DISCRIMINATORY TAX BURDEN: AN IMPLICATION OF DIFFERENCES IN METHODS AND RATES OF DEPRECIATION IN PRESENT INCOME TAX ACT

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ABSTRACT

Current Nepalese tax laws have provided different facilities to industrial enterprises. Among them, one is the facility of selecting one method of depreciation from any of the diminishing balance method and straight-line method. And the other is the facility of accelerated rate of depreciation (deducting of 33% more depreciation than the cost price). Present study proves two main claims - first, prevailing depreciation system has favoured diminishing balance method of depreciation discriminating straight-line method and second, accelerated depreciation provision of current tax law is not successful in creating as much high difference between tax burden on industrial and tax burden on non-industrial sector as intended.

INTRODUCTION

Depreciation is the expenditure of the cost of depreciable asset used in productive work. In short, it is current cost of services consumed. It is also the decline in the value of an asset due to productive use, obsolescence, wear and tear, effluxion of time, price changes and so forth.

There are mainly two types of deprecations, namely, tax depreciation and economic depreciation. The amount of depreciation which is permitted to write off as expenditure by tax law is tax depreciation. It is tax depreciation because it reduces the amount of tax to be paid by the firm. As opposed to tax depreciation, economic depreciation is the decline in asset value due to ageing. In fact, it is the real change in the value of the fixed asset during the firms accounting period.

For tax purpose, there are, basically, three methods of depreciation, which are in real life. They are straight-line method, diminishing balance method, and sum of the year's digit method. Across these three methods of depreciation; Canada, Denmark, UK, Norway, Finland etc. have used diminishing balance methods where as Austria, Italy, Spain, China, Malaysia, Philippines, Singapore, Thailand, Argentina, Brazil, Columbia and so forth are adopting straight-line method. Those countries which have allowed to use both the straight-line and diminishing balance methods as alternatives are Australia, France, Germany, etc. United States of America has adopted accelerated cost recovery system, a method equivalent to sum of the year's digit method. In India, diminishing balance method

is allowed for general industry and straight-line method is prescribed only to power sector industry, Nepal, on the other hand, has permitted to choose from any one of the two – straight-line and diminishing balance– methods provided that the system once chosen should be adhered for coming years. Correspondingly, Nepal has also provided to write-off additional one third of the prescribed rate to industrial sector as per Industrial Enterprise Act, 2049.

In relation to the rate of depreciation, where one of the both– diminishing balance method and straight-line method – are allowed to choose, there is convention of making diminishing balance method rate just double of the straight-line method rate, i.e., straight-line method rate should be half of the diminishing balance method rate. However, in Nepal, the rate difference is much greater than the above stated ratio i.e.; diminishing balance rate is almost three fold of the straight-line rate. In this respect, my first claim, therefore, is that the current provision of tax law regarding the rate of depreciation is discriminatory against straight-line method favoring diminishing balance method.

As it was already stated, Nepalese tax law has allowed industrial sector to write-off additional 33% of the prescribed rate as expenses from the original cost of the asset. This implies that the tax rules intend some favoured treatment to industrial sector against non-industrial one. The second claim in this study is that the current tax law is successful in its motive of creating small row between industrial and non-industrial sector through depreciation but that row is not of high magnitude. The rest parts of the study are model and parameter specification, analysis of the result and conclusions. Certainly, Appendix regarding the model will also be a part of the study.

MODEL, PARAMETER SPECIFICATION, ASSUMPTIONS AND DATA SOURCES

The model chosen to prove my earlier stated claims is the marginal effective tax rate analysis; a best method to weigh the tax burden on income from capital so far developed. The methodology of calculating effective tax rates is similar to Kandel (2000). However, for easiness of the reader, it is given in Appendix 1.

Computation of effective tax rate needs various parameters like inflation rate, interest rate, interest tax rate, physical depreciation rate, tax depreciation rate, return on equity rate, debt equity ratio, dividend tax rate, capital gain tax rate, investment allowance rate, new issue to retained earning rate and so forth. In this study, the rates of depreciation, according to Income Tax Rules, 1992, covering major part of the concerned assets under diminishing balance method for firms other than industries are: 5% for building, 10% for furniture, 15% for plant and equipment and 20% for vehicles. Under straight-line method, they are 1.65% for building, 3.4% for furniture, 5.3% for plant and machinery and 7.3% for vehicles. With accelerated rate, of additional one third, they become 6.67%,

13.33%, 20% and 26.67% respectively under diminishing balance method and 2.2%, 4.5%, 7.07% and 9.7% for building, furniture, machinery and equipment and vehicle respectively under straight-line method. The economic depreciation rates assumed for the study are as per the research of Hulten and Wykoff (1981). The average rates given by the research as per the particular assets are .037 for building, .133 for machinery, .11 for furniture and .27 for vehicle. As regards to other parameters, the statutory corporate tax rate 'u' for the study, 20% plus 5% surcharge(as per Finance Act,1999/2000); the interest rate 'i', 15% (average of last 25 years); personal tax rate 'm', .06(prevailing), inflation rate 'π', .095(average of last 25 years), return on equity 'ρ', .181 (interest rate minus interest tax plus 4% risk premium) and debt equity ratio'β', whole debt, mix (40% debt and 60% equity) and whole equity.

The assumptions for the study are neoclassical theory of investment, there are no capital gains or losses on holdings of capital goods, losses and gains are treated symmetrically, all assets are without salvage value at the end of life etc.

The main sources from where the data are borrowed for this analysis are: Income Tax Act, 1974, Income Tax Rules, 1982, Industrial Enterprise Act, 1981 and Industrial Enterprise Act, 1992, Finance Acts, Quarterly Economic Bulletin of Nepal Rastra Bank, Nepal Stock Exchange Ltd., Central Bureau of Statistics etc..

RESULT ANALYSIS

COMPARISON OF THE PRESENT VALUE OF DEPRECIATED AMOUNT AND EFFECTIVE TAX RATES UNDER DIFFERENT METHODS OF DEPRECIATION

It was already claimed in Introduction part that the present situation of allowing both the straight-line and diminishing balance methods for depreciation deduction as alternatives is favourable to second method discriminating the first one. To prove this hypothesis, present value of depreciation and effective tax rates under both the methods of depreciation are presented in Table 1 and Table 2. From the observation of the Tables, we see that the present value of depreciation in comparison to original cost for straight-line depreciation is 19% for building, 47% for machinery, 35% for furniture and 56% for vehicles under debt financing. The same values under diminishing balance method are 36% for building, 63% for machinery, 53% for furniture and 69% for vehicles. The excess of the present value of depreciation under diminishing balance method in comparison to straight-line method is 89% for building, 34% for machinery, 51% percent furniture and 23% for vehicle under debt financing. This gap between the present value of depreciation under different methods of depreciation goes on increasing whenever there is move from debt financing to equity financing. For example, under equity financing, the differences are: 125% for building, 51% for machinery, 75% for furniture and 36% for vehicles in comparison to the above-

mentioned present value of depreciation under debt financing. The other fact that can be observed from the Table 1 is that the less the depreciation rate the wider is the difference between the present value of depreciation under straight-line method and present value depreciation under diminishing balance method. For instance, the depreciation rates under straight-line and diminishing balance methods are 2.2 % and 6.67 % respectively for building where the differences in present value are highest and the same are 9.7 % and 26.67 % respectively for vehicle where the differences in present value are lowest.

As in present value case, the effective tax rates too under different methods of depreciation vary significantly. Note that such differences remain in the effective tax.

Table - 1: Present Value of Depreciation Per Rupee

Description in VP	St. Line Method	Dim. Bal. Method	Difference in PV
Debt Finance			
Building	.19	.36	89%
Machinery	.47	.63	34%
Furniture	.35	.53	51%
Vehicle	.56	.69	23%
Mix Finance			
Building	.14	.3	114%
Machinery	.4	.56	40%
Furniture	.28	.46	64%
Vehicle	.48	.63	31%
Equity Finance			
Building	.12	.27	125%
Machinery	.35	.53	51%
Furniture	.24	.42	75%
Vehicle	.44	.60	36%

Source: Author's calculation.

Note: For interpretation, figures in Table are converted into percentage by multiplying by 100.

rates of each type of asset whether it be a case of individual asset or an aggregate and whether it is in terms of total return and before tax return. For example, the effective tax rates for different assets in terms of total return under debt finance with straight-line method are:- .009 for building, -.001 for machinery, .001 for furniture and .012 for vehicle where as the same rates under the same source of finance with diminishing balance method are:- .012 for building, -.007 for machinery, -.006 for furniture and .001 for vehicle. Likewise, while the effective tax rates in terms of before tax income under the same source of finance with

straight-line depreciation are:- .26 for building- .01 for machinery, .01 for furniture and .20 for vehicle; the tax burden with diminishing balance method are:- .36 for building, -.18 for machinery, -.14 for furniture and .03 for vehicle. In case of aggregate effective tax rates, the burden of tax under debt financing with straight-line and diminishing balance methods of depreciation are:- .007 and -.011 respectively in terms total return and -.17 and -.30 respectively in terms of before tax income. Thus, the comparison of effective tax rates under debt finance with straight-line and diminishing balance method of depreciation shows that there is difference between the tax burdens of former and latter methods of depreciation. In so far as the magnitude of the burden, the former one is very much.

Table - 2: Marginal Effective Tax Rates under Different Methods of Depreciation

Description	In Terms of Total Return		In Terms of Before Tax Income	
	St. Line Method	Dim. Bal. Method	St. Line Method	Dim. Bal. Method
Debt Finance				
Building	-.009	-.012	-.26	-.36
Machinery	-.001	-.007	-.01	-.18
Furniture	.001	-.006	.01	-.14
Vehicle	.012	.001	.2	.03
Aggregate	-.007	-.011	-.17	-.3
Mix Finance				
Building	.013	.009	.16	.12
Machinery	.022	.014	.24	.16
Furniture	.004	.016	.25	.18
Vehicle	.037	.023	.34	.25
Aggregate	.016	.011	.19	.13
Equity Finance				
Building	.029	.024	.25	.22
Machinery	.038	.028	.3	.24
Furniture	.039	.030	.32	.26
Vehicle	.053	.038	.38	.31
Aggregate	.032	.030	.27	.26

Source: Author's calculation

Note:- For interpretation, figures in Table are converted into percentage by multiplying by 100.

heavier than the latter one. Furthermore, this difference in effective tax burden between two methods of depreciation implies that the present income tax rule has favoured diminishing balance method of depreciation discriminating against the straight-line one. In fact, this provision of tax law has benefited to those taxpayers which have the ability and knowledge to find out the discrimination. Virtually,

those which can have such ability are the larger organisations with abundant resources. In this sense, the present depreciation system has favoured the large entities too.

COMPARISON BETWEEN EFFECTIVE TAX RATES WITH ACCELERATED RATE AND EFFECTIVE TAX RATES WITH ORDINARY RATE

It was mentioned earlier that Industrial Enterprise Act, 1992 has given additional or accelerated depreciation facility to the industrial enterprises. This additional rate is called accelerated rate or acceleration the rate without additional facility is ordinary rate. The additional facility, according to that act is one third of the rate given by the Income Tax Rules, 1981 irrespective of the method of depreciation. The intention of the industrial enterprise act, in this respect, is to create environment of favouring industrial entities over non-industrial one. In other words, the main objective of providing higher depreciation facility to industrial firms is

Table - 3: Effective Tax Rates with Accelerated and Ordinary Rate under Straight-line Method of Depreciation

	In Terms of Total Return		In Terms of Before Tax Income	
	St. Line Method	Dim. Bal. Method	St. Line Method	Dim. Bal. Method
Debt Finance				
Building	-.009	-.009	-.26	-.23
Machinery	-.001	-.003	-.01	.06
Furniture	.001	.003	.01	.07
Vehicle	.12	.018	.2	.28
Aggregate	-.007	-.005	-.17	-.12
Mix Finance				
Building	0.13	.014	.16	.17
Machinery	.022	.026	.24	.27
Furniture	.004	.027	.25	.28
Vehicle	.037	.043	.34	.38
Aggregate	.016	.018	.19	.21
Equity Finance				
Building	.029	.030	.25	.26
Machinery	.038	.042	.3	.33
Furniture	.39	.042	.32	.33
Vehicle	.53	.060	.38	.41
Aggregate	.032	.034	.27	.28

Source: Author's calculation

Note: For interpretation, figures in Table are converted into percentage by multiplying by 100.

to make investor friendly environment in the country. The effective tax rates presented in Table 3 and Table 4 show that the intention of the law as stated above has been fulfilled to some extent but not in high magnitude. It is known from the observation of the Tables that in both the cases - effective tax rates in terms of total return and effective tax rates in terms of before tax income- there are rows between those under acceleration and those without acceleration. This means, effective tax rates both in terms of total return and in terms of before tax income under both the straight-line and diminishing balance method of depreciation show that industrial sector is taxed less than the non industrial sector. For example, the aggregate effective tax rates for industries under debt, mix, and equity financing with straight-line methods are:- .007, .016 and .032 respectively in terms of total return and -. 17, .19 and .27 respectively in terms of before tax income. The same rates under the same scheme of financing and depreciation method for non-industrial sector are:-.005, .018 and .034 respectively in terms of total return -.12,.21 and .28 respectively in terms of before tax income. This trend of lowered effective tax rates caused through accelerated rate is applied irrespective of the types of asset, methods of depreciation and bases of expression. However, it should be noted that the difference in effective tax rates due to accelerated rate is not as much as there lies difference between depreciation rates allowed for diminishing balance method and straight-line method. The gap in reality is about 2 percentage points in terms of total return and 1-5 percentage points in terms of before tax income. The implication is that the motive of industrial enterprise Act of providing high additional benefits to industrial sector through accelerated depreciation is not fulfilled sufficiently.

Table - 4: Effective Tax Rates with Accelerated and Ordinary Rate under Diminishing Balance Method of Depreciation

	In Terms of Total Return		In Terms of Before Tax Income	
	Accelerated	Ordinary	Accelerated	Ordinary
Debt Finance				
Building	-.12	-.011	-.26	-.32
Machinery	-.007	-.004	-.18	.1
Furniture	-.006	-.003	-.14	-.08
Vehicle	.001	.007	.03	.12
Aggregate	-.011	.009	-.30	-.24
Mix Finance				
Building	.009	0.11	.12	.13
Machinery	0.14	.017	.16	.20
Furniture	.016	0.19	.18	.21
Vehicle	.023	.03	.25	.30
Aggregate	.011	.013	.14	.16
Equity Finance				
Building	.024	.026	.22	.23
Machinery	.028	.032	.24	.27
Furniture	.030	.034	.26	.28
Vehicle	.038	.045	.31	.34
Aggregate	.026	.028	.23	.25

Source: Author's calculation

Note: For interpretation, figures in Table are converted into percentage by multiplying by 100.

The by product that we can get from the study of all the Tables presented above shows that the highest taxed one among four categories of depreciable assets - building, machinery, furniture and vehicle - is vehicle irrespective of the methods of depreciation and sources of finance. In contrast, the lowest taxed asset, according to the Tables, is building in all the cases.

CONCLUSION

Tax burden measurement is the best method to evaluate the distortion created by the taxes on capital income. Marginal effective tax rate analysis technique, a relatively new tool developed during 1980s by Auerbach and Jorgenson (1980), King and Fullerton (1984) and Boadway, Bruce and Mintz (1984 and 1987) can do this work considering all the macroeconomic and tax

related variables. In real sense, this tool can touch and operate every aspect of the capital income taxation on the basis of the burden of the tax imposed on marginal investment projects. Present study with the two main claims - first, present depreciation system has favoured diminishing balance method of depreciation discriminating straight-line method and second, accelerated depreciation provision of current Industrial Enterprise Act is not successful in creating as much high difference between tax burden on industrial and non-industrial sector - is based on the very methodology of the marginal effective tax rates. The claims of the researcher are proved from the tax burden analysis presented in different Tables. It means that present depreciation rule in Nepalese tax law has created row where it does not want and is not able to make discrimination where it intends to do.

ANNEX

Computation of effective tax rate needs various variables named gross of tax required rate of return or before tax income to investor 'r_g' net of tax rate of return to saver the saver. Gross of tax rate of return to investor in turn needs real cost of finance r_f, tax depreciation rate 'α', present value of tax depreciation' z', economic depreciation rate 'δ' etc. The following are the technique and procedure used for deriving the effective tax rates.

(A) COMPUTING REAL COST OF FINANCE

There may be three sources of finance that can be used for generating resources to purchase the capital asset. By name, these sources are –full debt, full equity and a mix of debt and equity. Equity source itself can be bifurcated into two parts– share issues and retained earnings. Across these sources, the debt financing has certain advantages over others due to deductibility of its cost i.e., interest, while calculating taxable profit. Because of the deductibility of interest, the cost of debt financing becomes to some extent less than the other sources of financing. That is why, the real cost of debt, denoted by 'r_b' is given by

$$r_b = i\,(1 - u) - \pi \quad ...(1)$$

Where, i = interest rate, u = corporate tax rate and π = inflation rate. In this equation, i (1 – u) means tax adjusted interest rate. Inflation is deducted to find out real value instead of nominal one.

Similarly, the real cost of equity is denoted by

$$'r_e' = \rho - \pi, \quad ...(2)$$

Where, 'ρ' means rate of return in the form of dividend to new equity holders and in the form of both the capital gain and dividend to old equity holders.

In case of mix finance, the real cost finance is the weighted average cost of debt and equity denoted by 'r_f' that is, real cost of finance and is given by

$$r_f = \beta i\,(1 - u)\,\rho - \pi \quad ...(3)$$

Where, β = fraction of finance raised through debt.

(B) TREATMENT OF DEPRECIATION

By using the following formula, one can calculate the present value of depreciation under straight-line method as given below:

$$\text{Pv of depreciation} = \frac{\alpha}{(r_f+\pi)}\left(1-\frac{1}{(1+r_f+\pi)T}\right) \quad \ldots(4)$$

Where, Pv = present value, and 'α'= tax depreciation rate.

Multiplying by the tax rate 'u' to present value of depreciation, the tax saving denoted by 'z' through tax depreciation 'α' can be derived.

(C) REQUIRED RATE OF RETURN TO INVESTOR 'r_g'

It is already mentioned that the user cost of capital includes real cost of finance, economic depreciation and tax paid to the government. In this sense, the per period user cost of capital except tax saving becomes $(1 - z)(r_f + \delta)$. It is also mentioned that for a marginal investment the total revenue becomes equal to its cost.

If the economic depreciation is deducted from this user cost of capital, there remains the gross of tax rate of return to the investor 'r_g'.

$$\text{That is, } r_g = \frac{(r_f+\delta)(1-z)}{1-u} - \delta \quad \ldots(6)$$

For a non-depreciable asset, neither the economic nor the tax depreciation is applicable. It means,

$$r_g = r_f/(1-u) \quad \ldots(7)$$

A part of this return 'r_g' goes to saver as a return from saving denoted by 'r_n' and other part goes to tax authorities as tax denoted by 't'.

(D) REQUIRED RATE OF RETURN TO SAVER 'r_n'

Now proceed to find out the net rate of return 'r_n' which really goes to the saver of the economy. Here, it is assumed that marginal rupee saved does not go into special tax sheltering assets and the intermediaries do not make monopoly profit. The rate of return to the saver or 'r_n' is the sum total of two types of returns to savers - earning from debt 'r_n^b' and earning from equity 'r_n^e'. Here, the 'r_n^b' can be calculated as follows:

$$r_n^b = i\,(1\text{-}m) - \pi, \qquad \ldots(8)$$

Where, 'm' is the personal tax rate.

In case of equity, the after tax rate of return to saver depends on whether the financing comes from retained earnings or new issues. If there is no dividend taxation, net of tax rate of return to saver 'r_n^e' simply becomes $\rho - \pi$, where 'ρ' denotes capital gain in case of retained earning and dividend in case of new issues. Thus, in case of no dividend and no capital gain tax assumption, the weighted average 'r_n' becomes,

$$r_n = \beta i\,(1 - m) + (1 - \beta)\,\rho - \pi \qquad \ldots(9)$$

It should be noted here that there is no capital gain tax and dividend tax in Nepal. That is why, this formula is appropriate to analyse Nepalese tax burden. If there are capital gain tax and dividend tax, there should be modification in this formula.

(E) ASSETWISE AND AGGREGATE ETR

When there is 'r_g'and 'r_n' one can get effective tax rate on investment easily. Here, it should noted that two types of effective tax rates can be calculated - one expressed in terms of total return and other in terms of before tax income. Among these two,

Effective tax rate 't' in terms of total income = $r_g - r_n$

Effective tax rate 't' in terms of gross of tax required rate or before tax income

$$\pm \frac{r_g - r_n}{r_g} \times 100 \quad \ldots (10)$$

The aforementioned methodology of calculating effective tax rate is related to the particular assetwise rate. However, the effective tax rate in aggregate form is more useful than the tax rate in disaggregate form. That is why, disaggregate, as well as aggregate effective tax rates are calculated in this study.

In this study, the assetwise effective tax rates are calculated at first and aggregated on the basis of the capital stock weight later for the purpose of computing aggregate effective tax rates. The capital stock weight for this analysis is derived as per the weight of the flow of the stock of various assets during 1972/73 to 1996/97 given by the Census of Manufacturing Establishments of 1973/74 and 1996/97.

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