Open-Economy Macroeconomics: The Balance of Payments and Exchange Rates
The main difference between an international transaction and a domestic transaction is the currency exchange. International exchange must be managed in a way that allows each partner in the transaction to wind up with his or her own currency.
Exchange Rates

• The *exchange rate* is the price of one country’s currency in terms of another country’s currency; the ratio at which two currencies are traded for each other.
Nominal Exchange Rate

• It is important to distinguish between nominal and real exchange rates
• The nominal exchange rate refers to the rate at which currencies of two countries are traded
  • specifically, the nominal exchange rate is the number of units of a foreign currency that can be purchased with a unit of the domestic currency (indirect quotation)

• An alternative quotation is:
  • price or direct quotation which measures the units of domestic currency needed to purchase one unit of the foreign currency eg: GHC 3.4 = $1

• We focus on the direct quotation
Appreciation and Depreciation

• Using the direct quotation, an increase in the nominal exchange rate means a depreciation of the domestic currency.

• This means more units of the domestic currency is needed to buy the same unit of the foreign currency
  • that is the domestic currency has weakened

• When the value nominal exchange rate falls, the domestic currency has appreciated
  • fewer units of the domestic currency are needed to purchase a unit of the foreign currency
Real Exchange Rate

• Real exchange rates measures the price of domestic goods relative to foreign goods
  • it measures the number of domestic goods needed to purchase a unit of foreign goods

• The real exchange rate depends on: the domestic price level, foreign price level and the nominal exchange rate
  • \( e_{real} = \frac{p}{eP_{for}} \)
    • where \( e \) is the nominal exchange rate in direct quotation

• Suppose a bottle of coke sells for GHC 2 in Ghana and N100 in Nigeria. If you need 2 pesewas to buy 1 naira, then real exchange rate is:
  • \( e_{real} = \frac{2}{0.02*100} \) or one coke in Ghana equal 1 Coke in Nigeria
Purchasing Power Parity

- From the example above, a bottle of coke has the same price in both countries
  - This reflects the idea of purchasing power parity (PPP)

- PPP states that exchange rate between currencies are in equilibrium, when their purchasing power is the same in both countries.

- From the expression for real exchange rate above, if the real exchange rate equals unity, then $P = eP_{for}$

- The concept of PPP is important for international comparisons of standards of living
  - you will frequently see GDP per capita measured in PPP
• The *balance of payments* is the record of a country’s transactions in goods, services, and assets with the rest of the world; also the record of a country’s sources (supply) and uses (demand) of foreign exchange.
The BOP Account

### United States Balance of Payments, 2002

#### CURRENT ACCOUNT

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goods exports</td>
<td>682.6</td>
</tr>
<tr>
<td>Goods imports</td>
<td>–1,166.9</td>
</tr>
<tr>
<td>(1) Net export of goods</td>
<td>–484.3</td>
</tr>
<tr>
<td>Export of services</td>
<td>289.3</td>
</tr>
<tr>
<td>Import of services</td>
<td>–240.5</td>
</tr>
<tr>
<td>(2) Net export of services</td>
<td>48.8</td>
</tr>
<tr>
<td>Income received on investments</td>
<td>244.6</td>
</tr>
<tr>
<td>Income payments on investments</td>
<td>–256.5</td>
</tr>
<tr>
<td>(3) Net investment income</td>
<td>–11.9</td>
</tr>
<tr>
<td>(4) Net transfer payments</td>
<td>–56.0</td>
</tr>
<tr>
<td>(5) Balance on current account (1 + 2 + 3 + 4)</td>
<td>–503.4</td>
</tr>
</tbody>
</table>

#### CAPITAL ACCOUNT

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(6) Change in private U.S. assets abroad (increase is –)</td>
<td>–152.9</td>
</tr>
<tr>
<td>(7) Change in foreign private assets in the United States</td>
<td>533.7</td>
</tr>
<tr>
<td>(8) Change in U.S. government assets abroad (increase is –)</td>
<td>–3.3</td>
</tr>
<tr>
<td>(9) Change in foreign government assets in the United States</td>
<td>46.6</td>
</tr>
<tr>
<td>(10) Balance on capital account (6 + 7 + 8 + 9)</td>
<td>474.1</td>
</tr>
<tr>
<td>(11) Statistical discrepancy</td>
<td>29.3</td>
</tr>
<tr>
<td>(12) Balance of payments (5 + 10 + 11)</td>
<td>0</td>
</tr>
</tbody>
</table>
A country’s current account is the sum of its:
- net exports (exports minus imports),
- net income received from investments abroad, and
- net transfer payments from abroad.
The Current Account

• Exports earn foreign exchange and are a credit (+) item on the current account. Imports use up foreign exchange and are a debit (−) item.
The Current Account

• The balance of trade is the difference between a country’s exports of goods and services and its imports of goods and services.

• A trade deficit occurs when a country’s exports are less than its imports.

• Net exports of goods and services \((EX – IM)\), is the difference between a country’s total exports and total imports.
The Current Account

• *Investment income* consists of holdings of foreign assets that yield dividends, interest, rent, and profits paid to Ghana asset holders (a source of foreign exchange).
The Current Account

• *Net transfer payments* are the difference between payments from Ghana to foreigners and payments from foreigners to Ghana.
The Current Account

- The *balance on current account* consists of net exports of goods, plus net exports of services, plus net investment income, plus net transfer payments. It shows how much a nation has spent relative to how much it has earned.
The Capital Account

• For each transaction recorded in the current account, there is an offsetting transaction recorded in the capital account.

• The *capital account* records the changes in assets and liabilities.
The Capital Account

• In the absence of errors, the balance on capital account would equal the negative of the balance on current account.

• If the capital account is positive, the change in foreign assets in the country is greater than the change in the country’s assets abroad, which is a decrease in the net wealth of the country.
Equilibrium Output (Income) in an Open Economy

Planned aggregate expenditure \((AE)\) in an open economy:

\[
AE \equiv C + I + G + EX - IM
\]

- Planned consumption expenditure:
  \[
  C = a + bY
  \]
- Planned investment expenditure:
  \[
  I = I_0
  \]
- Government spending:
  \[
  G = G_0
  \]
- Goods and services export:
  \[
  EX = EX_0
  \]
- Goods and services import:
  \[
  IM = mY
  \]

\(m\) = marginal propensity to import (or MPM)

- In equilibrium:
  \[
  Y = C + I + G + EX - IM
  \]
  \[
  Y = a + bY + I + G + EX - mY
  \]
  \[
  Y - bY + mY = a + I + G + EX
  \]
  \[
  Y(1 - b + m) = a + I + G + EX
  \]
  \[
  Y^* = \frac{1}{1 - b + m} (a + I + G + EX)
  \]

\(Y^*\) = multiplier

\(a + I + G + EX\) = autonomous expenditures
Equilibrium Output (Income) in an Open Economy

- Exports contribute to an increase in autonomous expenditures and cause the planned aggregate expenditure function to shift upward.
- Imports affect the value of the multiplier. After imports are included, the aggregate expenditure function rotates and equilibrium income decreases.
• The determinants of imports are the same as the factors that affect consumption and investment behavior.
  • Typically income.

• Spending on imports also depends on the relative prices of domestically produced and foreign-produced goods.
Imports and Exports and the Trade Feedback Effect

- The *trade feedback effect* is the tendency for an increase in the economic activity of one country to lead to a worldwide increase in economic activity, which then feeds back to that country.
• When the export prices of one country rise, with no change in the exchange rate, the import prices of another rise.

• If the inflation rate abroad is high, import prices are likely to rise.
The *price feedback effect* is the process by which a domestic price increase in one country can “feed back” on itself through export and import prices.

Thus Inflation is “exportable.”
Exchange Rate Regimes

• The processes and institutional arrangements that government uses in the determination of a country's exchange rate is the exchange rate regime.

• There are two major regimes: fixed exchange rate regime and flexible/floating exchange rate regime.

• In fixed exchange rate regimes, the exchange rate is officially determined by the central bank/gov't.

• In flexible exchange rate regimes, the exchange rate is determined by conditions of demand and supply.

• Many countries practice a form of managed floating system where the exchange rate is largely market-determined with occasional interventions by central banks to keep the rate within a particular range (band).
Exchange Rate in a Floating System

• The nominal exchange rate in the flexible regime is determined by the forces of demand and supply like any other financial asset.

• In this market, the equilibrium quantity of domestic currency and the exchange rate are determined.

• To the supply cedis in this market means to offer cedis in exchange for other currencies.
• In a world where there are only two countries, Ghana and the United States, the demand for cedis is comprised of holders of dollars wishing to acquire cedis. The supply of cedis is comprised of holders of cesid seeking to exchange them for dollars.
Some Private Buyers and Sellers in International Exchange Markets: Ghana and the United States

THE DEMAND FOR CEDIS (SUPPLY OF DOLLARS)

1. Firms, households, or governments that import goods made in Ghana into the United States or wish to buy Ghana-made goods and services
2. U.S. citizens traveling in Ghana
3. Holders of dollars who want to buy Ghana stocks, bonds, or other financial instruments
4. U.S. companies that want to invest in Ghana (FDI)
5. Speculators who anticipate a decline in the value of the dollar relative to the cedis
Some Private Buyers and Sellers in International Exchange Markets: United States and Great Britain

**THE SUPPLY OF CEDIS (DEMAND FOR DOLLARS)**

1. Firms, households, or governments that import U.S. goods into Ghana or wish to buy U.S.-made goods and services
2. Citizens of Ghana traveling in the United States
3. Holders of cedis who want to buy stocks, bonds, or other financial instruments in the United States
4. Ghanaian companies that want to invest in the United States
5. Speculators who anticipate a rise in the value of the dollar relative to the cedi
Equilibrium in the exchange rate market
Equilibrium in the exchange rate market

• When the price of cedis falls, Ghana-made goods and services appear less expensive to U.S. buyers. If Ghana prices are constant, U.S. buyers will buy more Ghana goods and services, and the quantity demanded of cedis will rise.

• When the price of cedi rises, Ghanaians can obtain more dollars for each cedi. This means that U.S.-made goods and services appear less expensive to buyers in Ghana. Thus, the quantity of cedis supplied is likely to rise with the exchange rate.
Effect of falling commodity prices on the value of Cedi
The Equilibrium Exchange Rate

• An excess supply of cedis will cause the price of cedis to fall—the cedi will *depreciate* (fall in value) with respect to the dollar.

• An excess demand for cedis will cause the price of cedis to rise—the cedi will *appreciate* (rise in value) with respect to the dollar.
The Effects of Exchange Rates on the Economy

• When a country’s currency depreciates (falls in value), its import prices rise and its export prices (in foreign currencies) fall.

• When the U.S. dollar is cheap, U.S. products are more competitive in world markets, and foreign-made goods look expensive to U.S. citizens.
• A depreciation of a country’s currency can serve as a stimulus to the economy:
  • Foreign buyers are likely to increase their spending on U.S. goods
  • Buyers substitute U.S.-made goods for imports
  • Aggregate expenditure on domestic output will rise
  • Inventories will fall
  • GDP ($Y$) will increase