

Revision Study for Real Effective Exchange Rate (REER)

Real Effective Exchange Rate (REER) as a product of Nominal Effective Exchange Rate (NEER) and Relative Price Index (RPI) depends on the nominal exchange rates of the countries in the basket, their trade weights with respect to the reporting economies, and respective Consumer Price Indices (CPI). NEER, CPIs and weights are expressed in terms of base year. REER was being calculated based on the CPI for Pakistan with base year 2007-08 whereas, trade weights of trading partners (25 countries) compiled by IMF for member countries of year 2005 were being used. IMF has revised their existing base year 2005 to a new base year 2010 but trade weight of trading partners kept the same, which is expressed table No.1

Table 1. IMF's trade weight for Pakistan based on years 2005 and 2010

Sr. No	Country	Trade Rank	Trade Weights (in percent)
		2005 and 2010	2005 and 2010
1	US	1	19.50
2	China	2	13.99
3	Germany	3	8.45
4	Japan	4	7.44
5	UK	5	5.49
6	Italy	6	4.69
7	France	7	3.91
8	Korea	8	3.32
9	UAE	9	2.48
10	India	10	2.41
11	Turkey	11	2.27
12	Netherlands	12	2.26
13	Spain	13	2.23
14	Canada	14	2.20
15	Thailand	15	2.17
16	Singapore	16	2.08
17	Belgium	17	1.95
18	Taiwan	18	1.94
19	Saudi Arabia	19	1.92
20	Australia	20	1.79
21	Malaysia	21	1.73
22	Switzerland	22	1.51
23	Sweden	23	1.45
24	Russia	24	1.45
25	Indonesia	25	1.37
Total			100

These trade weights were used first to calculate NEER values using following formula:

$$NEER = \left[\prod_{i=1}^N (I/I_i)^{w_i} \right] \quad \text{as} \quad \sum_{i=1}^N w_i = 1$$

$$NEER = \frac{I}{Exp[\sum_{i=1}^N w_i \ln(I_i)]}$$

$$\Rightarrow NEER = \frac{ERI_P}{ERI_{TPC}} \times 100 \quad (\text{expressed in percent})$$

Where;

I is exchange rate index of US dollar per currency of compiling economy (Pakistan).

I_i is exchange rate index of US dollar per currency of trading partner's currency.

w_i is the trade weights for the countries in the basket and $\sum_{i=1}^N w_i = 1$

N is the number of trading partner countries.

ERI_P is the exchange rate index for USD per Pak rupee and

ERI_{TPC} is the exchange rate index for USD per trading partners countries' currency

To determine the exchange rates, currency unit per SDR for each trading partner is taken from IFS-IMF¹ on daily basis. Using these SDR rates, exchange rate for each country against the US dollar is then computed as the US dollar per currency unit and then exchange rate index (ERI_P) for Pakistan and ERI_{TPC} for each trading partner country by using following formula:

$$ERI = \frac{e(\text{Current period})}{e(\text{Base period})} \times 100$$

Where, e represents USD per currency unit of Pakistan and currencies of trading partner countries of Pakistan for current period (day/month/quarter/year) with respect of the base year 2010, i.e. average of the year 2010,

$$ERI_P = \frac{e(\text{Current period})}{e(\text{Base period})} \times 100 \quad \text{Here, } e \text{ will be selected USD per currency unit of PKR (Pakistan currency), and}$$

$$ERI_{TPC} = \frac{e(\text{Current period})}{e(\text{Base period})} \times 100 \quad \text{Here, } e \text{ will be selected USD per currency unit of individual currencies of all trading partners of Pakistan}$$

Similarly, after calculation of NEER, relative price index (RPI) is prepared using following formula:

$$RPI = \frac{P}{Exp[\sum_{i=1}^N w_i \ln(P_i)]}$$

Let $CPI_P = P$ (in case of Pakistan) and $CPI_{TPC} = Exp[\sum_{i=1}^N w_i \ln(P_i)]$, Then

$$RPI = \frac{CPI_P}{CPI_{TPC}} \times 100 \quad (\text{expressed in percent})$$

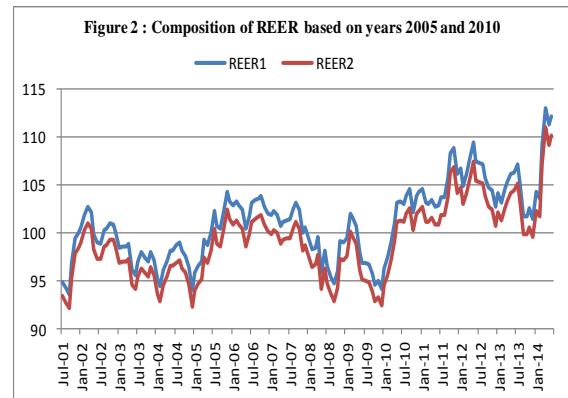
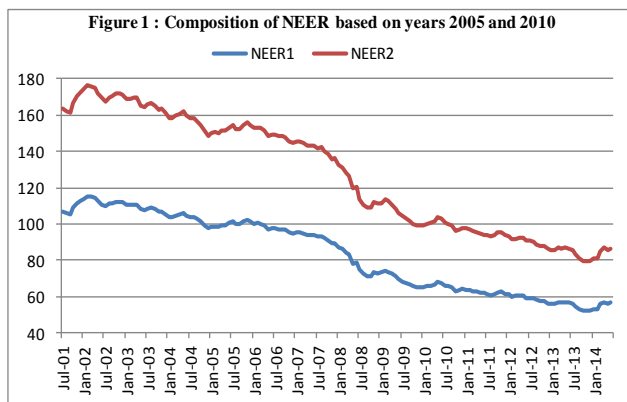
CPI values are collected for individual countries (trading partner countries and also of Pakistan) on monthly basis from their websites. The monthly CPI data of different countries have different base years. All CPI data are then shifted to the base year 2010, to form a harmony in the RPI values.

After calculating NEER and RPI, REER can be obtained by using following formula;

$$REER = \frac{NEER \times RPI}{100} \quad (\text{Expressed in percent as NEER and RPI have already expressed in percent})$$

Consequent upon the shifting of base year CPI of Pakistan, base year and weights of the trading partners, base year for exchange rates in line with the base year of CPI and weights of trading partners, and composition of countries in the basket the series for the indices NEER and REER have been revised.

Based on the methodology described, the historical trend of nominal effective exchange rate (NEER) and real effective exchange rate (REER) for Pakistan based on the year 2005 are NEER1 and REER1 respectively and subsequently based on year 2010 are NEER2 and REER2 respectively, which are plotted in the following graphs:



¹ Special Drawing Right (SDR) has been chosen as the currency in the construction of REER/ NEER indices because of its wide data coverage against all trading partner/competitors. The data for currency units per SDR can be retrieved from this link http://www.imf.org/external/np/fin/data/param_rms_mth.aspx