The Mundell-Fleming Model Revisited

- Surajit Das

1. Introduction:
Incorporating the possibility of capital flows in an open economy set-up, an extension of the closed economy IS-LM analysis (Hicks 1937) was introduced in the literature in early 1960s by Marcus Fleming (1962) and Robert Mundell (1963). The Mundell-Fleming (M-F now onwards) model is one of the most influential macroeconomic models in the context of an open economy with capital flows whose presence is there right from school text books to the highest level policy making circles. This model is so celebrated because of its strengths lying in the following facts. Firstly, it does not require the assumption of full employment or, in other words, it is perfectly compatible with the Keynesian assumption of down-ward rigidity of money wages. Secondly, it is one of the pioneering models recognising capital flows separately in the balance of payment of any country. Thirdly, it is a simple comparative static equilibrium framework which is easily comprehensible. And most importantly, it deals with the basic macroeconomic aggregates of commodity market, money market and the balance of payment including capital flows in order to determine the aggregate level of activity and employment (given technology/ labour productivity).

The next section briefly reviews the selected literature. Section 3 deals with the available empirical evidences. We propose our alternative model in section 4 which is followed by a concluding section (5).

2. Selected Literature:
The essential idea behind the M-F doctrine was to link the money and the monetary policy with the real economic activities in the context of an open economy with capital mobility. The primary focus on the money supply (and not even on the interest rate as an integral part of the monetary policy) made the foreign exchange market secondary in M-F model for which the monetary stances change time to time in reality. As Mundell himself said, later in 2001 while discussing the history of the M-F model (Mundell 2001), that this doctrine has been developed and evolved mainly

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within IMF and also that Mundell himself was greatly influenced by Meade’s work (1951). However, the monetary authority tries to influence the domestic interest rate as well as the exchange rate more directly rather than controlling the aggregate money supply in the economy per se.

The M-F model has two separate analyses - one is under fixed and another is under flexible exchange rate assumptions. The assumption of fixed or pegged exchange rate entails that there is little scope for monetary policy but, that the expansionary fiscal policy may work in enhancing growth of level of activities and employment. On the other hand, under the assumption of flexible exchange rate, if there is perfect capital mobility, a monetary expansion leads to an increase in aggregate demand while a fiscal or export expansion has no effect at all on the level of output and employment even under a demand constrained situation. Expansionary fiscal policies would not be effective because the entire additional demand would necessarily be leaked by an equivalent import surplus.\(^1\)

The crux of the argument put forward by M-F model (or popularly known as the IS-LM-BP model) in the context of floating exchange rate and ‘perfect’ capital mobility is as follows. In the context of an open economy, the commodity market equilibrium equation or the IS curve is a negatively sloped schedule in the rate of interest-income (r-Y) plane. The aggregate supply of money (Ms) is assumed to be determined exogenously. Now if the total demand for money be the sum of transaction demand for money (L\(_1\)) and the speculative demand for money (L\(_2\)), then the equation for money market equilibrium or equation for LM curve be M\(_S\) = L\(_1\)(Y) + L\(_2\)(r) and it is a positively sloped curve in the r-Y plane. The BP schedule shows those combinations of real income and real interest rates that gives equilibrium in the balance of payments for a given exchange rate. The BP schedule is again a positively sloped schedule in r-Y plane. Mundell-Fleming assumption under ‘perfect’ capital mobility is that if the domestic rate of interest is higher than the world rate of interest then unlimited capital inflow will take place and vice-versa. And ultimately domestic interest rates of the concerned country cannot be different (exchange rate expectations and country risks

\(^1\)”But this (increased government spending financed by borrowing) would increase the demand for money, raise interest rates, attract a capital inflow, and appreciate the exchange rate, which in turn would have a depressing effect on income. In fact, therefore the negative effect on income of exchange rate appreciation has to offset exactly the positive multiplier effect on income of the original increase in government spending. Income cannot change unless the money supply or interest rates change, ... the change in government spending is equal to the import surplus.” – R. Mundell (1963)
are ignored for the time being for simplicity) from what prevails internationally. The model in its simplest terms can be described as:

\[ r = r^* \quad \ldots \quad \ldots \quad (A) \]

\[ M_s = L(Y, r) \quad \ldots \quad \ldots \quad (B) \]

and

\[ Y = C(Y - t \cdot Y) + I(r, Y) + G + NX(Y, e) \quad \ldots \quad \ldots \quad (C) \]

where \( r \) is the domestic rate of interest, \( r^* \) is the prevailing world rate of interest, \( e \) is the exchange rate, \( NX \) is the net exports, \( t \) is the given tax rate (for simplicity without loss of generality) and the other symbols have their usual meanings. \( r = r^* \) because in equilibrium it must necessarily hold and we are concerned only with equilibria. These three equations determine the values of three unknowns viz. \( r \), \( Y \) and \( e \) (if \( G \) is given).

In case of fixed exchange rate \( e \) is given and therefore it is money supply that becomes an unknown or endogenously determined within the system.

There have been some extensions of Mundell-Fleming model. Michael Mussa (1976) and Rudiger Dornbusch (1976) came out with two different papers, which were extensions of M-F Model incorporating expectations. As has been summarised by Michael Parkin (1976), Mussa’s paper talked about four basic propositions as follows. First, an exchange rate is a relative price of two national monies and is determined by the conditions for stock equilibrium in the markets for national monies and not in flow markets for goods. Secondly, one of the factors which influence the demand for money and, therefore, the exchange rate, is the expected future exchange rate. That expectation is formed rationally and depends, therefore, on expected future monetary policy. Thirdly, the exchange rate is not purely a monetary phenomenon. Real factors which affect the demand for money also affect the exchange rate. Fourthly, the problem of policy conflict which exists under fixed rates is modified rather than eliminated by floating rates. Parkin (1976) commented that the modern post-Keynesian view of the role of stock equilibrium in the money market reverses the two links in the Fisher causation story. The proximate determinants of the price level are now seen as the price expectations and assessments of excess demands by price setting firms (and households) in individual markets for goods and services (and factors of production). Given a price level thus determined, stock equilibrium in the money market arises from interest rate and real output adjustments. In other words, it is interest rates and real aggregate demand which are proximately determined by the
equality of the supply of and demand for money. Now if the exchange rates are, by
definition, relative prices of national money, then it does not follow the central
proposition of Mussa that the proximate determinants of exchange rates are the
demand for and the supplies of various national monies.

On the other hand, Dornbusch’s model is based on rational expectation and perfect
foresight – more popular as the overshooting model. Later in 2002, Kenneth Rogoff
(2002) made another extension to it. Two relationships lie at the heart of the
overshooting result. The first is the "uncovered interest parity" condition. It says that
the home interest rate on bonds, i, must equal the foreign interest rate i*, plus the
expected rate of depreciation of the exchange rate, e (i.e. e_{t+1} - e_t), where e is the
logarithm of the exchange rate (home currency price of foreign currency). The second
core equation of the Dorbusch model is the money demand equation: Mt - Pt = -\eta i_{t+1} +
\phi Y_t, where M is the money supply, P is the domestic price level, and Y is domestic
output, all in logarithms; \eta & \phi are positive parameters. Higher interest rates raise the
opportunity cost of holding money, and thereby lower the demand for money.
Conversely, an increase in output raises the transactions demand for money. Finally,
the demand for money is proportional to the price level for given Y and i. Now if for a
monetary shock, the money supply M rises relative to domestic price level P, the
interest rate i must fall for any given level of Y. If i falls relative to i*, then foreign
currency outflow takes place and the long-run impact of the money supply shock must
be a proportionate depreciation in the exchange rate. The initial depreciation of the
exchange rate must, on impact, be larger than the long-run depreciation. This initial
excess depreciation leaves room for the ensuing appreciation needed to
simultaneously clear the bond and money markets. The exchange rate must
overshoot\(^2\). But Y is assumed to be given because of underlying full employment
assumption. However, the original formulation of M-F model does not require this
assumption at all.

Patnaik & Rawal (2005) argued “It is of course true that in a world with global
mobility of finance the rates of interest (a proxy for the spectrum of returns) must be
the same in all countries (net of risk-premia); but when the rates of interest are equal
in all countries, it is not the case that capital would flow into each country exactly to
match its current account deficit. It would have an autonomy in its global pattern of

\(^2\) See, Obsfield, M & Kenneth Rogoff (1996) for the elaboration about the mechanism.
flows (which can of course be sought to be explained in terms of ‘expected returns’
but such an explanation would border on a tautology), the macroeconomic
consequences of which were not investigated by Mundell and Fleming whose theory
in effect precludes autonomous financial flows."

In today’s world nobody can deny the fact that finance capital is highly mobile across
countries and it is being more and more dynamic day by day with the strengthening of
share markets, development of information technology and domestic policies of fuller
capital account convertibility, various tax concessions given to foreign investors etc.
But, particularly in the context of developing countries, the assumption of perfectly
elastic capital inflow is unrealistic. Rather, it would be more realistic to assume that a
given amount of capital (say k) becomes available to the country on the capital
account during the single period under discussion. The destination and direction of
international finance capital flows depend upon its profit opportunity net of perceived
or expected risks. Now, this profit opportunity has very little (almost nothing) to do
with the domestic interest rate of a particular economy in today’s context. It is
primarily the possibilities of capital gains based on various kinds of expectations
(investors’ confidence building spirals) and openness of the economy in terms of free
in/out flows of finance capital, which attracts the foreign institutional investments
(FIIs), which constitute a significantly large proportion of total net foreign capital
flows. Apart from FIIs, other kinds of foreign investments or disinvestments are also
dependent on profit opportunities, which are not really directly related to the rate of
interest differential (vis-à-vis any given international interest rate like FED rate or
LIBOR etc.) alone. In other words, the rate of interest is not at all a good proxy for the
spectrum of returns expected by the international finance capital.

It is true that if the domestic interest rate is too high and the cost of credit is
substantially lower elsewhere, then the domestic entrepreneurs may choose to borrow
from abroad. It is also true that if the domestic interest is too low as compared to the
internationally prevailing rate (FED rate or LIBOR) then there is a perceived risk of
capital flight. However, the point is that the net foreign capital inflow in a particular
economy and in a particular period of time should more realistically be assumed to be
exogenously given rather than assuming it to be solely dependent on the domestic
interest rate or interest rate differential or interest rate differential net of exchange rate
fluctuation etc. Interest differential may be one of the factors explaining a part of the
aggregate capital flow given other things equal but it is certainly not the dominant explanatory variable of the international financial flows in today’s World. In the next section we would elaborate this point with the help of available empirical evidences. In such a case, in addition to the three equations there has to be a fourth one for the balance of payment equilibrium:

\[ NX(Y, e) = -k \cdot e \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (D) \]

Now, since ‘k’ is given, the system is now over determined and the only way that equilibrium can exist if the money supply happens to be endogenous. Therefore, even in a world with flexible exchange rates, equilibrium in the foreign market can exist only if money supply ceases to be exogenous. Following post-Keynesian concept of endogenous money supply, the endogeneity does not quite depend upon the degree of exchange rate flexibility as is claimed by the M-F theorization.

3. Empirical Evidences:

The M-F doctrine makes the assumption that the interest rate differential net of risk of (expected) exchange rate fluctuation of a particular country solely causes net (in/out) flows of foreign capital. In Indian case, for example, we have witnessed that the net foreign capital inflows have dramatically increased particularly since 2003-04 onwards, which have resulted in a phenomenal increase in the foreign exchange reserve of the order 320 billion US$ (almost 30% of India’s GDP) by 2007-08 from less than 60 billion US$ during 1999-2000. But, interest rate has not increased at all during this period. Rather, the real interest differential of India with USA has come down quite steadily but the annual net foreign capital flow was surging up from virtually zero in 1999-2000 to over 43 billion US$ during 2007-08. As a result of this huge net inflow, way above the current account deficit, the foreign exchange reserves have piled up and the exchange rate has appreciated to less than Rs.40 per US$ despite various government interventions in foreign exchange market through sterilization, market stabilization schemes and other mechanisms. However, during crisis of 2008-09, the exchange rate depreciated to more than Rs.50 per US$ due to capital flight and then again there was capital inflow and exchange rate appreciation in the recovery phase.

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3 Borrowed from Patnaik, Prabhat (2001).
Clearly, the interest differential cannot really explain the sudden surge in inflow of foreign investment in recent past in India. This capital flow has taken place mainly in the form of portfolio investment although foreign direct investment (may be in the form of mergers and acquisitions or otherwise) has also increased since 2000-01. During 2003 to 2007, the net portfolio investment (NPI) has been almost double of the net foreign direct investment (FDI) in India. On the other hand, we find an extremely closed relation between the BSE-SENSEX and aggregate net foreign investment. During 2008, we have witnessed capital flight before during and after the financial crisis in the West followed by a recovery in the recent past. The BSE-SENSEX also moved accordingly.

The direction of flows of ever increasing international pool of finance capital can not be seen in isolation only from one country’s point of view. How this pool gets distributed among countries and in which proportion they fly away from various economies needs to be discussed. It is also important to distinguish between the flow of FDI and that of NPI. If we look at the worldwide flow of FDI during 2003-2007, that is the period when India witnessed maximum net foreign capital inflow, we see that the top 20 countries have received, on an average, more than 70% of entire FDI available for all 170 countries (for which data is available). China alone has received 34% of net FDI of what was available for these top 20 countries. India has been in 8th position with 3.33% of net FDI of top 20 countries. As far as the top 20 countries with net outflow of FDI during 2003 to 2007 are concerned, they account for almost 100% of entire net outflow. The US tops with 16.7%, followed by Euro countries and Japan (see Table 1). China is getting 24% of World’s FDI and the developed World is facing net outflow is the recent development in shift of manufacturing production base which everybody is talking about.

The data source is International Financial Statistics (IFS) 2009 provided by the International Monetary Fund (IMF). For Indian data on trade deficit, exchange rate (Rs./US$), international price of oil and petroleum product of Indian basket, and domestic GDP at current market price, the source is Handbook of Statistics on Indian Economy, 2009 provided by the Reserve Bank of India (RBI), Government of India.
Table 1: Top 20 Countries in Terms of FDI In/Outflow During 2003 to 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Net FDI Inflow (In US Million $)</th>
<th>% of Top 20</th>
<th>Net FDI Outflow (In US Million $)</th>
<th>% of Top 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>China, P.R.: Mainland</td>
<td>69307</td>
<td>34.06</td>
<td>United States</td>
<td>-54936</td>
</tr>
<tr>
<td>Mexico</td>
<td>16612</td>
<td>8.17</td>
<td>Spain</td>
<td>-39422</td>
</tr>
<tr>
<td>Poland</td>
<td>10340</td>
<td>5.08</td>
<td>Japan</td>
<td>-39232</td>
</tr>
<tr>
<td>Turkey</td>
<td>10276</td>
<td>5.05</td>
<td>Germany</td>
<td>-38396</td>
</tr>
<tr>
<td>Singapore</td>
<td>9864</td>
<td>4.85</td>
<td>France</td>
<td>-34982</td>
</tr>
<tr>
<td>Brazil</td>
<td>9847</td>
<td>4.84</td>
<td>Switzerland</td>
<td>-23859</td>
</tr>
<tr>
<td>Romania</td>
<td>7076</td>
<td>3.48</td>
<td>Netherlands</td>
<td>-18397</td>
</tr>
<tr>
<td>India</td>
<td>6780</td>
<td>3.33</td>
<td>Italy</td>
<td>-14304</td>
</tr>
<tr>
<td>Thailand</td>
<td>6652</td>
<td>3.27</td>
<td>Luxembourg</td>
<td>-14266</td>
</tr>
<tr>
<td>Belgium</td>
<td>6610</td>
<td>3.25</td>
<td>Ireland</td>
<td>-13724</td>
</tr>
<tr>
<td>Australia</td>
<td>6504</td>
<td>3.20</td>
<td>Sweden</td>
<td>-10987</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>5873</td>
<td>2.89</td>
<td>Norway</td>
<td>-9017</td>
</tr>
<tr>
<td>Chile</td>
<td>5644</td>
<td>2.77</td>
<td>Kuwait</td>
<td>-4827</td>
</tr>
<tr>
<td>Egypt</td>
<td>5480</td>
<td>2.69</td>
<td>Iceland</td>
<td>-3250</td>
</tr>
<tr>
<td>Ukraine</td>
<td>5122</td>
<td>2.52</td>
<td>Denmark</td>
<td>-3158</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>4997</td>
<td>2.46</td>
<td>Korea</td>
<td>-2305</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>4675</td>
<td>2.30</td>
<td>Austria</td>
<td>-1711</td>
</tr>
<tr>
<td>Colombia</td>
<td>4588</td>
<td>2.25</td>
<td>Saudi Arabia</td>
<td>-1573</td>
</tr>
<tr>
<td>Canada</td>
<td>3799</td>
<td>1.87</td>
<td>China, P.R.: Hong Kong</td>
<td>-762</td>
</tr>
<tr>
<td>Finland</td>
<td>3411</td>
<td>1.68</td>
<td>Venezuela, Rep. Bol.</td>
<td>-247</td>
</tr>
</tbody>
</table>


Similarly, if we look at the worldwide flows of portfolio capital, we see that, on an average, the top 20 countries receive 98% of the entire NPI availability for 150 countries (for which data is available) during 2003 to 2007. Again, the top 20 countries facing an outflow of NPI account for 96% of all outflows. USA alone attracts 60% of NPI, and India was in 10th position with 1.25% of NPI among top 20 countries during 2003-2007. Countries which were experiencing portfolio capital outflow are France, Saudi Arabia, Switzerland, Norway, Chinese province of Hong Kong, Canada, Belgium etc. Apart from US, countries which have experienced significant net portfolio capital inflow are Spain, Luxemburg, UK, Germany, Italy, Australia, Japan, Greece etc. Net FDI inflow in all countries receiving positive FDI is just one fourth of NPI on an average during 2003-07.
Table 2: Top 20 Countries Vis-à-vis Net In/Outflow of Portfolio Capital 2003-07

<table>
<thead>
<tr>
<th>Country</th>
<th>NPI Inflow (In US Million $)</th>
<th>% of Top 20</th>
<th>NPI Outflow (In US Million $)</th>
<th>% of Top 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>633996</td>
<td>59.79</td>
<td>-66868</td>
<td>18.84</td>
</tr>
<tr>
<td>Spain</td>
<td>91974</td>
<td>8.67</td>
<td>-54621</td>
<td>15.39</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>65933</td>
<td>6.22</td>
<td>-36419</td>
<td>10.26</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>50036</td>
<td>4.72</td>
<td>-27827</td>
<td>7.84</td>
</tr>
<tr>
<td>Germany</td>
<td>44486</td>
<td>4.20</td>
<td>-26849</td>
<td>7.57</td>
</tr>
<tr>
<td>Italy</td>
<td>34082</td>
<td>3.21</td>
<td>-25935</td>
<td>7.31</td>
</tr>
<tr>
<td>Australia</td>
<td>27648</td>
<td>2.61</td>
<td>-25520</td>
<td>7.19</td>
</tr>
<tr>
<td>Japan</td>
<td>23044</td>
<td>2.17</td>
<td>-19280</td>
<td>5.43</td>
</tr>
<tr>
<td>Greece</td>
<td>14701</td>
<td>1.39</td>
<td>-13452</td>
<td>3.79</td>
</tr>
<tr>
<td>India</td>
<td>13269</td>
<td>1.25</td>
<td>-9206</td>
<td>2.59</td>
</tr>
<tr>
<td>Brazil</td>
<td>12681</td>
<td>1.20</td>
<td>-8867</td>
<td>2.50</td>
</tr>
<tr>
<td>South Africa</td>
<td>8627</td>
<td>0.81</td>
<td>-8604</td>
<td>2.42</td>
</tr>
<tr>
<td>Mexico</td>
<td>7008</td>
<td>0.66</td>
<td>-6925</td>
<td>1.95</td>
</tr>
<tr>
<td>Austria</td>
<td>6602</td>
<td>0.62</td>
<td>-5584</td>
<td>1.57</td>
</tr>
<tr>
<td>Turkey</td>
<td>6403</td>
<td>0.60</td>
<td>-4540</td>
<td>1.28</td>
</tr>
<tr>
<td>Iceland</td>
<td>5373</td>
<td>0.51</td>
<td>-3758</td>
<td>1.06</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4130</td>
<td>0.39</td>
<td>-3330</td>
<td>0.94</td>
</tr>
<tr>
<td>Hungary</td>
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<td>0.86</td>
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<td>New Zealand</td>
<td>3432</td>
<td>0.32</td>
<td>-2583</td>
<td>0.73</td>
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<tr>
<td>Poland</td>
<td>3234</td>
<td>0.31</td>
<td>-1638</td>
<td>0.46</td>
</tr>
</tbody>
</table>


Now the crucial question is whether these flows of FDI and NPI are significantly dependent on the average interest rates of the respective countries or not. We have calculated some cross sectional correlation coefficients between proportion of capital in/outflows and the average interest rates or average interest rates net of exchange rate fluctuations and their t-values and the respective probabilities of t-statistics (Table 4). We have listed the average interest rate, exchange rate fluctuation and the interest rate net of exchange rate fluctuation of 48 countries (in alphabetical order) comprising of the top 20 countries with respect to either FDI in/outflows or NPI in/outflows during 2003 to 2007.
### Table 3: Interest Rate & Exchange Rate Fluctuation of 48 Countries 2003-07

<table>
<thead>
<tr>
<th>Country</th>
<th>Interest Rate %</th>
<th>Exchange Rate (%)</th>
<th>Net Interest Rate %</th>
<th>Country</th>
<th>Interest Rate %</th>
<th>Exchange Rate (%)</th>
<th>Net Interest Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>193.15</td>
<td>-7.98</td>
<td>1.17</td>
<td>Japan</td>
<td>176.76</td>
<td>-1.12</td>
<td>0.65</td>
</tr>
<tr>
<td>Austria</td>
<td>176.64</td>
<td>-7.00</td>
<td>0.64</td>
<td>Kazakhstan</td>
<td>184.40</td>
<td>-4.34</td>
<td>4.06</td>
</tr>
<tr>
<td>Bahrain, Kingdom of</td>
<td>8.14</td>
<td>0.00</td>
<td>8.14</td>
<td>Korea</td>
<td>6.05</td>
<td>-5.73</td>
<td>0.32</td>
</tr>
<tr>
<td>Belgium</td>
<td>7.57</td>
<td>-7.00</td>
<td>0.56</td>
<td>Kuwait</td>
<td>7.14</td>
<td>-1.36</td>
<td>5.78</td>
</tr>
<tr>
<td>Brazil</td>
<td>54.38</td>
<td>-7.46</td>
<td>46.93</td>
<td>Luxembourg</td>
<td>3.94</td>
<td>-7.00</td>
<td>-3.07</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>8.99</td>
<td>-7.02</td>
<td>1.97</td>
<td>Malta</td>
<td>5.71</td>
<td>-6.18</td>
<td>-0.46</td>
</tr>
<tr>
<td>Canada</td>
<td>5.00</td>
<td>-7.36</td>
<td>-2.36</td>
<td>Mexico</td>
<td>7.85</td>
<td>2.63</td>
<td>10.48</td>
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<tr>
<td>Chile</td>
<td>6.93</td>
<td>-5.28</td>
<td>1.65</td>
<td>Netherlands</td>
<td>7.95</td>
<td>-7.00</td>
<td>0.95</td>
</tr>
<tr>
<td>China, P.R.: Mainland</td>
<td>6.01</td>
<td>-1.66</td>
<td>4.35</td>
<td>New Zealand</td>
<td>11.36</td>
<td>-8.36</td>
<td>3.00</td>
</tr>
<tr>
<td>China, P.R.: Hong Kong</td>
<td>6.45</td>
<td>0.00</td>
<td>6.45</td>
<td>Norway</td>
<td>4.87</td>
<td>-5.92</td>
<td>-1.05</td>
</tr>
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<td>-3.14</td>
<td>11.48</td>
<td>Poland</td>
<td>10.11</td>
<td>-7.40</td>
<td>2.70</td>
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<td>-9.08</td>
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<td>Denmark</td>
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<td>-1.06</td>
<td>Saudi Arabia</td>
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<td>6.00</td>
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<tr>
<td>Egypt</td>
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<td>7.09</td>
<td>20.12</td>
<td>Singapore</td>
<td>5.31</td>
<td>-3.34</td>
<td>1.97</td>
</tr>
<tr>
<td>Finland</td>
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<td>-7.00</td>
<td>1.61</td>
<td>South Africa</td>
<td>12.24</td>
<td>-6.76</td>
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<tr>
<td>France</td>
<td>6.60</td>
<td>-7.00</td>
<td>-0.40</td>
<td>Spain</td>
<td>8.57</td>
<td>-7.00</td>
<td>1.56</td>
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<tr>
<td>Germany</td>
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<td>-7.00</td>
<td>2.18</td>
<td>Sweden</td>
<td>4.44</td>
<td>-6.81</td>
<td>-2.38</td>
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<tr>
<td>Greece</td>
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<td>-7.00</td>
<td>6.03</td>
<td>Switzerland</td>
<td>3.15</td>
<td>-4.96</td>
<td>-1.81</td>
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<td>Hungary</td>
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<td>Thailand</td>
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<td>-4.23</td>
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<td>Iceland</td>
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<td>-3.11</td>
<td>8.35</td>
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<td>16.11</td>
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<td>-7.00</td>
<td>1.96</td>
<td>United States</td>
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<td>0.00</td>
<td>6.13</td>
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<tr>
<td>Italy</td>
<td>10.78</td>
<td>-7.00</td>
<td>3.78</td>
<td>Venezuela, Rep. Bol.</td>
<td>18.62</td>
<td>13.93</td>
<td>32.55</td>
</tr>
</tbody>
</table>

**Source:** Calculated from International Financial Statistics, IMF, 2009.

Another interesting observation is that the 32 countries are common in the list of 40 countries of FDI (in/outflow) and in the list of 40 countries of NPI (in/outflow). It is important to note here that countries like USA, Japan, Spain, Germany, Italy, Luxembourg etc. are facing huge net FDI outflow during 2003-07 whereas, at the same time they are experiencing large NPI inflow. Again, countries like China, Belgium, Finland, Chile, Kazakhstan, Singapore etc. are experiencing NPI outflow but receiving huge FDI inflow at the same time. Therefore, it is not necessary at all that both the flows would take place in the same direction depending on their net interest rate differentials.
<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable</th>
<th>Corr Coeff.</th>
<th>P(t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average net FDI outflow of a particular country as % of average net FDI outflow of 20 countries during 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>(-)0.27</td>
<td>0.24</td>
</tr>
<tr>
<td>Average net FDI outflow of a particular country as % of average net FDI outflow of top 20 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>(-)0.24</td>
<td>0.31</td>
</tr>
<tr>
<td>Average net FDI inflow of a particular country as % of average net FDI inflow of top 20 countries during 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>(-)0.07</td>
<td>0.75</td>
</tr>
<tr>
<td>Average net FDI inflow of a particular country as % of average net FDI inflow of top 20 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>0.00</td>
<td>0.99</td>
</tr>
<tr>
<td>Average net FDI in/outflow of a particular country as % of average net FDI in/outflow of top 40 countries during 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>0.18</td>
<td>0.28</td>
</tr>
<tr>
<td>Average net FDI in/outflow of a particular country as % of average net FDI in/outflow of top 40 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Average NPI outflow of a particular country as % of average NPI outflow of top 20 countries during 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>(-)0.32</td>
<td>0.17</td>
</tr>
<tr>
<td>Average NPI outflow of a particular country as % of average NPI outflow of top 20 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>(-)0.06</td>
<td>0.79</td>
</tr>
<tr>
<td>Average NPI inflow of a particular country as % of average NPI inflow of top 20 countries during 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>(-)0.18</td>
<td>0.45</td>
</tr>
<tr>
<td>Average NPI inflow of a particular country as % of average NPI inflow of top 20 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>(-)0.09</td>
<td>0.72</td>
</tr>
<tr>
<td>Average NPI in/outflow of a particular country as % of average NPI in/outflow of top 40 countries 2003-07</td>
<td>Average interest rate of respective countries during 2003-07</td>
<td>0.04</td>
<td>0.81</td>
</tr>
<tr>
<td>Average NPI in/outflow of a particular country as % of average NPI in/outflow of top 40 countries during 2003-07</td>
<td>Average interest rate net of average exchange rate fluctuation of respective countries during 2003-07</td>
<td>0.09</td>
<td>0.57</td>
</tr>
</tbody>
</table>

**Source:** Calculated from International Financial Statistics, IMF, 2009.
Clearly, the above empirical evidence suggests that there is insignificant correlation between FDI or NPI flows and the interest rates or that net of exchange rate fluctuations. However, external commercial borrowings may be related to the interest rate differential. But, these flows of FDI and NPI dominate the capital account and that in turn dominates the current account or the trade balance in countries with huge capital flows. The above mentioned empirical evidences substantiate the proposition that the direction origin and destination of international flows of finance capital are not solely determined by the interest rate differential for sure. Other factors dominate. In that sense it is exogenous from any single country’s point of view. The so called ‘investment friendly environment’, government guarantees like ‘full capital account convertibility and tax concession on capital gains for the foreign investors in the share markets, easy mobility of finance capital due to development of information technology and internet banking etc. are anyway out of the scope of the M-F framework. Even if, the interest parity is maintained all over the World after adjustments for various country risks and exchange rate fluctuations in forward market, then also the finance capital would move in search of profit. This expected rate of profit has very little to do with the domestic interest rates.

However, these flows of finance capital affects the exchange rate significantly, which in turn affects the trade deficit. For example, in Indian case, the exchange rate fluctuation has very strong and significant effect on the trade deficit and in turn on the aggregate level of activity. If the exchange rate appreciates then historically the trade deficit increases at least in Indian case and dampens the level of activity and employment. If we regress the logarithm of trade deficit of India with respect to logarithm of Indian exchange rate vis-à-vis US dollar (Rs./US$), logarithm of India’s GDP at current market price and logarithm of the international price of Indian basket of oil and petroleum products, we get a negative significant relationship with the exchange rate with partial elasticity of 2.4 during the period 1977-78 to 2007-08. As expected, the trade deficit is a positive function of domestic GDP (as import demand rises with GDP) and a positive function of international price of oil and petro-products of the average Indian basket (as it inflates the import bill given relatively inelastic demand for oil). The model is fairly good fit with $R^2$ being 96.66% and DW-Stat being exact 2 with a dummy for 1998-99 capturing the possible post South East Asian crisis effect. The residual is fairly stationary.
Table 5: Relation of Trade Deficit with Exchange Rate 1977-78 to 2007-08 India

Dependent Variable: Log of Trade Deficit
Method: Least Squares
Sample: 1977-78 to 2007-08
Included observations: 31

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-18.26503</td>
<td>1.806253</td>
<td>-10.11211</td>
<td>0.0000</td>
</tr>
<tr>
<td>Log of Exchange Rate</td>
<td>-2.364841</td>
<td>0.484321</td>
<td>-4.882793</td>
<td>0.0000</td>
</tr>
<tr>
<td>Log of Domestic GDP</td>
<td>2.322476</td>
<td>0.288435</td>
<td>8.051991</td>
<td>0.0000</td>
</tr>
<tr>
<td>Log of International Price of Oil</td>
<td>0.716357</td>
<td>0.191822</td>
<td>3.734497</td>
<td>0.0009</td>
</tr>
<tr>
<td>Dummy 1998-1999</td>
<td>0.888159</td>
<td>0.233459</td>
<td>3.804338</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

R-squared 0.966581, Mean dependent var 9.542392
Adjusted R-squared 0.961440, S.D. dependent var 1.507704
S.E. of regression 0.296063, Akaike info criterion 0.550200
Sum squared resid 2.278984, Schwarz criterion 0.781488
Log likelihood -3.528104, F-statistic 188.0026
Durbin-Watson stat 2.005778, Prob(F-statistic) 0.000000

Diagram showing trends over time.

**Source:** Calculated from Handbook of Statistics on Indian Economy, RBI, GoI.

**Note:** Relationship between trade deficits with advanced country GDP is tested to be insignificant. The data for the advanced country GDP is taken from the World Economic Outlook 2009, IMF.
4. The Proposed Model:

Now if the money supply happens to be endogenously determined and the net foreign capital inflow happens to be exogenous then in a simple comparative static framework, then some of the obvious corollaries of M-F model get reversed. The M-F postulate is that the product and the money market equilibrium conditions would determine the overall level of activity and employment in the economy irrespective of the situation of the balance of payment and the capital flow would always automatically necessarily adjust to it under flexible exchange rate. We believe that it would be more realistic to assume that the macroeconomic equilibrium is determined through the simultaneous equilibrium in commodity market and balance of payment and the money market automatically always adjust to that equilibrium in the context of an open economy with free capital flows. Capital flow is not a passive residual variable as was postulated by the M-F doctrine but, in today’s context it is one of the crucial exogenous variable which actively affect the level of activity and employment in an economy. For a formal derivation, let us assume some standard relationships in their simplest linear\(^5\) form as follows:

The national income identity or the commodity market equilibrium condition is given by

\[
Y = C(Y - T) + I(r, Y) + G + X(e) - M(Y, e) \quad \ldots \quad \ldots \quad (1)
\]

where \(Y\) is aggregate income, \(C\) is consumption, \(T\) is tax, \(I\) is investment, \(r\) is rate of interest, \(G\) is government spending, \(X\) is export, \(e\) is the exchange rate and \(M\) is the import.

Standard tax function, when the tax-GDP ratio is assumed to be given takes the form

\[
T = t.Y \quad \ldots \quad \ldots \quad (2)
\]

where \(t\) is constant tax-GDP ratio.

The consumption as a positive function of disposable income is given by

\[
C = \theta + c.(Y - T) = \theta + c.Y(1 - t) \quad \ldots \quad \ldots \quad (3) \quad \text{[since, (2)]}
\]

where \(\theta\) is an arbitrary positive (+ve) constant.

The investment function is assumed to depend positively on \(Y\) and negatively on \(r\) as

\(^5\) See Das (2008) for generalised derivation without the assumption of linearity and the stability condition.
\[ I = \lambda + \alpha Y - \beta r = \delta + \alpha Y \quad \ldots \quad \ldots \quad (4) \]

where \( \lambda, \alpha, \beta \) and \( \delta \) are arbitrary +ve constants and \( \delta = \lambda - \beta r^* \) when \( r = r^* \) administered.

The export function is given as positive function of the exchange rate and hence competitiveness

\[ X = \mu + e x \quad \ldots \quad \ldots \quad (5) \]

where \( \mu \) and \( x \) are arbitrary constants

And the import as a positive function of \( Y \) and negative function of \( e \) is given as

\[ M = \rho + m Y - e n \quad \ldots \quad \ldots \quad (6) \]

Therefore, from (1) we get the commodity market equilibrium condition as,

\[
Y = \theta + c Y (1 - t) + \delta + \alpha Y + G + \mu + e x - (\rho + m Y - e n)
\]

\[ \Rightarrow Y \left[1 - c (1 - t) - \alpha + m\right] = \phi + e (x + n) \quad \ldots \quad \ldots \quad (7) \]

where \( \phi = \theta + \delta + G + \mu - \rho \).

The equilibrium condition for the balance of payment (BoP) in foreign exchange market be

\[ \rho + m Y - e n - (\mu + e x) = k e = K \quad \ldots \quad \ldots \quad (8) \]

i.e. current account deficit is equal to net foreign capital inflow in terms of domestic currency.

The above equation (7) tells us the relationship between \( e \) & \( Y \) for commodity market equilibrium and equation (8) gives the relationship between \( e \) & \( Y \) in BoP equilibrium. For fixed exchange rate \( e = e^* \), we get a solution for \( Y \) from this equation itself. \( Y = (k e^* + X - A) / m = Y^* \)

For flexible exchange rate to get a unique solution for \( e \) & \( Y \) we need equilibrium in commodity and foreign exchange market simultaneously.

From (7) we get the slope of the commodity market equilibrium condition as

\[ \frac{de}{dY} = \frac{[1 - c (1 - t) - \alpha + m]}{(x + n)} \quad \ldots \quad \ldots \quad (9) \]

From (8) we get the slope of the foreign exchange market BoP equilibrium condition as
\[ \frac{de}{dY} = \frac{m}{x + n + k} \ldots \ldots \ldots (10) \]

It would be fairly reasonable to assume in any economy that

\[ G > M - X \]

\[ \Rightarrow G + \theta + \delta > M - X \]

\[ \Rightarrow Y \equiv C + I + G + X - M > C - 0 + I - \delta \equiv \alpha.Y + c.Y(1 - t) \quad \text{(from 3 & 4)} \]

\[ \Rightarrow 1 > c.(1 - t) + \alpha \text{ or, } [1 - c.(1 - t) - \alpha] > 0 \]

Since, \([1 - c.(1 - t) - \alpha] > 0\) \quad \text{(the multiplier)}

i.e. \([1 - c.(1 - t) - \alpha]/(x + n) > 0\) \quad \text{(since} x, n >0\)

Again, \(m/(x + n) > m/(x + n + k)\) \quad \text{(since} m, k > 0\)

Therefore, \([1 - c.(1 - t) - \alpha]/(x + n) + m/(x + n) > m/(x + n + k)\)

i.e. \([1 - c.(1 - t) - \alpha + m]/(x + n) > m/(x + n + k)\)

\[ \text{[where} m = |\delta M/\delta Y|, x = |\delta X/\delta e|, n = |\delta M/\delta e| \text{ and} k = |\delta K/\delta e|] \]

i.e. slope of commodity market equilibrium condition > slope of BoP equilibrium condition. This is the stability condition of the existence of equilibrium.

Therefore, \((x + n)/m + k/m > (x + n)/(1 - c.(1 - t) - \alpha + m)\).

The impact of a given change in exchange rate on the level of activity for BoP equilibrium is higher than that for equilibrium in commodity market. A certain change in the exchange rate, for any given level of net capital inflow, would change the net availability of capital account surplus in terms of domestic currency. Given stock of foreign exchange, for balance of payment equilibrium, the net import in terms of domestic currency has to be equal to that particular amount of capital account surplus. Net import being a positive function of level of activity, would change with change in \(Y\). Now, the commodity market would be affected due to change in import and export as a result of change in exchange rate. On the other hand, the balance of payment market equilibrium would be affected by change in export, import as well as value of net capital inflow due to exchange rate fluctuation. Moreover, in commodity market, the effect of exchange rate fluctuation on the level of activity via change in import and export would be comparatively more moderate. In the above equation on the left
hand side not only the positive factor \((k/m)\) is extra but also \((x + n)/m > (x + n)/ [1 - c.(1 - t) - \alpha + m]\). Taking reciprocal in both sides we get,

\[
m/(x + n) < m/(x + n) + [1 - c.(1 - t) - \alpha]/(x + n)
\]

\([1 - c.(1 - t) - \alpha]/(x + n) > 0\) always. Therefore, the effect would be moderate.

From equation (7) & (8) we get a solution for e & Y in the following manner:

Equation (7) implies that \(Y = [\varphi + e.(x + n)]/(1 - c.(1 - t) - \alpha + m)\)

From equation (8) we get, \(Y = [k.e + e.n + (\mu + e.x)]/m\)

For simultaneous equilibrium in both the markets equating these two we get,

\(e(k + n + x)/m - e.(x + n)/[1 - c.(1 - t) - \alpha + m] = \varphi/[1 - c.(1 - t) - \alpha + m] - \mu/m.\)

\(\Rightarrow e^* = (\varphi.m - \mu.m - \mu.\xi)/[\xi.(x + n + k) + m.k] \quad \cdots \cdots \cdots (11)\)

\(\Rightarrow Y^* = [(\varphi.m - \mu.m - \mu.\xi).(k + n + x)]/[m.\{\xi.(x + n + k) + m.k\}] + \mu/m \quad \cdots \cdots (12)\)

[from (8)]

where \(\xi = [1 - c.(1 - t) - \alpha]\)

Therefore, coordinate \((Y^*, e^*)\) in e-Y plane is a particular combination of exchange rate and income where both the commodity and the foreign exchange market would be in equilibrium simultaneously.

Now, let us see the effect of change in government expenditure G and the net capital inflow k on the exchange rate e and aggregate output Y in a comparative static framework. If, for example G rises by \(\Delta G\), ceteris paribus, then Y changes by \(\Delta Y\) and e changes by \(\Delta e\). Now, if G increases by \(\Delta G\), then \(\varphi\) also increases by \(\Delta G\). Therefore, from (12) we get,

\(\Delta Y^* = \Delta G.m.(k + n + x)/[m.\{\xi.(x + n + k) + m.k\}]\)

\(\Rightarrow \Delta Y^*/\Delta G = m.(k + n + x)/[m.\{\xi.(x + n + k) + m.k\}] \quad [\text{Since } \xi = \{1 - c.(1 - t) - \alpha\}]\)

\(\Rightarrow \Delta Y^*/\Delta G = (k + n + x)/[\{1 - c.(1 - t) - \alpha\}.(x + n + k) + m.k] \quad \cdots \cdots (13)\)

And from equation (11) we get,

\(\Delta e^* = \Delta G.m/[\xi.(x + n + k) + m.k]\)

\(\Rightarrow \Delta e^*/\Delta G = m/[\xi.(x + n + k) + m.k] \quad [\text{Since } \xi = \{1 - c.(1 - t) - \alpha\}]\)
\[ \Delta e^*/ \Delta G = m/[\{1 - c.(1 - t) - \alpha\}(x + n + k) + m.k] \quad \ldots \quad \ldots \quad (14) \]

Therefore, we get, \((\Delta Y^*/ \Delta G) > 0 \) as well as \((\Delta e^*/ \Delta G) > 0 \). Hence, if \(G\) increases, \textit{ceteris paribus}, both \(Y\) and \(e\) unambiguously rises and \textit{vice-versa} for any given level of net capital inflow \(k\).

Similarly if \(k\) rises by \(\Delta k\), \(Y^*\) becomes \(Y_i^*\) and \(e^*\) becomes \(e_i^*\). Therefore, from (12) we get,

\[ Y_i^* = [\Delta k(\phi.m - \mu.m - \mu.\xi) + (k + n + x)(\phi.m - \mu.m - \mu.\xi)]/[\Delta k.m.(\xi + m) + m.\{\xi(k + n + x) + m.k\} + \mu/m] \quad \ldots \quad \ldots \quad (15) \]

Now, \(Y_i^*\) would be less than \(Y^*\) if the percentage rise in the numerator is less than the percentage increase in the denominator (hence the ratio comes down) and \textit{vice-versa}.

\[ \frac{\Delta k(\phi.m - \mu.m - \mu.\xi)}{(k + n + x)(\phi.m - \mu.m - \mu.\xi)} < \frac{\{\Delta k.m.(\xi + m)\}}{m.\{\xi(k + n + x) + m.k\}} \]

\[ \text{i.e.} \quad \frac{\Delta k}{(k + n + x)} < \frac{\{\xi(k + n + x) + m.k\}}{\{\xi(k + n + x) + m.k\}} \]

\[ \text{i.e.} \quad 1/(k + n + x) < \frac{\{\xi(k + n + x) + m.k\}}{\{\xi(k + n + x) + m.k\}} \]

\[ \text{i.e.} \quad \xi(k + n + x) + m.k < (k + n + x)(\xi + m) \]

\[ \text{i.e.} \quad m.k < (k + n + x).m \]

\[ \text{i.e.} \quad k < k + n + x \]

i.e. \(n + x > 0\), but this is always true because by assumption both \(n\) and \(x\) are positive.

Therefore, if net capital inflow increases, then necessarily \(Y\) declines to keep both the product and the foreign exchange market in equilibrium.

Similarly, from (11) we get,

\[ e_i^* = (\phi.m - \mu.m - \mu.\xi)/[\Delta k.(\xi + m) + \xi.k(n + x) + m.k] \quad \ldots \quad \ldots \quad (16) \]

Now, \(e^* > e_i^*\) if \(\Delta k.(\xi + m) > 0\), this is always true because \(\Delta k, \xi, \text{ and } m\) are positive.

Therefore, if net capital inflow increases, then necessarily the exchange rate appreciates to keep both the product and the foreign exchange market in equilibrium. Hence, the ultimate effect of an expansion of autonomous demand on level of activity is positive and net capital inflow eventually reduces the level of employment and output under the flexible exchange rate.
5. Conclusion:

Here we are significantly deviating from the M-F doctrine in the following manner. Firstly, we are saying that the e* & Y* are determined by goods market and foreign exchange market equilibria and the money market would always be in equilibrium at any rate of interest or in other words the money supply would be endogenously determined according to the demand for it\(^6\). In M-F model, as opposed to that, under flexible exchange rate the equilibrium is determined through intersection of commodity market equilibrium condition and money market equilibrium condition subject to an exogenous aggregate money supply and the foreign exchange market always adjusts to that common equilibrium point automatically. Secondly, we are claiming here that the net foreign capital inflow is not really directly dependent on the interest rates differentials; rather, it would be more realistic to assume that the net capital flows into or out of a particular economy to be exogenously determined at any particular period of time. Particularly in today’s context, when most of the foreign capital flows take place through share markets in terms of foreign institutional investment, it will be exaggeration to say that the profit or loss opportunity of foreign investment would depend solely on the interest rate differential even after adjustment of expected exchange rate fluctuations. Rather the direction and destination of international finance capital would be driven by profit motive based on expected capital gains (profit) net of various kinds of country risks.

Net export is a positive function of the exchange rate (NX = k.e) because if the exchange rate increases (i.e. depreciation), exporters would get more price as export earning and their competitiveness increases and importables become comparatively more expensive and as a result reduces. On the other hand, if the exchange rate appreciates then, the importers would be encouraged to import more at a relatively cheaper rate and exporters would be discouraged as their competitiveness would fall. The domestic production would be substituted by relatively cheaper imported inputs given any fixed rate of import duties and as an obvious consequence de-industrialization takes place in an open economy exposed to foreign capital flows under flexible exchange rate regime (necessarily if the Marshall-Lerner condition holds\(^7\)). Therefore, we get a positive function of aggregate demand Y with the exchange rate for commodity market equilibrium. If autonomous components of

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\(^7\) See Sodersten, B (1980)
consumption or investment or the government expenditure increase then for each levels of exchange rate we would get larger level of aggregate demand and larger amount of $Y$ and as a result the commodity market equilibrium function shifts parametrically.

In absence of any increase in autonomous demand, due to larger net capital inflow the exchange rate would appreciate and the employment and output would fall (however, the opposite is not true\(^8\)) under a flexible exchange rate regime. If autonomous demand, for example government expenditure, increases, *cet par*, then the level of activity would increase. However, if the foreign capital inflow helps domestic demand to boost up by increasing, for example, investment, exports or government expenditure, then also the commodity market equilibrium condition or the IS schedule shifts rightward increasing the level of activity. If both net capital inflow as well as autonomous demand increases simultaneously then the net effect on the level of activity would depend on which effect more that offsets what. Therefore, under such a situation under flexible exchange rate and with larger net capital inflow the expansionary fiscal policy would definitely work but, its effect would be dampened on expansion of employment and the level of activity.

For fixed exchange rate, the overall aggregate level of activity is solely determined by the commodity market equilibrium condition. As opposed to the essential corollary of the M-F doctrine that the expansionary fiscal policy would be completely ineffective, we are concluding that under the assumption of Keynesian downward wage rigidity in the presence of persisting involuntary unemployment and money supply endogeniety, given any tax rate, the expansionary fiscal policy unambiguously increases employment and output when the exchange rate is flexible. Again, the increase in net foreign capital inflow, *ceteris paribus*, reduces the level of employment and output. Therefore, the demand expansion has to be large enough to more than offset this dampening effect or the foreign capital flows have to be controlled or some combination of these two. Therefore, the expansionary fiscal policies coupled with some control over foreign capital flows are recommended as opposed to conservative fiscal stance along with absolutely reckless capital flows that we are witnessing today.

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\(^8\) For an explanation see Patnaik, Prabhat & Vikas Rawal (2005).
References:


International Monetary Fund (2009) – World Economic Outlook Database.


