

Note

Calculation of the Real Exchange Rate

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Trade Weighted Real Exchange Rate --- Methodology

For the purpose of calculating the trade weighted real exchange rate series for the years 1982 to 1995 the following definition of PER is used:

$$\text{PER} = \frac{\text{price of tradeables}}{\text{Price of non-tradeables}}$$

or

$$\text{PER} = \frac{E \times P_t}{P_n}$$

Instead of simply taking the WPI as a measure of the price of tradeable goods and CPI as a measure of nontraded goods, the whole system to calculate their appropriate proxies is worked through.

Price of nontradeables --- domestic price level (P_n)

The definition of expenditure on GDP, used in the Economic Survey of Pakistan includes private consumption (C), general government current consumption expenditure (G), gross domestic fixed capital formation and changes in stock (I), export of goods and non-factor services (X), less imports of goods and non-factor services (M). In symbols this can be written as:

$$\text{GDP} = C + I + G + X - M$$

To find the domestic expenditure on non-traded goods, exports (X) from the above equation are subtracted, which becomes domestic expenditure on non-traded goods:

$$\text{GDP} - X = C + I + G + X - M - X$$

$$\text{or } Y_n = \text{GDP} - X$$

The ratio of domestic expenditure on non-traded goods (Y_n) at current prices to the domestic expenditure on non-traded goods at constant prices can be used as a proxy to measure the domestic price level (P_n) or the price of non-tradeables.

$$P_n = \frac{Y_n \text{ at current prices}}{Y_n \text{ at constant prices}}$$

where;

Y_n = expenditure on GDP – exports

P_n = domestic price level

The index of P_n as calculated above is given in Table-1 below:

Table-1: Domestic Price Level (P_n)

	P_n		P_n
1982	110.77	1989	170.08
1983	116.51	1990	178.59
1984	127.29	1991	205.64
1985	132.95	1992	228.12
1986	139.22	1993	250.77
1987	144.31	1994	282.12
1988	155.02	1995	314.09

Price of tradeables --- foreign prices in terms of domestic prices ($E^* P_t$)

To find the prices of tradeables, the weighted Harmonic Mean of the price of exports and imports is calculated, where weights are respectively exports and imports.

In symbols;

$$E^* P_t = \frac{X^i + M^i}{X^i / P_x + M^i / P_m}$$

where;

X = total exports with the i th country at current prices.

M = total imports with the i th country at current prices.

P_x = unit value of exports

P_m = unit value of imports

Instead of considering only one large country, the exports and imports of Pakistan's ten major trade partners will be used. The countries chosen are : U.S.A., U.K., Germany, Japan, Italy, South Korea, Saudi Arabia, U.A.E., China and Malaysia. The trade with these countries constitute approximately 60 per cent of the total trade of Pakistan. The major source of the data is the Economic Survey of Pakistan.

Table-2: Foreign prices in terms of Domestic prices (E^*P_t)

	E^*P_{tUS}	E^*P_t	E^*P_t	E^*P_t	E^*P_t	E^*P_t	E^*P_t	E^*P_t	E^*P_t
	U.S.A.	U.K.	GERMANY	JAPAN	ITALY	S.KOREA	U.A.E.	CHINA	MALAYSIA
1982	107.2	107.2	107.7	107.6	106.0	110.0	107.1	104.8	110.5
1983	115.9	115.4	115.3	116.0	114.8	117.5	113.3	112.6	118.2
1984	123.4	123.6	123.4	123.7	122.7	123.7	122.6	123.3	124.7
1985	130.6	130.1	130.3	130.5	129.2	130.5	130.3	130.3	132.8
1986	127.5	127.7	128.2	128.4	126.7	126.0	125.5	130.4	131.4
1987	134.9	134.8	135.0	135.3	134.0	134.4	134.4	136.5	136.7
1988	167.5	167.5	167.7	167.9	166.2	167.8	166.8	169.0	169.8
1989	180.7	178.9	179.9	180.0	177.0	179.1	174.1	179.6	186.5
1990	205.4	203.8	205.0	206.9	200.1	205.1	202.3	210.0	213.1
1991	225.7	219.1	221.6	230.6	223.3	219.8	224.0	243.4	246.3
1992	230.4	230.4	233.8	238.3	235.4	233.9	230.1	247.1	246.2
1993	238.0	238.8	242.4	252.9	246.4	250.4	234.3	261.1	260.7
1994	266.8	264.7	270.4	275.9	269.3	275.1	262.4	290.2	291.2
1995	324.3	326.4	329.3	333.2	335.1	329.2	329.5	341.1	346.0

After calculating E^*P_t , the real exchange rate for each country separately by taking the ratio of E^*P_t and P_n is calculated i.e.;

$$PER = \frac{E * P_t}{P_n}$$

The formula used to calculate the trade shares is as follows:

$$TS_i = \frac{\text{total trade of } i\text{th country } (X_i + M_i)}{\text{total trade of the ten chosen countries}}$$

where, TS_i denotes the trade share of the i th country

The formula used to calculate the growth rate of real exchange rate (PERgr) is as follows:

$$PERgr_t^i = \frac{PER_t^i - PER_{t-1}^i}{PER_{t-1}^i}$$

where 'i' denotes the i th country.

In order to find the final and weighted PER series, the PERgr of the ten countries by taking the respective trade shares as weights is aggregated. The formula used for this purpose is as follows:

$$WRERgr_t^i = \sum_{i=1}^{10} \frac{(PER_t^i - PER_{t-1}^i) * TS_t^i}{PER_{t-1}^i}$$

or;

$$WRERgr = \sum (RERgr_t^i) * TS_t^i$$

Where $WRERgr_t^i$ is the weighted real exchange rate series.

Finally, the index of this PER series by taking 1982 as the base year is calculated applying the following formula;

$$PER_t = WRERgr_{t-1} (1 + WRERgr_t)$$

The final result is given in Table-3 below:

Table-3: Index of Real Exchange Rate Series

PER Series		Per Series	
1982	100.00	1989	108.86
1983	102.01	1990	118.55
1984	99.79	1991	113.68
1985	101.09	1992	105.95
1986	94.54	1993	100.72
1987	96.32	1994	99.47
1988	111.36	1995	108.61

Empirical analysis

By inspecting the index of real exchange rate calculated in Table-3, it is clear that the real exchange rate of Pakistan has remained relatively stable for the period 1982 to 1995. It depreciated by only 8.6 per cent for the entire period. From 1982 till 1987, it showed a mixed pattern, depreciating and appreciating continuously. A very striking and interesting result can be observed, that is, the PERs of Pakistan with major trade partners tend to hold Purchasing Power Parity (PPP) for this particular period. In 1988, the RER depreciated suddenly by 15 per cent, then appreciating in 1989 it again depreciated by 10 per cent in 1990. During most of the 1990s (excluding 1995 in which the RER depreciated by 9 per cent) it has shown a tendency to hold PPP. The reason for this phenomenon may be attributable to the high inflation rates in Pakistan (as reflected in Table-1). Also, it can be deduced that the trade shares and exports and imports of major trade partners does not significantly effect RER.

Conclusions and Policy Implications

RER misalignment results in severe welfare and efficiency costs, greatly hurts exports and generates massive capital flight. In the most common case, the RER misalignment takes the form of overvaluation and loss of international competitiveness. The purpose of this paper has been to analyse RER behaviour in Pakistan for the year 1982 to 1995 with the aim of exploring factors that determine the competitiveness of Pakistan in the world trade market. For this purpose a time series of trade weighted index of real exchange rates for Pakistan is calculated. An interesting conclusion is that Pakistan has been rather well served by the managed rate system it

adopted in 1982. The RER has been relatively stable with only 8.6 per cent real depreciation for the entire period 1982 to 1995, although it fluctuated continuously between 6.65 per cent real appreciation in 1986 and 18.5 per cent depreciation in 1990. In other words, it can be concluded that the RERs of Pakistan tend to hold Purchasing Power Parity.

The persistent devaluation of the rupee since January 1982 has been necessitated on account of weak macroeconomic management reflected in large fiscal deficits, strained external account, low rate of national savings, disproportionate increase in money supply as compared to growth in output and frightening inflationary pressures. In my opinion, the ineffectiveness of exchange rate depreciation in securing improvements in the current account stems from the fact that changes in the costs arising from exchange rate movements feed quickly and extensively in to the economy and contribute to the aggravation of inflationary pressures. This phenomenon is strongly supported by this paper which shows that owing to high inflation rates the rate of real depreciation has been very low as compared to the nominal exchange rate depreciation. The result is that the international competitiveness of our exports has been nullified and we have been trapped in a vicious devaluation-inflation cycle.

The importance of the time factor is also highlighted while studying the RER behaviour. The time factor is important since any external imbalance to which the disequilibrium RER gives rise will have to be financed. The size of such imbalance may be greater under the current regime of enhanced capital mobility than in the past, and financing it would have the potential of representing a significant drain on Pakistan's foreign currency reserves.

Based on the findings of the paper some policy suggestions to correct for the RER overvaluation could be:

1. Devaluation --- Unfortunately, hopes associated with this policy measure have not been fulfilled in the case of Pakistan. So controlling domestic prices instead of repeated devaluation of currency may be another way to correct the overvaluation and maintain a stable RER.
2. Import tariffs and export subsidies. This combination will replicate only some of the negative effects of devaluation and can play an important role in improving the international competitiveness of Pakistan's trade.

3. The change in the non-traded goods sectors also exerts an influence on the RER. Therefore, policies geared for efficient and optimal use of resources in this sector can also play an important role in maintaining a competitive and stable RER.
4. Adequate attention to the efficiency dimension of our economic system can also play an important role in achieving desired levels of the RER. Economic efficiency at micro and macro levels requires productive growth, high rates of savings and investments, an income policy that does not lead to cost-push inflation and prudent management through appropriate fiscal and monetary policies. It has become obvious now that we must bring about structural changes in our economy to institutionalise a process of export-led growth by increasing our share in traditional markets as well as discovering new markets.

By using the trade-weighted RER series, one can develop a complete model determining the equilibrium path of the RER. This proposed model can help to determine the real effectiveness of the exchange rate as a policy tool to solve a number of problems, particularly in export expansion and in improving the current account deficit.