SELECTED FACTORS GOVERNING INTERNATIONAL FINANCIAL INTEGRATION – SPECIAL REFERENCE TO INDIAN ECONOMY WITH SINGAPORE AND TURKEY.

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ABSTRACT

The Global financial crisis predicted by Mr. Raghuram Rajan during 2005 has created an impact on multinational investment towards exchange rate fluctuations, crude oil prices and investment decision. Ignoring the prediction of 2008 crisis made by a great economist was a big mistake of the multilateral funding agency. The impact of crude oil prices, exchange rate on both the inflation rate and interest rate together resulting to major factor of International Financial Integration has been reviewed and empirically proved factor by various authors in their respective study. A selected factor such as, Forward Premium / Discount, Interest rate parity and Purchasing power parity has been considered to analyse the financial integration with a special reference to Indian Economy with Singapore and Turkey. This paper argues about selected factors governing International financial integration of Indian economy along with Singapore and Turkey for a period of 4 years (2010 – 2013). The study is carried out by ex post – Facto type research design. The objective of the study is to identify the Interest rate and Inflation rate of India along with Singapore and Turkey with the help of IRP, PPP and Fishers effect Index. The study uses Trend analysis as a statistical tool and Hypothesis testing to prove the financial integration on Indian Economy with respect to selected countries. The findings will act as a catalyst towards promoting the effectiveness of International Financial Integration.

Key Words: Financial Crisis, Inflation rate, Forward premium / discount, Purchasing power parity, Interest rate parity, Fishers Index.

Introduction

Financial Integration is said to be complete when domestic financial markets become part of the world whereby synchronizing interest rate movements, investment, savings and the accumulation of physical capital stocks. The Interest rate concept has been into practice from the past several decades and its impact on economic development of a country is considered necessary. The importance and usage of interest rate in different areas is considered crucial. Subsequently, country’s inflation rate with respect to cross border investment needs a special attention which is also considered an important factor. As a result of this free movement of capital across countries will arise whenever interest rate differential emerges, because the marginal product of capital will be different, thus implying an arbitrage opportunity. This movement of capital ensures the availability of capital in economies where the domestic savings are not adequate for domestic investments.

Exchange rate determination

Foreign Exchange Rate is the amount of domestic currency that must be paid in order to get a unit of foreign currency. According to Purchasing Power Parity theory, the foreign exchange rate is determined by the relative purchasing powers of the two currencies.
Foreign exchange markets are among the largest markets in the world with an annual trading volume in excess of $160 trillion. It is an over-the-counter market, with no central trading location and no set hours of trading. Prices and other terms of trade are determined by computerized negotiation.

Over the past decade or so, financial crises seem to have become more frequent and perhaps more disruptive than in the past. They also seem to propagate more rapidly. This experience has spurred intense interest among academics and policy-makers in understanding the link between financial integration and crises, and in better assessing the merits of financial integration in general. Since the foreign exchange rate is a price, economists apply supply-demand conditions of price theory in the foreign exchange market. Now the value of one currency in terms of another currency depends upon demand for and supply of foreign exchange. The rate depends upon the forces of supply and demand that in turn depend upon the macroeconomic variables, such as interest rate, rate of inflation, etc.

**Purchasing Power Parity (PPP)**

Purchasing power parity is used worldwide to compare the income levels in different countries. PPP thus makes it easy to understand and interpret the data of each country. A fall in either currency's purchasing power would lead to a proportional decrease in that currency's valuation on the foreign exchange market.

PPP is a neo classical economic theory that estimates the amount of adjustment needed on the exchange rate between countries in order for the exchange to be equivalent to each currency's purchasing power. In other words, the exchange rate adjusts so that an identical good in two different countries has the same price when expressed in the same currency. Using that PPP rate for hypothetical currency conversions, a given amount of one currency has the same purchasing power whether used directly to purchase a market basket of goods or used to convert at the PPP rate to the other currency and then purchase the market basket using that currency. Observed deviations of the exchange rate from purchasing power parity are measured by deviations of the real exchange rate from its PPP value of 1.

**Interest Rate Parity [IRP]**

Interest rate parity is a theory in which the interest rate differential between two countries is equal to the differential between the forward exchange rate and the spot exchange rate. Interest rate parity plays an essential role in connecting interest rates, spot exchange rates, and foreign exchange rates.

Interest rate parity refers to the fundamental equation that governs the relationship between interest rates and currency exchange rates. Interest rate parity is a no-arbitrage condition representing an equilibrium state under which investors will be indifferent to interest rates available on bank deposits in two countries. Interest rate parity plays an essential role in foreign exchange markets, connecting interest rates, spot exchange rates and foreign exchange rates. The fact that this condition does not always hold allows for potential opportunities to earn riskless profits from covered interest arbitrage. Interest rate parity takes on two distinctive forms: uncovered interest rate parity refers to the parity condition in which exposure to foreign exchange risk is uninhibited, whereas covered interest rate parity refers to the condition in which a contract has been used to cover (eliminate exposure to) exchange rate risk. Each form of the parity condition demonstrates a unique relationship with implications for the forecasting of future exchange rates: the forward exchange rate and the future spot exchange rate.

**Fisher Effect:**

The Fisher Effect is an economic hypothesis stating that the real interest rate is equal to the nominal rate minus the expected rate of inflation. In the late 1930s, U.S. economist Irving Fisher wrote a paper which posited that a country's interest rate level rises and falls in direct relation to its inflation rates. Fisher mathematically expressed this theory in the following way:

\[ R \text{ Nominal} = R \text{ Real} + R \text{ Inflation} \]

The equation states that a country's current (nominal) interest rate is equal to a real interest rate adjusted for the rate of inflation. In this sense, Fisher conceived of interest rates, as the prices of lending, being adjusted for inflation in the same manner that prices of goods and services are adjusted for inflation. For instance, if a country's nominal interest rate is eight percent and its inflation rate is six percent, the country's real interest rate is two percent (8% - 6% = 2%). The Fisher effect is an important tool by which lenders can gauge whether or not they are making money on a granted loan. Unless the rate charged is above and beyond the economy's inflation rate, a lender will not profit from the interest. Moreover, according to Fisher's theory, even if a loan is granted at no interest, a lending party would need to charge at least the inflation rate in order to retain purchasing power upon repayment.
Review of Literature and Research Methodology

Review of Literature

Froot and Thaler (1990) in a famous survey, reported an average estimated value of $\beta$ for industrialized countries to be -0.88 for data of maturity more than one day and less than one year. They report few cases where the sign of the coefficient on interest rate differentials in exchange rate prediction equations is consistent with the unbiasedness hypothesis and not a single case where it exceeds the theoretical value of unity. This resonant unanimity on the failure of the predictive power of interest differentials is practically unique in the empirical literature of economics.

The enormous literature on UIP uses data drawn from low-inflation, floating exchange rate regimes (Flood and Rose, 1997). UIP may work differently for countries in crisis, whose exchange and interest rates both display considerably more volatility. This volatility raises the stakes for financial markets and central banks; it also may provide a more statistically powerful test for the UIP hypothesis. UIP may also work differently over time as financial markets deepen; UIP deviations may also vary across countries for the same reason. Surveys by Macdonald and Taylor (1992) and Isard (1996) came to similar conclusions. Similar results can be found in Fama (1984) and Bilson (1981).

Chinn and Meredith (2004) use data from 1980-2000 at 3, 6 and 12 month horizons for 6 major currencies and find an average coefficient also of -0.8, with four of the estimated coefficients having the wrong sign and being significantly different from unity. Another important finding is that estimates from the arbitrage equations tend to be highly unclear, so even where one cannot reject the null of unity coefficient, one can often also not reject the null of zero coefficient. Several explanations have been forwarded for this failure of unbiasedness to hold at horizons less than a year and more than a few hours. These basically fall into three categories: Risk Premium, Forecast Errors, and Non-Linearity’s. Meredith and Chinn (1998) and Chinn (2006) obtained panel estimates for UIP at 5 and 10 year horizons for 4 countries and obtained betas close to 1, although these were imprecisely estimated.

Lothian and Simaan (1998) used time averaged long horizon data to obtain evidence in favor of UIP for 1974-1994. Cheung et al. (2005) also notes more evidence of UIP at long, rather than at short horizons. Liu and Maddala (1992) tested the unbiased expectations theory and concluded that the predictor is biased, so covered interest parity doesn't hold and that the efficiency of the major currency markets of Japan, Germany, Great Britain, and Switzerland is questionable.

Bakaert and Hodrick (1993) observed that uncovered interest rate parity did not hold through the early 1990s as high-interest-rate countries provided a higher net return, taking account of exchange rate changes, than did low interest rate countries. In other words, currency values of high interest rate countries did not depreciate fast enough to offset their yield advantages.

Varma (1997), in the Indian context, has carried out an exploration of the covered interest parity. He posits a structural break in the money market in India in September 1995, with CIP become effective from that point on for the first time in the Indian money market. The structural break itself is attributed to interplay between the money market and the foreign exchange market. The period after 1995 witnesses to several deviations from the CIP. Varma has used rates on Treasury bills, certificates of deposit and commercial paper and call money rate to analyze the Indian money market. For the foreign rate, he has calculated an implicit euro-rupee rate for six, three and overnight maturity. Thus, he uses a mix of actual and constructed rates of different maturity. A rigorous test requires use of interest rates on identical instruments (e.g. maturity, risk) and a consistent forward rate (period of forwards should be identical to that of instruments).

The uncovered interest parity (UIP) theory states that differences between interest rates across countries can be explained by expected changes in currencies. Empirically, the UIP theory is generally rejected assuming rational expectations, and explanations for this rejection include that expectations are irrational. At least two influential empirical studies on the LOP were executed in the 1970s.

First, Isard (1977) uses disaggregated data for a number of traded goods (chemical products, paper, and glass products, among others) and for a number of countries, providing strong empirical evidence that the deviations from the LOP are large and persistent and appear to be highly correlated with exchange rate movements.

Second, Richardson (1978) finds very similar results to Isard, by using data for 4- and 7-digit standard industrial classification (SIC) categories. Giovannini (1988) uses a partial equilibrium model of the determination of domestic and export prices by a monopolistic competitive firm and argues that the stochastic properties of deviations from the LOP are strongly affected by the currency of denomination of export prices. In particular, Giovannini uses data on domestic and dollar export prices of Japanese goods and provides evidence that deviations from the LOP—found to be large not only for sophisticated manufacturing goods but also for commodities such as screws, nuts, and bolts—are mainly due to exchange rate movements, consistent with the earlier relevant literature.
Some of the most influential and convincing work in testing for the LOP is provided by Knetter (1989 and 1993). Knetter uses high-quality disaggregated data (7-digit) and provides evidence that large and persistent price differentials exist for traded goods exported to multiple destinations (e.g., for German beer exported to the U.K. as compared to the U.S.).

Another interesting study in this context is due to Engel (1993), who uncovers a strong empirical regularity: the consumer price of a good relative to a different good within a country tends to be much less variable than the price of that good relative to a similar good in another country. This fact holds for all goods except very simple, homogeneous products. Engel suggests that models of real exchange rates are likely to have predictions regarding this relation, so this fact may provide a useful gauge for discriminating among models.

Parsley and Wei (1996) look for convergence towards the LOP in the absence of trade barriers or nominal exchange rate fluctuations by analyzing a panel of 51 prices from 48 cities in the United States. They find convergence rates substantially higher than typically found in cross-country data, that convergence occurs faster for larger price differences and that rates of convergence are slower for cities farther apart. Extending this line of research, Engel and Rogers (1996) use CPI data for both U.S. and Canadian cities and for 14 categories of consumer prices in order to analyze the stochastic properties of deviations from the LOP. The authors provide evidence that the distance between cities can explain a considerable amount of the price differential of similar goods in different cities of the same country. Nevertheless, the price differentials are considerably larger for two cities across different countries relative to two equidistant cities in the same country. The estimates of Engel and Rogers suggest that crossing the national border—the so-called “border effect”—increases the volatility of price differentials by the same order of magnitude that would be generated by the addition of 2,500 to 23,000 extra miles between the cities considered.

Sharma and Mitra (2006) studied the factors that drive the forward premium in India. They observed a peculiar phenomenon in the forward market in the year 2003-04. The Indian premium which was usually positive became negative during that period. They considered this period as peculiar, since according to theory in a country where inflation and interest rates are higher than that of the other country that country’s currency should be at a discount.

Bhatt and Virmani (2005) have tested for UIP and CIP in India using regression. They conducted a regression of 3 month forward premium on 3 month TB rate differential between Indian TB rate and the US TB rate, for the period covering April 1993 to March 2003, to calculate CIP. They found that the coefficient was 0.65 and accepted the null hypothesis at 55% level of significance. Hence they concluded that CIP holds for that period.

Research Methodology

Statement of the problem: The study is done to analyze how crucial and selected factors contribute towards international financial integration, a failure of which would create a negative impact on country’s economic development with respect to multinational investments and analyzed with special reference to Singapore and Turkey with India.

Objectives of the study:

a) Primary objective - To analyze the selected factors that govern international financial integration for the Indian Economy along with Singapore and Turkey.

b) Secondary objectives –

1. To ascertain the impact of purchasing power parity on the home country currency and its reflection on Singapore and Turkey.
2. To ascertain the impact of interest rate parity on the home country currency and its reflection on Singapore and Turkey.
3. To compare the Expected Spot rate with the realized spot rate and to determine whether the exchange rates fall under Forward Premium (or) Forward Discount.

Research Design: Ex-post- Facto type of research design has been adopted in this study.

Research Findings

Purchasing power parity:

- **Singapore**: As the realized spot rate is greater than the expected spot rate the resultant is forward discount for the year 2010, 2011, 2012 & 2013 and there’s no result of forward premium in this case (Refer Table No 1.1)

- **Turkey**: As the realized spot rate is lesser than the expected spot rate the resultant is forward premium for the year 2010, 2011 & 2013 & since realized spot rate is higher than the expected spot rate the resultant is forward discount for the year 2012. (Refer Table No 1.2).
Interest rate parity:

- **Singapore**: As the realized spot rate is greater than the expected spot rate the resultant is forward discount for the year 2010, 2011, 2012 & 2013 and there’s no result of forward premium in this case. (Refer Table No 1.3)

- **Turkey**: As the realized spot rate is greater than the expected spot rate the resultant is forward discount for the year 2012 and as the expected spot rate is greater than the realized spot rate the resultant is forward premium for the year 2010, 2011 & 2013. (Refer Table No 1.4)

Fisher Effect:

- **Singapore**: It is inferred that the fisher effect records the highest for the year 2011 and it records the lowest for the year 2010. (Refer Table No 1.5)

- **Turkey**: It is inferred that the fisher effect records the highest for the year 2011 and it records the lowest for the year 2010. (Refer Table No 1.6)

Conclusion

The study reveals that the variables namely Purchasing power parity and Interest rate parity are the crucial variables which bring in an imbalance between developing vs. developed economy. The study further reveals that inflation and interest rate are the crucial variables in bringing the imbalance between developing vs. developed economy. Thus it becomes necessary to bring the common platform where these economies can be made into one and the crucial variables which acts as common platform is non-other than the purchasing power and interest rate differentials. In order to bridge these gaps the principles of one price theory should be applied and the interest rate offered should be comparatively higher thus the domestic country can drive in more number of investors. If these two factors have been traded off the concept of integration of the economy will be in existence.

References:

Data Analysis

Financial Analysis

Computation of Purchasing power parity

a) Nature of the Economy: Developed (Singapore)
Table showing the expected spot rate vs. realized spot rate for the calendar year 2010 - 2013 with a special reference to Indian Rupee to Singapore $

<table>
<thead>
<tr>
<th>Year</th>
<th>RSR</th>
<th>ESR</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>34.8266</td>
<td>34.0512</td>
<td>FD</td>
</tr>
<tr>
<td>2011</td>
<td>40.7328</td>
<td>36.6270</td>
<td>FD</td>
</tr>
<tr>
<td>2012</td>
<td>44.8694</td>
<td>42.2130</td>
<td>FD</td>
</tr>
<tr>
<td>2013</td>
<td>48.9707</td>
<td>45.9051</td>
<td>FD</td>
</tr>
</tbody>
</table>

Graph No: 1.1

Inference: From the above table it is inferred that Singapore dollar will incur an additional expense of Rs 0.7754 P, Rs 4.1058 P, Rs 2.6564 P and Rs 3.0656 as the value of the Indian Rupee has been appreciated for the year 2010, 2011, 2012 and 2013 respectively.

b) Nature of the Economy: Developing (Turkey)
Table showing the expected spot rate Vs realized spot rate for the calendar year 2010 - 2013 with a special reference to Indian Rupee to Turkish lira.

<table>
<thead>
<tr>
<th>Year</th>
<th>RSR</th>
<th>ESR</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>28.9698</td>
<td>32.8297</td>
<td>FP</td>
</tr>
<tr>
<td>2011</td>
<td>27.6663</td>
<td>32.2309</td>
<td>FP</td>
</tr>
<tr>
<td>2012</td>
<td>30.6055</td>
<td>29.7016</td>
<td>FD</td>
</tr>
<tr>
<td>2013</td>
<td>28.7151</td>
<td>32.9967</td>
<td>FP</td>
</tr>
</tbody>
</table>
Inference: From the above table it is inferred that the India will incur an additional expense of Rs 3.8599 P, Rs 4.5646 P and Rs 4.2816 P as the value of Turkish lira has been appreciated for the year 2010, 2011 and 2013, whereas Turkish lira will incur an additional expense of Rs 0.9039 P as the value of Indian Rupee has been appreciated for the year 2012.

Computation of Interest Rate Parity

a) Nature of the Economy: Developed (Singapore)

Table showing the expected spot rate vs. realized spot rate for the calendar year 2010 - 2013 with a special reference to Indian Rs to Singapore $.

Table No 1.3

<table>
<thead>
<tr>
<th>Year</th>
<th>RSR</th>
<th>ESR</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>34.8266</td>
<td>32.6098</td>
<td>FD</td>
</tr>
<tr>
<td>2011</td>
<td>40.7328</td>
<td>32.7320</td>
<td>FD</td>
</tr>
<tr>
<td>2012</td>
<td>44.8694</td>
<td>38.5269</td>
<td>FD</td>
</tr>
<tr>
<td>2013</td>
<td>48.9707</td>
<td>42.9357</td>
<td>FD</td>
</tr>
</tbody>
</table>

Inference: From the above table it is inferred that India will incur an additional expense of Rs 2.2168 P, Rs 8.0008 P, Rs 6.3425 P and Rs 6.035 P as the value of the Singapore $ has been appreciated for the year 2010, 2011, 2012 and 2013 respectively.
b) Nature of the Economy: Developing (Turkey)

Table showing the expected spot rate vs. realized spot rate for the calendar year 2010 - 2013 with a special reference to Indian Rs to Turkish lira.

Table No 1.4

<table>
<thead>
<tr>
<th>YEAR</th>
<th>RSR</th>
<th>ESR</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>28.9698</td>
<td>30.4368</td>
<td>FP</td>
</tr>
<tr>
<td>2011</td>
<td>27.6663</td>
<td>28.6678</td>
<td>FP</td>
</tr>
<tr>
<td>2012</td>
<td>30.6055</td>
<td>27.4358</td>
<td>FD</td>
</tr>
<tr>
<td>2013</td>
<td>28.7151</td>
<td>29.9896</td>
<td>FP</td>
</tr>
</tbody>
</table>

**Graph 1.4**

**Inference:** From the above table it is inferred that the Turkish lira will incur an additional expense of Rs 3.1697 P as the value of the Indian Rupee has been appreciated for the year 2012. Whereas India will incur an additional expense of Rs 1.467 P, Rs 1.0015 P and Rs 1.2745 P as the value of the Turkish lira has been appreciated for the year 2010, 2011 and 2013.

**Computation of Fishers effect as per PPP & IRP**

**Singapore:**

Table showing the fishers effect status with a special reference to Singapore $ for the year 2010-2013

Table No 1.5

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FISHER EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1.0442</td>
</tr>
<tr>
<td>2011</td>
<td>1.1189</td>
</tr>
<tr>
<td>2012</td>
<td>1.0957</td>
</tr>
<tr>
<td>2013</td>
<td>1.0692</td>
</tr>
</tbody>
</table>

**Graph No 1.5**

**FISHER EFFECT**
Inference: From the above table it is inferred that the fisher effect records the highest for the year 2011 and it records the lowest for the year 2010.

Turkey

Table showing the fishers effect status with a special reference to Turkish lira for the year 2010-2013

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FISHER EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>1.0786</td>
</tr>
<tr>
<td>2011</td>
<td>1.1243</td>
</tr>
<tr>
<td>2012</td>
<td>1.0826</td>
</tr>
<tr>
<td>2013</td>
<td>1.1003</td>
</tr>
</tbody>
</table>

Graph No 1.6

Inference: From the above table it is inferred that the fisher effect records the highest for the year 2011 and it records the lowest for the year 2010.

Trend Analysis

1. Nature of the Economy: Developed Country (Singapore)

Name of the Parameter: Inflation Rate

Let ‘X’ represents the Number of Years

‘Y’ represents the Inflation rate

Table No 1.7

<table>
<thead>
<tr>
<th>X</th>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Inflation rate</td>
<td>2.8</td>
<td>5.2</td>
<td>3.6</td>
<td>2.6</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>

\[ Y = a + bx \]

\[ a = 3 \]

\[ b = -0.22 \]

\[ Y = 3 + (-0.22) \] [5]

\[ Y = 3 + (-0.22) \] [6]

\[ Y = 3 - 1.1 \]

\[ Y = 1.9 \]

\[ Y = 1.68 \]

Inference: The projected Inflation rate for the year 2014 will be 1.9 and for 2015 will be 1.68.
2. Nature of the Economy: Developing Country (Turkey)

Name of the Parameter: Inflation Rate

Let ‘X’ represents the Number of Years

‘Y’ represents the Inflation rate

<table>
<thead>
<tr>
<th>X</th>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Inflation rate</td>
<td>6.40</td>
<td>10.45</td>
<td>6.16</td>
<td>7.40</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>

\[ a = 7.925 \]
\[ b = -0.129 \]

\[ Y = a + bx \]
\[ Y = 7.925 + (-0.129) (5) \]
\[ Y = 7.925 - 0.645 \]
\[ Y = 7.28 \]

Inference: The projected Interest rate for the year 2014 is 7.28 and for 2015 it is 7.151.

3. Nature of the Economy: Developed Country (Singapore)

Name of the Parameter: Interest Rate

Let ‘X’ represents the Number of Years

‘Y’ represents the Interest rate

<table>
<thead>
<tr>
<th>X</th>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Interest rate</td>
<td>7.00</td>
<td>1.00</td>
<td>2.0</td>
<td>3.0</td>
<td>.....</td>
<td>.....</td>
</tr>
</tbody>
</table>

\[ a = 6 \]
\[ b = -1.1 \]

\[ Y = a + bx \]
\[ Y = 6 + (-1.1) (5) \]
\[ Y = 6 - 5.5 \]
\[ Y = 0.5 \]

Inference: The projected Interest rate for the year 2014 will be 0.5 and for 2015 will be -0.6.

4. Nature of the Economy: Developing Country (Turkey)

Name of the Parameter: Interest Rate

Let ‘X’ represents the Number of Years

‘Y’ represents the Interest rate
### Table No 1.10

<table>
<thead>
<tr>
<th>X</th>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Interest rate</td>
<td>6.79</td>
<td>6.02</td>
<td>5.75</td>
<td>4.81</td>
<td>......</td>
<td>......</td>
</tr>
</tbody>
</table>

\[ a = 7.395 \]

\[ b = -0.621 \]

\[ Y = 7.395 + (-0.621) (5) \quad Y = 7.395 + (-0.621) (6) \]

\[ Y = 7.395 - 3.105 \quad Y = 7.395 - 3.726 \]

\[ Y = 3.895 \quad Y = 3.669 \]

**Inference:** The projected Interest rate for the year 2014 is 3.895 and for 2015 it is 3.669.

### Hypothesis Testing (T – Test)

1. **Nature of the Economy: Developed Country (Singapore)**
   - **Name of the Parameter: Inflation Rate**

   H0: The Inflation rate is independent to that of the time period [\( \mu = 3.2 \)]

   H1: The Inflation rate is dependent to that of the time period [\( \mu \neq 3.2 \)]

   **Table No 1.11**

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation rate</td>
<td>2.8</td>
<td>5.2</td>
<td>3.6</td>
<td>2.6</td>
</tr>
</tbody>
</table>

   Arrange in ascending order 2.6, 2.8, 3.6 and 5.2

   \[ \mu = 3.2 \quad X = 3.55 \quad \sigma = 1.182. \quad T = X - \mu / \sigma \]

   \[ = 3.55 - 3.2/1.182 \quad = 0.35/1.182 \quad = 0.2961 \]

   At 5% significant level the degree of freedom is given by \( (n-1) = (4-1) = 3 \)

   CV = 0.2961 \quad TV = 2.353

   **Inference:** As the calculated value is less than the table value H0 is accepted and hence it is concluded that Inflation rate is independent to that of the time period.

2. **Nature of the Economy: Developed Country (Turkey)**
   - **Name of the Parameter: Inflation Rate**

   H0: The Inflation rate is independent to that of the time period [\( \mu = 6.90 \)]

   H1: The Inflation rate is dependent to that of the time period [\( \mu \neq 6.90 \)]

   **Table No 1.13**

<table>
<thead>
<tr>
<th>Year</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation rate</td>
<td>6.40</td>
<td>10.45</td>
<td>6.16</td>
<td>7.40</td>
</tr>
</tbody>
</table>

   Arrange in ascending order 6.16, 6.40, 7.40 and 10.45

   \[ \mu = 6.90 \quad X = 7.6025 \quad \sigma = 1.972 \quad T = X - \mu / \sigma \quad = 7.6025 - 6.90/1.972 \]

   \[ = 0.7025/1.972 \quad = 0.356 \]

   At 5% significant level the degree of freedom is given by \( (n-1) = (4-1) = 3 \)

   CV = 0.356 \quad TV = 2.353

   **Inference:** As the calculated value is less than the table value H0 is accepted and hence it is concluded that Inflation rate is independent to that of the time period.