

Ops Notes: Currency Strategy

Section 1

[Currency Strategy](#) by Callum Henderson is a solid overview of advanced currency trading theory and practical strategy.

Although it reads a bit like a textbook and is somewhat dated (it was published in 2000) the meat of the book remains relevant and useful to currency speculators today.

The following *Ops Notes* cover important sections from the book that are useful to us as traders. I left out the parts devoted to corporate currency hedging and technical analysis (if you're reading this you probably know what a H&S pattern is).

I consider this book required reading if you're serious about engaging in the currency markets. Two other excellent books to pair with it are [Currency Forecasting](#) by Rosenberg and [Handbook of Exchange Rates](#) by Jessica James.

These *Ops Notes* serve as a great reference for those who already have a foundation in currency theory and application. Keep in mind that this is pretty advanced stuff. In the future, we'll be taking each of these sections and diving in deeper via separate *Vault* pieces.

Since *Currency Strategy* is dense and packed full of useful information, we're splitting its *Ops Notes* into four sections.

The first section covers the positives and negatives of the various traditional approaches to exchange rate modelling.

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Chapter 1: Fundamental Analysis - The Strengths and Weaknesses of Traditional Exchange Rate Models

Traditional exchange rate models are based off equilibriums. The idea is that the exchange rate should balance out over time to reflect the differences in prices of various commodities and goods between one currency and the next.

Each model varies in the primary data points it uses to determine equilibrium rates of exchange:

- ❖ Purchasing Power Parity: The exchange rate as the relative price of goods
- ❖ Monetary Approach: The exchange rate as the relative price of money
- ❖ Interest Rate Approach: The exchange rate as the relative price of interest rates
- ❖ Balance of Payments Approach: The exchange rate as the relative price of current and capital flows
- ❖ Portfolio Balance Approach: The exchange rate as the relative price of assets

1.1 Purchasing Power Parity

Purchasing Power Parity (PPP) or the “law of one price” is the best known exchange rate model within currency analysis. The basic idea is that in a world without barriers to free trade, the price of the same good must be the same everywhere over time. As a result, the exchange rate must move towards a long-term equilibrium value to ensure this is true. PPP or the law of price should hold if:

1. There are no barriers to trade or arbitrage in the good
2. There are no transaction costs
3. The good being traded is perfectly homogeneous

Thus, the basic mathematical expression of PPP is:

$$E = P / P^*$$

Or, another way to express this is:

$$P = E \times P^*$$

Where

E = The PPP long-term equilibrium exchange rate value

P = Domestic price level of goods

P* = Foreign price level of goods

This reflects the fundamental view of PPP, which is that the long-term equilibrium value of an exchange rate is a direct function of the ratio between the “internal” prices of the same tradable goods between two countries.

For example, let’s say that a basic basket of consumer goods are priced materially higher in Germany than in Norway. This would cause people to buy the goods in Norway and sell them in Germany — a form of consumer goods arbitrage. But in the process of doing so, they would drive up the demand for the Norwegian goods. As a result, the demand for Norwegian Krona (the currency used to buy those goods) would climb higher as well. The Krona would therefore become more expensive and in turn offset the differences in local pricing of the basket of goods. The arbitrage would bring the currencies into equilibrium.

Cheap currency → Attracts buyers → Increased demand to buy goods → Currency appreciates

Practitioners think of exchange rates in terms of base and term currencies. The base currency is usually the US dollars and used first as a point of reference.

For example, the exchange rate between the US and Japan is not seen as yen per dollar, but instead as dollar per yen. The dollar is the base currency and the yen is the term currency. This is how foreign exchange traders quote rates. We could express this slightly differently in our PPP formula as:

$$E = P^t / P^b$$

Where:

E = The PPP long-term equilibrium exchange rate value

P^t = Price level in the term currency

P^b = Price level in the base currency

1.1.1 Reasons for “Misalignment”

Exchange rates that don’t reflect the PPP value are “misaligned” and assumed to eventually revert.

Misalignments are caused by temporary distortions, either to the price of the good or the exchange rate, that should quickly be eliminated by a rational, profit-seeking market. But in reality, “misalignments” can last for months or even years. The track record of the PPP model over the short term leaves a lot to be desired. It’s known in the market as the “Pretty Poor Predictor”.

The reasons for this are:

- **We don’t have perfectly free trade** — Free trade would imply zero import tariffs, zero export subsidies, and perfect competition across all business sectors. Needless to say, this is not the case. As a result there are significant trade-related price (and therefore exchange rate) distortions.
- **The adjustment mechanism is not necessarily immediate** — During periods of market volatility, corporations may delay setting prices and budgeting their exchange rates. They may wait until they have a better idea of where appropriate levels should be to retain competitiveness and margin.
- **The price of goods may not be the most important exchange rate determinant** — A basic PPP assumption is that the relative pricing of goods is the main driver of exchange rates. However, since the liberalization of capital markets and the subsequent effect of speculation on exchange rates, this may no longer be the case.
- **The good or basket of goods may be slightly different in different countries** — The consistency of a good should not be taken for granted. The “same” good may vary between countries in terms of quality, cost, and speed to market.
- **Base-year effects** — There’s also the question of when to start PPP analysis. PPP analysis requires a base year to compare changes over time. Logic might suggest starting from the end of the Bretton Woods exchange rate system in the 1971–1973 period, yet this took place at a time of very high inflation, thus significantly distorting results.

(Sidenote: Alex here. A surprisingly effective and free tool for comparing PPP is *The Economist’s* “McParity” index. It uses the adjusted prices of big macs from around the world. [Link here.](#))

1.1.4 PPP and the Real Exchange Rate

1. The real exchange rate is the nominal exchange rate adjusted for inflation (price) differentials
 - a. If PPP holds over the long term, the real exchange rate should remain constant
 - b. Inflation differentials between two countries will be offset by an appropriate adjustment in the nominal exchange rate

2. Some final points:
 - a. PPP provides a useful medium-term to long-term perspective of currency valuation
 - b. If PPP holds, the real exchange rate remains stable over the long-term
 - c. However, there can be substantial short-term divergences from PPP
 - d. PPP is therefore most useful in currency forecasting for corporations, long-term investors, and also leveraged investors, but much less so for short-term traders

1.2 The Monetary Approach

1. According to classical theory, a country's price level is a function of the quantity of its money. However, according to PPP, exchange rates adjust to equalize prices of goods between countries. So if monetary factors determine prices, they must also play a part in determining exchange rates. The theoretical transition mechanism is:

- (i) Change in money supply → Change in price → Change in exchange rate
 (ii) Change in money supply → Change in interest rate → Change in exchange rate

- For example, a rising money supply that pushes prices up is likely due to relatively loose monetary policy from the central bank.
- Under the PPP law of one price, freely tradable goods must be the same price everywhere over time. Exchange rates must adjust to achieve that.
- This means that as prices in one country rise relative to prices for the same goods elsewhere, the currency must depreciate to restore equilibrium.
- There's often significant lag time between monetary changes and their effect on the exchange rate.
- This delay is where the idea of "sticky" prices comes from. In reality, instead of the theoretical transmission mechanism above, we get something like:

Change in money supply → Delayed price change → Delayed exchange rate change

- Rising money supply (of a currency) should eventually lead to depreciation. Supply will continue to increase as the currency depreciates until it's met with a rising money demand. This equilibrium is where the currency will stabilize and recover lost ground.

1.2.1 Mundell-Fleming

1. Suppose in an economy with high capital mobility, a central bank loosens its monetary policy by cutting interest rates. They cut rates because of weak growth and benign inflation.
 - a. Lowering interest rates reduces the incentive to hold interest-bearing securities. The reward isn't worth the risk. So on a relative basis, the incentive to hold money or cash increases.
 - b. This should lead to depreciation in the exchange rate so that the trade balance can revert to equilibrium.
 - c. Another way to say it: Lower interest rates cause capital outflows, which in turn cause depreciation in the exchange rate.
2. On the fiscal side, much depends on whether trade or capital flows dominate.
 - a. On the one hand, looser fiscal policy, either through tax cuts or spending increases, should increase domestic demand, which in turn should cause deterioration in the trade balance.
 - b. On the other hand, looser fiscal policy causes higher domestic interest rates, which in turn attracts capital inflows. If trade flows dominate, then the exchange rate should depreciate.
3. Conversely, tighter fiscal policy should, according to Mundell–Fleming, lead to weaker domestic demand.
 - a. On the trade flow side, this should result in reduced import demand, causing a positive swing in the trade balance.
 - b. On the capital flow side, tighter fiscal policy should lead to lower interest rates, which in turn lead to capital outflows.
 - c. If trade flows dominate, the exchange rate should appreciate, whereas if capital flows dominate, the exchange rate should depreciate.
4. In a world of perfect or at least high capital mobility, it is assumed that capital flows dominate over trade flows. Therefore, we can express the likely impact on exchange rates via specific combinations of monetary and fiscal policies through Table 1.2.

Table 1.2 The policy mix impact on exchange rates in an economy with high capital mobility

	Loose monetary policy	Tight monetary policy
Loose fiscal policy	Offsetting impact	Exchange rate appreciation
Tight fiscal policy	Exchange rate depreciation	Offsetting impact

Table 1.3 The policy mix impact on exchange rates in an economy with low capital mobility

	Loose monetary policy	Tight monetary policy
Loose fiscal policy	Exchange rate depreciation	Offsetting impact
Tight fiscal policy	Offsetting impact	Exchange rate appreciation

The assumption that a change in monetary policy leads directly and automatically to a parallel change in the exchange rate is flawed for the following reasons:

- There may be a delay in the transmission mechanism
- The initial exchange rate reaction may be the exact opposite of what standard models assume

Over the medium to long term, the Mundell–Fleming model of policy combinations is an invaluable guide to future exchange rate direction. In the short term there may be delays and distortions, which at least put off the anticipated results.

1.2.4 Two Legs but not Three

1. The final word on the Monetary Approach and the exchange rate impact from policy combinations concerns the idea from the Mundell–Fleming model that a central bank can in a world of high capital mobility target the exchange rate or the interest rate but not both. Another way of expressing this is that you can have two of the following but not all three:
 - a. A fixed exchange rate regime
 - b. Monetary policy independence
 - c. High capital mobility
2. The first assumes the targeting of the exchange rate, while the second assumes the targeting of inflation and interest rates.

1.3 THE INTEREST RATE APPROACH

1. The first principle involves the basic interest rate parity theory, which is that:
 - a. An exchange rate's forward % premium/discount = its interest rate differential

2. The traditional forward discount on the dollar–yen exchange rate should equal the interest rate differential between the two currencies.
 - a. This is seen as the equilibrium reflecting the relationship between the exchange rate and interest rates.
 - b. Because forwards are a traded instrument and thus subject to supply and demand, the forward premium or discount can vary briefly from this equilibrium, but should always revert to norm.
 - c. After all, if for argument's sake the forward premium/discount for some reason did not equal the interest rate differential between the two currencies an arbitrageur could in theory make risk-free profits by borrowing in one currency, investing in the securities of the other currency and simultaneously opening a forward contract in the exchange rate for the same period as the initial loan. This is called covered interest rate arbitrage.

(Sidenote: Alex here. Covered interest arbitrage or parity has broken down since the financial crises in 07'. The break has left many economists scratching their heads. Here's a good whitepaper from the BIS on the matter ([link here](#)). And also Alhambra Partners has done some decent presentations on the subject via Real Vision.)

1. Returning to the theory for now, interest rate parity theory states that the difference between a spot and forward exchange rate expressed as a percentage should equal the interest rate differential between the two currencies. Yet, we know from the PPP principle that exchange rates and inflation rates are linked. Can we not link these also with interest rates? Indeed we can, thanks to the seminal work of the economist Irving Fisher.
 - a. Thus, according to what has become known as the "Fisher effect:"
 - i. The difference in interest rates = the difference in expected inflation rates
2. Thus, we have gone from the difference between the spot and the forward exchange rate equating to the interest rate differential through the interest rate parity theory, which in turn equates to the difference in expected inflation rates through the Fisher effect. Yet, PPP tells us that absolute or relative price growth levels can be used to forecast future exchange rates.
3. Through PPP we can extrapolate this one stage further to suggest that:
 - a. The difference in expected inflation rates = the expected exchange rate change
 - i. Bringing all these together, we get:
 1. The difference in spot and forward rates = the difference in interest rates (Interest rate parity theory)
 2. The difference in interest rates = the difference in expected inflation rates (Fisher effect)

3. The difference in expected inflation rates = the expected change in spot exchange rate (Purchasing Power Parity)
4. Logically from this, one may conclude that the difference between the spot and forward rates expressed as a percentage should equal the expected change in the spot exchange rate. **This is known as the expectations theory of exchange rates.**
 - a. The difference in interest rates = the expected change in the spot exchange rate (International Fisher effect)

Summary: Over the long term, the interest rate parity theory is seen to work as enough market participants can be found to “discover” the opportunities available for covered interest rate arbitrage between currencies and interest rates, thus in the process eliminating such disparities. However, there are much longer lags than the theory might suggest is possible.

Here again, the issue of incentive must be a focus. **As noted earlier, it should behoove the theorists to know that the majority of currency market practitioners are currency interbank dealers and moreover that the main incentive for these to trade is directional gain rather than interest income.** Currency markets do focus on interest rate differentials for extended periods of time, but equally they focus on other factors, in many cases completely disregarding interest rates.

1.3.1 Real Interest Rate Differentials and Exchange Rates

1. Currency strategists do however use models comparing the real interest rate differential with either the nominal or the real exchange rate between two countries.
 - a. The logic behind this relates to both the international Fisher effect and to PPP, where on the one hand the difference in interest rates should, if not be exactly equal to an expected change in the spot exchange rate, at least be an important driver of it.
 - b. And nominal interest rate differentials are adjusted for inflation (i.e. domestic price growth) and thus relate to the exchange rate through the law of one price.

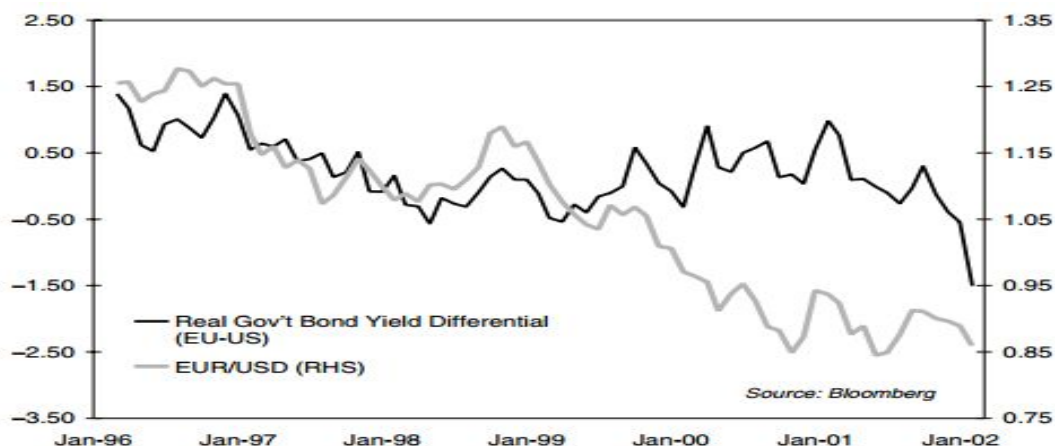


Figure 1.1 Euro-dollar exchange rate vs. 10-year bond yield differential

- The link or correlation between real interest rate differentials and the exchange rate appears to have grown exactly in line with the gradual move since the end of the Bretton Woods exchange rate system to liberalize capital flows globally.
- As barriers to capital movement have fallen, so the overall importance of capital flow has grown exponentially relative to that of trade flow.
- As capital flows have gained in importance, so their importance within overall currency market flows has grown and thus the correlation between the two increased.
- Thus, currency strategists across the market continue to track this relationship between real interest rate differentials and nominal exchange rates as one of many useful and important indicators of currency over- or undervaluation.

1.4 THE BALANCE OF PAYMENTS APPROACH

1. The core idea behind the Balance of Payments Approach is that changes in national income affect both the current and the capital account and through this cause a predictable reaction in the exchange rate in order to restore balance of payments equilibrium. The best way of looking at this is to examine the transmission mechanism from the change in national income through to the exchange rate reaction.
2. When considering the Balance of Payments Approach to exchange rates, it is good to keep in mind the classic accounting identity for economic adjustment:

$$S - I = Y - E = X - M$$

where:

S = Savings

I = Investment

Y = Income
E = Expenditure
X = Exports
M = Imports

Within economics, this is an unequivocal law which governs how economies adjust to changes in economic dynamics.

1.4.1 A Fixed Exchange Rate Regime

1. Under a fixed exchange rate regime where capital mobility is extremely limited, the focus is on the current account rather than the capital account.
 - a. The exchange rate cannot be the transmission mechanism for restoring balance of payments equilibrium since the exchange rate is fixed.
 - i. Hence, the monetary authority has the choice of either selling its foreign exchange reserves in the market to alleviate pressure on the exchange rate or more practically tightening monetary policy in order to dampen domestic demand, thus reducing import demand and restoring the balance of payments equilibrium.
2. The dynamic whereby a change in national income is transmitted within a fixed exchange rate regime through the current account balance is expressed in the following diagram:

Change in national income → Change in current account balance → Monetary reaction → Reversal of current account balance change → Balance of payments equilibrium restored

1.4.2 A Floating Exchange Rate Regime

1. Under a floating exchange rate regime, we have to consider the capital account as well as the current account.
 - a. Here, as national income rises, so import demand rises, in turn causing the current account balance to deteriorate.
 - b. In the case of the floating exchange rate regime, the exchange rate is able to be the transmission mechanism for restoring the balance of payments to equilibrium.
 - i. On the capital account side, a rise in national income, causing the current account balance to deteriorate, must be accompanied by a rise in real interest rates.
 - ii. The higher real interest rate will dampen import demand, which will in turn cause the current account balance deterioration to reverse.

- iii. As that happens, national income will fall back, causing real interest rates also to fall back.

Thus, the current account improvement reverses and real interest rates rebound. We can express this transmission mechanism from a change in national income through the balance of payments within a floating exchange rate regime with the following diagram:

Change in national income → Change in current account balance → Change in real interest rates → Change in capital flows → National income change reversed → Current account reversed → Capital flows reversed → Real interest rates reversed → Balance of payments equilibrium restored

1.4.4 REER and FEER

1. In line with the external balance approach, the Real Effective Exchange Rate (REER) is the trade-weighted exchange rate (NEER) adjusted for inflation.
 - a. The purpose of using REER is to try to gauge an exchange rate's over- or undervaluation relative to a given norm.
 2. Significant REER overvaluation relative to a given norm of 100 tends to produce a widening current account deficit or "external imbalance" in the jargon of economists.
 - a. In order to restore balance or equilibrium, there has logically to be a REER depreciation. This can be achieved either by a depreciation of the trade-weighted exchange rate — that is to say by a depreciation of the nominal exchange rate — or by a sharp decline in inflation.
 3. Significant REER overvaluation can last for substantial periods of time. In some cases it can take several years before an adjustment process takes place to eliminate such overvaluation.
 4. The lesson of REER is that it can be a useful tool for diagnosing over- or undervaluation and a consequent need for an adjustment to restore equilibrium — but what it cannot do is tell you when that will happen.
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1. Another way to estimate a real exchange rate's equilibrium is FEER, or Fundamental Equilibrium Exchange Rate.
 - a. FEER reflects the exchange rate value that is the result of a current account surplus or deficit that is in turn appropriate to the long-term structural capital inflow or outflow in the economy, assuming that the country does not have barriers to free trade and is also trying to pursue internal balance.
 - b. Assessing the appropriate level of long-term structural capital inflow or outflow requires a considerable degree of value judgement.

- c. Indeed, models based on the FEER concept have been widely used within the private sector for some time. However, it is to say that using such a type of exchange rate model puts a considerable degree of emphasis on the value judgement of the analyst concerned, thereby undermining the point of using a model in the first place.

1.4.5 Terms of Trade

1. Another important aspect of the external balance approach to exchange rate determination is the so-called “terms of trade”, which is the relationship between a country’s export and import prices. A country’s terms of trade can be an important determinant of its long-term equilibrium real exchange rate.
 - a. Rising export prices should be reflective of rising global demand for that country’s exports, both on an absolute basis and relative to domestic demand levels.
 - i. Consequently, one should assume that an improvement in the terms of trade should lead to an improvement in the current account balance, which in turn requires a real exchange rate appreciation to restore equilibrium.
 - ii. Equally, a deterioration in the terms of trade leads to a current account deterioration, which requires a real exchange rate depreciation to restore equilibrium. For the sake of clarity, we can express this transmission mechanism using the following simple diagram:

Change in terms of trade → Change in current account balance → Real exchange rate change to restore equilibrium

1.4.6 Productivity

1. Rising productivity growth causes increased supply of a good. Supply/demand dynamics require that increased supply relative to demand leads to a fall in price.
 - a. The principle of Purchasing Power Parity requires however that falling prices in one country relative to another lead to an offsetting exchange rate appreciation under the law of one price.
 - b. Thus higher productivity growth in tradable goods should lead to exchange rate appreciation to restore equilibrium to the current account.
2. Just as PPP is not a good short-term predictor of exchange rates, so productivity growth should not be used as a short-term trading model.
3. However, both are profoundly useful in predicting medium- to long-term exchange rate trends.

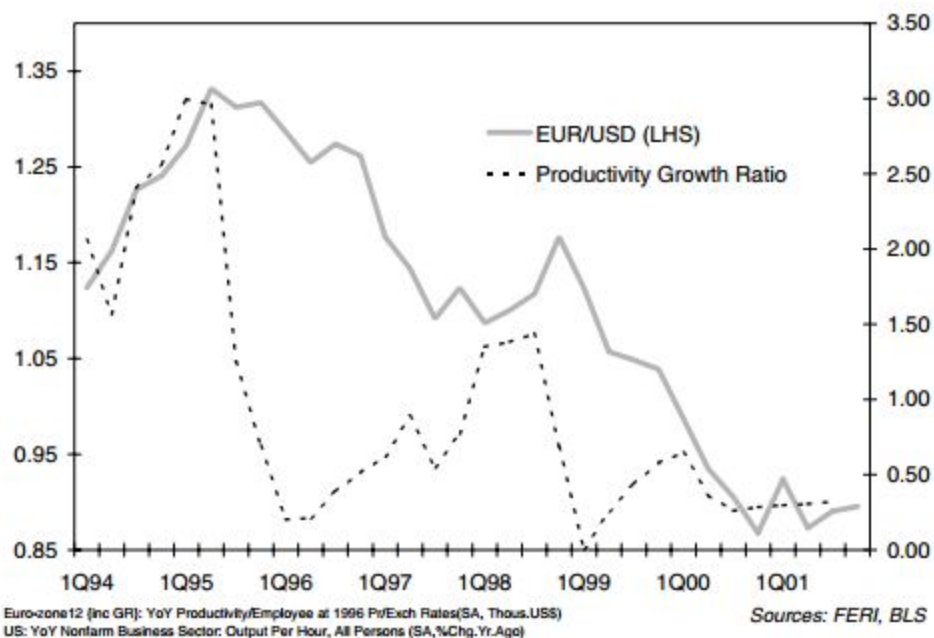


Figure 1.2 Euro-dollar exchange rate vs. relative productivity growth levels

1.5 THE PORTFOLIO BALANCE APPROACH

1. The Portfolio Balance Approach deals specifically with the relationship between the relative price of domestic and foreign bonds and the exchange rate.
 - a. A change in monetary and/or fiscal conditions will in turn lead to changes in the supply and demand for domestic currency bonds and the demand for foreign currency bonds, which will in turn trigger a reaction in the exchange rate between the two currencies.
2. On the monetary side, assume that a cut in interest rates by the central bank causes outflows from domestic interest rate-bearing securities into money/cash, as per the Monetary Approach we looked at earlier. If one assumes for the sake of this simple model that domestic bond supply is unchanged, demand for those bonds should be reduced because of the lower interest rate.
 - a. This effect should cause increased demand for the foreign currency bonds, which in turn should cause the domestic currency to depreciate against the foreign one. Equally, if one starts from the premise that the central bank raises interest rates, this should, according to this simple model, cause a domestic currency appreciation.
3. This Portfolio Balance Approach appears overly simplistic and it is. Indeed, it has been a very poor predictor of exchange rates, not least because it does not deal with the real-world realities of a fixed income fund manager who has to make asset allocation decisions.

1.6 SUMMARY

1. Building on this, going forward, it seems logical to assume that traditional exchange rate models should be modified to suit the modern structure of currency market flows.
 - a. More specifically, trade flows, which form the premise behind the PPP, Balance of Payments and External Balance Approaches, were once seen as the main driver of currency market overall flow.
 - i. However, nowadays, they make up only around 1–2% of the USD5.3 trillion in daily volume going through the currency market. Hence, as the overall importance of trade to total market flow has declined, so to a degree has the relevance of those exchange rate models that rely solely on shifts in trade flow patterns.
 - ii. Meanwhile, just as the pre-eminence of trade flows has declined, so the importance of portfolio flows has grown exponentially as barriers to capital have been lifted over the past two decades. The Portfolio Balance Approach is clearly an attempt to focus on asset markets and specifically the bond market as a driver of exchange rates, yet this model remains unsatisfactory as a predictor of exchange rates for the reasons given.

In order to try to get to a better answer of exchange rate movement over the short term, we have to define the main flow drivers of exchange rates:

- “Speculative” flow (without an underlying attached asset)
- Equity flow & Fixed income flow
- Direct investment flow
- Trade flow

❖ **By far, speculative flow is the main driver of exchange rates over the short term.**

Sections 2-4 will dive into the various ways to measure and track speculative flow as well as discuss Thomas’ integrated “Signal/Grid” approach to currency speculation.