In this essay I will undertake four investigations into the validity of Relative Purchasing Power Parity (RPPP). RPPP extends the idea of Purchasing Power Parity to national economies and looks to account for the influences of exchange rates and inflation rate differentials.

If RPPP holds then for some time period *Δt* the following equilibrium between exchange rates and inflation is observed:

*ΔS = πh - πf*

*S* = Spot exchange rate

*πh*= Inflation rate in home country

*πf* = Inflation rate in foreign currency

To calculate the above as percentages from our raw data I will use the following equation:

*(log(St) - log(St-1 )) \* 100 = ((log(Ph,t) - log(Ph,t-1)) - (log(Pf,t) - log(Pf,t-1))) \* 100*

*Ph,t* = Price in home country at time *t*

*Pf,t-1* = Price in foreign country at time *t-1*

I have gathered historic Consumer Price Index (CPI) and spot exchange rate data from FRED and will investigate the validity of RPPP under various economic situations. In order to analyse validity I will be using the notion of an RPPP score, this is calculated by re-arranging our first equation as follows:

*RPPP score* = *ΔS - (πh - πf)*

This gives us the following situations:

RPPP score ~= O Implies that RPPP equilibrium is holding.

RPPP score > 1 Implies that the home country has more purchasing power.

RPPP score < 1 Implies that the foreign country has more purchasing power.

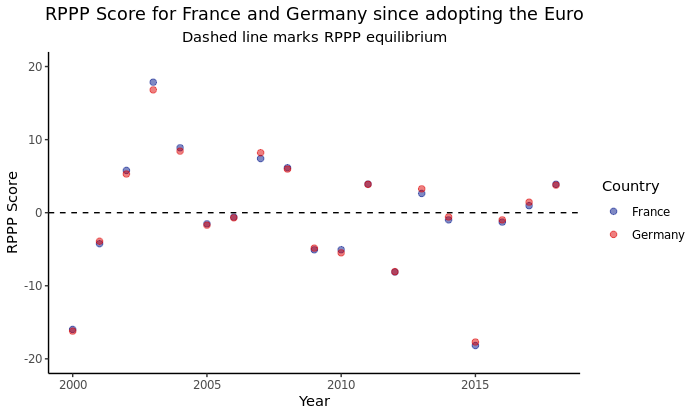
For the purposes of our investigations the home country will always be the USA, therefore the home currency is the US dollar and exchange rates are direct quotations. Both the CPI and spot rate data are annual averages and for investigations 1-3 *Δt* is one year.(ref my data)

Investigation 1: RPPP for the USD against Exchange Arrangement Currencies

xchange arrangement currencies such as the East Caribbean Dollar, the CFA Franc and the Euro present a conceptual barrier to the validity of RPPP. The issue comes from the fact that one exchange rate is used for comparison against several countries, each with their own inflation rates.

There are many influences upon the inflation rate of country some of which such as money supply and base interest rates, etc are directly controlled by the central bank and will apply universally to all countries within the currency. However, there are some influences such as NON-TRADEABLE economy will lead to some inter-country variations in inflation and purchasing power.

To compare this I have HAVE DA FOLLOWING LOVLELY GRAPH:



The above figure raises two interesting points. Firstly the RPPP scores of France and Germany mirror each other very closely suggesting our initial concerns around domestic factors creating divergence in RPPP do not appear to hold, at least not in this particular case.

The second point is around the scattering of RPPP scores and the fact that in only a handful of years the value even comes close to the equilibrium score of 0.

DO A STATISTICAL TEST

Investigation 2: RPPP for the USD against a pegged foreign currency

According to the IMF there are XX countries that officially engage in pegging, namely deliberately acting to maintain specific exchange rates with a target foreign currency. This presents an interesting challenge to RPPP.

If we presume that the attempts at pegging prove successful then *ΔS* is held very low, theoretically zero, therefore if RPPP is to be held then the inflation rates differential must also be approximately zero.

Counter to this argument is the fact that the exchange rate pegging methods such as quantitative easing and OTHER stuff often lead to increased inflation in the currency being supressed.

Does this inflation volatility prevent RPPP from occurring or does it serve as a mechanism through which the inflation rates are manipulated to account for the supressed dS?

To investigate this Figure 2 compares RPPP scores for the US dollar against the Chinese Yuan.



Once again I can see that only in handful of years does the RPPP score approach 0.

REPEAT THE STATS TEST.

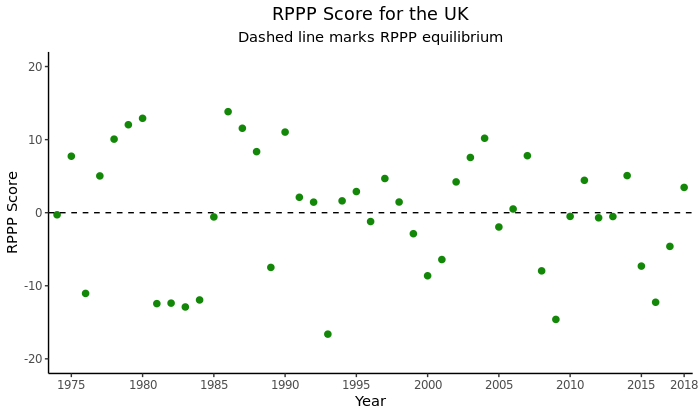
Two interesting points are

The smaller range of values

Majority of years a negative RPPP score is happening

Investigation 3 : RPPP for the USD against freely floating currency

Next I will compare the validity of RPPP the USA against the freely floating British pound.



REPEAT THE STATS TEST

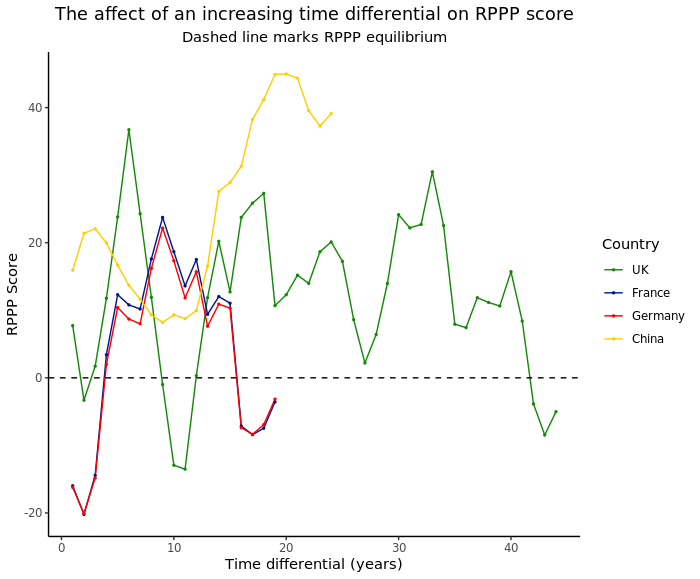
Range has gotten fatter.

RPPP validity still appears quite week.

Does RPPP validity increase with *Δt* ?

There are some theorise PEEEPS that RPPP is a slowly moving market force that can get lost on the volatility of shorter time frames. In order to test this theory I will re-calculate our RPPP scores by locking the t-1 date to the earliest date in the each of the countries datasets and calculating RPPP values across ever increasing time frames.

This is shown below in figure 4.



Should be asyptompic

Could be down to dodgy starting years, choose something

Conclusion

References

(FRED)

(Data, 2020) - A repository for the code written to undertake our analysis can be found at :  
<https://github.com/CptnCrumble/rpp>