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Determinants of Government Revenue Share – A Case Study of Nepal

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Introduction

This paper, basing on empirical findings, deals with the factors responsible in determining government revenue share in Nepal's tax structure for the period 1964–65 to 1980–81. In this context the relationship between total revenue to GDP (R/Y) with various other independent variables like per capita GDP (Y_P), export – GDP ratio (X/Y) and import – GDP ratio (M/Y), export plus import GDP ratio (X+M)/2Y, share of agricultural (A_Y) and non-agricultural (NA_Y) sector to GDP and the ratio of money supply to GDP (M_S / Y) has been examined in order to identify as to what extent these variables influence the level of revenue or government revenue shares in the total tax structure. Finally, earlier works on factors affecting government revenue shares have also been reviewed in detail.

The present study has three stages based on the importance attached to the independent variables. Employing the step-wise regression technique, several combinations of different parameters have been estimated. A generalised convention has been followed regarding the weight of the independent or explanatory variables. For example, the per capita income has been considered a primary variable affecting the revenue–GDP ratio (R/Y). Likewise, the export and import ratio and export plus import ratio to GDP have been considered primary-cum–secondary variables influencing the R/Y ratio. Finally, money supply and the share of agriculture and non–agriculture sectors to GDP have been considered as secondary variables.

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In fact, this analysis is primarily focussed on, firstly, whether the per capita income (Y_P) is reliably associated with the government revenue shares (R/Y); and secondly, whether a better index exists in lieu of the per capita income.

A long run post-Keynesian viewpoint supports the argument that if the sum of marginal propensities to consume, invest and export, tends to fall as income level rises the government revenue share must grow larger to maintain a full employment equilibrium over time.[1]

Two important elements involved in the process of increasing government revenue shares are the **structural change** in the economy encompassing industrialisation, urbanisation, specialisation and productivity and income changes- a change that leads to greater share of national income and the **ideological change** both in time and in the course of social mobilisation itself. Both these changes should complement each other for a "welfare state" and/or towards the "security and defence" of the existing ideological system.[2]

Influence of Per Capita Income (Y_P)

The per capita GDP (Y_P) was found to be a strong variable, significantly related to variations in the tax ratio of Nepal. As can be seen from equations (1) and (2) the per capita income was a good predictor of the R/Y ratio. The $\bar{R}^2$ values were significant both for simple and log linear fit. The simple and log linear equations are:

$$R/Y = 2.0860 + 0.0035^{**} Y_P \quad (4.7589) \quad (9.4607)$$
$$\bar{R}^2 = 0.85; \quad D.W. = 1.16 \qquad \ldots\ldots\ldots(1)$$

$$\log R/Y = -3.0321 + 0.6900^{**} \log Y_P \quad (-5.5853) \quad (8\ 8056)$$
$$\bar{R}^2 = 0.83; \quad D.W. = 1.28 \qquad \ldots\ldots\ldots(2)$$

With one more explanatory variable in the above equations the relationship was found to be highly signficant at one per cent level for per capita GDP with a high level of $\bar{R}^2$ (0.84).

1 Hinrichs, Harley, H., "Determinants of Government Revenue Shares Among less Developed Countries" *The Economic Journal* Vol. 65, September, 1965; p. 549.

2 C. F. Marinus Van Der Mel, *Fiscal Burden and Pattern of Current Revenue in Various Countries,* IBRD Report No. EC-60, (Washington : Feb. 21, 1958) and Harley H. Hinrichs and Richard M. Bird "Government Revenue Shares in Developed and Less Developed Countries" *Canadian Tax Journal* Vol. 11, September-October 1963; pp. 431-37.

The results were found to be equally significant for per capita GDP in all five combinations when regressed with total revenue to GDP (R/Y) ratio. Further more, it was justified by obtaining a logarithmic fit which was found to be highly related with R/Y ratio.

On the contrary, export-GDP ratio was found to be an insignificant factor affecting the level of the government revenue share in Nepal's tax struture. This may be attributed to the inability of HMG/Nepal to promote and diversify the international trade with overseas countries and the exportable items were largely confined in traditional areas for a long time. That is why the contribution of export duty to the total customs duties declined from 13.3 per cent in 1964-65 to approximately 5.1 per cent in 1981-82. The relation between per capita income and R/Y ratio, when export-GDP ratio was introduced, can be seen in the following equations:

$$R/Y = \underset{(1.3961)}{1.6988} + \underset{(8.8151)}{0.0036^{**}\ Y_P} + \underset{(0.3378)}{0.0572\ X/Y}$$

$$\bar{R}^2 = 0.84;\ D.W. = 1.06 \qquad \text{.....(3)}$$

$$\log R/Y = \underset{(-4.2157)}{-3.2316} + \underset{(8.1883)}{0.7009^{**}\ \log Y_P} + \underset{(0.3804)}{0.0710\ \log X/Y}$$

$$\bar{R}^2 = 0.82,\ D.W.\ 1.16 \qquad \text{.....(4)}$$

The relationship between the R/Y ratio and per capita income was examined with another independent variable, and was found to be highly significant in both the multiple and log linear fit. The independent variables used, apart from the per capita income, were export-GDP ratio, import-GDP ratio, export plus import-GDP ratio, the share of GDP from agriculture, the share of GDP from the non-agricultural sector and the money supply ratio to GDP. The per capita income in all the cases was found to be occupying a predominant position as compared with other variables. For example, when per capita income along with the import ratio was regressed with R/Y ratio, the result was found to be significant with respect to Y_P . This can be seen in the following equations:

$$R/Y = \underset{(3.8837)}{2.3676} + \underset{(7.7931)}{0.0037^{**}\ Y_P} - \underset{(-0.6883)}{0.0458\ M/Y}$$

$$\bar{R}^2 = 0.84;\ D.W. = 1.33 \qquad \text{.....(5)}$$

$$\log R/Y = -3.0990 + 0.7595^{**} Y_P - 0.1745 \log M/Y$$
$$(-5.7894) \quad (8.0249) \quad (-1.2578)$$
$$\bar{R}^2 = 0.83; \text{ D.W.} = 1.63 \quad \ldots\ldots\ldots(6)$$

The predominance of per capita income in determining government revenue share in Nepal's tax structure is a clear evidence that the contribution of other factors has been minimum over the years and to what extent variables will affect the level of tax revenue share in an economy may largely depend on the level of economic development.

Furthermore, when the per capita income along with the combined ratio of export plus import ratio to GDP $(X+M)/2Y$ was regressed with R/Y ratio the regression coefficient for per capita income was found to be significant at one per cent level, though that of R/Y ratio was found to be insignificant. The equations are given below:

$$R/Y = 2.3704 + 0.0036^{**} Y_P - 0.0448 (X+M)/2Y$$
$$(2.9118) \quad (8.4325) \quad (-0.8184)$$
$$\bar{R}^2 = 0.84; \text{ D.W.} = 1.28 \quad \ldots\ldots\ldots(7)$$

$$\log R/Y = -2.9388 + 0.7199^{**} \log Y_P - 0.1417 \log (X+M)/2Y$$
$$(-5.5420) \quad (8.2529) \quad (-0.8184)$$
$$\bar{R}^2 = 0.82; \text{ D.W.} = 1.56 \quad \ldots\ldots\ldots(8)$$

In the next step three independent variables, including the per capita income were regressed with the R/Y ratio and the results were found to be significant for the per capita income. In different combinations which were tried, inclusive of per capita income, regression coefficient for per capita income was found to be significant at one per cent level. This was further justified by the log linear fit. In the case of the three variables the value of regression coefficient of per capita income was very high when it was regressed along with the GDP from the non-agricultural sector and import-GDP ratio with R/Y ratio. The equations are:

$$R/Y = -2.1283 + 0.0032^{**} Y_P + 0.1865^{**} NA_Y - 0.1539^{*} M/Y$$
$$(-1.4998) \quad (7.6830) \quad (3.2603) \quad (-2.5238)$$
$$\bar{R}^2 = 0.91; \text{ D.W.} = 0.88 \quad \ldots\ldots\ldots(9)$$

$$\log R/Y = -5.7023 + 0.6700^{**} \log Y_P + 1.0438^{**} \log NA_Y - 0.3720^{**} \log M/Y$$
$$(-5.6233) \quad (8.0447) \quad (2.8437) \quad (-2.8039)$$
$$\bar{R}^2 = 0.89; \text{ D.W.} = 1.14 \qquad \text{.....(10)}$$

Finally, in the presence of the four independent variables also the per capita income was found to be a signficant varible determining the R/Y ratio. This can be observed in the following equations.

$$R/Y = -2.2028 + 0.0033^{**} Y_P + 0.1796^{**} NA_Y - 0.1707^{*} M/Y + 0.0861 X/Y$$
$$(-1.5403) \quad (6.0388) \quad (2.9687) \quad (-2.3989) \quad (0.5025)$$
$$\bar{R}^2 = 0.90; \text{ D.W.} = 0.82 \qquad \text{.....(11)}$$

$$\log R/Y = -6.0649 + 0.7362^{**} \log Y_P + 0.9681^{**} \log NA_Y - 0.4363^{**} \log M/Y + 0.1856 \log X/Y$$
$$(-5.6917) \quad (7.0963) \quad (2.6005) \quad (-3.0029) \quad (1.0605)$$
$$\bar{R}^2 = 0.89; \text{ D.W.} = 0.96 \qquad \text{.....(12)}$$

Equtions (11) and (12) clearly show that the relationship between per capita income and R/Y ratio was found to be highly significant. The correlation cofficients were also very high in each case. From these observations an inference can be derived that per capita income had a dominating character in determining the tax revenue shares in the tax structure of Nepal.

Openness: Insignificant Importance of Foreign Trade Sector

An important question can be raised in a developing country like Nepal: why should openness be such an important factor in determining government revenne shares ?

Firstly, the indirect taxes as a function of customs duty, excise duty and sales tax constituted 66 per cent of the total revenue which is nearly 6 per cent of GDP, whereas the contri-

bution of custom duty alone was more than 50 per cent of the indirect taxes and 33 per cent of total revenue.[3]

Secondly, there was a spillover effect of the foreign trade sector's size on the ability to collect taxes elsewhere in the economy. The larger the size of foreign trade greater will be the degree of monetisation of the economy and also the predominance of "cash" crops rather than subsistence agriculture. Likewise, there will be an expansion of business units and urbanisation, and industrialisation will also increase.[4] A relatively large foaeign trade sector is associated with a high tax level due to administrative ease of taxing imports and exports. Furthermore the foreign trade variable serves as an index of monetisation.[5]

In our analysis 'openness' has been considered as a function of both the export and import ratio $(X+M)/2Y$. In connection with this, we had examined the case of export duties as the function of R/Y, separately. Through this hypothesis it was found that export ratio bore a negative relation with the R/Y ratio which did prove to be an insignificant determinant in both the simple and log linear fit. These equations are:

$$R/Y = \underset{(3.5424)}{8.3577} - \underset{(-1.0412)}{0.4234}\, X/Y$$

$$\bar{R}^2 = 0.0005; \quad D.W. = 0.29 \qquad \text{.....(13)}$$

$$\log R/Y = \underset{(3.4837)}{2.5094} - \underset{(-1.0725)}{0.4388}\, \log X/Y$$

$$\bar{R}^2 = -0.0009; \quad D.W. = 0.24 \qquad \text{.....(14)}$$

The fit marginally improved when the per capita income was introduced to export duty as an explanatory factor. However, the regression coefficient for export duty still remained insignificant.

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3 See M. K. Dahal, *Taxation in Nepal : A Study of its Structure, Productivity and Burden* (Ph. D. Dissertation, Bombay University : Bombay, August 1983)

4 See Stephen R. Lewis, Jr., "Government Revenue from Foreign Trade: An International Comparison, *The Manchester School of Economics and Social Sciences,* Vol. 31, No. 1, January.

5 See J. R. Lotz and E. R. Morss, "A Theory of Tax Level Determinants for Developing Countries", *Economic Development and Cultural Change,* Vol. 18, 1969-70; pp. 328-41.

The second relationship was examined, considering import ratio (M/Y) independently as a function of openness, and thereby determining the R/Y ratio. In this case, though the regression coefficient (0.2696) was found to be positive and significant at 5 per cent level, the value of R^2 was found to be too low. The log fit further reduced its t-values. The following equations give a detailed picture of the relationship of import-GDP ratio with R/Y ratio.

$$R/Y = \underset{(2.1901)}{2.9571} + \underset{(2.2893)}{0.2696^*}\ M/Y$$

$$\bar{R}^2 = 0.21;\ D.W. = 0.28 \qquad \text{.....(15)}$$

$$\log R/Y = \underset{(1.0056)}{0.6172} + \underset{(1.8418)}{0.4746^*}\ \log M/Y$$

$$\bar{R}^2 = 0.13;\ D.W. = 0.30 \qquad \text{.....(16)}$$

The results showed negative relationship when the import-GDP ratio was introduced as an explanatory variable (equations 5 and 6). By introducing two more variables (A_Y and M/Y) apart from the per capita income, relationship with R/Y ratio was found to be negative leading to the conclusion that the relationship between the import-GDP ratio and R/Y ratio was not satisfactory.

In the third case, when a combined ratio of export and import (X+M)/2Y was examined independently as an explanatory factor in determining the R/Y ratio, the results showed a positive relationship. However, the value of R^2 was too low in both the simple and log fit. This can be seen in the following equations:

$$R/Y = \underset{(1.5521)}{1.9970} + \underset{(1.5539)}{0.3477}\ (X+M)/2Y$$

$$\bar{R}^2 = 0.08;\ D.W. = 0.27 \qquad \text{.....(17)}$$

$$\log R/Y = \underset{(0,0948)}{0.7774} + \underset{(1.2381)}{0.4555}\ \log (X+M)/2Y$$

$$\bar{R}^2 = 0.03;\ D.W. = 0.21 \qquad \text{.....(18)}$$

But when the combined export and import-GDP ratio along with the per capita income was regressed with R/Y ratio, though the results showed a negative relationship, it was significant at 5 per cent level.

The Degree of monetisation (M_S /Y) as a factor responsible in determining R/Y ratio

It is indeed reasonable to hypothesize that, because of the administrative difficulties involved in the collection of taxes in kind the taxable capacity will be affected by the extent to which it is monetised.[6] In this context, the ratio of money supply to GDP (M_S /Y) would serve as an index. Money supply here is considered as a function of coins and notes put into circulation in an economy. The definition of money, however, could be expanded by employing some more variables like demand-deposits and time-deposits.

The relationship of M_S /Y was found to be positive and significant with respect to R/Y. Its correlation coefficent was also considerably high for both the simple and linear fit. The equations are:

$$R/Y = \underset{(-1.6418)}{-1.8622} + \underset{(6.9877)}{0.8584^{**}}\, M_S / Y$$

$$\bar{R}^2 = 0.75;\ D.W. = 1.34 \qquad \text{.....(19)}$$

$$\log R/Y = \underset{(-2.7463)}{-1.2452} + \underset{(6.0884)}{1.3636^{**}}\, \log M_S / Y$$

$$\bar{R}^2 = 0.73;\ D.W. = 2.02 \qquad \text{.....(20)}$$

From these results an inference can be drawn: there was a significant relationship between M_S / Y and R/Y ratio. In other words, M_S / Y was a very strong variable in determining the level of R/Y ratio. The relationship when examined by adding more explanatory variables, along with per capita income was found to be significant between M_S / Y and R/Y ratio. This could be seen in the following equations:

$$R/Y = \underset{(1.3771)}{8.6023} + \underset{(5.2025)}{0.0024^{**}}\, Y_P + \underset{(1.8442)}{0.2664^{**}}\, M_S / Y$$
$$\underset{(-1.3892)}{-0.1005}\, A_Y \quad \underset{(-1.2727)}{-0.9336}\, (X+M)/2_Y$$

$$\bar{R}^2 = 091;\ D.W. = 0.91 \qquad \text{.....(21)}$$

6 J. R. Lotz and E. R. Morss, op, cit., p. 330.

$$\log R/Y = \underset{(0.1473)}{0-.7073} + \underset{(4.6087)}{0.4994^{**}} \log Y_P + \underset{(1.6711)}{0.4279^{*}} \log M_S / Y$$
$$\underset{(0.9163)}{-0.1929} \log (X+M)/2Y \underset{(-0.7326)}{- 0.7206} \log A_Y$$
$$\bar{R}^2 = 0.88; \text{ D.W.} = 1.55 \quad \text{.....(22)}$$

It is true that the degree of monetisation does have an impact on the tax performance but it is only one of the dimensions of econmic development for which the per capita income serves as a partial proxy. There is also a problem in identifying whether a narrow or broader definition of money is acceptable to the developing countries.

Share of Agricultural (A_Y)vs. Non-Agricultural (NA_Y) Sectors as an Explanatory Factor

As observed in the following equations (Nos. 23, 24, 25 and 26) the relationship of the non-agricultural sector with R/Y ratio was found to be significant. The level of $\bar{R}^2$ was also very high. On the contrary, the GDP from the agricultural sector had a negative relationship with the R/Y ratio. The following equations, on the one hand, examine the relationship between GDP from the agricultural sector and the R/Y ratio and on the other, GDP from the non-agricultural sector and the R/Y ratio:

$$R/Y = \underset{(5.6454)}{28.6815} - \underset{(-4.4833)}{0.3470^{**}} A_Y$$
$$\bar{R}^2 = 0.54; \text{ D.W.} = 0.45 \quad \text{.....(23)}$$

$$\log R/Y = \underset{(4.0600)}{16.9099} - \underset{(-3.6424)}{3.6279^{**}} \log A_Y$$
$$\bar{R}^2 = 0.43; \text{ D.W.} = 0.32 \quad \text{.....(24)}$$

$$R/Y = \underset{(-2.2459)}{-6.0213} + \underset{(4.4855)}{0.3470^{**}} NA_Y$$
$$\bar{R}^2 = 0.54; \text{ D.W.} = 0.45 \quad \text{.....(25)}$$

$$\log R/Y = \underset{(-2.6866)}{-5.2896} + \underset{(3.5722)}{1.9889^{**}} \log NA_Y$$
$$\bar{R}^2 = 0.42, \text{ D.W.} = 0.30 \quad \text{.....(26)}$$

(Figures in the parentheses represent 't' values of the regression coefficients)

* Significant at 5 per cent level. ** Singificant at 1 per cent level.

Summary of the Regression Results for Goverment Revenue Shares (R/Y) as a Function of Selected Explanatory Variables and their combinations

Simple and log Linear Fit

1. The per capita income (Y_P) was found to be a highly significant variable, affecting the level of goverment revenue shares in Nepal's tax structure in both simple and long linear fit;

2. Next to the per capita income the degree of monetisation (Ms/Y) was found to be significantly related with R/Y ratio in both cases;

3. The ratio of foreign trade index (X+M/2Y) was found to be insignificant and therefore, it should not be considered a responsible factor in determining government revenue shares in the tax structure of Nepal;

4. When foreign trade components were regressed seperately, the relationship of the import ratio (M/Y) with R/Y ratio was found to be significant against export ratio which had a negative relationship with R/Y ratio. But the level of $\bar{R}^2$ was found to be very low in both the cases;

5. The share of GDP from the non-agricultural sector was mote significantly related with R/Y ratio in comparison to the share of GDP from the agricultural sector. Though the level of $\bar{R}^2$ was comparatively higher, GDP from the agriclutural sector maintained a negative relationship with R/Y ratio.

Multiple and log Linear Fit

1. In the case of multiple regression also the per capita income was found to be a key determinant of government revenue shares;

2. The reletionship was found to be equally significant when the degree of monetisation was regressed with R/Y ratio;

3. When the share of GDP from the agricultural and non-agricultural sector was added separately with the per capita income, and regressed with the R/Y ratio, the relationship was significant in both the cases. However, GDP from the agricultural sector showed a negative relationship.

4. When the per capita income was introduced to the import ratio and a combined export and import ratio, a negative relationship was found with dependent variable which was insignificant in both cases; the export ratio also maintained a positive but insigntificant relationship when per capita income was added and regressed with R/Y ratio;

5. In all the multiple and log linear fits when per capita income was used with other explanatory varirables the regression coefficients and correlation coefficients were found to be highly significant at one per cent level for per capita income.

Hence it can be said that the **per capita income** and **degree of monetisation** are highly responsible factors in determining goverment revenue shares. The other residual factor affecting the level and size of goverment revenue shares in Nepal, to some extent is **openness** (M/Y ratio only) of the economy.

Though the per capita income and degree of monetization appeared to be very influencial factors in determining the size of tax revenue in Nepal's tax structure, the per capita income at current market prices has risen at a slow pace. Its magnitude currently estimated is in the vicinity of $ 150. The income distribution is also said to be uneven in Nepal[7] and this is one good reason why the per capita income, in spite of its gradual rise may not affect the level of government revenue shares as it might otherwise have been the case.

It is already pointed out that the export – GDP ratio is not an effective factor in determining the size of government revenue share in Nepal's tax structure. Comparatively, the import – GDP ratio has given a better performance. But in an economy where the balance of trade is extremely unfavourable, the export – import ratio being approximately 1:3 excessive dependence on import duties as a source of revenue may prove abortive. Similarly, though the level of money supply can be considered as index of the degree of monetisation in Nepal, there is absence of national market due to extreme inaccessibility of many parts of the country. There is prevalence of barter system in remote areas. Under the circumstances it is doubtful whether the degree of monetisation will prove to be a significant factor in determining the level and size of the government revenue share in Nepal.

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7. See HMG/NPC, *A Survey of Employment, Income Distribution and Consumption Patterns in Nepal*, Summary Reports, Vol. I–IV, (NPC : Kathmandu, 1978), Chap. IX, pp. 113 – 27.

Finally, there has been a continuous and frequent disagreement on the choice of explanatory variables. One kind of generalisation is often made: goverement revenue shares increase with per capita income.

U Tun Wai has also asserted that such a relationship was important among the less developed countries.[8] However, to use per capita income as an index for government revenue shares is open to serious questions.[9] But why is the per capita income included in examining the relationship with tax revenue ratio ? It is simply that it had a considerable normative significance in considering taxable capacity and in assessing the tax effort.

On the other hand, there are sufficient grounds for believing that the share of the agricultural sector effects not only taxable capacity but also, perhaps more importantly, the willingness to tax, and therefore, it should be excluded. Per capita income is presumably included because it is a proxy for a potentially higher tax base on a larger 'taxable surplus'.[10] Similarly the argument that the agriculture sector should not be included in the group of explanatory variables is based on the assumption that the developing countries have found it difficult to tax agriculture adequately, for historical and political reasons.

Factors Affecting Government Revenue Shares: A Review of Contemporary Works

Predominance of Per Capita Income

The pioneering work of Martin and Lewis (1956) in a study of Sixteen developed and developing countries regarding tax ratio variations concluded that government revenue as a percentage of national income rises with the stage of development having fairly close relation with per capita income.[11] Harry Oshima ranked thirty-two countries and found a strong positive relation between the share of government revenue and the level of per capita income.[12]

8. See U Tun Wai, "Taxation Problems and Policies of Underdeveloped Countries", *IMF Staff Papers*, Vol. 9, No. 3, Nov. 1962.
9. Harley, H Hinrichs, *op. cit.*, p. 548.
10. R.M. Bird, "Assessing Tax Performance in Developing Countries: A Critical Review of the Literature" in J.F.J. Toye (ed.), *Taxation and Economic Development* (London: Frank Cass, 1978); p. 38.
11. See Alison M. Margin and W. A. Lewis, "Patterns of Public Revenue and Epxenditure". *Manchester School of Economic and Social Studies*, Vol. 24, No. 3, Sept. 1956; pp. 203 – 44.
12. See Harry T. Oshima, "Share of Government in Gross National Product for Various Countries", *American Economi Review*, Vol. 67, June 1957; pp. 381 - 90.

Likewise, in a sample of thirty-three developed and developing countries, Williamson's results also indicated a significant positive relationship between the tax ratio and the per capita income. The differences in the revenue share were, however found to be less pronounced than those in the per capita income.[13]

Openness and Other Factors

For the first time one more variable along with the per capita income was included by Plasschaert (1962) in his study as a determinant to explain variations in the ratio of government revenue to GNP.[14] Harley H. Hinrichs and R.M. Bird (1963) in their joint study, identified **openness** in terms of foreign trade, as one of the most illuminating factors attributing differences in tax rates.[15] Further on, Hinrichs (1966) in his study of forty developing and twenty developed countries proxied **openness** by imports/GDP ratio, and found it a significant determinant of the government revenue share.

He further asserted that the case was stronger with respect to low income developing countries.[16] Thorn (1967) found per capita income a significant determinant of the tax ratio as compared to import ratio to the national income.[17] Commenting on Hinrichs' hypothesis that the government revenue share varies, not so much with income, but rather with the degree of openness of the economy, Roe (1968) in this context, highlighted different implications to poorer countries. According to him, the size of the budget in the poorest countries will depend not so much on political or ideological commitment but in a predominantly subsistence economy, it will depend largely on the size of the foreign trade sector.[18]

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13. Jeffrey G. Williamson, "Public Expenditure and Revenue: An International Comparison", *Maochester School of Economic and Social Studies*. Vol. 39, January 1961; pp. 43–56.
14. See S. Plasschaert, *Taxable Capacity in Develoning Countries* (Washington D.C. : World Bank Report No. EC 103–1962).
15. See Harley H. Hinrichs and Richard M. Bird, *op.cit.*
16. See Harley H. Hinrichs, "Determinants of Government Revenue Sharing Among Less Developed Countries" *Economic Journal*, Vol. 76 Sept. 1965; pp. 546–56.
17. See Richard S. Thorn, "The Evolution of Public Finances During Economic Development", *The Manchester School of Economic and Social Studies*, Vol. 35, 1967; pp. 19–53.
18. See Alan R. Roe, "The Government Revenue Share in Poorer African Countries - A Comment", *The Economic Journal*, Vol. 78. 1968; pp. 479 – 81.

Lotz and Morss (1967), while examining the relationship between tax ratio differences and differences in per capita income and degree of openness, used the ratio of the sum of imports and exports to GNP. Both income and openness were found to be significant explanatory variables positively related to the tax ratio. However, they noted that the tax ratio for developed countries was more a function of political preference than a function of taxable capacity.[19]

In a later study of Lotz and Morss (1970), additional variables like degree of monetisation, export composition and the level of government centralization were introduced.[20] Their results suggested that the availability of the taxable bases was a very important determinant of tax levels in the developing countries.[21] Shin (1969), in the line of the study of Lotz and Morss in addition to the per capita income and openness, introduced some more variables. These are:[22]

1. The ratio of agricultural income to total income as a measure of commercialisation, urbanisation and industrilalisation;
2. The rate of population growth, and
3. The rate of change in prices.

Surprisingly, Shin found the rate of change of prices, the rate of population growth and the degree of industrialisation–and not per capita income or openness-which caused differences in tax ratio among the low income countries.

Chelliah is of the opinion that tax income ratios are not substantially raised in many developing countries because the existing tax structure is not conducive to rapid growth of tax revenue. The average tax ratio had hardly increased from 13.6 per cent to 15.1 per cent between 1953–55 and 1969–71.[23] It can be argued that "conceptually, the tax ratio or share

19. See Jorgen R. Lotz and Elliot R. Morss, *op. cit.*
20. *Ibid.*, p. 328.
21. See Jorgen R. Lotz and Morss, "Measuring Tax Effort in Developing Countries", *IMF Staff Papers*, Vol. 14, November 1967; pp. 478 – 97.
22. See Kilman Shin, "Internatioual Difference in Tax Ratio", *The Review of Economics and Statistics*, Vol. 51, No. 2, May 1969.
23. See Raja J. Chelliah, "Trends in Taxation in Developing Countries", *IMF Staff Papers*, Vol. 18, July 1971; pp. 254 – 331 and also see Raja J. Chelliah, Hessel J. Bass and Margaret R. Kelly, "Tax Ratios and Tax Effort in Developing Countries, 1969 – 71", *IMF Staff Papers*, Vol. 22, March 1975; pp. 187 – 205.

of national income appropriated by government, can be determined by four broad groups of factors."[24] On the demand side: (1) the need for services arising out of "objective" conditions; (2) the preference of the people and the leaders between public and private services. On the supply side: (1) the capactity of the people to pay taxes and (2) ability of the government to collect taxes.

The relative differences in the tax level and ratios can be viewed as a function of taxable capacity in terms of the per capita income, openness in the economy and the degree of monetisation. These ingredients of taxable capacity are proxies to the tax bases chosen on *a priori* basis because it is extremely difficult to quantify, what Musgrave has called, the "tax handles" available to a country.[25] The tax ratio and tax effort concepts are based on two methods. The first is the ratio of taxes to income that equates tax effort and the second is that tax ratio (R/Y) is a suitable reflection of taxable capacity.

Identifying a number of methodological problems in this approach, Roy Bahl (1972) developed a "representative tax system approach."[26] It involves the application of average effective rates to a standard set of tax bases. Bahl's approach consisted in relating the tax ratio in two variables: Firstly, the share of mineral and oil in GNP and secondly, the share of agriculture in GNP. In a sample study of forty-seven developing countries, he examined the marginal effects of taxation.

In a number of other studies of Chelliah, Bass and Kelly (1975)[27], Tait, et al (1979)[28] it was found that openness as measured by export/GNP (X/Y) rather than import/GNP(M/Y), the stage of development as measured by the level of per capita income (Y_P) and the sectoral composition of income produced (share of agriculture), and mining and exports in GNP, were vital factors affecting the level of tax in the developing countries.

More recently, M.M. Ansari (1982) examined the influence on the tax ratio by selecting

24. Raja J. Chelliah, *op. cit.*, p, 292.
25. R.M. Bird, *op. cit.*, p. 253.
26. See Roy Bahl, "A Representative Tax System Approach to Measuring Tax Effort in Developing Countries", *IMF Staff Papers*, Vol, 19, March 1972; pp. 97 – 122.
27. See Chelliah, Bass and Kelly, *op. cit.*
28. See Alan Tait, Gratz, L. M. Wilford and Barry J. Eichengreen, "International Comparison of Taxation for Selected Developing and Developed Countries, 1972–76", *IMF Staff Papers*, Vol. 26, March, 1979; pp 13-56.

specific variables like gross domestic product, size of overseas trade and density of population. His results indicated higher explanatory power.[29] In different studies following factors were found to be affecting the level of tax ratios: sectoral composition of the economic size of public expenditure, proportion of foreign aid, degree of monetisation of the economy, revenue administration efficiency, nature and quality of political leadership and literacy and other socio-cultural factors.[30] The other attempt made in relation to tax ratios and tax efforts is known as the 'Utility Maximisation Model.'[31]

Apart from the various reasons attributed to variations in the tax ratios, factors like time period, sample size, classification of countries into various income groups, selection of independent variables, sources of data and classification of national accounts also affect the tax level and tax ratios.

29. M. M. Ansari, "Determinants of Tax Ratio : A Cross Country Analysis". *Economic and Political Weekly*, Vol. 17, No, 25, 19 June 1982; pp. 1035-42.
30. *ibid.*, p. 1039.
31. See Peter Heller, "A Model of Public Fiscal Behaviour in Developins Countries : Aid, Investment and Taxation", *American Economic Review*, Vol. 65, June 1975, pp, 429–445.