# An Agent Based Approach to Short Term Currency Markets

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Through Principal Component Analysis, about 70% of variance can be explained by a handful of factors for 171 different cross currency returns based on 18 major currencies. Rolling windows of about nine months long beginning in April 2005 through present for Principal Component analysis have shown that these handful of factors do not remain constant throughout time. The graph below is a plot of the subspace angles between the five leading factors throughout different points in time.
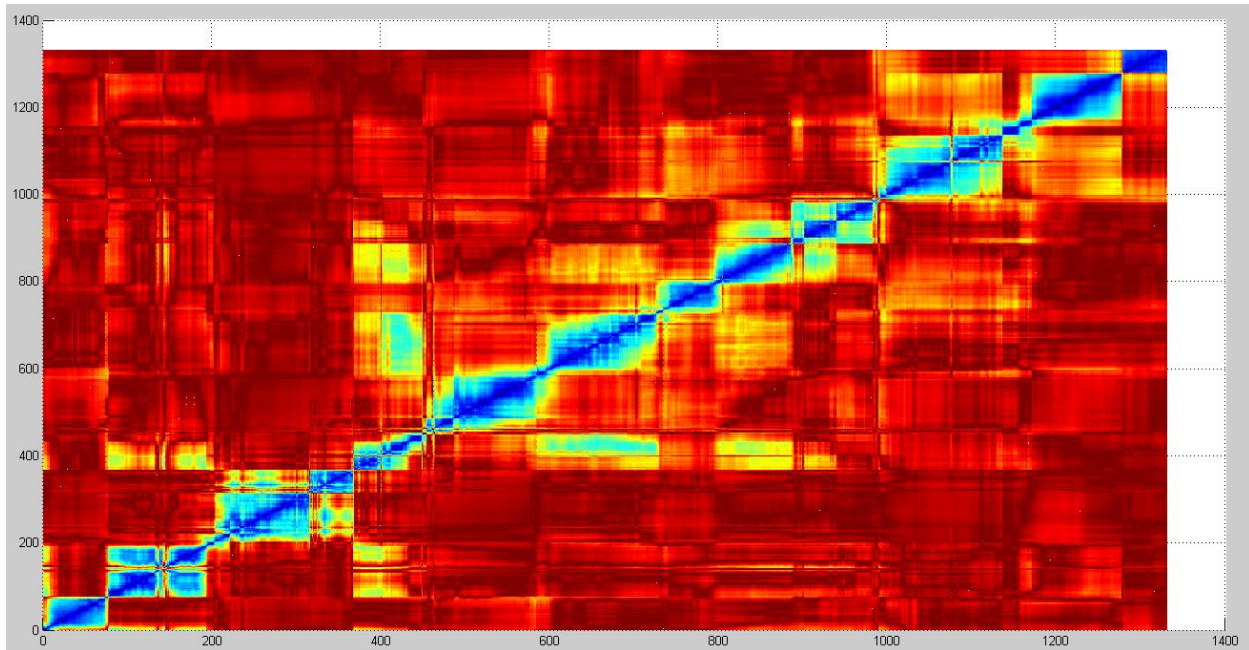


What can be inferred from this graph is that the top components that explain changes in currency markets shift through various regimes. These shifts in regime are event driven; new information changes what factors are relevant in the market at any given point in time. There is no hierarchal authority to determine what drives currency markets in the short to medium term. Academic theory that currently exists for determinants of foreign exchange rates (Purchasing Power Parity Approaches, Balance of Payments, Monetary, Asset Markets, etc.) do a poor job explaining movements in the short to medium term, and are often at odds with each other.

Agent based modeling may be incorporated into Foreign Exchange markets to shed light on short to medium term changes. Players in the currency market are the agents that decide which information affects exchange rates. Characteristics of these agents will affect how different kinds of information are interpreted, and may include for what intent the agent is conducting currency transactions (for hedging purposes, for payment of debts, for tourism), the average size and frequency of currency transactions, and the efficiency with which the agent processes new information. Shifts in regimes for the leading factors do not occur instantaneously-the shift to a new stable subspace takes often takes a week or longer. Agent based modeling can be applied to current for earlier identification of shifts in factor regimes.