The Exchange Rate

The exchange rate of a currency is the value of an economy's money in relation to that of another. Why do we need this measure of relative value? Principally, no economy is self sufficient or efficient in the production of all goods, which we have found justifies trade using the idea of comparative advantage in production. When we need to import a good or set of goods we want, that is produced by another country, the payment must be made either in their currency, or our own currency. It then becomes necessary to value each currency with respect to the other with whom we need to trade with. We get the foreign currency we need from the Foreign Exchange Market. It is in this world wide market that currencies are traded between each economy via the various agents, such as Banks, or other financial institutions, or trading houses etc. You can then imagine that it is the relative demand between the different economies for each other's currency that would determine the foreign exchange rate. Further, we may be able to examine foreign exchange rate determination using our simple demand and supply analysis. What would you have on your vertical and horizontal axes?

The major currency are internationally traded, and the most common being the US Dollar, British Sterling Pound, European Euros, and Japanese Yen. Their importance is principally a result of historical use (Sterling Pound was a result of the British dominance in Post Industrial World as an imperial power, and the Progenitors of the Industrial Revolution), economic power (Japan, EU, and USA). However, as economies rise, it is certain that the major international currencies may change. In consequence of their importance, other currencies are hence valued in relation to these major currencies, and the price at which one currency exchanges for another is called the foreign exchange rate. It is the value of own currency in terms of another currency. For example, if each Canadian Dollar can be used to buy 85 cents in US made products, the exchange rate would be 85 US cents, or $0.85. Of course we can also think of exchange rate as how much a US dollar could buy in Canada, which in terms of our previous example would mean that the exchange rate is 1/0.85=CAD1.1765.

More generally, we can write the following formula. Let us denote our own money by CAD, Canadian Dollar, and all other currencies as $OT. The exchange rate of the Canadian Dollar with respect to the other currency we are concerned with, in terms of Canadian Dollar, may be expressed as CAD*x*:$OT1 or CAD*x* to 1 $OT. This is typically referred to as the price, in this case the price of $OT ($OT may be USD, Euros, Hong Kong Dollar, Japanese Yen etc). Similarly, we can express exchange rate in terms of the

other currency, i.e. CAD1:OTy$=$OT 1/x, or OTy$=$OT 1/x to 1CAD. When each Canadian dollar can be exchanged for more of $OT, we say that the Canadian Dollar has ***appreciated***, since the value has risen in value vis-à-vis the $OT. In general, when the value of any currency increases in value with respect to another, we say that there has been ***Currency Appreciation***. For example using the above formula, suppose each CAD can buy an additional OTz$, the exchange rate becomes, CAD1:OTy+z$ or in other words CAD 1/($y+z$):$OT1 in stead of CAD 1/($y$):$OT1. The reverse is true for ***Currency Depreciation***.

Simple Exercise to see if you've understood the above
Read vertically to see how much each currency buys.
Read horizontally to find the prices of the other currency.

	USD	**Euros**	**JPY (in 100 yen)**	**CAD**
USD	1		0.92	
EUR	0.86	1	0.66	0.62
JPY (in 100 yen)			1	0.96
CAD	1.2			1

Foreign Exchange Market

As noted, foreign exchange market determines the exchange rate between currencies, and consequently we can think of this price and quantity determination in terms of the interactions between demand and supply of different currencies.

→ ***The Demand of One Currency is the Supply of Another***

When agents in one economy demands CAD, they want to exchange their currency for CAD, similarly holders of CAD who wants another economy's currency, they would supply CAD for their desired currency. At anytime, holders or traders in foreign currency holds several currency. Should they have insufficient supply of any, they would then trade in the foreign exchange market for it, and in turn supply what the other party desires, and it needn't be their home economy's currency. That is a foreign exchange trader in Canada holding USD but who wants Euros could trade with another in Hong Kong, for Euros with USD. The significance is that the demand for a currency then has

implication or affects the supply of other currencies.

→ ***The Demand in the Foreign Exchange Market***

The demand for any currency is dependent on

1. Exchange Rate: The Law of Demand for Foreign Exchange
2. World Demand for Economy's Exports
3. Relative Interest Rates
4. Expected Future Exchange Rates

→ ***The Law of Demand for Foreign Exchange***

The higher the exchange rate, i.e. the greater the price of a currency in terms of another currency that would be traded for it, the lower the demand. Example, the greater the price of CAD (in terms of the currency that would be traded for CAD), the lower would the quantity demanded for CAD. Another example; let the current exchange rate between CAD and JPY be CAD1:JPY100, that is the price of CAD to Japanese consumers of CAD is JPY100. Now suppose this price rises to 120, i.e. the Japanese consumer now needs to pay JPY120 to get just CAD1. This means the price of CAD has risen. Do you think demand for CAD by the person/individual/firms would rise or decrease intuitively? Put another way, would you think about buying a Lexus if the exchange turns in your favor this way? Consider this, a previously CAD30000 Lexus imported from Japan which might otherwise cost JPY3,000,000, would now cost CAD25,000!

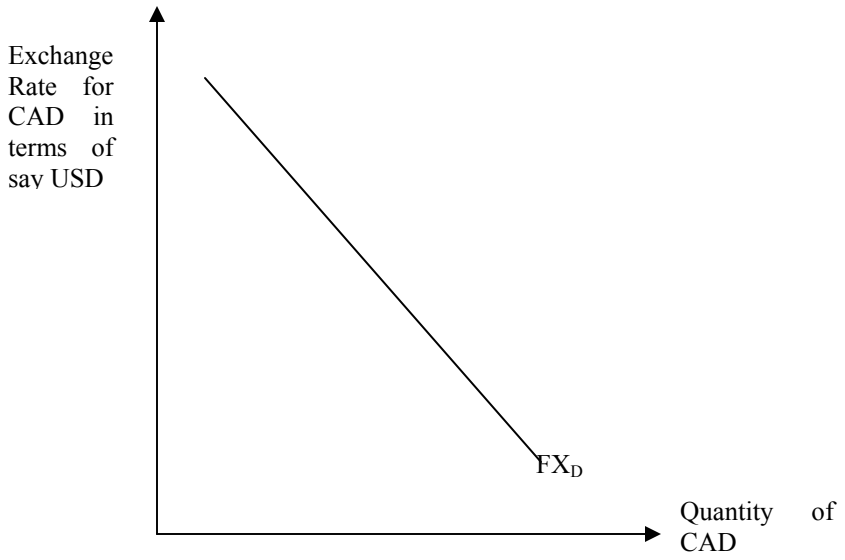
Exports however isn't the only reason other economies may demand CAD. Demand is also generated by other Canadian Financial products such as Canadian Stocks, Businesses, Real Estate, and Bonds, all of which together influence demand for CAD. The same argument holds true for the demand of other currencies.

Principally, exchange rate influences the quantity demanded of a currency for two reasons (holding points 2 to 4 constant),

1. ***Exports Effect***: Such as in the above example. Basically, when the exchange rate of a currency falls, it means the price of its currency is low vis-à-vis the other currencies. This in turn means that exports from that economy (whose exchange rate has fallen) are cheaper, and more of that (depreciated) currency would be demanded.
2. ***Expected Profit Effect***: Suppose you expect the price of Euros to rise in the future to CAD1.8:Euros1. However, currently the exchange stood at CAD1:Euros1. If you bought Euros now, and sell it in the future, you would then stand to gain in profit. (Of course this is on the presumption the interest rate you're paying to

borrow in order to buy sufficient Euros does not rise faster than the rate of increase in Euro Exchange Rate vis-à-vis CAD.

Together, this gives us the standard downward sloping demand, and looks like the following.



→ ***Supply in the Foreign Exchange Market***

Just as demand of CAD or other currencies depend on exports etc, so too supply of CAD (or any currency for that matter) depends on the planned transactions in stocks, imports, bonds, businesses, real estate. In general, the quantity of currency supplied depends on

1. Exchange Rate
2. Domestic Demand for Imports
3. Relative Interest Rates
4. Expected Future Exchange Rates

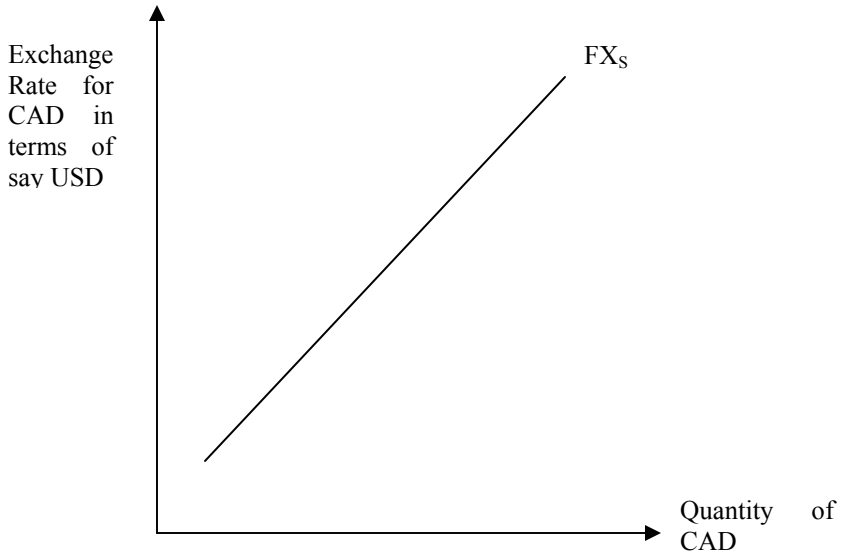
→ ***The Law of Supply of Foreign Exchange***

The greater the exchange rate, the more likely agents holding a currency would want to sell it, since if they had purchased the currency at lower exchange rates, by selling them when the exchange rates are high would allow the greatest gain in profit. Consequently, the greater the exchange rates, the greater would the supply of currency be. Principally, exchange rate influences the quantity supplied of a currency for two reasons (holding points 2 to 4 constant),

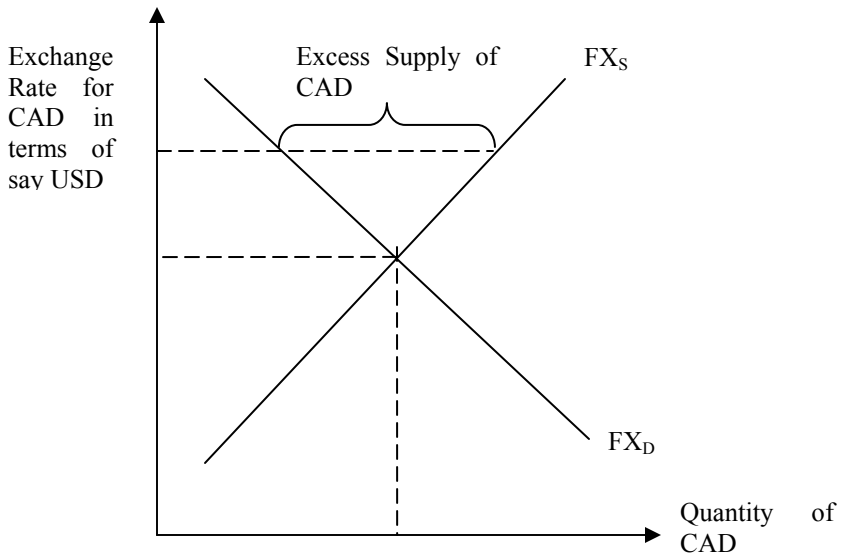
1. Import Effects: Consider Canada. The greater the value of Canadian

Dollar to foreign currency, the greater would the demand for foreign imports, the greater would Canadian Dollar be offered for payment, and consequently, the greater the supply of CAD.

2. Domestic Demand for Imports: This is the argument mentioned above. Holders of Canadian dollar would find it most profitable to sell Canadian dollar when the exchange rate for CAD is the highest.



→ ***Market Equilibrium*** is where demand for a currency meets supply, as in your microeconomic segment. This is characterized by the point of intersection of demand with supply. This is because at all other points, there is always incentives and pressures to bring the exchange rate towards the point of intersection. Consider the incidence of excess supply of foreign exchange or of CAD. The holders of CAD would be able to sell their holding by reducing their price of CAD a little, thereby selling their stock of CAD. This would go on until what sellers of CAD want to be paid for their stock just equates with what demanders of the currency want to pay CAD for. Further, at equilibrium there cannot be any arbitrage opportunity, that is the exchange rate and the cross exchange rate must always line up.



→ *Exchange Rate Fluctuations*

Shifts in the demand and supply of a currency in the foreign exchange market affects the foreign exchange equilibrium. Consequently the factors that shift the demand and supply for foreign exchange alters equilibrium

1. World Demand for Exports and Imports: World Demand for exports and imports determines the flow of goods, which in turn determines the foreign exchange. Suppose the prices of goods manufactured in Canada are of a lower price, then baring any discernible differential in quality etc, demand for Canadian output would rise, which raises demand for CAD, and drive the price of CAD up. Consider again what the NAFTA agreement did for Canada. When Canada signed the NAFTA agreement, trade with the US rose. This led to an increase in supply of CAD, and brought about a fall or depreciation of CAD over 1991-2002.
2. Relative Interest Rates: Interest Rates is the price of capital used in manufacturing. If interest rates in Canada are higher than that of the US, then investors would realize that their monies would yield them greater profit from investing in Canada, then the US, and this would consequently raise the demand for CAD for investment in Canada. Similarly, the higher the interest rates, the lower the supply of CAD, since demand for foreign assets would diminish given it is more profitable to invest in Canada.
3. The Expected Future Exchange Rate

→ What really affects Exchange Rate Expectations?

1. ***Purchasing Power Parity***: The principal idea is that prices for the same goods must cost the same, or have the same value. If they are not, there would then be profits to be made, and corrections through the exchange rate process would then ensure that prices are the same in all currency. Example: Consider the price of a AC Cobra in US was USD100,000 and in Canada, it was sold at CAD120,000. Assuming the car is manufactured in both US and Canada, and the cost of distribution and stocking is zero. Further suppose the exchange rate stood at CAD1.2: USD1. This would mean that the same car cost the same or money has the same value in both countries. Now suppose the price of the same car in Canada cost CAD150,000, but that in the US the price of the car is still the same, and the foreign exchange is still the same. At such an exchange rate, and price level, the same car in Canada is worth USD125,000. While the same car in US is worth CAD120,000. This means that money buys more in US than in Canada. This would then drive expectations for an appreciation of USD vis-à-vis CAD, or a depreciation of CAD vis-à-vis USD. Why? Suppose the exchange does not correct through changes in the foreign exchange market. Then you being the enterprising individual could then buy the car in US, and sell it in Canada for a USD25,000 or CAD30,000 profit! Brilliant! **The argument is similar, but reversed if prices increased in US but not in Canada. Try it for yourself.**
2. ***Interest Rate Parity***: Just as goods must be worth the same value, so too does investments. If investments made in the British Isles yields 5%, while that in Canada yields 3%, why would investors keep maintaining their investments in Canada. If exchange rates do not change within the investment horizon of say 1 year, all investors would and should reinvest in the UK. The reason they don't is that they expect that foreign exchange between Canada and Sterling Pound would rise, or appreciation of the CAD with respect to Pound Sterling, and in fact rise by 2%, so that the investment in both economies yield the same returns.

Exchange Rate Policy

We had noted earlier that one of the possible monetary policy tools is to control foreign exchange rates by the Bank of Canada. There essentially four exchange rate policies

1. Flexible Exchange Rate: This is the method of choice for Bank of Canada, which is to permit the demand and supply of foreign exchange to freely determine the

Canadian exchange rate. However, that said, it must be noted that Bank of Canada's interest rate policies will spill over into the foreign exchange market, since once the overnight rate is chosen, all other interest rates in the economy would adjusts on its cue. Consequently, interest parity would dictate that foreign exchange rate equilibrium would be affected. Recall Bank of Canada uses the Target Rule which uses a wide array of information, which would include foreign exchange. When the decision on interest rate is set, it knows to some degree how exchange rates would be affected. Consider the example of when the Bank of Canada raises interest rates. Holding all other economies' interest rate constant, we would expect the CAD to depreciate while the policy stands.

2. Fixed Exchange Rate: This regime means that the Bank of Canada or the Central Bank chooses the exchange rate, and would maintain that level or value under all circumstances to the best of its ability. The Bank of Canada operated on this regime, pegging the CAD to USD at 92.5 US cents, or 0.925 USD. Technically, there is no limit that a central bank at sell its own currency, since it controls how much currency is printed. However, how much open market acquisition of CAD is limited by its foreign currency holdings. Consider the following: Suppose there is a fall in demand for CAD such that under normal circumstances without intervention, CAD should devalue. However, the Bank of Canada can maintain the fixed exchange by reducing the supply of CAD, thereby maintaining the pegged exchange rate. It reduces the supply of CAD by buying it back in the Foreign Exchange Market. **Can you draw the diagram for this?**
3. Crawling Peg: This strategy is similar to Fixed Exchange Rate, and has the Central Bank maintain a moving target for the exchange rate, at a specified growth rate.
4. Currency Union: This is the merger of currencies of a number of countries to form a single money and avoid foreign exchange transactions. The most recent of this is due to the formation of EU. Although it is not in the political agenda in Canada, it has been suggested by some Canadian economist to be viable, between USA and Canada. The benefits of which are
    a. **Transparency and Competition Improves**: With a common unit of accounting, prices of the same product can be easily calculated, and would prevent unnecessary competition through depreciation is currency to encourage exports.
    b. **Transaction Costs**: Changing of currency in trade in transaction costs. Consequently, when you eliminate this with a key trading partner, this

aspect of costs is eliminated.

c. **Foreign Exchange Risk Elimination**: Principally, when a firm sells its product in a foreign economy, they have to face exchange rate risks. For example, when an order with a foreign firm is made, it is made with a particular exchange in mind (typically, firms make their purchase decision on a risk margin, which may not be optimal). Should the exchange rate change the day they make their payments, this may be in their favor, or against them, such as when the domestic currency depreciates.
d. **Real Interest Rates Falls**: Real interest rate is the cost of capital and the return to savings, and it includes a premium for risk from default, currency, and inflation fluctuations. A common currency with a key trading partner reduces risks from currency fluctuations, and fluctuations in prices arising from exchange rate fluctuations.

Just as there are gains, there are costs, and economists always consider both in suggesting the optimal move.

a. **Shock that need dedicated National Monetary or Fiscal Policy**: Both the US and Canadian economies are structurally different, and consequently grow at different rates. This means the potential levels of output are different, and need different policies and magnitudes of policies to meet different shocks that may affect the economy.
b. **Loss of Sovereignty**: Surrender the monetary policies at different levels of sacrifice, and limited use of fiscal policy since any policy must have the aggregate entity in mind.
c. **Reduction in wages**: If US workers are more productive on account of their structure, since Canadian economy is still dominated by mineral and raw material extraction, and since workers are paid their value of marginal product, this merger may lead to a fall in wages for a substantial portion of the Canadian economy. If wages has been maintained at levels that are not sustainable through union action (Union membership has been falling in US), unions may be forced into the history books of Canada as well, since otherwise domestic Canadian firms would not be able to compete with US firms due to higher costs of production.