Econ 4382 - International Finance
Granados

Practice Problems - Part 1 Preparation

This practice set covers all major topics from Chapters 12-15 of Feenstra & Taylor. Work through all questions to prepare for the midterm.

1. (10 points) Exchange Rate Definitions and Concepts

   (a) Define the nominal exchange rate. If the EUR/USD exchange rate increases from 0.90 to 0.95, which currency has appreciated and which has depreciated? Explain your reasoning carefully.

Nominal exchange rate: The price of one currency in terms of another currency. It tells us how many units of one currency are needed to purchase one unit of another currency.

EUR/USD = 0.90 means it takes 0.90 euros to buy 1 dollar.
EUR/USD = 0.95 means it takes 0.95 euros to buy 1 dollar.

The price of the dollar (in euros) has increased from 0.90 to 0.95.

The dollar has appreciated (it's more expensive in euro terms).
The euro has depreciated (each euro buys fewer dollars).

This can be verified: From the dollar's perspective (USD/EUR):

Before: $1/0.90 = 1.111$ USD per EUR

After: $1/0.95 = 1.053$ USD per EUR

The dollar price of euros fell, confirming the euro depreciated.

   (b) Define the real exchange rate. What does it mean if the real exchange rate equals 1? What does it mean if the real exchange rate is greater than 1?

Real exchange rate:

$$q = \frac{E_{h/f} \times P_f}{P_h}$$

Where $E_{h/f}$ is the nominal exchange rate (home per foreign), P_f is the foreign price level, and P_h is the home price level.

The real exchange rate measures the relative price of goods: it tells us how many home goods we must give up to obtain one foreign good.

If $q = 1$: Absolute PPP holds. The same basket of goods costs the same in both countries when measured in the same currency. Goods are equally expensive everywhere.

If $q > 1$: The foreign basket is more expensive than the home basket when measured in the same currency. The home currency is undervalued (home goods are relatively cheap). This makes:

Home exports competitive (cheap for foreigners)

Foreign imports expensive (discourages imports)

Trade surplus more likely

If $q < 1$: The home basket is more expensive. The home currency is overvalued. Home exports are less competitive, imports are attractive, trade deficit more likely.

(c) Explain the difference between appreciation/depreciation and overvaluation/undervaluation.

Appreciation/Depreciation: Changes in the exchange rate over time.

Appreciation: Currency becomes more valuable (exchange rate decreases in direct quote)

Depreciation: Currency becomes less valuable (exchange rate increases)

These are *dynamic* concepts about movement (observed as an equilibrium)

Overvaluation/Undervaluation: Deviation from equilibrium (typically PPP) at a point in time.

Overvalued: Currency is "too strong" relative to PPP benchmark ($q < 1$)

Undervalued: Currency is "too weak" relative to PPP benchmark ($q > 1$)

These are *static* concepts about level relative to fundamental value

Example: A currency can appreciate (get stronger over time) even if it's undervalued (still below PPP level). Or a currency can be overvalued but depreciating (moving back toward PPP).

This can be relevant for policy, countries accused of "currency manipulation" are typically maintaining undervalued currencies to boost exports.

2. (9 points) Interest Parity Conditions

(a) Compare and contrast Covered Interest Parity (CIP) and Uncovered Interest Parity (UIP). Write both formulas and explain the key difference.

Covered Interest Parity (CIP):

$$F_{h/f} = E_{h/f} \times \frac{1 + i_h}{1 + i_f}$$

Uses forward contracts to lock in the future exchange rate F. No exchange rate risk—returns are certain.

Uncovered Interest Parity (UIP):

$$E_{h/f} = \frac{1+i_f}{1+i_h} E^e_{h/f}$$

Uses expected future spot rate E^e. Investors face exchange rate risk—returns are uncertain.

Key differences:

	CIP	**UIP**
Exchange rate	Forward rate F (contractual)	Expected spot E^e (forecast)
Risk	No FX risk (hedged)	FX risk (uncovered)
Nature	Arbitrage condition	Equilibrium condition
Empirics	Holds very closely	Fails badly
Assumptions	Free capital mobility, no transaction costs	CIP assumptions PLUS risk neutrality, rational expectations

Why CIP is closer to holding than the UIP:

CIP violations are risk-free arbitrage opportunities, more quickly eliminated if there's enough liquidity. UIP requires risk-neutral investors and rational expectations. In reality:

Risk premiums exist (investors demand extra return for currency risk)

Expectations are often wrong (systematic forecast errors)

Carry trades profit from UIP violations

(b) If CIP holds but UIP doesn't, what does this tell us about the forward rate as a predictor of the future spot rate?

If CIP holds: $F = E \times \frac{1+i_h}{1+i_f}$

If UIP holds: $E = \frac{1+i_f}{1+i_h} E^e$, which rearranges to $E^e = E \times \frac{1+i_h}{1+i_f}$

Comparing: If both CIP and UIP hold, then $F = E^e$

Implication: The forward rate should equal the expected future spot rate.

But UIP fails empirically, so $F \neq E^e$ in reality.

What this tells us:

The forward rate is a **biased predictor** of the future spot rate. In fact:

When $F > E$ (forward premium), currencies typically appreciate instead of depreciating

This is the "forward premium puzzle"

High interest rate currencies tend to appreciate, not depreciate

The forward rate systematically overestimates depreciation

Why? Risk premiums. Investors demand higher returns for holding riskier currencies. The interest differential reflects both expected depreciation AND a risk premium:

$$i_h - i_f = \frac{E^e - E}{E} + \text{risk premium}$$

Note that, we abstracted from this premium in our baseline UIP explanation, however, we also mentioned the UIP does not exactly hold.

The forward rate reflects the interest differential (CIP), but the expected spot reflects only the expected depreciation part, not the risk premium.

3. (10 points) The Monetary Approach to Exchange Rates (Long Run)

(a) Write down the long-run exchange rate equation derived from the monetary approach, combining the quantity theory, PPP, and the Fisher effect. Explain each component.

Long-run exchange rate equation with interest-sensitive money demand:

$$E_{h/f} = \frac{M_h}{M_f} \times \frac{L(i_f)}{L(i_h)} \times \frac{Y_f}{Y_h}$$

Derivation:

Quantity theory: $M = P \times L(i) \times Y$

For home: $P_h = \frac{M_h}{L(i_h) \times Y_h}$

For foreign: $P_f = \frac{M_f}{L(i_f) \times Y_f}$

PPP: $E_{h/f} = \frac{P_h}{P_f}$

Combining:

$$E_{h/f} = \frac{M_h/[L(i_h) \times Y_h]}{M_f/[L(i_f) \times Y_f]} = \frac{M_h}{M_f} \times \frac{L(i_f)}{L(i_h)} \times \frac{Y_f}{Y_h}$$

Intuition of each component:

M_h/M_f **(money supplies):** Higher home money supply $\rightarrow$ higher E (depreciation). More money chasing same goods $\rightarrow$ inflation $\rightarrow$ depreciation.

Y_f/Y_h **(real incomes):** Higher home income $\rightarrow$ lower E (appreciation). More income $\rightarrow$ more demand for money $\rightarrow$ lower prices $\rightarrow$ appreciation.

$L(i_f)/L(i_h)$ **(money demand):** Higher home interest rate $\rightarrow$ lower $L(i_h)$ $\rightarrow$ higher E (depreciation). High rates mean low money demand, so given money supply, prices are higher.

Fisher effect: $i = r^* + \pi$

Links interest rates to inflation, completing the circle between monetary policy and exchange rates. Here r^* refers to the real rate, but also to the global real interest rate (real rate parity).

(b) A country permanently increases its money supply growth rate (not level, but growth rate) from 3% to 5%. Assume real income growth is 2% and constant. What happens to:

- The long-run inflation rate?
- The nominal interest rate (use Fisher equation)?
- The expected rate of depreciation?

Long-run inflation:

From quantity theory in growth rates: $\mu = \pi + g$

Where μ = money growth, π = inflation, g = real growth

Before: $\pi = 3\% - 2\% = 1\%$

After: $\pi = 5\% - 2\% = 3\%$

Inflation increases from 1% to 3% (a 2 percentage point increase).

Nominal interest rate:

Fisher equation: $i = r^* + \pi$

Global real rate r^* is unchanged. Inflation increased by 2 percentage points.

Therefore, nominal interest rate increases by 2 percentage points.: If initially $i = r^* + 1\%$, now $i = r^* + 3\%$.

Expected depreciation:

From relative PPP: $\frac{\Delta E^e}{E} = \pi_h - \pi_f$

Assuming foreign inflation unchanged, home inflation increased by 2 percentage points, and thus expected depreciation rate increases by 2 percentage points.

In sum, a permanently higher money growth leads to:

Higher inflation (by same amount as money growth increase)

Higher nominal interest rates (by same amount)

Faster expected depreciation (by same amount)

All nominal variables change proportionally; real variables unchanged.

4. (10 points) Short-Run Asset Approach: Announcement Effects

The home central bank announces a credible plan to permanently increase the money supply growth rate from 2% to 4% starting next year. The actual money supply has not changed yet—only expectations have changed. Prices are flexible.

(a) What happens immediately to the home nominal interest rate? Explain using the Fisher equation.

Fisher equation: $i = r^* + \pi^e$

The announcement changes expectations: π^e will be 2 percentage points higher in the future (from part 5b, we know inflation rises from 0% to 2% if $g = 2\%$, or more generally, π increases by 2 points).

Even though the actual money supply hasn't changed yet, the **expected future inflation** immediately increases.

With flexible prices and forward-looking expectations, the nominal interest rate **immediately jumps up by 2 percentage points**.

The reaction is immediate because asset markets are forward-looking. Bond prices adjust instantly to reflect higher future inflation expectations, pushing up yields (interest rates). This happens BEFORE any actual change in M or P.

(b) What happens to the spot exchange rate immediately? Use FX market analysis (DR and FR curves) in your answer.

FX Market Analysis:

Domestic Return (DR): Normally, higher home interest rate would shift DR up, appreciating the currency. But there is more to this story.

Foreign Return (FR): The announcement is permanent, so the expected future exchange rate E^e changes. With permanently higher inflation, the home currency is expected to be much weaker in the future.

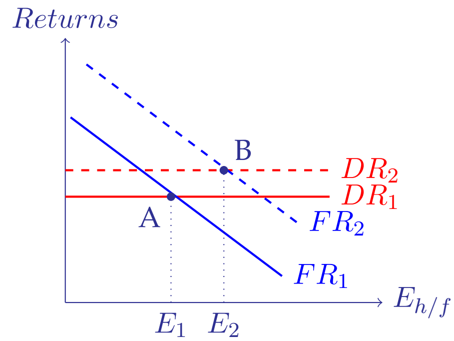
$E^e_{h/f} \uparrow$ substantially (expected to be much higher)

This shifts the FR curve right (upward), making foreign deposits more attractive (depreciation effect).

Net effect:

Even though DR shifts up (higher i_h), the shift in FR dominates because the permanent shock causes a large change in E^e.

The spot exchange rate **immediately depreciates** (increases).



Intuition: Markets are forward-looking. Even though money hasn't increased yet, investors know it will. They anticipate higher future inflation and depreciation, causing immediate depreciation. The currency weakens *in anticipation* of loose policy.

After the announcement: Exchange rate continues depreciating at 2% per year (the new inflation differential).

5. (8 points) Fixed vs. Floating Exchange Rates

   (a) What is the "impossible trinity" (trilemma) in international finance? Explain why a country cannot achieve all three objectives simultaneously.

The Impossible Trinity (Trilemma):

A country cannot simultaneously have all three of:

i. **Fixed exchange rates**

ii. **Free capital mobility** (no capital controls)

iii. **Independent monetary policy**

A country must choose two and give up one.

Why it's impossible:

Suppose you want all three. Then:

With free capital mobility and fixed exchange rates, UIP implies:

$$i_h = i_f + \underbrace{\Delta E^e/E}_{=0 \text{ under fixed rates}} = i_f$$

Your interest rate must equal the foreign interest rate. You cannot choose i_h independently—it's pinned down by i_f and the peg $\Rightarrow$ No independent monetary policy.

Likewise, if you assume any other two objectives, the remaining one becomes unfeasible.

Possible combinations:

1. Fixed rates + Capital mobility $\rightarrow$ Give up monetary independence

- Example: Hong Kong (currency board with USD)
- Example: Eurozone countries (fixed rates within Euro, gave up national monetary policy)

2. Fixed rates + Monetary independence $\rightarrow$ Give up capital mobility (impose capital controls)

- Example: China (until recently)
- Example: Bretton Woods system (1944-1971)

3. Capital mobility + Monetary independence $\rightarrow$ Give up fixed rates (float)

- Example: U.S., UK, Japan, Canada (modern major economies)
- Most common choice today

Why this matters: Countries face real trade-offs. Want to stabilize exchange rate? Can't also use monetary policy for domestic stabilization if capital is mobile. Want policy independence? Must float or impose capital controls.

Many financial crises (Mexico 1994, East Asia 1997, Argentina 2001) involved countries trying to maintain fixed rates + capital mobility + some monetary independence. The trilemma caught up with them.

(b) A country with a floating exchange rate experiences a positive productivity shock that increases real GDP growth. What happens to its currency? What if the country had a fixed exchange rate instead?

Floating exchange rate:

Productivity shock: $Y \uparrow$

Money market: Higher real income increases money demand. With fixed money supply, interest rate rises.

FX market: Higher interest rate attracts capital inflows. **Currency appreciates**.

Additionally, from long-run monetary approach:

$$E_{h/f} = \frac{M_h}{M_f} \times \frac{L(i_f)}{L(i_h)} \times \frac{Y_f}{Y_h}$$

With $Y_h \uparrow$, the term $Y_f/Y_h \downarrow$, so $E \downarrow$ (appreciation).

Intuition: Higher productivity $\rightarrow$ more output $\rightarrow$ country becomes more attractive for investment $\rightarrow$ capital inflows $\rightarrow$ currency appreciation.

Example: U.S. productivity boom of late 1990s $\rightarrow$ strong dollar.

Fixed exchange rate:

The central bank must intervene to prevent appreciation:

Market pressure pushes currency to appreciate

Central bank sells domestic currency, buys foreign reserves

This increases domestic money supply

Money supply increase lowers interest rate

Interest rate falls until it equals foreign rate (maintaining UIP with fixed E)

Result: Exchange rate stays fixed, but:

Foreign reserves accumulate

Money supply expands endogenously

Interest rate is lower than it would be under floating

Potential inflationary pressure from money growth

Trade-off: Floating allows currency to appreciate (helping control inflation, making imports cheaper). Fixed requires monetary expansion (potentially inflationary, but keeps exports competitive).

Example: China's productivity surge 2000s $\rightarrow$ massive reserve accumulation under de facto peg, inflationary pressures.

6. (9 points) Money Growth and Exchange Rate Dynamics

Country A and Country B initially have the same inflation rate of 2%. At time T, Country A permanently increases its money supply growth rate from 4% to 6%, while Country B keeps its money growth at 4%. Both countries have real GDP growth of 2%.

(a) What is the new inflation rate in Country A after the policy change?

From quantity theory: $\mu = \pi + g$

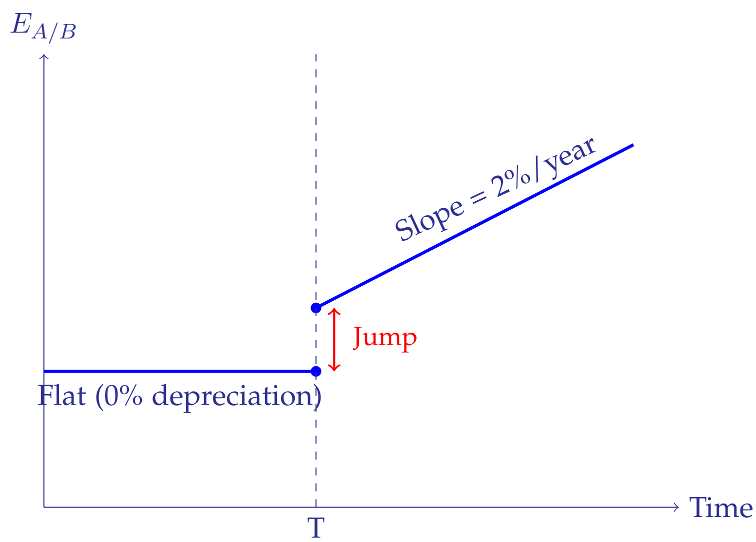
Before: $4\% = 2\% + 2\%$

After: $6\% = \pi_A + 2\%$

$$\pi_A = 4\%$$

Country A's inflation increases from 2% to 4%.

(b) Draw the time path of the Country A/Country B exchange rate, showing the path before time T, at time T, and after time T. Explain the key features of this path.



Key features:

Before time T: Both countries have same inflation (2%), so $E_{A/B}$ is constant (relative PPP: depreciation = inflation differential = 0).

At time T (immediate jump): Currency A immediately depreciates (jumps up). Why?

- Expected future inflation immediately increases
- Fisher effect: nominal interest rate jumps up by 2 points
- Expected future exchange rate path shifts up
- Spot rate jumps immediately to align with new expectations

After time T: Currency A depreciates at 2% per year:

- $\pi_A - \pi_B = 4\% - 2\% = 2\%$
- Relative PPP: $\Delta E_{A/B}/E_{A/B} = 2\%$

- Exchange rate follows an upward trend at 2%/year

Why the jump? Forward-looking markets incorporate all future depreciation immediately into current price. The level shift reflects discounted sum of all future higher inflation.

7. (8 points) Real-World Policy Application

In 2022, the U.S. Federal Reserve began raising interest rates aggressively to combat inflation, while the Bank of Japan kept rates near zero. The yen depreciated sharply against the dollar.

(a) Use UIP to explain why the yen depreciated when U.S. rates rose relative to Japanese rates. You can assume the interest rates are about equal before the 2022 rates increase.

UIP condition (using USD/JPY notation - dollars per yen):

$$i_{\text{USD}} - i_{\text{JPY}} \approx \frac{E^e_{\text{USD/JPY}} - E_{\text{USD/JPY}}}{E_{\text{USD/JPY}}}$$

Where $E_{\text{USD/JPY}}$ is the dollar price of yen. The right-hand side represents the expected rate of appreciation of the yen (or equivalently, the expected depreciation of the dollar against the yen).

Initial situation: $i_{\text{USD}} \approx i_{\text{JPY}} \approx 0\%$, so the interest differential was approximately zero.

After Fed hikes: i_{USD} rose to approximately 4-5%, while i_{JPY} remained near 0%.

Interest differential: $i_{\text{USD}} - i_{\text{JPY}} \approx 5\%$

UIP implication:

For UIP to hold with this 5% interest differential:

$$\frac{E^e_{\text{USD/JPY}} - E_{\text{USD/JPY}}}{E_{\text{USD/JPY}}} \approx 5\%$$

This means the yen must be expected to *appreciate* (equivalently, the dollar is expected to depreciate against the yen).

Why do we get a depreciation of the dollar if USD assets are yielding more returns? Because of overshooting! The dollar does appreciate initially (USD/JPY falls, meaning fewer dollars needed per yen), but it appreciates excessively in the short run. From that overshooted strong position, the dollar then depreciates back toward its new long-run level—this is what the equation captures as expected depreciation. Importantly, the new long-run level is still lower than the initial one as the dollar and US assets are more desirable.

What actually happened - Overshooting dynamics:

Short run (immediate effect):

- Higher U.S. rates made dollar-denominated assets much more attractive
- Large capital flows from Japan to the U.S. as investors sought higher returns
- Yen depreciated sharply: USD/JPY fell from approximately 0.0087 (when JPY/USD $\approx$ 115) to approximately 0.0067 (when JPY/USD $\approx$ 150)
- Crucially, the yen **overshot** its long-run equilibrium—it depreciated more than necessary in the short run (or analogously, the USD appreciated more than necessary)

Expected future path (from overshooted level):

From the overshooted weak position, the dollar (yen) is expected to gradually depreciate (appreciate) back toward a new long-run level:

- Current spot (overshooted): $E_{\text{USD/JPY}} \approx 0.0067$
- Expected future: $E^e_{\text{USD/JPY}} \approx 0.0070$
- The USD would depreciate as the price of the yen would increase by about : $(0.0070 - 0.0067)/0.0067 \approx 4.5\%$

UIP new equilibrium: After the interest rate differential is offset by the expected depreciation (of the USD) both dollar and yen investments will be equally attractive in expected returns.

Important caveat: UIP often fails empirically (the "forward premium puzzle"), so actual market dynamics may deviate from this theoretical prediction. However, the qualitative pattern—yen depreciation followed by partial expected recovery—provides the correct economic framework for understanding the 2022 episode.

(b) The Bank of Japan eventually intervened in FX markets to support the yen. Explain how intervention works and why it might have limited effectiveness if the interest rate differential persists.

How FX intervention works:

To support the yen (prevent further depreciation):

i. BOJ sells foreign reserves (dollars, euros)
ii. BOJ buys yen in the market
iii. This increases demand for yen
iv. Yen appreciates (or at least stops depreciating)

Mechanism:

- Selling dollars $\rightarrow$ puts downward pressure on dollar
- Buying yen $\rightarrow$ puts upward pressure on yen
- Net effect: $E_{\text{JPY/USD}} \downarrow$ (yen appreciation) or $E_{\text{USD/JPY}} \uparrow$ (dollar depreciation).

Why limited effectiveness:

1. Reserves are finite: Japan has large reserves ($1.2 trillion), but FX markets trade $7 trillion daily. If determined speculators bet against yen, reserves can be exhausted.

2. UIP violation persists: As long as $i_{\text{USD}} \gg i_{\text{JPY}}$, there's fundamental pressure for yen to weaken. Intervention fights the tide without addressing the cause.

3. Sterilized vs. unsterilized:

Sterilized intervention: BOJ buys yen but simultaneously injects yen liquidity elsewhere (e.g., buying domestic bonds). Net effect on money supply is zero. This only affects exchange rate through portfolio balance effects—weak and temporary.

Unsterilized intervention: BOJ buys yen without offsetting action. This contracts yen money supply, raising Japanese interest rates, supporting yen more effectively. BUT this tightens monetary policy, potentially hurting the economy.

4. Credibility: If market believes BOJ will eventually give up, traders bet against yen, forcing more intervention. Self-fulfilling pressure.

5. Fundamental solution: To truly support yen, BOJ would need to raise interest rates, narrowing the differential. But this conflicts with domestic objectives (Japan fighting deflation, wants loose policy).

Outcome: BOJ intervention in 2022 had limited, temporary effects. Yen weakened again as interest differential persisted. This shows limits of intervention when fundamentals (interest rates) are misaligned.

8. (9 points) Comprehensive Conceptual Questions

(a) Explain why PPP is more likely to hold in the long run than in the short run. Give at least two specific reasons.

Three key reasons PPP holds better in long run:

1. Price stickiness:

Short run: Prices (especially wages and service prices) adjust slowly due to menu costs, contracts, wage rigidity, and coordination problems. Even when exchange rates change, domestic prices don't immediately respond.

Long run: All prices eventually adjust. Contracts expire, wages renegotiate, firms update price lists. The frictions that prevent price adjustment become less important over longer horizons.

Example: Restaurant prices don't change daily with exchange rate fluctuations, but over 5 years, restaurants in overvalued-currency countries lose competitiveness and must adjust prices.

2. Transaction costs and arbitrage:

Short run: Small deviations from PPP may not be worth arbitraging due to shipping costs, tariffs, time costs, and bid-ask spreads. A 5% deviation might not justify the costs of international arbitrage.

Long run: Large, persistent deviations become profitable to arbitrage. If a currency is undervalued by 30% for years, firms will shift production, tourists will travel, and trade patterns will adjust, pushing prices toward parity.

Example: Won't ship cheap hamburgers from India to Switzerland, but will shift production and exports over years if systematic price differences persist.

Extra: Non-traded goods and Balassa-Samuelson effects:

Short run: Large sectors (services, real estate, healthcare) are non-tradable. PPP doesn't apply to these sectors, and they're a big part of price indices.

Long run: While individual services stay non-traded, the relative price of traded vs. non-traded goods adjusts. Also, technological change and globalization gradually make more goods tradable (e.g., telemedicine, remote services).

Example: Haircuts always cost more in rich countries (Balassa-Samuelson), but this is a persistent deviation. For traded goods, PPP works better over time.

Additional factors:

Market integration: Over time, markets become more integrated through better information, lower trade barriers, improved logistics. This makes arbitrage easier and PPP more likely.

Measurement issues: Short-run deviations may partly reflect measurement problems (different baskets, quality differences, seasonal factors). Long-run trends are more reliable.

Empirical evidence: Half-life of PPP deviations is 3-5 years, meaning it takes this long for deviations to shrink by half. This confirms PPP is a long-run phenomenon.

(b) Compare the predictions of the monetary approach for a permanent versus temporary money supply shock. How do the exchange rate dynamics differ?

Permanent money supply increase:

Flexible prices (instantaneous adjustment):

- Price level immediately increases proportionally to money supply
- Interest rate unchanged (no real effects, Fisher equation: $i = r^* + \pi$, but this is a one-time level change, not ongoing inflation)
- Exchange rate immediately depreciates proportionally via PPP
- All adjustments are instantaneous
- No overshooting because prices adjust immediately

Sticky prices (more realistic):

Short run:

- Prices fixed: P unchanged
- Real money supply rises: $M/P \uparrow$, Interest rate falls: $i \downarrow$ (to clear money market)
- Expected future exchange rate rises: $E^e \uparrow$ (because permanent M increase means permanently higher future P, so PPP implies higher future E)
- Current exchange rate **overshoots**: Depreciates MORE than its long-run level
- Why overshoot? Both lower i (DR shifts down) AND higher E^e (FR shifts right) push current E up strongly

Transition to long run:

- Prices gradually rise: $P \uparrow$
- Real money supply returns to original: $M/P \downarrow$ back toward initial level
- Interest rate rises back: $i \uparrow$ toward original level
- Exchange rate **appreciates** from overshooted level toward new long-run PPP level

Long run:

- M/P returns to original (prices rose proportionally to M)
- i returns to original
- E settles at new level: depreciated by same percentage as M increased (PPP holds)
- Net effect: $E_{\text{initial}} < E_{\text{long-run}} < E_{\text{overshoot}}$

Exchange rate path: Jump depreciation to overshooted level, then gradual appreciation to new long-run level (which is still depreciated from initial level).

Temporary money supply increase:

Short run (prices sticky):

- $M \uparrow$, P fixed $\rightarrow M/P \uparrow \rightarrow i \downarrow$
- DR shifts down in FX market
- FR unchanged (because shock is temporary, E^e doesn't change)
- Exchange rate depreciates (but NO overshooting)

Long run:

- Money supply returns to original level
- ALL variables return to original values
- Exchange rate appreciates back to original
- Zero permanent effects

Exchange rate path: Depreciation, then full reversal back to original.

Key differences:

	Permanent Shock	**Temporary Shock**
Long-run E	Permanently depreciated (same % as M increase)	Returns to original
Long-run P	Permanently higher (same % as M)	Returns to original
Long-run i	Returns to original	Returns to original
FR curve	Shifts right (expected future E changes)	Unchanged
Overshooting	YES - exchange rate overshoots its long-run depreciation	NO overshooting
Path	Overshoot depreciation $\rightarrow$ gradual appreciation to new LR level	Depreciation $\rightarrow$ full appreciation back to original