

An Analysis of Government Expenditure And Its Impact On Imports Money Supply and Prices In Nepal

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Introduction

Government expenditure policy has always been a matter of great concern for a number of people throughout the world. Among economists and politicians, it is now more than a fashion to criticize government expenditure policy of any nature. But, however, the fashion looks quite natural, if one realizes the prospective wider effects that it can have on the economy. But, despite its growing criticism, governments of developing countries are not in a position to curtail their expenditures drastically. One big reason is the welfare-oriented nature of the government policy itself.

Expansionary government expenditure policy is quite likely to have adverse effect on the balance of payments situation, money supply and the domestic price level. In this regard, a number of studies has been made specially in developed countries to design a budget measure that would indicate whether a budget is expansionary, neutral or contractionary in nature in relation to a norm. But the design of an appropriate norm and the qualitative appraisal of the budget with the help of the norm is quite difficult to make in underdeveloped countries. Rather, the analysis of a quantitative relationship between government expenditure policy and certain key variables of the economy will be of much more help to make some sort of appraisal of the budget.

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The present paper tries to develop this sort of norm in the context of Nepal, by quantifying the impact of a change in the government expenditure policy on imports, money supply and domestic price level.

Some Theoretical Relationships:

Government expenditure can affect the economy in a number of ways, most important among them are through such macro variables as imports, exports, GDP, money supply and domestic price level. A simple macro framework can be taken to show the relationships more explicitly. For an open economy, like Nepal.

$$\text{Let, } Y = X + G + E - M \dots \dots \dots (1)$$

where,

Y —GDP, E =Exports F.O.B, M =Imports C.I.F.

G =Govt. Expenditure and,

X =Private total expenditure (or non-Govt. expenditure)

G & X include both consumption and investment expenditures in the respective sectors. Rearranging equation (1)

We have,

$$Y + M = X + G + E \dots \dots \dots (2)$$

The left hand side of (2) refers total supply during a period of time, while the right hand side refers to total demand during the same period, that is, supply at any period equal demand at the same period.

Again rearranging (2). we have,

$$G = (Y + M) - (X + E) \dots \dots \dots (3)$$

Equation (3) shows that an increase in G will have to be balanced either by an increase in total supply, i.e., $Y + M$ or by a corresponding decrease in private plus foreign demand, i.e. $X + E$ or by a change in both. Now, to show the relationship between G and other variables, (3) needs much closer look. Increase in total supply (to balance increase in G) needs either an increase in GDP, i.e., Y , or import M or both. If both fails to increase by the desired

amount, total demand will exceed total supply and the consequences will be on domestic price level, P. If total supply increases with an increase in G, the likely increase will be on M rather than on Y. It is so because,

- (1) Increase in Y with an increase in G needs a long time lag, while
- (2) Increase in M is relatively easier more over the demand component in G may be such that it has to be imported from outside (due to non or lesser production inside the country) which means increase in M.

Now, even if supply is increased with an increase in M, the import price will affect domestic price, thereby causing it to rise further.

Similarly, to increase in G is balanced by a corresponding decrease in X+E, then either X or E has to decrease or change in both has to be made. But, decrease in X or E or both is quite unlikely since.

- (1) With a growing number of population in developing countries X is bound to increase and,
- (2) decrease in E will create decrease in foreign exchange earnings (which they need most) and balance of payments difficulties.

Thus, increase in G will add existing demand and push domestic price upward.

Now let us see the other side of the coin. Total government expenditure in developing countries generally consists of three components, viz,

- 1) Government revenue, R,
- 2) Foreign borrowings, FB (includes both loans and grants) and
- 3) Deficit financing D (includes public borrowings and use of government cash balance)

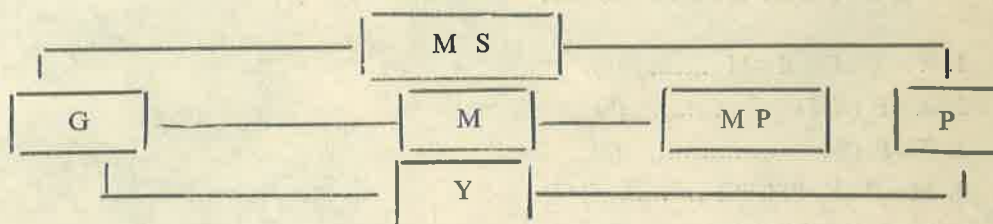
That is, algebraically,

$$G=R+FB+D\text{.....(4)}$$

Financing G through FB or D will increase money supply MS, the former through increase in foreign assets and the latter through increase in claims on government. The increase

in MS will be more faster, since increase in P and the expectation of further increase in P corresponding with growing level of monetization in the economy will make people demand more money, thereby increasing MS.

The relationship of G with other variables is shown in the following simple flow-chart:



The relationship of the variables thus needs general equilibrium type of model to explain. We have tried in this paper to develop such model to explain the relationship in Nepal.

Methodology:

Short-term fiscal impact on import, domestic price level and money supply is measured during this time period. Three separate methods are used here to measure the fiscal impact on price, money supply and imports.

- 1) General macro economic model: to reduce from equations of the model is used to test the significance of the relationship between government expenditure with imports price and money supply respectively.
- 2) Beta coefficients are used to determine the importance of government expenditure in determining imports, prices and money supply respectively, and,
- 3) Hansen stabilisation index is used to measure the stabilising or destabilizing character of expenditure policy of the government during the period of study.

The Marco Economic Model:

The model adopted here is the model of an open economy (1). Short-term fiscal impact on such variables like import, price level and money supply has been tested with the help of the model.

The General Model:

The model consists of six structural equations and which has been reduced forms to three of equations as below:

A. Structural Equations:

1. $Y = X + G + E - M$(5)
2. $X = F(Y, T)$ (6)
3. $T = F(Y)$ (7)
4. $M = F(Y, PM, ES)$(8)
5. $P = F(Y, PM, MS)$ (9)
6. $MS = F(G - T, Y, P)$(10)

B. Reduced Form Equation For M, P & MS

1. $M = F(G, E, PM)$ (11)
2. $P = F(G, E, PM)$ (12)
3. $MS = F(G, E, PM)$ (13)

Endogenous Variables:

$Y = \text{GDP}$; $X = \text{Private expenditure (Both cons. \& inv.)}$

$M = \text{Import}$

$T = \text{govt. Revenue}$

$P = \text{Domestic consumer's price index}$

$MS = \text{Money supply (narrow money)}$

Exogenous Variable:

$G = \text{Government total expenditure}$

$E = \text{Exports}$

$PM = \text{Import price index}$

Except PM & P all other variables are expressed in current price.

Altogether there are six structural equations, of which the first refers to identity, and the rest the behavioral equations.

Since our objective is to quantify the relationship between govt. expenditure with imports, prices and money supply respectively, it is not necessary to specify and test the entire model. By solving the model, three reduced form equations for M, P & Ms are obtained which, when tested, will provide fiscal impact measures.

Short-Term Impact Measure:

Deviations from the trend method are used to measure the short-term fiscal impact on the respective variables. Assuming deviation from the trend of GDP to be equal to the algebraic sum of deviations from the trend of private expenditure, government expenditure, imports and exports as:

$$\bar{Y} = \bar{X} + \bar{G} + \bar{E} - \bar{M} \dots \dots \dots (4)$$

(Bar above the variable indicates deviation from their respective trends). The overall assumption of the model is that when all variables assume their trend values, supply and demand in the economy are equal.

The reduced form equation from the above model can be written as :

$$1. \bar{M} = f (\bar{G}, \bar{E}, \bar{PM}) \dots \dots \dots (15)$$

$$2. \bar{P} = f (\bar{G}, \bar{E}, \bar{PM}) \dots \dots \dots (16)$$

$$3. \bar{MS} = f (\bar{G}, \bar{E}, \bar{PM}) \dots \dots \dots (17)$$

And the model in the estimating form can be written as:

$$1. \bar{m} = M_0 + m_1 \bar{G} + m_2 \bar{E} + m_3 \bar{PM}$$

$$2. \bar{P} = P_0 + P_1 \bar{G} + P_2 \bar{E} + P_3 \bar{PM}$$

$$3. \bar{Ms} = a_0 + a_1 \bar{G} + a_2 \bar{E} + a_3 \bar{PM}$$

All coefficients are assumed to be positive except the intercepts, P_0 , a_0 , and m_0 , which should be zero, implying that, imports, prices and money supply will be on trend, when all exogenous variables are on trend.

Besides the structural model, the following two methods are also used to check the consistency of the results:

2 Beta Co-efficients:

Beta coefficients are used to measure the impact of government expenditures on domestic price level, money supply, and imports. The coefficient is defined as the regression coefficient times the ratio of the two respective standard deviations. In the present case the Beta coefficients of government expenditures are given by,

$$\text{Beta}_g = b_g (Q_g / Q_z)$$

Where, b_g = Regression coefficient of government expenditures on price, or money supply, or imports,

$$Q_g = \text{Standard deviation of } \overline{G},$$

$$\text{and, } Q_z = \text{Standard deviation of } \overline{P, M}, \text{ or } \overline{MS}.$$

The interpretation of Beta_g is that, variations in the dependent variable, that is \overline{M} , \overline{MS} or \overline{P} , would have been Beta_g times the observed variations, if government expenditure alone would have determined the course of the dependent variables, i.e., \overline{P} , \overline{M} , and \overline{MS} , assuming \overline{X} , \overline{PM} , etc., to be always equal to zero. Now if,

- a) $\text{Beta}_g > 1$, the government expenditure has been a major factor in determining the course of imports, money supply, and price;
- b) $\text{Beta}_g = 1$, the observed variations in government expenditures would have produced similar variations in \overline{P} , \overline{M} , and \overline{MS} ; and,

c) $\beta_g < 1$, the government expenditure has been only a minor factor in determining the course of \bar{M} , \bar{MS} and \bar{P} .

Case a) and c) shows the important impact of government expenditure on M , MS and P , whereas case b) shows an insignificant impact of government expenditure on the respective variables.

Hansen Stabilization Index :

Hansen stabilisation index is used here to measure the nature of short-term stabilization or correspondingly destabilization effects of government expenditures on price, supply and imports.

The impact is said to be stabilizing in nature, when the actual deviation of imports, money supply and prices from their trend is smaller in absolute term than the deviation that would have occurred with no change in expenditure policy, i.e., if government expenditures would have been in trend. The stabilization index is given by,

$$HSI = (1 - \frac{\sum z_t}{\sum z_t^1}) \cdot 100$$

Where, $\sum z_t$ = sum of M , or P or MS ;

$\sum z_t^1$ = Sum of estimated M , P , or MS assuming that $\Delta G_t = 0$ for all t .

Now if 1. $\sum z_t > \sum z_t^1$, HSI will be positive, indicating a stabilizing government expenditure policy;

2. $\sum z_t < \sum z_t^1$, HSI will be negative, indicating a destabilising government expenditure policy;

3. $\sum z_t = \sum z_t^1$, HSI will be zero, indicating a government expenditure policy, which is neither stabilizing nor destabilizing in nature; and

4. $Z_t = 0$, HSI will be 100, indicating a perfectly stabilizing government expenditure policy.

But, however, if the regression coefficients of government expenditures on price, imports and money supply are insignificant, it will automatically indicate the neutral role of government policy on respective fields, and hence, no need to calculate HSI.

Data Source And Explanation:

The period taken for the present study is from 1964/65 to 1978/79. Data for the study has been collected from different sources such as Nepal Rastra Bank quarterly bulletins, CBS, International Financial Statistics, HMG budget speeches, etc.

Government expenditure, G , refers to the actual total expenditure by government, except for the year 1978/79. Export and import refer to export, f.o.b., and import c.i.f. value, and it does not include export and import of services, simply because of the non-availability of respective data.

Domestic price index refers to the weighted price index for Kathmandu. Since no weighted price index data of the entire economy for the study period are available, Kathmandu weighted price index is taken as a proxy for the period.

Import price index has been estimated by adjusting the Indian wholesale price index with exchange ratio and C.I.F. to f.o.b. import value index from India. Since India is the major trading partner during the study period, the import price index thus derived may well represent as a proxy by the actual import price for Nepal.

The figure thus estimated is though a proxy for the import price index of Nepal, but one can rely on it looking at the share of imports from India to total imports during the study period.

The Empirical Results:

The reduced form equations estimated for the measurement of short-term fiscal impact give following results :

$$\bar{M} = 24.3617 + 1.6216 \bar{G} - 0.2711 \bar{E} + 7.5709 \bar{P} M$$

(0.6216) (3.6521) # (-0.6811) (2.879) # #

$$\bar{R}^2 = 0.6452, \quad F = 9.4846$$

$$\bar{P} = 0.8725 + 0.0090 \bar{G} + 0.0176 \bar{E} + 0.3143 \bar{P} M$$

(0.4875) (0.4127) (0.8824) (2.5058) # #

$$\bar{R}^2 = 0.4757, \quad F = 5.2337$$

and,

$$\bar{M} S = 20.8422 + 0.9263 \bar{G} + 0.0840 \bar{E} - 1.039 \bar{P} M$$

(1.0144) (3.7208) # (0.3765) (-0.7215)

$$\bar{R}^2 = 0.5427, \quad F = 6.5388$$

t- Value in parenthesis indicates

Significant at 1% level.

Significant at 5% level.

Significant at 10% level.

The estimated reduced form equation shows the relationship between government expenditure with Import, M, price level, P, and money supply, Ms. The equation shows quite interesting results. As expected, government expenditure, G, has been significantly prominent in influencing changes in import and money supply, whereas contrary to our expectation, it is significant in determining the changes in domestic price level, P. The table 1 (below) summarizes the result :

Table 1
Government expenditure impact on money supply, import and price

	\bar{G}	t-value
\bar{M}	1.6216	3.6521 #
\bar{P}	0.0090	0.4127
$\bar{M} S$	0.9263	3.7208 #

Thus, during the period 1964/65 to 1978/79, changes in government expenditure have been found mainly responsible for increasing imports and money supply, which seems quite natural. For the growing government development expenditure can be said to be partially responsible (other and more prominent may be the private demand), for the rapid increase in imports and secondly the deficit in the government budget, to finance growing expenditures may have caused money supply to increase substantially. Hence the positive and highly significant relationship of government expenditure on imports and money supply.

But surprisingly, government expenditure during the period has been found to have very low and insignificant influence in changing domestic price. Rather import price PM has been found significantly effective in determining the course of domestic price level. One can very well understand the influence of import price on domestic price level, but one would find difficult to explain the insignificant role played by government expenditure in influencing price level. Let us find some possible explanations. Starting with the flow chart shown above government expenditure in Nepal consists of development expenditures and regular expenditure. Hence the possible transmission of government expenditures on price may be through either one or the combined path of the following:

- 1) Increase in government expenditures (especially development expenditure) causes imports to increase (due to supply bottlenecks in main capital & construction items) and thus, through import price it may increase domestic price.
- 2) Increase in government expenditure (due to increase in deficit financing) causes money supply to increase, and this may cause an increase in the demand for goods and services leading to rise in price and
- 3) Increase in government expenditure causes rise in the demand for goods and services from channels other than above two such as through new employment generation, etc., causing price to rise.

Thus from the above reasoning, it is now clear that government expenditure influences domestic price level through increased demand in imports, increase in the demand for domestic goods and services and through increasing the supply of money. Money supply has been found quite sensitive towards government expenditure policy, a little bit less towards GDP a proxy for domestic demand for goods and services, and is significant towards domestic price. A regression analysis of these shows,

$$\begin{aligned} \bar{M}S = & 48.2982 + 0.9220 (G+T) + 0.0610Y \\ & (0.2791) \quad (5.0960)\# \quad (1.3833)\#\#\# \\ & -0.0865 P \\ & (-0.215) \\ \bar{R}^2 = & 0.9824 \quad F = 204.2108 \end{aligned}$$

Where $G-T$ refers to the volume of deficit in the budget. The result shows deficit in the budget as having a significant positive effect on money supply. Similarly, the positive and significant coefficient of Y indicates a possible influence in money supply due to

- 1) More demand for goods and services leading to an increase in demand for money to satisfy it; and
- 2) The growing process of monetization in the economy which demands more money to satisfy it (this point will be further discussed later).

The deviation form of the above equation gives,

$$\begin{aligned} \bar{M} = & 20.7550 - 0.0227 \bar{Y} + 0.9527 \bar{G} + 0.1938 \bar{P} \\ & (0.0086) \quad (-0.5205) \quad (4.14)\# \quad (0.0555) \end{aligned}$$

G is again highly significant and Y is negative but insignificant. Hence, it does not contradict the above reasoning at least for the long run. P in both cases is insignificant showing that it has no role as such during the period to influence money supply. Regression of P with other prominent variables give following results:

$$\begin{aligned} P = & 32.8196 + 0.0065 Y + 0.2597 PM + 0.0088 MS \\ & (5.0731) \quad (2.4463)\#\# \quad (1.7610)\#\#\# \quad (0.746) \\ \bar{R}^2 = & 0.9860 \quad F = 328.7346 \end{aligned}$$

The result shows import price PM , and domestic demand for goods and services Y as the prominent determinant of consumer price level in Nepal, with the former more influential than the latter. Money supply seems to have insignificant role in influencing price level in the country during the study period. It may be because of the major portion of the money supplied

in the economy goes to meet the demand for it in the large non-monetized sector of the economy to make the sector gradually monetized, The above hypothesis can be supported from the trend of income velocity of money in Nepal during the period as shown in table- 2

Table 2

Income Velocity of Money:

F. Y.	Income Velocity of Money
1964/65	14.06
1965/66	14.84
1966/67	12.63
1967/68	12.99
1968/69	12.77
1969/70	12.87
1970/71	12.61
1971/72	13.53
1972/73	10.99
1973/74	11.20
1974/75	12.39
1975/76	11.98
1976/77	9.33
1977/78	9.51
1978/79	8.53

The income velocity of money is defined as a ratio between GDP to money supply. The table shows downward trend of income during the period 1964/65 to 1978/79, from a high 14.84 in 1965/66 to a low 8.53 in 1978/79. The reason for the decreasing trend in income velocity goes to the gradually increasing degree of monetisation in the economy. Since as the non-monetised income flows are being drawn into monetised sector, money has to cover a wider area of economic transactions for the same level of income and consequently, the income velocity of the money goes down. Thus, decreasing trend in income velocity during the period supports our hypothesis that large portion of the increase in money supply goes to monetize the economy rather than to increase price level. It thus throws some light for not influencing the level

of price in the country significantly, during the study period.

Now the only possibility of government expenditure to increase price level is either through imports or through increase in the demand for domestic goods and services.

If one looks at the nature of the government import demand, one can argue that the import content of government expenditure can affect price only indirectly (and not directly) because of the capital goods nature of government imports. The detailed analysis in the aspect is not possible at this stage because of the non-availability of related data.

Thus, the only possible way that government expenditure can affect price level is through increase in the demand for domestic goods and services. But if we look at the percentage share of government expenditure on GDP, we will find that the share during the period is only 9.96 % on average from a low 5.53% in 1965/66 to a high 14.58% in 1978/79. The very low share of government expenditure on GDP raises doubt as to the validity of its influence on price level significantly; one can but say that government expenditure could have only a little role in influencing price changes through increase in demand for domestic goods and services.

The correlation matrix given below in table - 3 shows that government expenditure though has a significant short-term impact on imports and money supply, it has little to do with changes in the domestic price level.

Table 3

Zero-Order Correlation Matrix of Some Important Variable

	G	E	M	PM	P	MS	Y
G	1.0	0.52	0.71	0.23	0.35	0.79	0.16
E		1.0	0.47	0.54	0.59	0.41	0.32
M			1.0	0.62	0.10	0.54	0.51
PM				1.0	0.72	0.11	0.73
P					1.0	0.19	0.74
MS						1.0	0.0017
Y							1.0

Looking at the correlation matrix above the largest impact of government expenditures during the period seems to be on money supply followed by imports and exports but to Y and P it is very low. The most important determinant of changes in price level seems to be the increase in the domestic demand followed by changes in import price and volume of export.

Importance of Government Expenditure Impact:

As discussed above, Beta coefficient measures the importance of government expenditure on import price and money supply.

One very common way to measure is to see the significance and value of regression coefficients of government expenditures in the respective equations, the coeff. of government expenditures in these equations should be large indicating that one rupee deviation from the trend of government expenditures has a large impact on imports, money supply and prices. But government expenditure during the period may also have fluctuated widely. If it did not, the total impact on dependent variables cannot be large. Hence, regression coeff alone cannot measure the actual impact on dependent variables. Thus, what is needed is a combination of the two that can take into account the fluctuations in government expenditure as well as its relationship with dependent variables. Beta-coeff. serves our purpose, since, it takes both into account. Estimation of $Beta_g$ for the study period gives:

Table 4

Variables	$Beta_g$
Imports	0.6404
Price level	0.0937
Money supply	0.7847

Surprisingly, the result above shows the value of $beta_g$ in all three cases as less than one, indicating that government expenditure policy during the period has only been a minor factor influencing the variation in imports, price and money supply in the country. The results are quite contrary to the belief we share most commonly and, hence, need further justification. A look at the pattern of deviations, given by standard deviations of the variables, shows imports

fluctuating most widely from its trend followed by,

Table 5

Standard Deviations of Some Variables

<u>Variables</u>	<u>Standard Deviations</u>
1. Import	249.4764
2. Price	9.4585
3. Gov. Exp.	98.5234
4. Money supply	116.3088
5. Import price	17.3963

Domestic price level seems to have followed its trend most closely.

A closer look at the determinants of money supply (among domestic credits only) during the period shows:

$$MS = 414.5669 + 0.4413 CG - 0.1442 CGE + 1.2758 CPS$$

$$(6.8801) \# (2.3630) \# (-0.5859) \quad (7.1493) \#$$

$$\bar{R}^2 = 0.9823 \quad F = 260.54$$

Where,

CG = Claims on government

CGE = Claims on government enterprises

CPS = Claims on private sector.

The result above clearly reveals the dominance of "Claims on private sector" in determining money supply among domestic credit components that influence money supply in Nepal. The role of total domestic credit in determining money supply during the period can be seen from the following result:

$$MS = 27.7060 + 0.4581 NFA + 0.4539 DC - 0.2151 TD$$

$$(5.0908) + (4.8770) + (4.3489) + (-0.8568)$$

$$\bar{R}^2 = 0.9939 \quad F = 763.6207$$

Where,

NFA = Net foreign assets

DC = Domestic credit

TD = Time deposits

The above results clearly explain the less than proportionate ($BETA_g < 1$) effect of government expenditure on fluctuations in money supply.

About import, if we take machinery and equipment components of total imports (classification in NRB bulletines) as a proxy for government imports (since government import figures are not available), it never exceeds 20% of total imports during the entire period of study. Therefore, it can effect very little in the fluctuations in total imports during the period. Hence, a low value of $Beta_g$. About price, we have talked enough; hence the result $Beta_g < 1$ does not surprise us. Thus it seems that government expenditure has contributed less than proportionately to the size of fluctuation in imports and money supply but not in price level since the value of $Beta_g$ for price level is close to zero.

It indicates government expenditure as having insignificant contribution in increasing price level during the period.

Hansen Stabilization Index:

Hansen stabilization index has been used here as a measure of the stabilizing or destabilizing nature of government expenditure policy on imports, money supply and price during the period. The result obtained is presented as follows:

Table 6

<u>Variables</u>	<u>HSI</u>	<u>Remarks</u>
Imports	-55.12 %	Destablizing
Money supply	-56.99 %	Destabilizing
price level		neutral

Hansen stabilization index estimated above shows government expenditure policy: destab-

bilizing more for imports and money supply, but neutral in relation to price level. The index shows, government expenditure policy during the past has only contributed to the size of the fluctuations around the import and money supply trend but not to price level; but government expenditure policy has been neutral in nature when we take account of domestic price level.

Conclusion

Combining the results shown by the three different tests made above, we can conclude that,

- (1) Government expenditure policy during the past has contributed to the size of fluctuations in imports from its trend; but the contribution is low though not negligible. The most important determining factor becomes the variation in import price and the imports by the private sector.
- (2) Government expenditure policy in the past, is found to have contributed to the size of fluctuations in money supply from its trend. But the contribution is relatively low compared to the contribution made by other sectors especially the changes in net foreign assets and credit to private sector.
- (3) Government expenditure policy during the past has virtually contributed nothing to the size of fluctuation in domestic price level. Rather, during the period, the policy seems to have been neutral towards price level.
- (4) Fluctuations in price level during the period has been the result of fluctuations in import price (prominent factor) and fluctuations in domestic demand for goods and services (less important factor).
- (5) Increase in money supply during the period goes more to monetize the economy rather than to increase domestic price level.

Note

- (1) Nepal with an open border with India and having 18.68% as the share of total foreign trade volume to GDP (1978/79) can be taken as an open economy.
- (2) The methods used to estimate the trend line of a variable is of the form

$$\ln Z = a + b t$$

Where,

Z is the respective variable and t the time. The method is justified since, the rate of growth of rev. (17.14%) and government expenditure (17.37%) per annum at current price are very close during the period.

- (3) From 1964/65 to 1977/78 the share of imports from India to total import comes roughly on average 84.68% from a high 98.49% in 1964/65 to a low 61.92% in 1975/76.

