

Terms of Trade and Balance of Trade of Bhutan during 1907-26

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Introduction

Though exports and imports are important constituents of the aggregate demand of an economy, and hence the determinants of growth, welfare implication of foreign trade follows to a good extent from the terms of trade. In the trade literature, the concept of terms of trade is defined in many ways such as the quantity definition, the price definition and the income definition. In this study we adopt its price definition, i.e. the terms of trade of a country equals the ratio of her export and import price indices. Since such price indices are not readily available, those are calculated from estimated prices of individual export-import commodities. Before analyzing the terms of trade, therefore, we review the movements of import and export prices. Also important for an economy is the balance of trade that determines under the silver standard of currency (as practised in contemporary Bhutan) the flow of silver to and from the domestic economy, and hence the supply of money. This chapter, therefore, reviews also the balance of trade in Bhutan and along with it the change in the exchange value of Bhutan's currency in the contemporary period under the presumption that the balance of trade is functionally determined by devaluation/revaluation of domestic currency.

The organization of the study is this. Section I reviews the price movement of import and export commodities. For gaining insights into the nature of the commodities, it also derives and interprets their price elasticities. Section II deals with the terms of trade for Bhutan during the study period. Sections III and IV analyse her balance of trade and the exchange value of her

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currency, respectively. Major observations are summarized in Section V.

Section I: Export and import prices

For the analysis of individual price trends we consider only the important commodities with the threshold floor at four digit number in their value accounts. Price series of such commodities are presented in Table 1.

If we take into account the average prices during the pre-War, the War and the post-War periods from Table 1, it appears that the annual average price for horses, musk, provisions, fruits, lac and spices increased continuously over the successive periods. Compared to the pre-War average, the price of fruits and vegetables increased annually by 37.44 per cent during the War period. It further increased by 60.28 per cent per annum during the post-War period. It was followed by the price of lac, which rose by 9.03 and 36.53 per cent per annum in those respective phases. The annual price hike was moderate for horses, ponies and mules (viz. 10.96 and 4.69 per cent), and low for provisions (viz. 3.73 and 7.62 per cent) and musk (viz. 3.72 and 0.62 per cent).

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Table 1. Price series for important export commodities in Bhutan

Year	Horses, ponies, mules	Cattles,	Other animals	Musk	Provision	Fruits, vegetables	Lac	Wax	Timber	Spices
1907-08	85.54	17.55	2.96	43.25	39.95	1.99	23.94	48.23	1.11	17.26
1908-09	89.35	21.02	3.01	39.92	40.96	2.03	16.65	49.01	1.21	13.58
1909-10	60.75	28.50	2.78	37.33	31.10	2.34	13.06	46.55	0.65	12.76
1910-11	63.52	43.00	3.47	37.25	45.09	2.09	12.70	49.18	0.91	15.33
1911-12	69.76	30.95	3.20	48.10	33.45	2.84	13.38	46.60	0.66	13.48
1912-13	74.90	32.27	2.59	53.63	39.08	4.27	19.77	63.31	0.95	13.05
1913-14	111.89	20.56	8.57	59.94	52.14	7.99	18.33	61.50	0.68	12.15
1914-15	115.66	18.58	8.38	54.06	41.69	8.88	19.80	54.08	0.84	15.19
1915-16	133.29	24.83	10.02	50.06	43.63	13.14	18.80	48.04	0.23	18.60
1916-17	122.50	28.32	10.01	53.94	53.29	8.29	28.04	50.06	0.06	19.01
1917-18	105.88	24.14	20.41	54.24	55.03	17.87	29.70	53.01	0.52	24.42
1918-19	180.40	28.28	11.73	66.82	52.60	7.84	33.42	48.65	1.14	36.83
1919-20	239.34	53.12	7.83	53.42	54.14	26.54	47.15	50.82	1.28	23.99
1920-21	156.86	49.74	6.16	72.76	67.51	19.61	43.55	35.53	1.38	23.51
1921-22	138.36	38.77	4.66	62.69	69.21	47.27	46.40	48.69	0.87	30.32
1922-23	114.50	52.82	5.80	66.10	80.80	37.32	96.78	54.86	0.89	35.23
1923-24	128.39	36.07	5.94	35.80	70.55	78.67	56.71	32.28	1.17	27.45
1924-25	183.56	31.50	6.05	55.60	77.19	80.58	177.94	36.98	1.23	30.08

Source: Computed from various issues of Accounts Relating to the Trade by Land of British India with Foreign Countries for twelve months, April 1907 to March 1925

For other animals and timber, however, the export price rose in one period but fell in the other. For the War period the export prices were higher by 36.45 per cent for other animals but lower by 4.40 per cent for timber. They were reversed in the post-War period, viz. a rise of 40.71 per cent for timber and a fall of 9.07 per cent for other animals. For cattle, the export price fell by 1.72 per cent per annum during the War phase and rose by 13.80 per cent per annum during the post-War phase. The wax price, however, declined continuously over the years. It fell by 0.02 per cent during the War and 2.68 per cent thereafter.

Table 2. Price list of some important imported commodity

Year	Raw silk	Foreign piece goods	Indian piece goods	Foreign twist and yarn	Silk	Brass	Rice husked	Rice unhusked	Spices	Tobacco
1907-08	282.98	87.93	223.95	54.49	349.49	92.20	7.37	3.65	14.62	14.44
1908-09	282.56	74.36	123.82	51.07	351.21	86.08	7.63	3.20	16.94	18.68
1909-10	185.32	78.68	75.47	53.71	261.38	64.45	4.71	2.38	14.26	19.51
1910-11	302.40	77.95	111.00	58.84	227.92	78.03	4.43	2.41	10.90	16.77
1911-12	272.11	52.22	210.42	54.46	106.65	79.62	3.92	2.68	6.95	18.72
1912-13	259.65	64.45	76.10	55.53	371.73	79.85	4.01	2.48	10.00	22.68
1913-14	324.74	80.23	89.53	55.61	437.62	74.32	5.73	3.30	10.88	20.22
1914-15	326.63	81.28	83.46	53.42	454.02	103.23	5.95	3.16	9.18	22.35
1915-16	329.86	147.98	82.13	48.50	547.29	132.51	6.56	3.51	12.22	22.48
1916-17	300.18	78.05	81.82	59.32	291.75	109.17	6.52	3.17	12.81	25.00
1917-18	335.90	95.24	95.63	72.84	338.53	164.07	7.06	2.85	13.35	24.28
1918-19	400.27	213.83	230.11	131.96	547.06	304.99	7.79	2.46	14.22	23.64
1919-20	419.19	196.80	150.00	134.89	436.37	223.34	7.66	3.60	13.26	23.15
1920-21	506.61	251.01	234.00	133.37	772.90	162.45	7.91	3.62	17.53	25.18
1921-22	369.62	201.84	255.00	133.74	660.04	120.53	8.58	3.21	17.22	22.24
1922-23	429.61	211.62	237.22	120.15	748.53	145.73	7.65	3.11	17.82	27.16
1923-24	506.87	221.56	217.49	131.02	378.83	110.90	7.00	3.39	14.61	31.30
1924-25	220.00	186.53	204.78	93.35	134.74	120.00	8.58	3.27	14.19	27.00

Source: Computed from various issues of Accounts Relating to the Trade by Land of British India with Foreign Countries for twelve months, April 1907 to March 1925

Table 2 presents the price series for eight imported commodities, viz. raw silk, foreign piece goods, foreign twist and yarn, silk, rice (husked and unhusked), spices, and tobacco. Most of these imported articles were buoyant in price in the successive phases of our period. Calculating the annual average price in these successive phases, we find that the annual price hike was highest for foreign piece good (viz. 11.22 per cent during the War phase and 13.02 per cent after the War), and foreign twists and yarn (viz. 5.59 and 12.72 per cent respectively), moderate for silk (viz. 7.47 and 3.60 per cent respectively), rice-husked (viz.4.26 and 3.00 per cent respectively), tobacco (viz.4.30 and 1.91 per cent respectively) and low for raw silk (viz. 4.02 and 3.76 per cent respectively), spices (viz. 0.39 and 5.02 per cent

respectively), unhusked rice (viz. 0.93 and 2.04 per cent respectively), and spices (viz. 0.39 and 5.02 per cent respectively).

For Indian piece goods and brass, however, the import price rose in one period but fell in the other. For the War period the import price was lower by 1.98 per cent for Indian piece goods but higher by 17.58 per cent for brass. They were reversed during the post-War period, a rise of 16.15 per cent for Indian piece goods and a fall of 1.75 per cent for brass.

With the help of the price series we now estimate the export/import elasticity for individual commodities. To do so, we first estimate on the basis of the least square method the following relationship between export of individual commodities and their prices in double logarithmic form.

$$\log X_i = \log \alpha_1 + \beta_1 \log P_{xi} + U_{ii} \dots \dots \dots (1)$$

where U_{ii} is the disturbance term. Since the estimated value of β_1 is

$$\hat{\beta}_1 = d \log X_i / d \log P_{xi} = (d X_i / d P_{xi}) \cdot (P_{xi} / X_i)$$

it represents the price elasticity. We can not, however, suggest *a-priori* whether $\hat{\beta}_1$ is the price elasticity of demand or the price elasticity of supply for a given commodity. It depends whether Equation (1) represents demand function or the supply function. It represents a demand function if $\hat{\beta}_1 < 0$ and a supply function if $\hat{\beta}_1 > 0$. Hence, in the case of negative $\hat{\beta}_1$ it represents the price elasticity of demand; otherwise, it is the price elasticity of supply. In other words, the negative value of $\hat{\beta}_1$ signifies that the volume of export is largely determined by demand factors in the rest-of-the-world. Its positive value, on the other hand, implies that the export is largely determined by supply factors in the domestic economy.

Table 3 reports the values of $\hat{\beta}_1$ for the export commodities under study along with their relevant statistics.

The price-quantity relationship appears to be insignificant for spices, fire wood, hides and skins, and provisions, their level of significance being in the order of 0.643, 0.388, 0.663 and 0.764 percents. The commodities for which the relationship is the most significant are fruits, vegetables and nuts (0.000 per cent). Then came in rank other animals (0.006 per cent), followed by timber (0.020 per cent), lac (0.024 per cent), horses, ponies and mules (0.044 per cent), and musk (0.075 per cent).

Table 3. Price elasticities of export commodities in Bhutan

Name of commodity	$\hat{\beta}_1$ (S.E.)	R-Square	F (Level of Significance in per cent)	DW
Spices	0.622 (1.316)	0.014	0.223 (0.643)	0.303
Musk	1.838 (0.964)	0.185	3.637 (0.075)	1.131
Fire wood	0.195 (0.220)	0.047	0.787 (0.388)	1.442
Hides and skins	0.0917 (0.206)	0.012	0.198 (0.663)	0.314
Lac	- 1.079 (0.434)	0.278	6.165 (0.024)	2.184
Timber	-0.562 (0.218)	0.295	6.683 (0.020)	2.574
Wax	0.869 (0.687)	0.091	1.601 (0.224)	1.536
Horses, Ponies, Mules	0.784 (0.359)	0.230	4.767 (0.044)	1.098
Cattle	- 1.111 (0.780)	0.112	2.025 (0.174)	0.462
Other animals	0.487 (0.152)	0.390	10.247 (0.006)	0.756
Fruits, vegetables & nuts	- 0.367 (0.071)	0.628	26.982 (0.000)	1.201
Provisions	- 0.225 (0.735)	0.006	0.094 (0.764)	0.764
Cotton piece goods- Indian	0.983 (0.579)	0.171	2.878 (0.112)	0.935
Wool	- 1.172 (0.728)	0.156	2.591(0.130)	0.697

Source: Computed from the export-price series

Among commodities of significant price-quantity relationship, the estimations for fruits, timber, lac and musk do not suffer from the problem of autocorrelation. The Durbin-Watson statistics for all these commodities are found above the tabulated value of d_u . Against the appropriate tabulated value of d_u at 1.118 at 1 per cent level, its observed values are 1.201 for fruits and 1.131 for musk. Since in the case of timber and lac the observed DW values are found more than 2, we have tested negative autocorrelation for them. The values of (4-DW) for timber and lac are 1.426 and 1.816 respectively as against the DW range of 0.902-1.118. However, in case of other animals and horses, the Durbin-Watson statistics are found below the tabulated value of d_u at 1.118.

We analyse here the nature of different commodities from two viewpoints, i) the signs of the estimated elasticities, and ii) their absolute values.

Table 3 indicates that among the commodities of significant price-quantity relationships, musk, other animals and horses have positive elasticities of export, signifying thereby that their exports were largely supply-dominated. Indeed, all these products were, as we have already pointed out, in great demand in British India. But they had limited exportable surplus for inadequate domestic availability and/or extensive domestic use. While the former reason held good for the articles like musk, the latter was largely true for horses and other animals. In so far as the export of horse was concerned, we note that although Bhutan produced abundant horses, her common people had no right to sell them without the Deb Raja's permission. These, however, explain why the exports of these articles were largely supply-determined.

Negative value of elasticity is obtained for the export articles like fruits, vegetables, timber and lac. This finding is also in line with the production structure in Bhutan, which we have already discussed elsewhere. Their abundant availability and export surplus made their volumes of export largely dependent on foreign demand.

To study the nature of products on the basis of absolute value of elasticity, we note that among the export articles under scrutiny (as indicated by their respective F-statistics), only the value for musk is significantly above the unity while it is less than that for timber, horses, other animals and fruits. For lac, the value almost equals the unity. We may, therefore, conclude that the export items such as timber, fruits, horses and other animals had inelastic export whereas the export of musk was elastic. Hence, the higher prices of the former products that occurred during the study period must have given rise to gain in trade for Bhutan as their export values must have risen up. The elastic nature of musk export, on the other hand, led to falling trend in its value in the phase of rising price especially during the post-War period.

We similarly estimate the price elasticity of import from the regression equations of different imported commodities on their respective prices, viz.

$$\log M_i = \log \alpha_2 + \beta_2 \log P_{Mi} + U_{2i} \dots \dots \dots (2) \quad [U_{2i} = \text{disturbing term}]$$

and interpret its sign and absolute value as before.

Table 4 represents the values of β_2 for the import commodities under study along with the relevant statistics. This table indicates that the price-quantity relations for raw silk, foreign twist and yarn, iron, silk, brass, other metals, rice (husked and unhusked), sugar, living animals and oils are insignificant from the viewpoint of F-statistics (vide column 4 of the table). These commodities have, therefore, been disregarded. We rank the other commodities (in descending order of their significance): 1. salt (0.000 per cent), 2. foreign piece goods (0.000 per cent), 3. paints and colours (0.001 per cent), 4. provisions (0.002 per cent), 5. spices (0.008 per cent), 6. manufactured wool (0.019 per cent), 7. Indian piece goods (0.026 per cent), 8. Indian twist and yarn (0.053 per cent).

Table 4. Price elasticities of import commodities in Bhutan

Name of commodity	$\hat{\beta}_2$ (S.E.)	R-Square	F (Level of Significance in percent)	DW
Raw silk	0.495 (1.430)	0.007	0.120 (0.734)	0.884
Foreign piece goods	1.402 (0.304)	0.571	21.288 (0.000)	1.142
Indian piece goods	- 1.958 (0.800)	0.273	5.996 (0.026)	2.009
Foreign twist and yarn	- 1.070 (0.688)	0.131	2.421 (0.139)	1.825
Indian twist and yarn	- 1.074 (0.490)	0.325	4.810 (0.053)	2.218
Iron	- 0.794 (0.780)	0.061	1.036 (0.324)	1.312
Silk	- 0.263 (0.636)	0.011	0.171 (0.685)	0.689
Brass	- 0.424 (0.597)	0.038	0.630 (0.439)	1.869
Other metals	0.701 (0.529)	0.128	1.759 (0.209)	1.548
Spices	- 2.160 (0.716)	0.363	9.111 (0.008)	1.168
Rice-husked	- 0.0249 (1.004)	0.000	0.001 (0.981)	0.579
Rice-unhusked	1.820 (1.259)	0.116	2.092 (0.167)	1.344
Sugar	1.022 (1.191)	0.044	0.735 (0.404)	2.170
Tobacco	- 0.753 (0.749)	0.059	1.011 (0.330)	2.466
Provisions	- 2.034 (0.529)	0.552	14.756 (0.002)	1.314
Living animals	- 0.0973 (0.839)	0.003	0.013 (0.912)	2.151
Manufactured wool	- 3.332 (1.047)	0.566	10.124 (0.019)	2.291
Paints and colours	- 0.976 (0.159)	0.863	37.809 (0.001)	2.103
Oils	- 0.563 (0.526)	0.186	1.145 (0.333)	1.038
Salt	- 3.311 (0.620)	0.704	28.500 (0.000)	1.806

Source: Computed from the import-price series

Estimations for eight significant imported commodities do not suffer from the problem of autocorrelation. The observed Durbin-Watson values are 1.142, 1.168, and 1.314 for foreign piece goods, spices and provisions respectively and all these

values are found above the tabulated value of d_u at 1.118 at 1 per cent level. In case of paints and colours, salt, wool, Indian piece goods and Indian twist and yarn, the observed DW values are found greater than 2. We have tested the negative autocorrelation for these estimations. The values of (4-DW) are 1.897 and 1.709 for paints and colours and wool respectively as against the appropriate tabulated value of d_u at 1.036. The said values are 1.991 and 1.782 for Indian piece goods and Indian twist and yarn respectively as against the tabulated value 1.118.

This table points out that for all these commodities, the value of elasticity are negative signifying statistically that their imports were largely determined by domestic levels of demand. These findings may be rationalized as a characteristic of trade between a large country and a small country. Always the import of small country from a large country is determined by the former country's domestic demand.

We also gather from the table that among the eight import articles of significant price-quantity relations, the absolute value of price elasticity is found significantly greater than unity for as many as six articles. Those were foreign piece-goods (1.402), Indian piece-goods (1.958), spices (2.160), provisions (2.034), manufactured wool (3.332), and salt (3.311). It is almost equal to one for Indian twist and yarn (1.074), and paints and colours (0.976). The elastic values of the six significant items of import in Bhutan must have reduced their respective values of import in the phase of rising price, as occurred during the post-War period.

Section II: Terms of trade

For the purpose of calculating the terms of trade, we first compute price indices for both exports and imports. The Fisher's index is adopted for the purpose. Table 5 reports the series of price along with the terms of trade. The table also incorporates quantity indices for exports and imports, which will be required in the following section.

Table 5. Export, import indices and terms of trade

(1907-08 = 100)

Year	Export price index	Import price index	Export quantity index	Import quantity index	Terms of trade ¹
1907-08	100.00	100.00	100.00	100.00	100.00
1908-09	92.12	93.68	89.56	117.73	98.33
1909-10	71.60	84.67	73.80	79.99	84.56
1910-11	69.15	79.23	65.58	44.92	87.28
1911-12	45.49	74.60	196.44	1833.79	60.98
1912-13	230.44	84.31	416.35	496.70	273.32
1913-14	281.51	97.53	448.60	655.85	288.64
1914-15	297.99	100.34	446.22	663.95	296.98
1915-16	245.33	121.42	289.22	344.79	202.05
1916-17	254.66	95.63	229.37	407.93	266.30
1917-18	353.74	110.43	218.52	274.47	320.33
1918-19	240.59	170.05	123.23	132.22	141.48
1919-20	201.45	155.25	41.67	78.42	129.76
1920-21	278.79	194.88	127.49	139.04	143.06
1921-22	256.72	159.03	56.38	98.29	161.43
1922-23	358.41	174.91	98.93	158.57	204.91
1923-24	340.55	161.70	49.36	92.91	210.61
1924-25	82.30	136.92	26.49	48.68	60.11

Source: Computed from various issues of Accounts Relating to the Trade by Land of British India with Foreign Countries for twelve months, April 1907 to March 1925

We note at the outset that while the price index and quantity index for export moved in the same direction in most of the years, no regular relationship is found in Table 5 between the price and quantity indices for import. Certainly other economic factors and also various political factors must have played important role in the country's import activities.

The above table indicates that Price indices for export and import, however, moved mostly in similar directions during the study period. After initial setbacks, both the price series underwent secular upward trends during 1912/13 – 1923/24. Because of higher rate of increment in the export price series, however, Bhutan enjoyed a steady-state improvement in her trade balance. From 100 in 1907-08, it increased to 273.32 in 1912-13 and further to 320.33 in 1917-18.

Section III: Balance of trade

Bhutan's balance of trade with British India during 1907-08/1924-25 is shown in the following table.

Table 6. Balance of trade during 1907-08/1924-25

(in Rs.)			
Year	Balance of trade	Year	Balance of trade
1907-08	87,281	1916-17	283,688
1908-09	34,319	1917-18	1,078,949
1909-10	38,659	1918-19	233,113
1910-11	100,056	1919-20	187,258
1911-12	- 3,536,192	1920-21	412,067
1912-13	399,195	1921-22	433,796
1913-14	302,402	1922-23	549,305
1914-15	413,862	1923-24	557,391
1915-16	488,031	1924-25	546,291
Total			2,609,471

Source: Computed from various issues of Accounts Relating to the Trade by Land of British India with Foreign Countries for twelve months, April 1907 to March 1925

A favorable balance of trade is thus evident in Table 6 for all years excepting 1911-12. Moreover, this balance went up through oscillation over the period of study. From Rs.87 thousand in 1907-08, it went up to Rs.546 thousand in 1924-25. A growth rate of 30.93 per cent thus prevailed in the series.

As in other series, periodic rhythms were also present. Though both the series of exports and imports increased during the pre-War period, the former was consistently higher than the latter. As a result, the balance of trade steadily shot up. The rate of improvement in this phase is calculated at 53.45 per cent per annum. During the War period, a decreasing trend prevailed over both series with a greater degree of decline in exports. Consequently, the balance of trade deteriorated at 10.95 per cent per annum in this duration. The situation, however, reversed after the War. The balance of trade that stood at Rs.187 thousand in 1919-20 became Rs.546 thousand in 1924-

25. An annual improvement rate of 38.34 per cent took place in this sub-period.

Section IV: Exchange value of Bhutan's currency

We have already observed that Bhutan experienced favourable balance of trade. Bhutan's total trade balance during 1907-08/1924-25 (excepting 1911-12) thus appears to be Rs.3,330,486 (vide Table 7.6). Comparing this with the trade balance in the previous period, viz. 1894-95/1906-07, we may resolve whether it was improved during our study period. To do so, we calculate Bhutan's balance of trade during 1894-95/1906-07 in the following table.

Table 7. Bhutan's Balance of trade during 1894-95/1906-07

(in Rs.)							
Year	Export	Import	Balance of trade	Year	Export	Import	Balance of trade
1894-95	21,456	20,237	1,219	1901-02	38,334	18,937	19,397
1895-96	28,551	27,394	1,157	1902-03	31,785	12,742	19,043
1896-97	14,385	16,787	-2,402	1903-04	58,863	13,391	45,472
1897-98	14,667	15,883	-1,216	1904-05 *	650,018	102,570	547,448
1898-99	10,791	11,922	-1,131	1905-06	1,241,172	191,748	1,049,424
1899-1900	13,035	12,744	291	1906-07	1,135,505	256,820	878,685
1900-01	22,229	14,316	7,913				
				Total	3,280,791	715,491	2,565,300

Source: dsal.uchicago.edu/statistics/1894_excel/1894.165.XLS, dsal.uchicago.edu/statistics/1894_excel/1894.166.XLS and various issues of Accounts Relating to the Trade by land of British India with Foreign Countries for twelve months, April 1907 to March 1925

Table 7 indicates that total export and import values were of the order of Rs.3,280,791 and Rs.715,491 during 1894-95/1906-07 so that the aggregate balance of trade comes to Rs.2,565,300 in the concerned period. Bhutan's trade balance thus improved by Rs.44,171 during 1907-08/1924-25 compared to what was during 1894-95/1906-07.

Now the question arises whether this improvement in the trade balance was due to the devaluation of Bhutan's currency, or for other factors such as greater preference of Bhutanese goods in the global market, Bhutan's trade promoting policies, and so on.

To assess whether devaluation led to the favourable balance of trade in Bhutan, we assume

- i) market conditions for domestic goods in the foreign market remained unchanged; and
- ii) market conditions for foreign goods in the domestic market remained unchanged.

Now, in the trade literature, the following Marshall-Lerner Equation is usually adopted to verify whether a given rate of devaluation (k) results in favourable balance of trade:

$$dB = k X_f (e_{1M} + e_{2X} - 1) \dots \dots \dots (3)$$

where dB is the change in the balance of trade, X_f is the value of exports expressed in foreign currency, e_{1M} is the elasticity of home demand for imports and e_{2X} is the elasticity of foreign demand for exports.

If, for given values of e_{1M} , e_{2X} and X_f , the given rate of k leads $dB > 0$, the devaluation is said to cause favourable balance of trade. This happens when

$$|e_{1M}| + |e_{2X}| > 1 \dots \dots \dots (4)$$

This study uses the Marshall-Lerner Equation differently. We know $dB > 0$ here. If we find that the condition 4 is satisfied in our case, then a positive value of k , which can be derived from Equation 3, would confirm that it represents the rate of devaluation during the period of study.

For the estimation of Bhutan's import elasticity (e_{1M}), and export elasticity (e_{2X}) we use the series of export and import indices from Table 5. To do so, we estimate on the basis of least square method the relationship between quantity and price indices for Bhutan's exports and imports in double logarithmic form.

$$\log X_{qi} = \log \alpha + \beta_X \log P_{Xqi} + U_{1i} \dots \dots \dots (5)$$

$$\log M_{qi} = \log \alpha + \beta_M \log P_{Mqi} + U_{2i} \dots \dots \dots (6)$$

where X_{qi} is the quantity index for exports, P_{Xqi} is the price index for exports, M_{qi} is the quantity index for imports, P_{Mqi} is the price indices for imports and U_{1i} , U_{2i} are the disturbance terms. Since the estimated values of β_X and β_M are

$$\hat{\beta}_X = d \log X_{qi} / d \log P_{Xqi} = (d X_{qi} / d P_{Xqi}) \cdot (P_{Xqi} / X_{qi})$$

$$\text{and } \hat{\beta}_M = d \log M_{qi} / d \log P_{Mqi} = (d M_{qi} / d P_{Mqi}) \cdot (P_{Mqi} / M_{qi})$$

they represent the export elasticity (e_{2X}) and import elasticity (e_{1M}) respectively.

From Table 5 the values of β and β are estimated at 0.431 and - 1.321 respectively. Since $|e_{X^M}^{1M}| + |e_{2X}| = 1.752$ is greater than unity, the elasticity values confirm that a positive value of k represents the rate of devaluation for the study period.

Now, for the value of $dB = 44,171$, $X_f = 18,934,593$, $e_{1M} = - 1.321$, and $e_{2X} = 0.431$ as derived above, the rate of devaluation, k , is estimated at 0.31 per cent. Since it is of positive value, we infer that Bhutan experienced devaluation at her exchange rate during the study period. Given the values of elasticities, this was the maximum value of k that could generate the given level of trade surplus. If other relevant factors, mentioned above, exerted favourable impacts on the balance of trade, the value of k might have been lower. We, therefore, infer that there was very insignificant level of devaluation in Bhutan during the study period.

Section V: Conclusion

Our study generates six observations. Firstly, prices of most of the important export and import goods increased during the study period. Out of ten important export commodities, the price of only one commodity fell during both the War phase and the post-War phase while that of one each was lower in one of these phases. Again, out of ten important import items, price of seven went up in both these phases, and those of three alternated their directions of change. Secondly, the price-quantity relationships for six export commodities have been found statistically significant. Out of them, the exports of three commodities that were short in exportable surplus were supply-determined, and those of other three commodities, mainly of forest origin, were demand-determined. Thirdly, the similar relationship for eight import articles have been statistically found significant, and imports of all of them were demand-determined. Certainly the trade relation between a large and a small country generates such a feature. Fourthly, six out of eight important import goods have been found to be elastic in their respective prices and four out of six important export goods to be inelastic. Since all the important import articles were demand-determined, elastic nature of those commodities reduced their values of import in the phase of rising price. Inelasticities of export products also exerted favourable impact in the phase of rising price on the value of export even for those commodities whose price were demand-determined. Note that the value of export for the commodities, whose prices were supply-determined, always increases due to higher price. Thus, the price elasticities of import and export that Bhutan confronted during the period of study were very congenial for the economy. Fifthly, the balance of trade was surplus for Bhutan throughout the study period, and it underwent steady improvement over years. Lastly, the devaluation of domestic currency has been worked out at 0.31 per cent during the study period. If other economic and political factors generated favourable impacts on the trade balance, the rate of devaluation might be less than that.