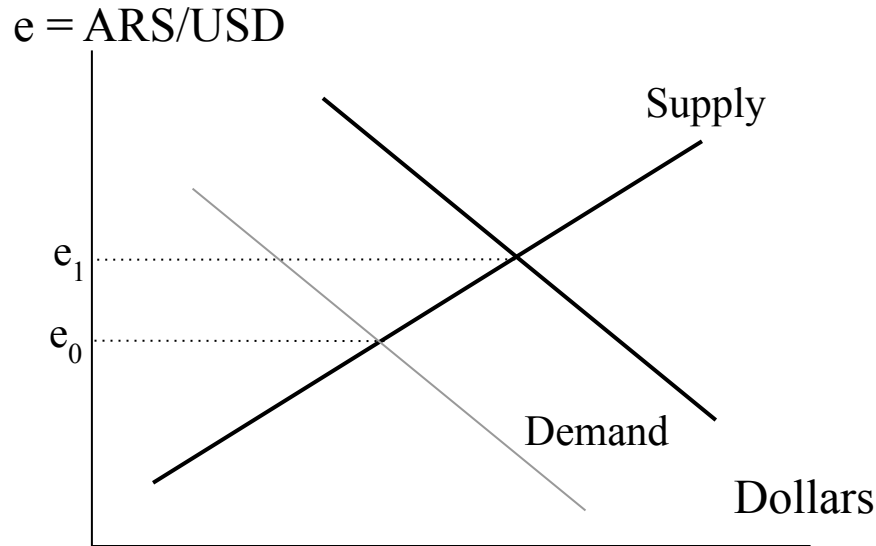
Global Savings Glut Redux

- Suppose, as posited by Bernanke (2005), that there is an increase in foreigners desire to invest in US assets. How will that affect the currency market?



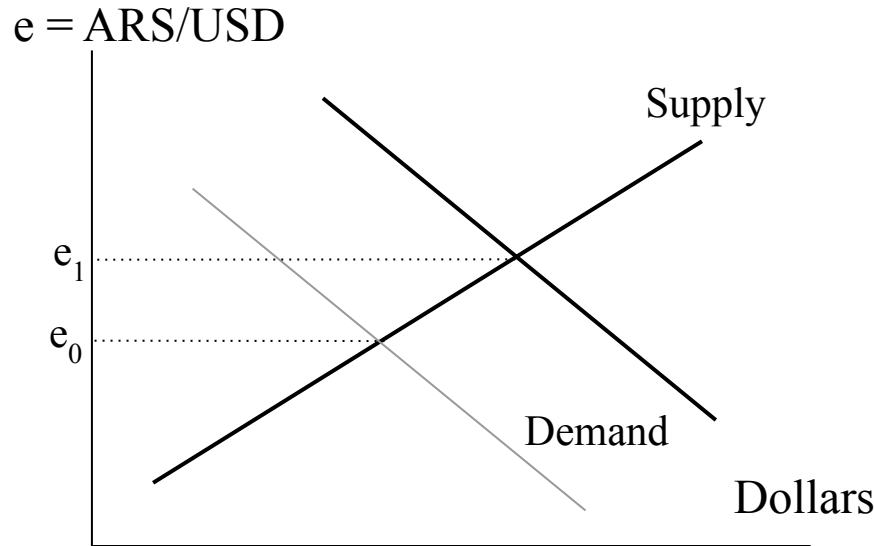
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- Suppose, as posited by Bernanke (2005), that there is an increase in foreigners desire to invest in US assets. How will that affect the currency market?
 - More demand for USD, e rises
- In the short run, when P and P^* are sticky, how does this affect ε , i.e. American “competitiveness”?



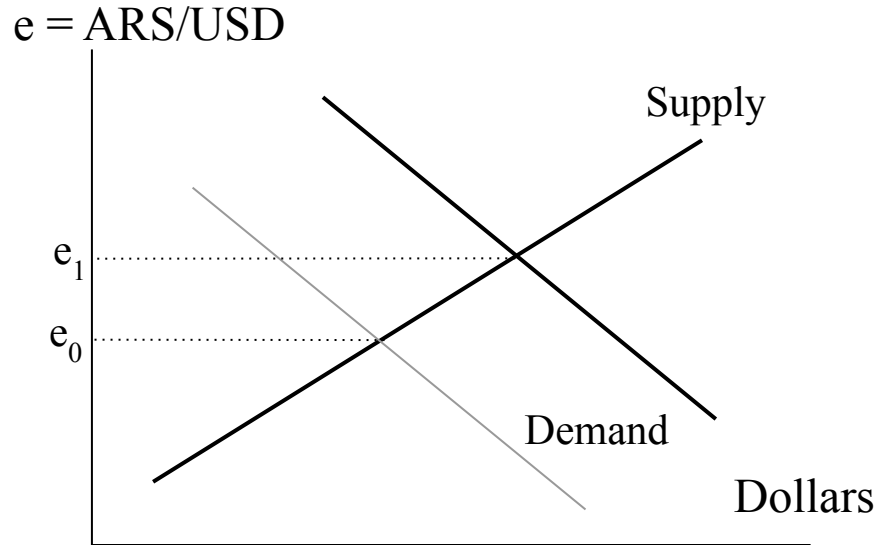
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 - ε rises, so American goods are more expensive (i.e. less competitive)
- What happens to the US trade deficit?
 - Trade deficit expands
- This is another link between flow of funds and flow of goods, the crux of the Bernanke (2005) argument



Law of One Price

$$\varepsilon = e \cdot P / P^*$$

- Economic forces should tend to keep ε stable, perhaps near 1
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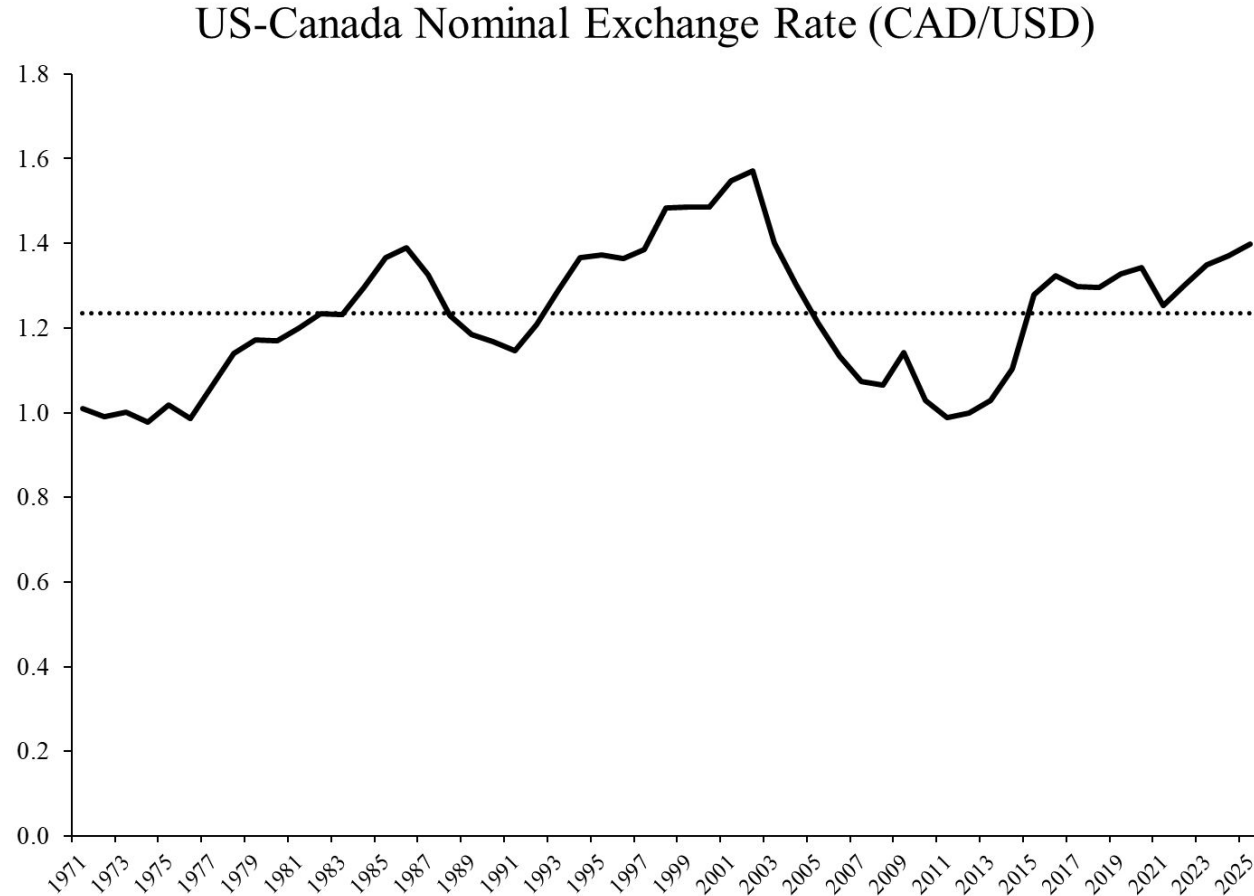
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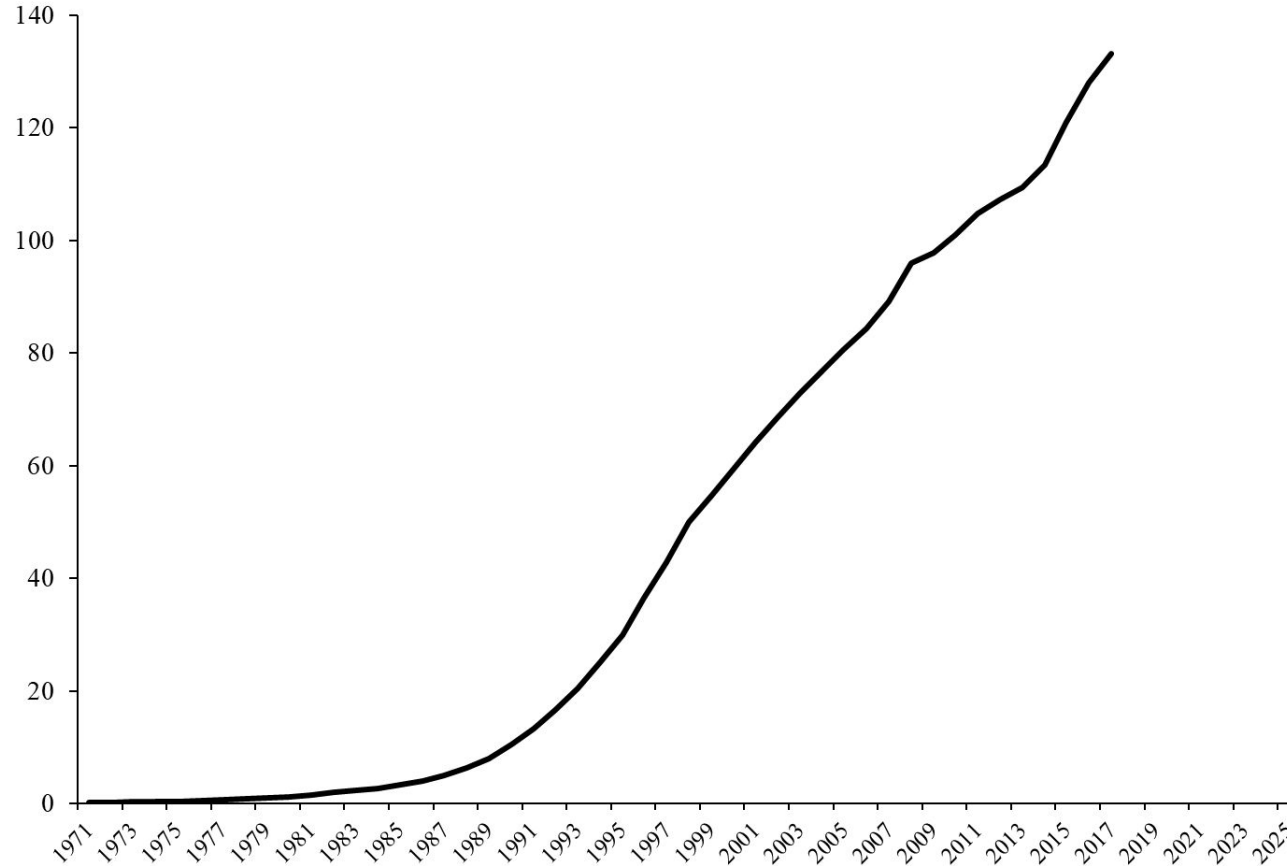
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- If ε were large, how could you make some easy profit?
 - Buy goods abroad, sell them in US. How would that affect P/P^* ?
 - It would raise P^* , lower P , and thus lower P/P^* . So what would be the impact on ε ?
 - ε would fall, and thus would continue in theory until $\varepsilon = 1$.
- The real world is more complicated
 - This would be a costly business, so relatively small deviations of ε from 1 may persist
 - It would take time to set up this business, so it may take time for deviations to disappear
 - This is not merely trading financial assets for each other, it involves moving goods!
- Nonetheless, there is evidence of relative stability in ε – and thus LOOP

Even the nominal exchange rate has been stable for US-Canada



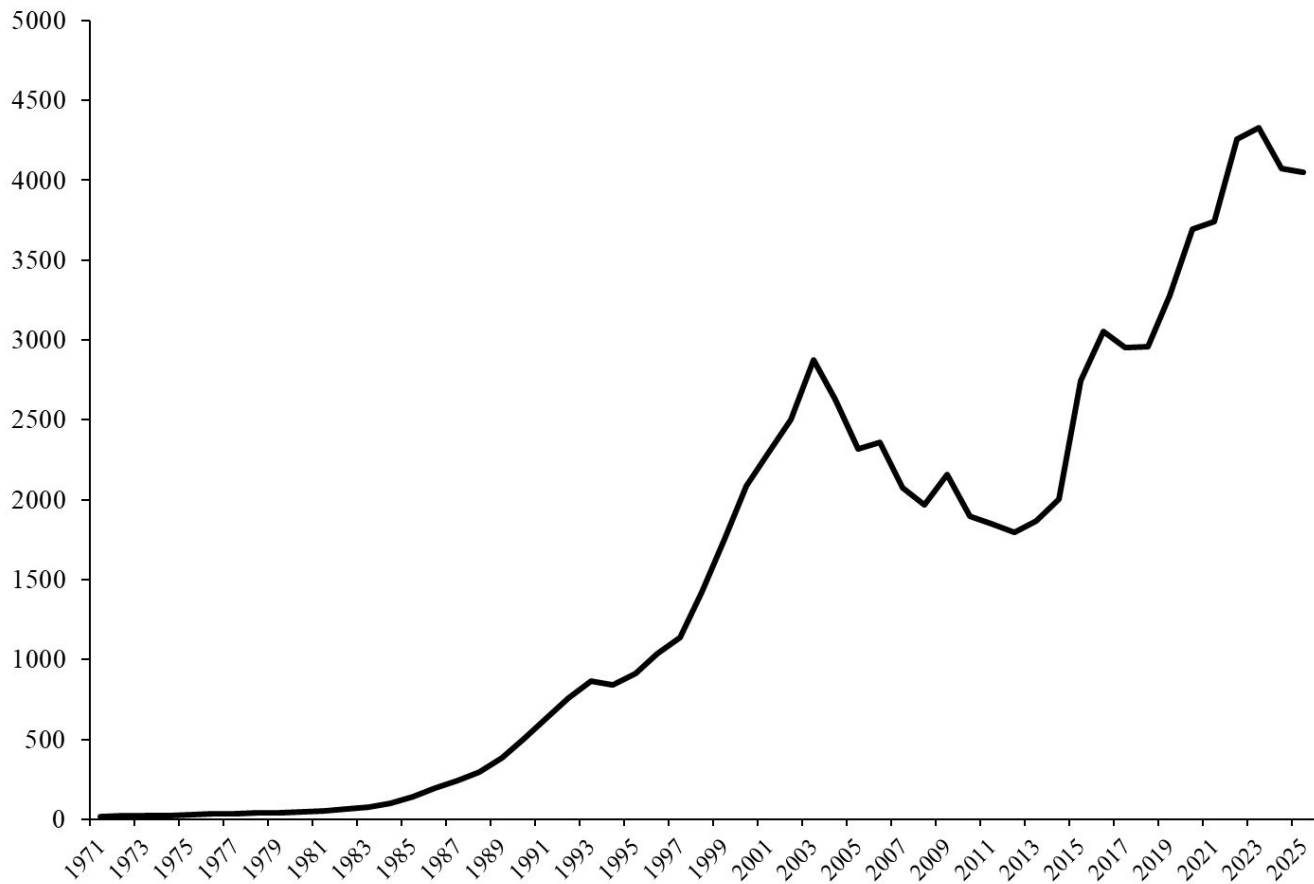
Not so for Argentina...

US-Argentina Nominal Exchange Rate (ARS/USD)



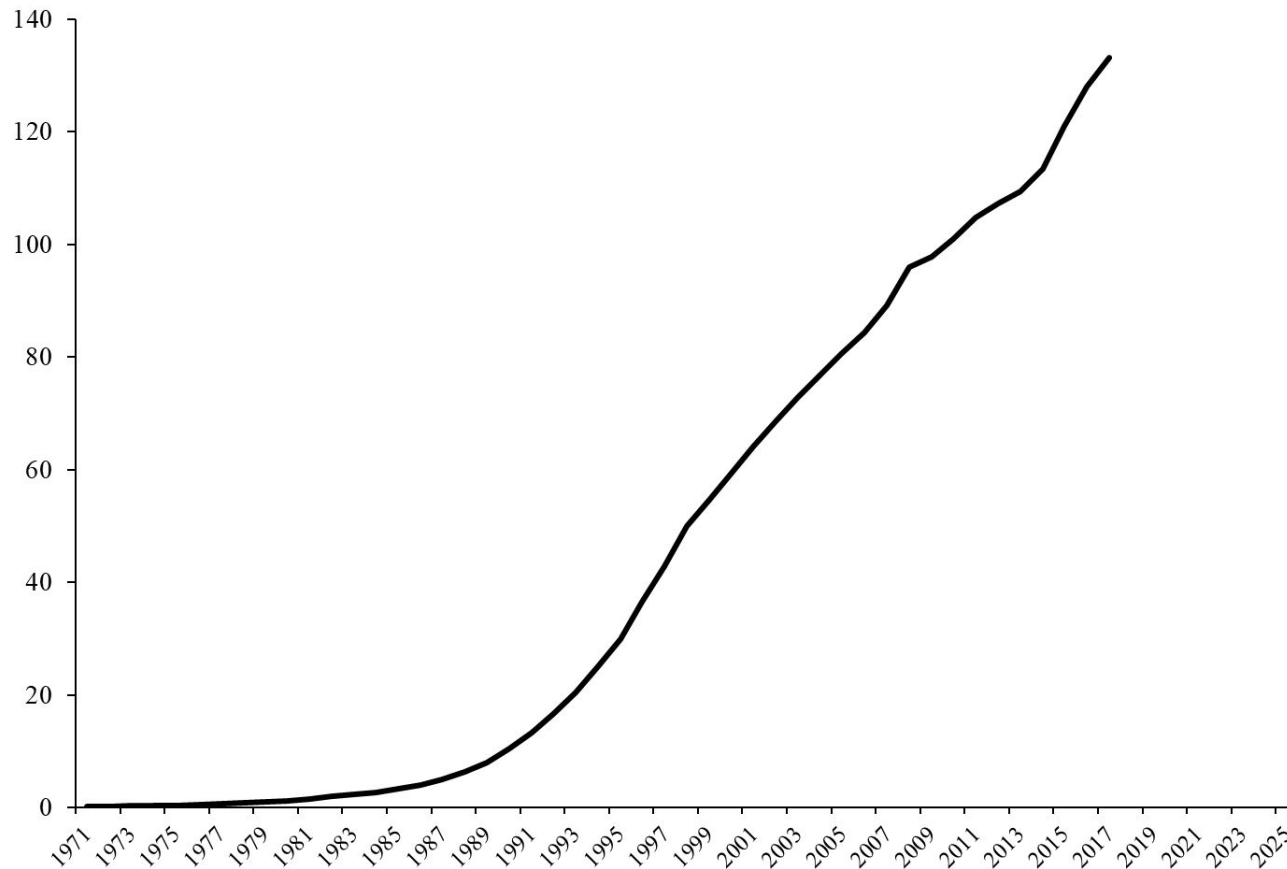
... or Columbia

US-Colombia Nominal Exchange Rate (COP/USD)



But the real exchange rate has been much better behaved

US-Argentina Nominal Exchange Rate (ARS/USD)

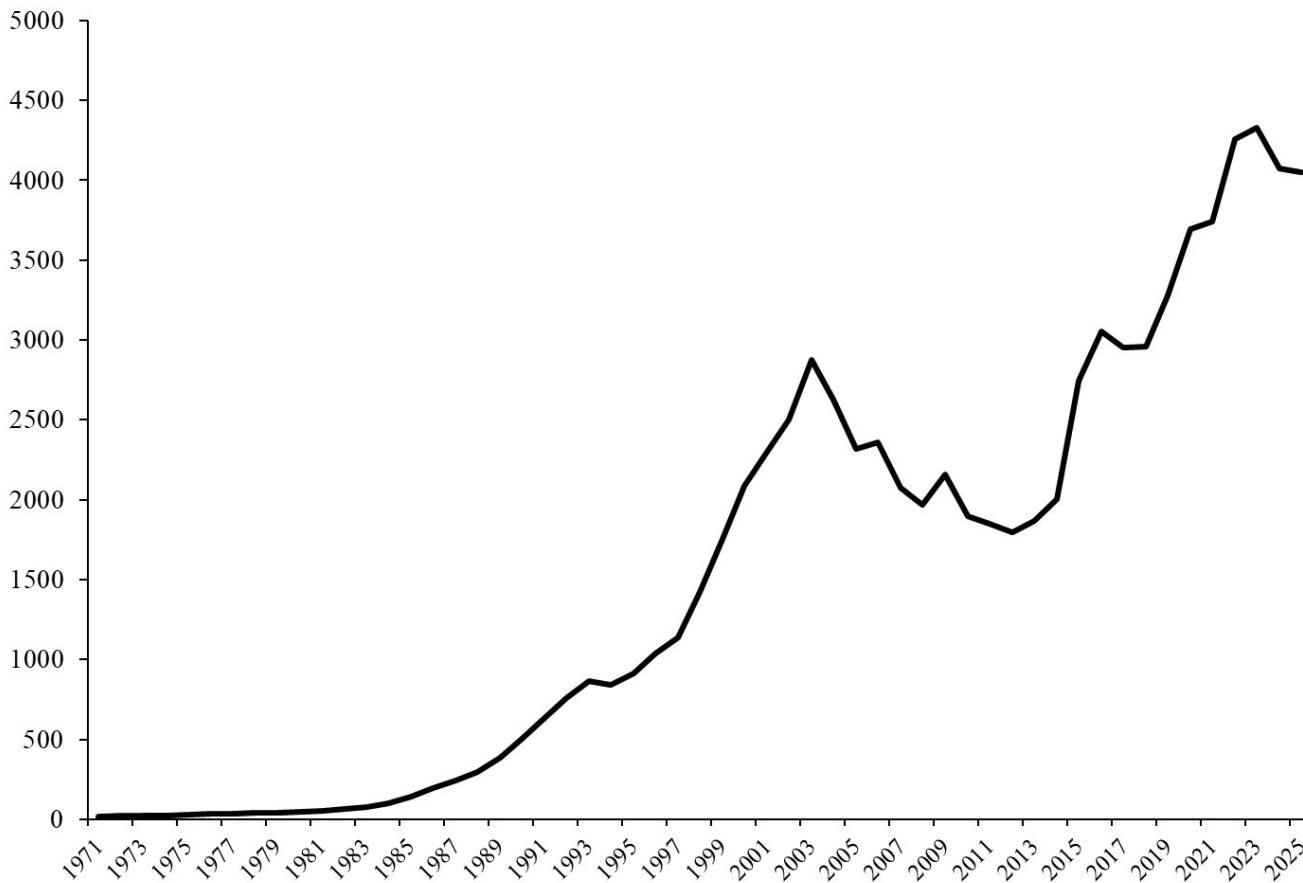


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US-Colombia Nominal Exchange Rate (COP/USD)



But the real exchange rate has been much better behaved



Exchange rates roughly reflect inflation differences over the long-run

$$\varepsilon = e \cdot P / P^*$$

- Zipper Rule:

$$g_{\varepsilon} = g_e + \pi - \pi^*$$

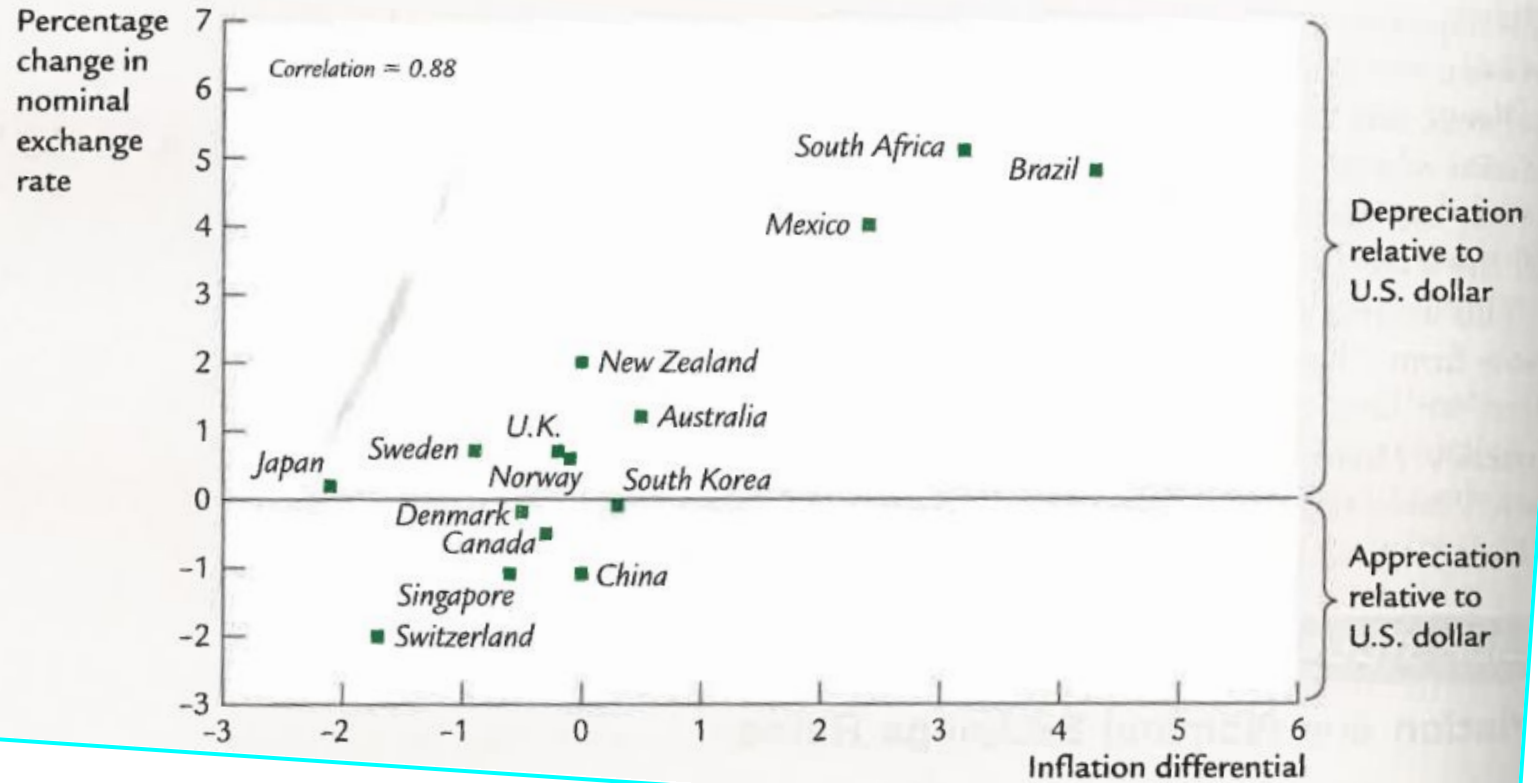
- In the long-run, $\varepsilon \cong 1$, so $g_{\varepsilon} \cong 0$. Therefore:

$$g_e \cong \pi^* - \pi$$

- Intuitive! The relative price of currencies just reflects the difference in the devaluing of the individual currencies

Exchange rates roughly reflect inflation differences over the long-run

FIGURE 7-13



Exchange Rates and Interest Rates

- Suppose you have \$1 you want to invest today so you can spend in a year. 2 options:
 1. Invest in US bond.
 - This will yield $\$(1+i)$.
 2. Exchange USD for ARS, invest in Argentinian bond, convert ARS back to USD
 - \$1 today becomes e_0 ARS today; that becomes $e_0 \cdot (1+i^*)$ ARS in one year, which can be converted back into $\$e_0 \cdot (1+i^*)/e_1$.
- So:

$$1 + i = (1 + i^*) \cdot e_0 / e_1,$$

or, by the Zipper Rule (and log approximation):

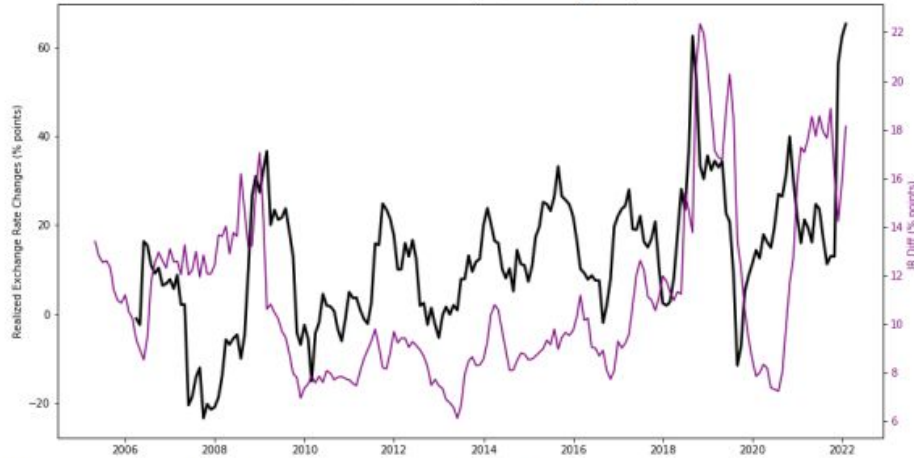
$$i \cong i^* - g_e$$

- Intuition: the foreign currency can offer a higher return ($i < i^*$) if and only if it's expected to depreciate
 - “Yeah, investing in Argentina returns more currency (ARS), but the relative value of that currency will decline.”
- This equation is known as “Uncovered Interest Parity,” and it's another one of these exchange rate relationships that – while imperfect – does seem to hold in the data, especially over long time periods

UIP Between Turkey and US

Figure 1: Exchange Rate Depreciation and Interest Rate Differentials

Δs_t and $(i_t - i_t^{US})$



Δs_{t+k}^e and $(i_t - i_t^{US})$



This figure displays time series of percentage year-over-year change in *realized* and *expected* (black solid lines in each plot) exchange rate changes with interest rate differential (purple solid lines).

- Movements in $i^* - i$ and g_e look very correlated!
 - Note: different levels can be attributed to different riskiness

Monetary Policy and NX: The Boomerang Theory

$$i \cong i^* - g_e$$

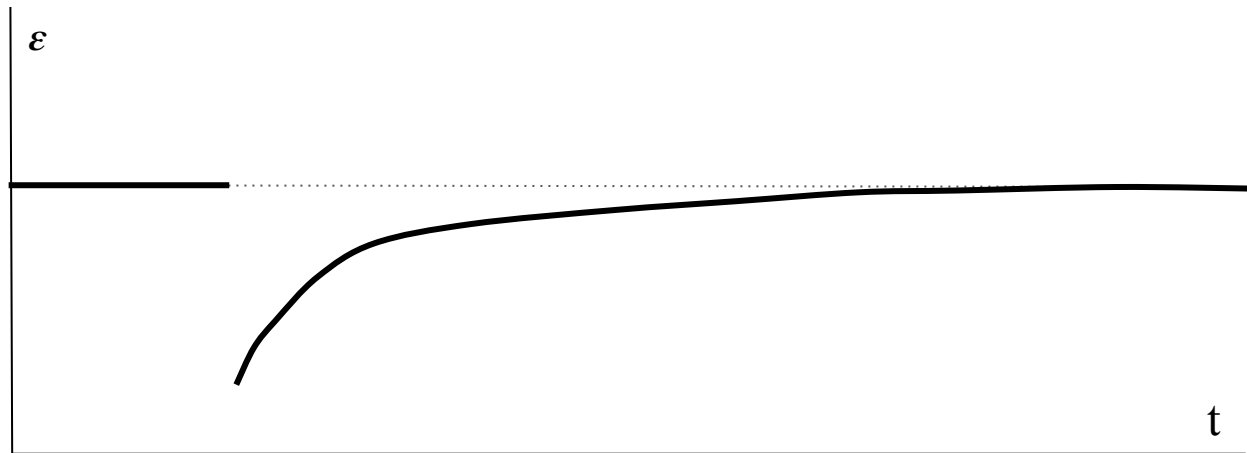
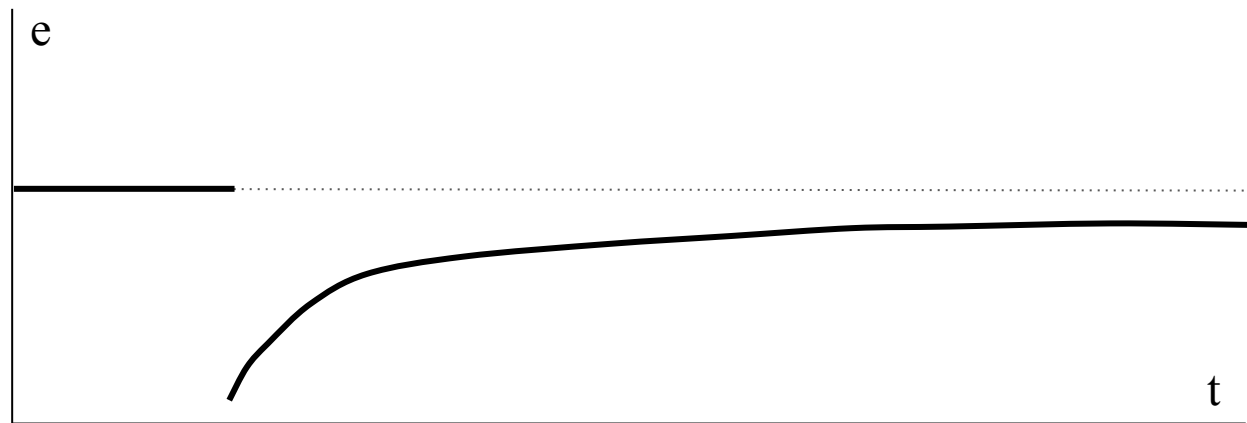
- If we cut i , UIP requires our exchange rate to be expected to appreciate ($g_e > 0$)
 - US bonds have a low return in dollars, but currency appreciation will make up for that.
- How does this work mechanically? Recall:

$$\varepsilon = e \cdot P/P^* \text{ (always)}$$

$$g_\varepsilon = 0 \text{ (long-run)}$$

- So if we cut i , then:
 1. e will fall, because the Fed is creating dollars/people give up dollars to invest in foreign bonds (b/c $i^* > i$)
 2. In the short run with sticky prices, this means ε will fall
 3. But because ε is stable in the long-run, it will rise in the future
 4. Mechanically, this will happen because the Fed's expansionary action will increase P
- i.e. ε and e fall so that they can be expected to rise
- This is another expansionary mechanism of monetary policy: lowering i increases NX by making US goods cheaper (lowering ε)

Exchange Rate Time Paths

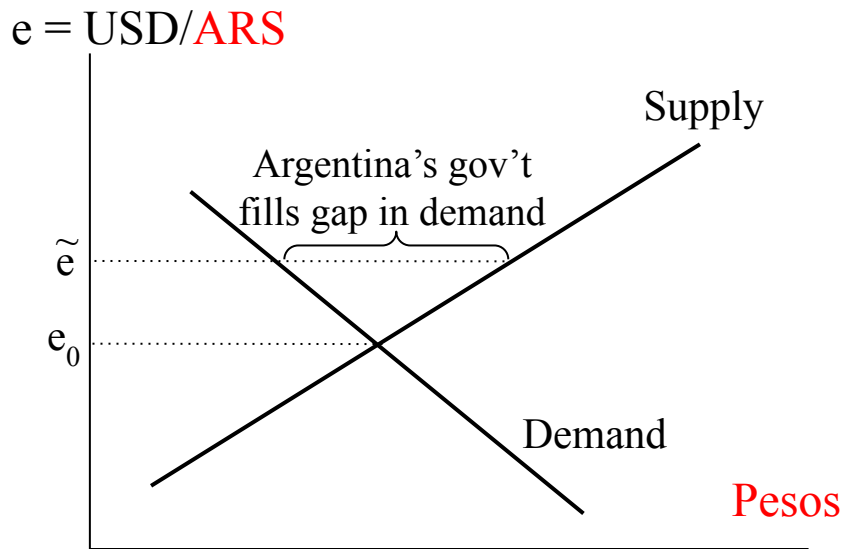


Fixed Exchange Rates

- Over time, many countries have employed “fixed exchange rate” regimes. In recent decades, that has typically meant keeping a fixed exchange rate with the US dollar
- Motivations:
 1. For small economies, international trade is a very big share of their economic activity. Keeping the exchange rate stable lowers exchange rate risk and so can foster economic activity
 2. For countries that have struggled with inflation, fixing the exchange rate is a way of “importing” US monetary policy (we’ll see this in a bit)

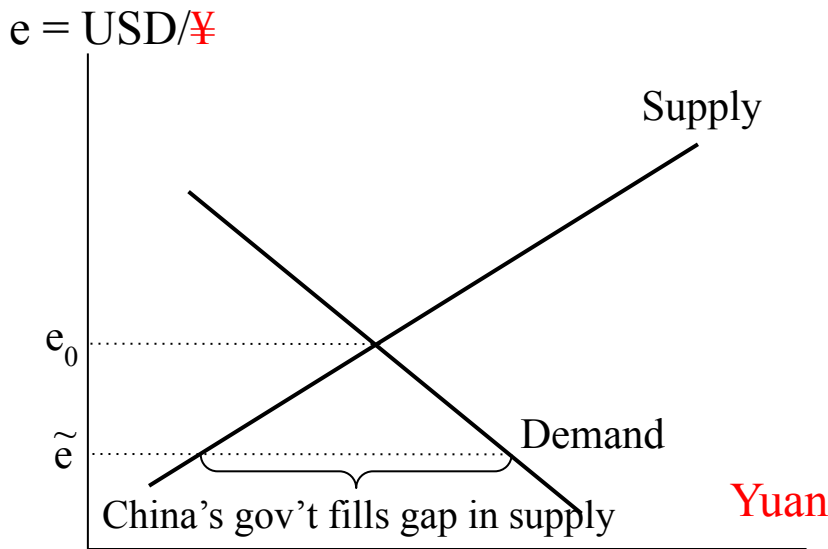
The Mechanics of a Fixed Exchange Rate

- Let's take Argentina's perspective. Suppose they want to fix e above its "free market" level, e_0 .
- At that elevated level, there's more supply of Pesos than demand
 - i.e. on net, market participants want to get rid of Pesos to get dollars
- Normally, this would cause e to fall, so a fixed exchange rate regime requires Argentina to close the gap by selling dollars to buy Pesos



The Mechanics of a Fixed Exchange Rate

- Let's take **China**'s perspective. Suppose they want to fix e **below** its "free market" level, e_0 .
- At that **depressed** level, there's **less** supply of **Yuan** than demand
 - i.e. on net, market participants want to get rid of **dollars** to get **Yuan**
- Normally, this would cause e to **rise**, so a fixed exchange rate regime requires **China** to close the gap by selling **Yuan** to buy **dollars**
- Foreshadowing...which do you think is easier for a government to do: fill in a gap in supply of its currency, or a gap in demand for its currency?



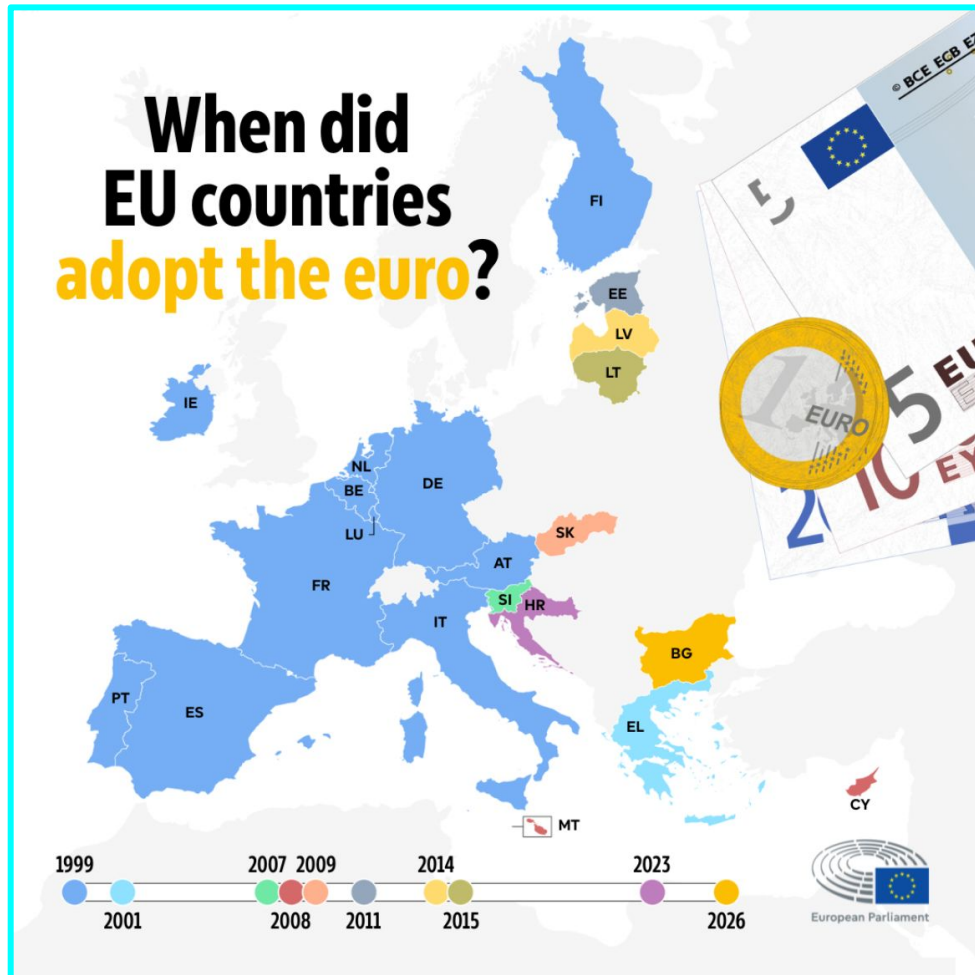
The Trilemma of International Finance

$$i \cong i^* - g_e$$

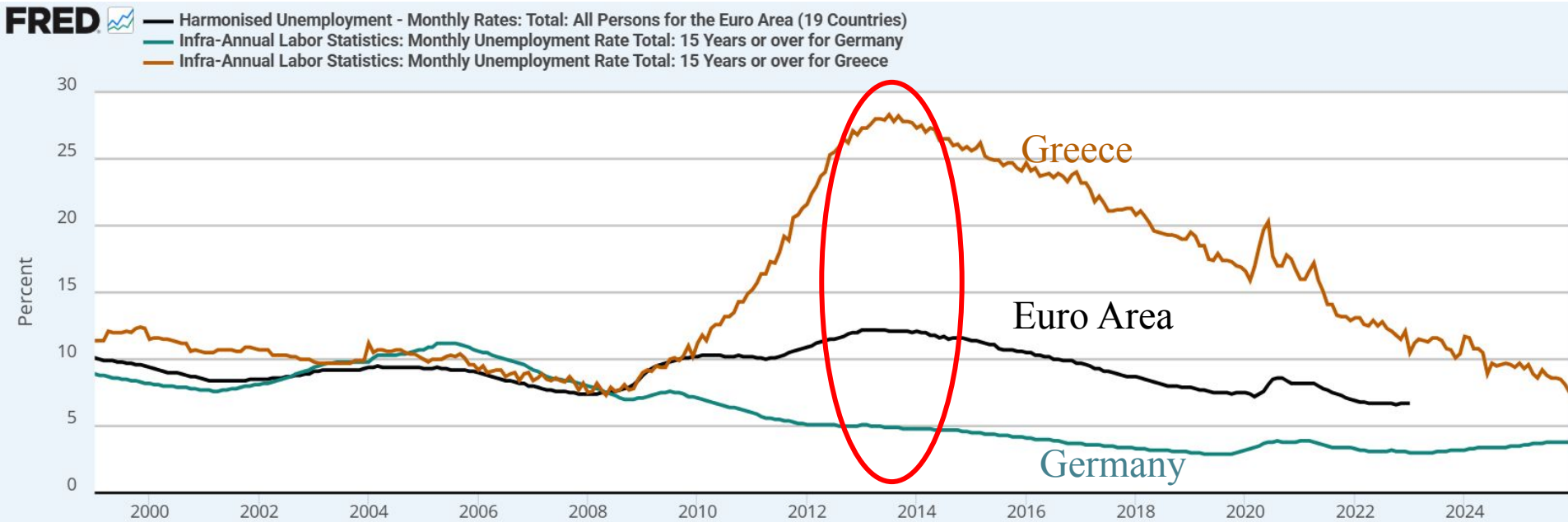
- With a fixed exchange rate regime, money creation – i.e. monetary policy – is preoccupied with managing the exchange rate, i.e. keeping $g_e = 0$.
- In other words, the country loses control of its monetary policy
 - i has to move around to match i^*
 - Mechanically, if the US raises i^* by shrinking the supply of dollars, Argentina has to remove Pesos and raise i in order to keep e stable.
- For some countries – in fact, like Argentina – this is one of the big benefits of a fixed exchange rate!
 - Historically, their monetary policymakers have not been trustworthy in battling inflation, so this is a way to import the US's monetary policy
- But in general, this is a huge cost, as it means giving up the best tool for fighting recessions

The Euro Area

**When did
EU countries
adopt the euro?**

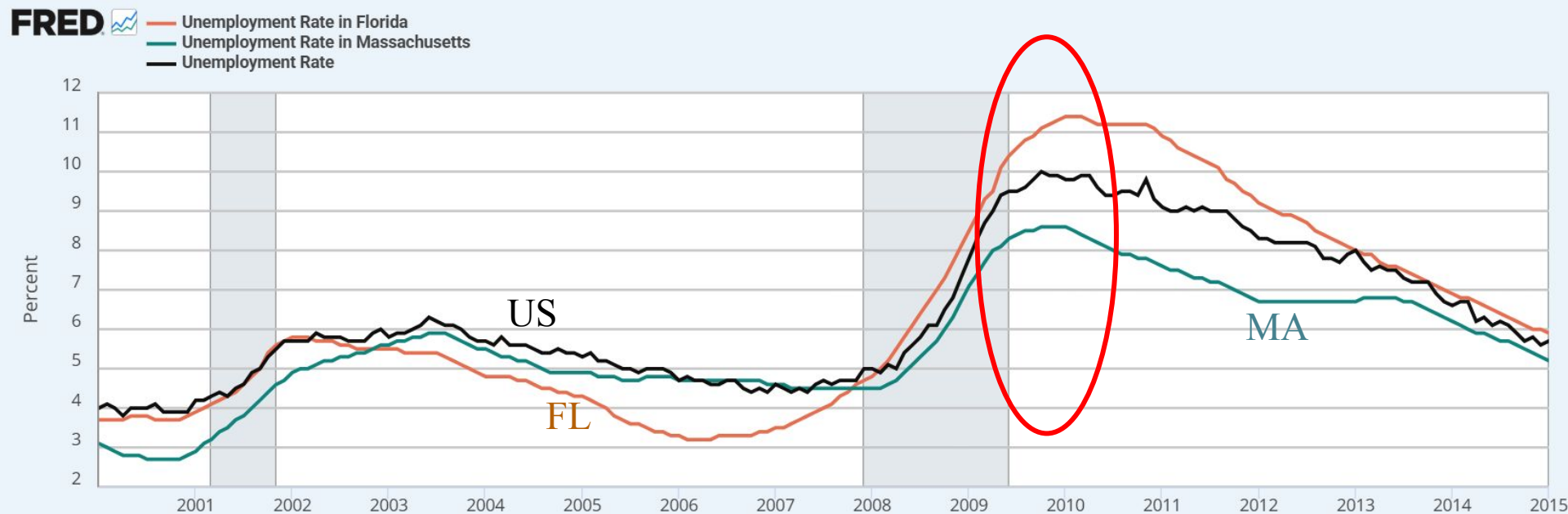


The Euro Area countries needed very different monetary policies



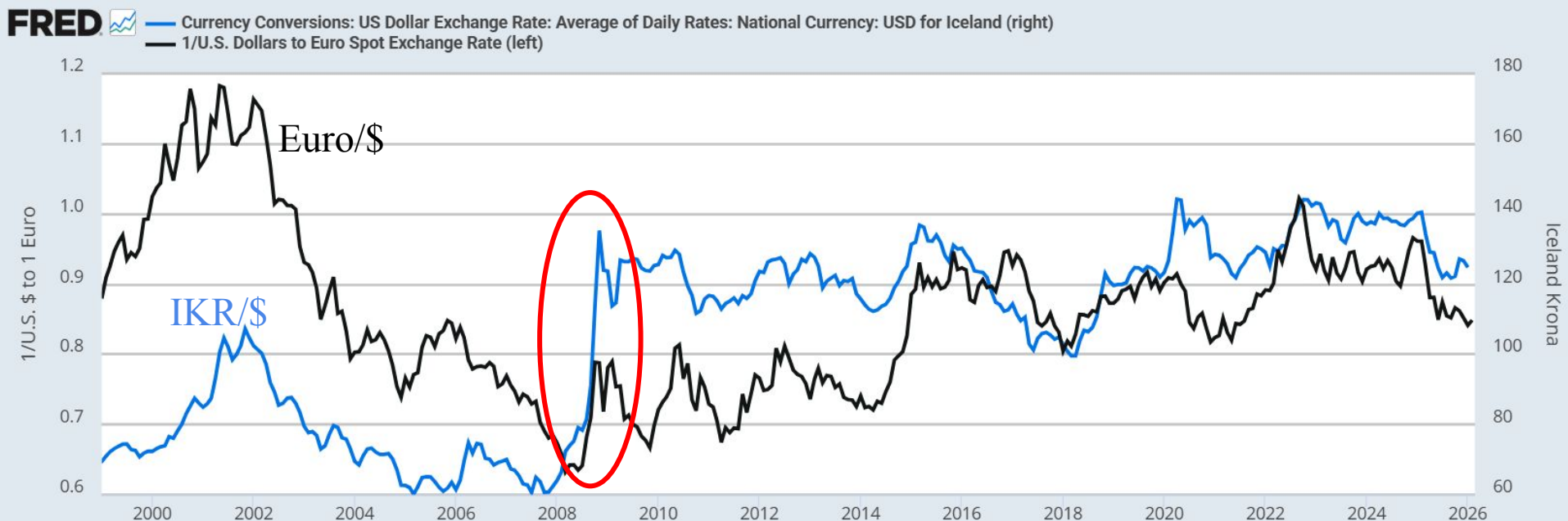
Source: Organization for Economic Co-operation and Development via FRED®

So did US states, but at least they had a fiscal union



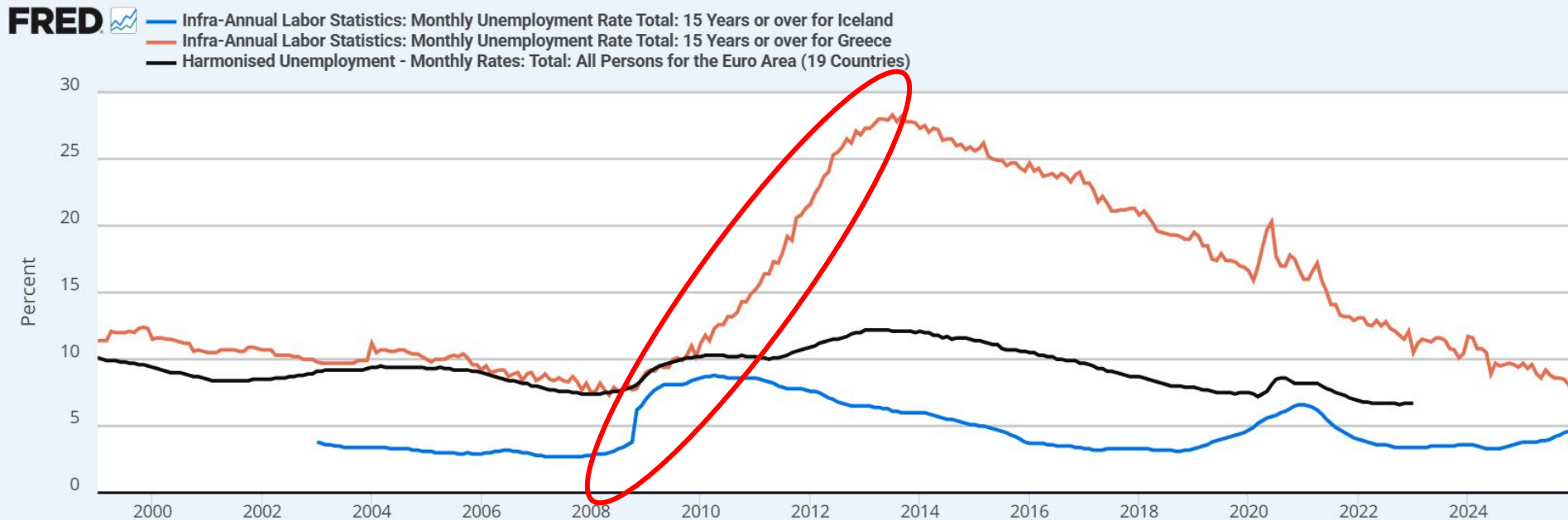
Source: U.S. Bureau of Labor Statistics via FRED®

Iceland does not use the Euro; they devalued they Kroner, an option
Greece could not pursue...



Sources: Board of Governors of the Federal Reserve System (US); Organization for Economic Co-operation and Development via FRED®

...limiting the damage after a scary initial jump in unemployment

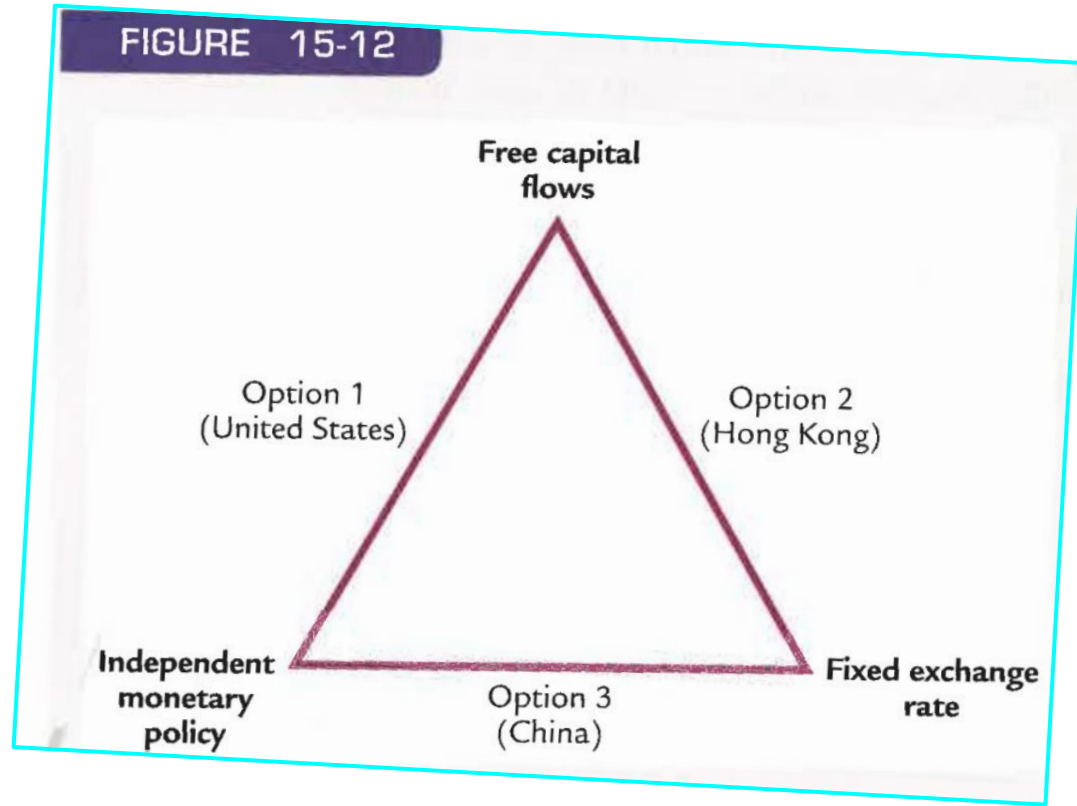


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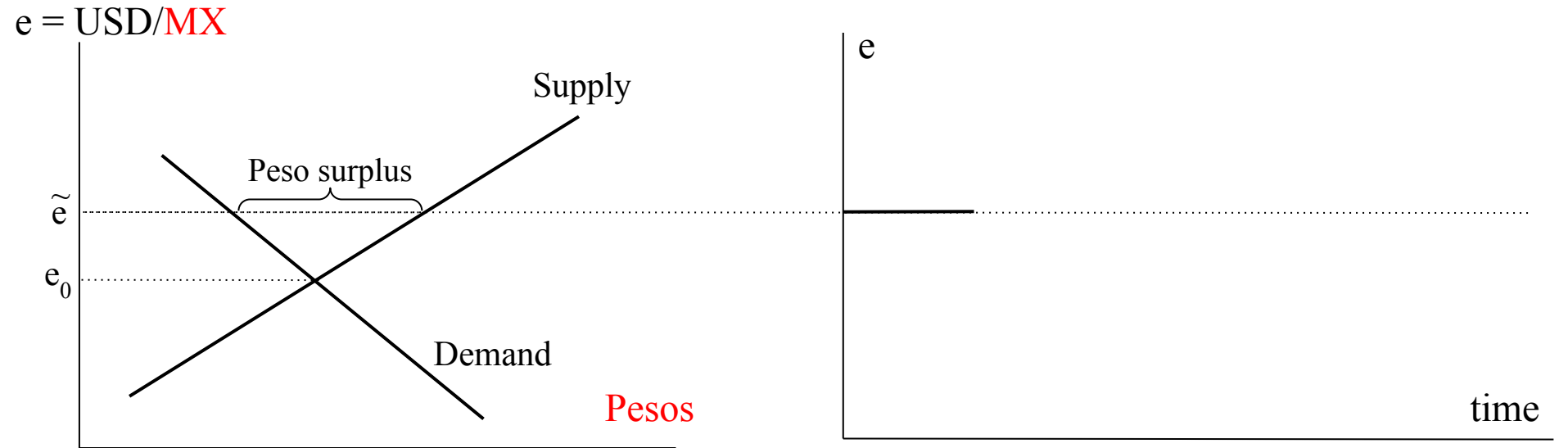
Item #3: Free Capital Mobility

- If you're willing and able to restrict flows of capital into and out of your economy, you can break the UIP relationship and maintain control of your monetary policy even with a fixed exchange rate.
- In sum, then, you can have 2 of the following 3:
 1. Independent monetary policy
 2. Fixed exchange rate
 3. Free capital mobility



Speculative Attacks

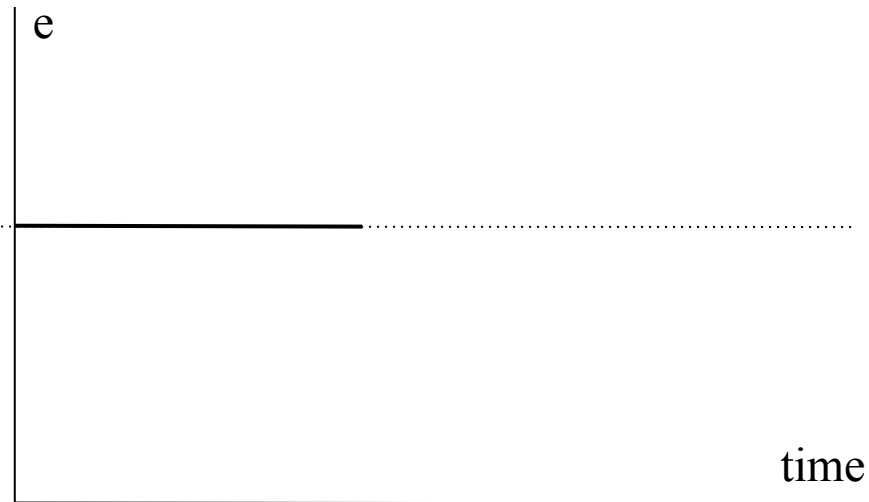
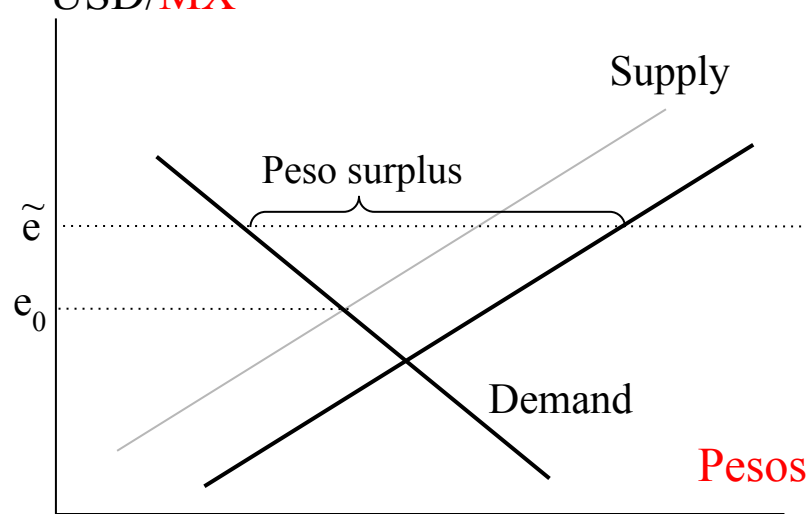
- To keep the Peso valuable, Mexico has to buy up the extra Pesos by selling dollars
- This requires the Mexican government/central bank to have “dollar reserves” available to sell off



Speculative Attacks

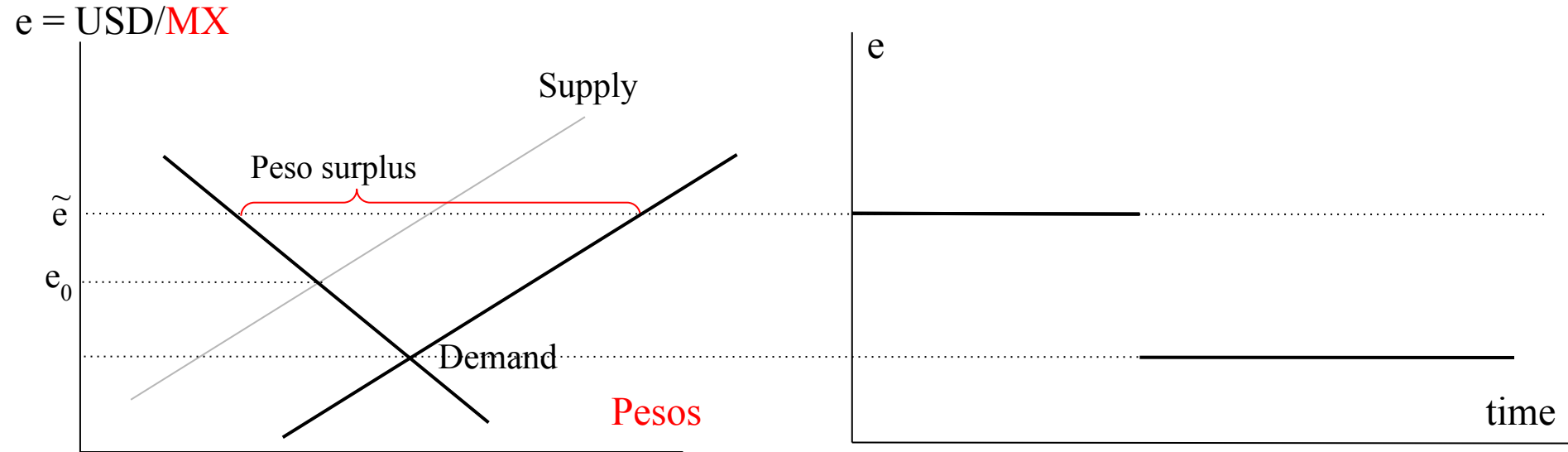
- To keep the Peso valuable, Mexico has to buy up the extra Pesos by selling dollars
- This requires the Mexican government/central bank to have “dollar reserves” available to sell off
- But suppose financial markets believe Mexico does not have enough dollars to keep this up.
 - They can start selling Pesos, dumping them on the market and forcing Mexico to use up more dollars

$e = \text{USD}/\text{MX}$

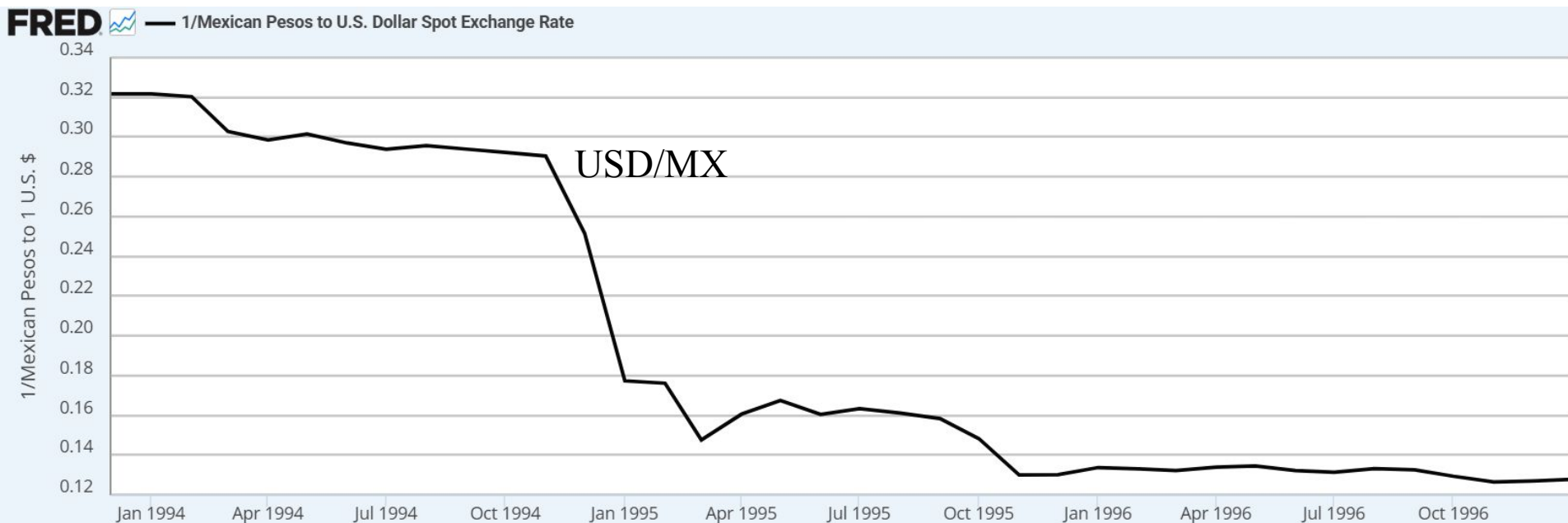


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 - They can start selling Pesos, dumping them on the market and forcing Mexico to use up more dollars
 - When Mexico finally runs out of dollars, the “peg” has failed and the Peso will depreciate
 - Investors can then buy the Peso back at a steep discount, earning a big profit
 - This is known as a “speculative attack,” and such efforts destroyed many fixed exchange rate regimes



This indeed happened to Mexico during its “Peso Crisis”



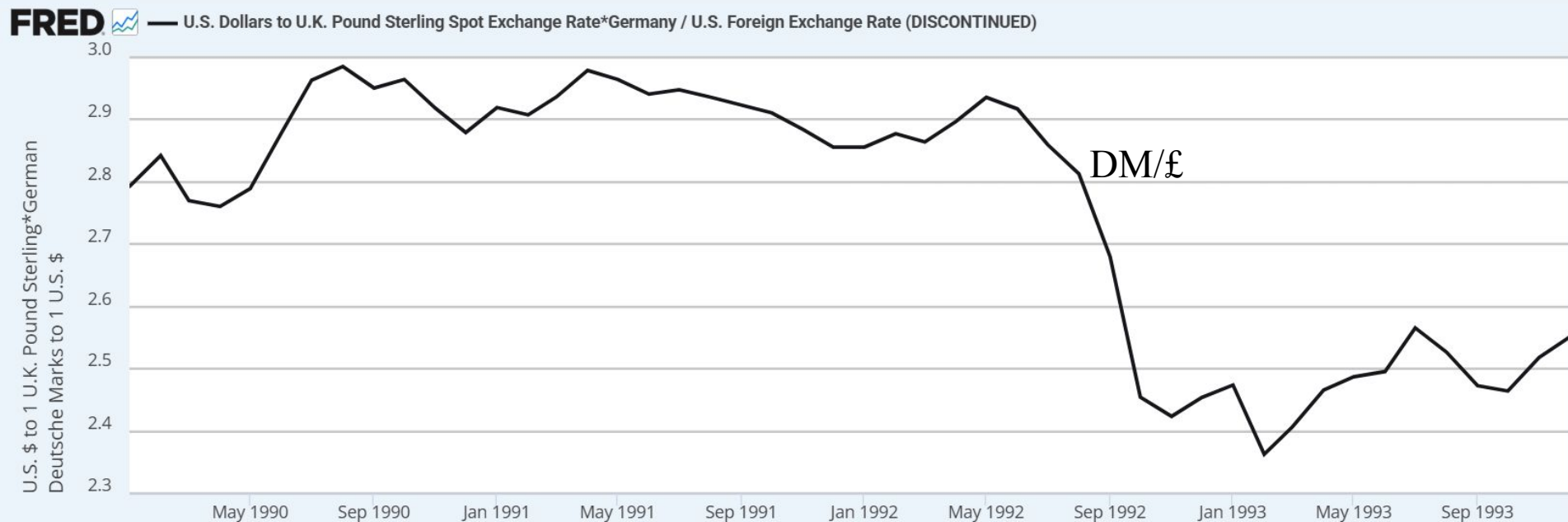
Source: Board of Governors of the Federal Reserve System (US) via FRED®

It happened in many Asian countries, such as Thailand, during the
“Asian Financial Crisis”



Source: Board of Governors of the Federal Reserve System (US) via FRED®

Even the Bank of England could not maintain its exchange rate against the German Mark



Sources: Board of Governors of the Federal Reserve System (US); Federal Reserve Bank of St. Louis via FRED®

Speculative Attacks: So What?

- Why should we care about these forced currency devaluations?
 - After all, there are pros and cons of having a valuable currency
 - Helps domestic consumers buy foreign goods, but harms domestic producers' ability to compete
- And indeed, many of these attacks/devaluations were really symptoms of other issues, not the root cause of the crises
- Nonetheless, there is a nasty effect of a currency devaluation that is particularly severe for developing economies like Mexico or Thailand at the time
 - They borrowed a lot from abroad to fund domestic spending
 - Critically, they borrowed in foreign currencies, typically dollars
 - Therefore, they have to pay back those loans in dollars, which suddenly becomes a lot harder when your local currency just dropped in value
 - This led those debt burdens to be crushingly onerous, leading to widespread business failures and even sovereign (i.e. government) defaults
- Since US entities – including the government – borrow almost entirely in dollars, even from foreigners, the effect of a currency devaluation here is not so bad.

Takeaways

1. Over long periods of time, changes in nominal exchange rates largely reflect inflation, meaning real exchange rates hold steady (LOOP)
2. In the short run, cutting interest rates lowers the exchange rate, boosting output through NX (Boomerang)
3. A fixed exchange rate requires the government to buy its currency to prevent it from depreciating and sell its currency to keep it from appreciating. This creates an important “trilemma.”
 - a. Some countries do the latter to boost export business
 - b. Some countries to the former to help consumers
 - c. Some countries don't care about the direction; they want exchange rate stability to reduce uncertainty
 - d. Some countries do it as a way of taming inflation, by “importing US monetary policy” ($\pi = \pi^* - g_e$)
4. A currency union, like the Euro, is the ultimate fixed exchange rate
 - a. Can facilitate trade through lower transaction costs, but it means the whole Euro Area only has 1 monetary policy
 - b. This was a disaster for places like Greece.
 - c. In contrast, Iceland was hammered early in the Great Recession, but they devalued their Kroner, helping to moderate the damage. This was only possible because they were not part of the Euro Area.
5. Inflating your currency's value indefinitely requires huge reserves of dollars. If investors sense you do not have that, they may break your policy (speculative attack), enriching themselves and – if you borrowed in foreign currencies – crippling your economy.