Macro Problem Set 6 solutions

Q1

A. The pound price of the dollar is lower in London than in New York. Thus, the arbitrage strategy involves buying dollars (selling pounds) in London and selling dollars (buying pounds) in New York. A trader holding £80 starts by selling the pounds in New York for £80 x $1/£0.64 = $125, and then selling the dollars in New York for $125 x £0.8/$1 = £100. That is a gain of 20 pounds.

B. The pound price of the dollar is lower in London than in New York. Thus, the arbitrage strategy involves buying dollars (selling pounds) in London and selling dollars (buying pounds) in New York. A trader holding $100 starts by selling the dollars in London for $100 x £0.80/$1 = £80, and then selling the pounds in New York for £80 x $1/£0.64 = $125. That is a gain of 25 dollars.

C. Since both arbitrage strategies involves selling pounds in London and buying pounds in New York, as more people try to exploit the arbitrage opportunity, the supply curve for pounds in London shifts rightward, and the demand curve for pounds in New York shifts rightwards. The pound will thus depreciate in London while it appreciates in New York. The two exchange rates will converge to a number in between 0.64 and 0.8 pounds per dollar. In practice, the presence of arbitrage and the ability to make trades near instantaneously worldwide means that geographical differences in the exchange rate are eliminated.

Q2

A. A trader with 90 riyals will convert this to 90/4 = 22.5 dollars. She then converts the dollars into 22.5 × 0.8 = 18 pounds. Finally, she exchanges the pounds for 18 × 6 = 108 riyals. This series of exchanges gives her a tidy profit of 108 – 90 = 18 riyals.

B. As more people exploit this three-way arbitrage opportunity, the riyal will depreciate against the dollar and appreciate against the pound, with the dollar also depreciating against the pound. The three exchange rates will adjust until these trades are no longer profitable. This example highlights how arbitrage ties together the various bilateral exchanges rates.

Q3

Suppose the Central Bank of Argentina pegs its peso to the US dollar at 30 pesos per dollar. Initially, the interest rate in both countries is 2 percent per year. The US Federal Reserve then raises its interest rate to 5 percent per year.

A. Argentinian assets are now less attractive to US residents, so the demand curve for pesos shift left. US assets are now more attractive to Argentina residents, so the supply curve for pesos shift right. At 30 pesos per dollar, there will be an excess supply for pesos. The peso will have to depreciate to reach the new equilibrium.

B. To keep the exchange rate at 30 pesos per dollar, the Central Bank of Argentina must absorb the excess supply of pesos by buying pesos with dollars. Consequently, it will deplete its foreign exchange reserves. It cannot do this indefinitely because it has a finite holding of foreign exchange reserves.

Q4

If Argentina is in a slump, then the appropriate monetary policy for counter-cyclical purposes is to do expansionary monetary policy i.e., reduce Argentina's interest rate. However, reducing the interest rate will make Argentinian assets less attractive, which then leads to an even larger excess supply of pesos. The Central Bank of Argentina will deplete its foreign exchange reserves at an even faster rate.

To keep the peg, the Central Bank of Argentina will eventually need to raise Argentina's interest rate to match the US interest rate. It must therefore run a contractionary monetary policy, instead of an expansionary monetary policy. This will push the economy into a deeper slump!

Alternatively, the Central Bank of Argentina could impose capital controls, meaning that it will restrict the inflow and outflow of funds, and allowing only exchanges of peso with USD at the pegged rate. This will drive currency trades into the black market, and make Argentina a pariah for foreign investors, who will stop lending USD to local businesses and the Argentinian government. This, too, will push the economy into a deeper slump.

Enrichment: While the question discusses a hypothetical situation, real-life Argentina has in recent years been dealing with heavy depreciation pressure, forcing its central bank to first apply high interest rates, seek IMF loans, and eventually imposing capital controls. A short

Wall Street Journal article reprinted in the Australian Business Review[1] describes the capital controls:

> "In a decree released on Sunday, the government said the central bank would limit dollar sales, requiring companies and banks authorisation to purchase hard currency. The country's exporters would be required to repatriate all hard currency from sales abroad.
>
> Individuals seeking to buy dollars will have a limit of $US10,000 per month. Bank transfers abroad by individuals will also face a monthly limit of $US10,000.
>
> Dollar purchases by non-residents will be restricted to $US1000 a month, and they won't be allowed to make bank transfers abroad."

Q5

The diagram below depicts the dollar-pound market with the quantity of dollars and the pound-price per dollar. The initial equilibrium is A (Q_0, E_0).
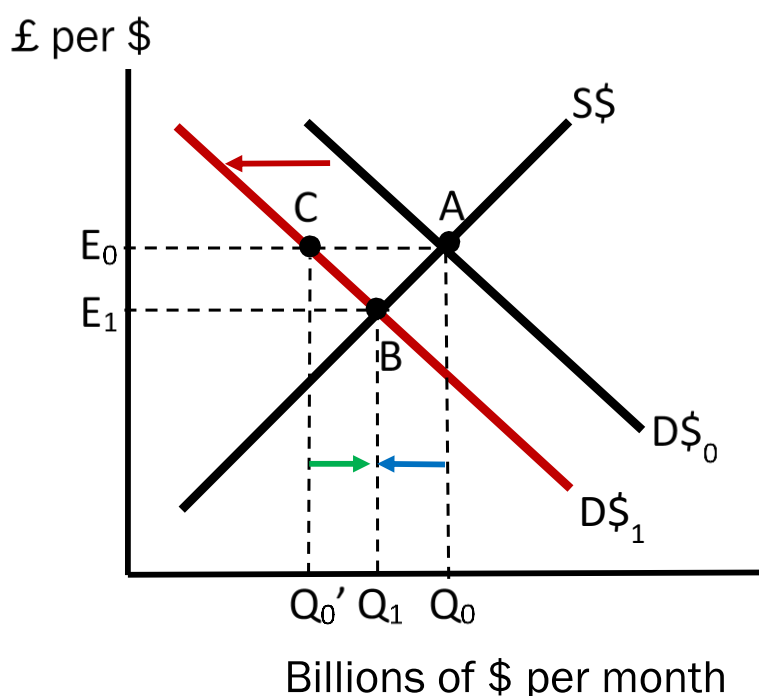
If UK residents reduce their purchases of US assets by $1 billion, the demand curve for dollars shifts left (D\$$_0$ to D\$$_1$) by $1 billion ($Q_0 - Q_0'$ = $1 billion). Thus, there is a $1 billion

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[1] SANTIAGO PEREZ, RYAN DUBE. (September 3, 2019 Tuesday). Argentina imposes capital controls as cash reserves drain away. The Australian. https://advance-lexis-com.libproxy1.nus.edu.sg/api/document?collection=news&id=urn:contentItem:5WYH-J0V1-JD3N-52W0-00000-00&context=1516831 (requires NUS library login).

excess supply of dollars. This leads the dollar to depreciate, i.e., the equilibrium pound-price per dollar will fall. The new equilibrium is B (Q_1, E_1).

The process of reaching point B involves

- Movement along the demand curve $D\$_1$ from C to B. This is the increase in UK residents' purchase of US goods (i.e., US exports to the UK) in response to the dollar's depreciation. Thus, US exports to the UK rise (green arrow).
- Movement along the supply curve $S\$$ from A to B. This is the reduction in US residents' purchase of UK goods (i.e., US imports from the UK) in response to the dollar's depreciation. Thus, US imports to the UK fall (blue arrow).

Together, the US trade balance against the UK improves by $1 billion.