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Measuring the economic worth of a project using 'present value' methods; Evaluation of the notion that any positive discount rate will discriminate against future generations' interests.

Post-war global economic restructuring, envisaged 'modernisation' and 'industrialisation' of primarily 'urban' and 'agricultural' Third World countries, as the way of 'catching up' with developed countries. Project Analysis, emerged as effective means of assessing the viability of investments, in industrial projects from a national perspective and thus became, part of planning process, in developing countries like India.

" Project analysis involves estimating and comparing the beneficial effects of an investment with its costs" (Curry and Weiss 1993:1). It is premised on the fact that costs and benefits of a project take place in future. Prediction and quantification of physical aspects, as well as prices is the basic objective of Cost Benefit analysis. The problem arises, as to how to express the 'cash flows' of income and expenditure in " terms of a common measure i.e., to derive a present value by discounting all items in net cash flow back to year 0" (Irvin 1986:10).

The basic objective of project appraisal, being to facilitate decision about economic worth of a project, present value, provides uniformity in evaluating resources, during the entire period of a project. Use of positive discount rates, to determine economic worth of a project, however, is under a lot of debate among economists and environmentalists. The critiques, express concern that high discount rates, tend to discriminate against interests of environment

and future generations. The essay will present, the pros and cons of debate by critically evaluating the arguments, in following sections.

2. MECHANISM OF DISCOUNTING :

Positive Discount Rates:

" The process of discounting applies a weight to resources in different years to convert them to a common basis...the weight applied in different years is known as discount factor" (Currey and Weiss 1993:34-5).

$$\text{general discount factor} = 1 / (1 + r)^{t}$$

where 'r' is rate of discount and 't' is the number of years. Discount rate for public as well as private sectors is, normally the interest rate fixed by banks. Thus further in future, lower becomes the 'present value' of a given sum of money and this is, what we mean by saying 'positive discount rate'. A project investment is acceptable, if Net Present Value (NPV) is more than 0, in other words discounted benefits (B), exceed discounted costs (C) of the project,

$$NPV = B-C > 0$$

Positive discount rate, is thus the mechanism of arriving at 'present value' to judge the economic worth of a project i.e., whether to accept or reject the same.

Here arises, the dilemma expressed in the subject-matter of question, under discussion in this paper. In order to arrive at appraisal of economic worth of a project, we need to quantify the present value, by discounting mechanism. Thus, in view of the very foundation of 'present value methods', future is valued less

than the present, and this is where critiques of the rationale of ‘positive discount rate’ target their arguments at, particularly the Environmental critiques.

Social Time Preference Rates (STPR):

Preference is the underlying rationale of discounting. An individual prefers £10 today rather than, a year later, due to different factors. First, according to ‘axiom of choice’, as a consequence of ‘law of non-satiation’, an individual prefers ‘more to less’. We can extend the logic to say that individuals, prefer ‘more and sooner’ to ‘less and later’. This is what economists call ‘pure time preference’, due to individual’s impatience. Secondly, individual can invest the money at the interest rate available and earn more capital out of it, this is called discounting due to ‘capital productivity’. Another argument for preferring present to future, is the possibility of individual not being alive i.e., the ‘risk of death’ argument for discounting. Besides, there is always the risk or uncertainty of anything happening, which may deprive individual from getting the money in future, the ‘risk or uncertainty’ argument for discounting. Further money available today has the chances of devaluation due to ‘diminishing marginal utility’. Discounting on account of pure time preference; risk of death; risk and uncertainty; and marginal diminishing utility of consumption, is called Social Time Preference Rate of discounting (STPR).

3. CRITIQUE OF THE RATIONALE OF DISCOUNTING:

Lummis (cited in Sachs 1992 : 46) says, “ that for the present world population, to live at the per capita energy consumption level of the city of Los Angeles would require five planets”. The figure of ‘five planets’ may not be accurate, but concern of environmentalists about interests of ‘nature’ and ‘future generations’ is definitely genuine. In fact future of mankind is interlinked with that

of environment, particularly in view of issues like ‘limits to growth’, ‘global warming’, and limited carrying capacity of earth. Environmentalists, target the high discount rate, as the mechanism of ‘undervaluing’ the future, thereby ‘accelerating’ the consumption of natural resources. Critiques of rationale of discounting base their arguments on following accounts:

Pure Time preference Rate:

Critique of discounting on account of ‘pure time preference ‘ say, that individual’s impatience as the ground of discounting is irrational; does not reflect public interest and ‘is not consistent with individuals life time welfare maximisation’ (Strotz 1956 cited in Markandya and Pearce 1988). The positive discount rate thus, shifts the costs to future generations and also dissuades from investments in long term natural resource management projects. Critiques base, their arguments on the fact that environment is public property and individual’s preferences do not reflect the interest of collectivity and future. There is strength in the arguments of critiques, but cost-benefit rules are premised on ‘preferences’ of individuals and therefore not taking into account this factor, goes against the basic tenets of discounting.

Risk and Uncertainty:

Critiques argue, that proponents of ‘risk of death’ argument forget, the fact that society is potentially immortal compared to mortality of individuals, therefore discounting should be adjusted or lowered on this account. Further basic needs like food, shelter, water are quite certain and uncertainty about presence or scale of costs or benefits may be unrelated to time and scale of risk. Markandya and Pearce (1988) don’t accept the arguments for adjustments to the discount rates on these grounds. Basic contradiction, again is due to dichotomy between ‘individual intersts’ over ‘ collective interests’. While

proponents of discount rates value individual's preferences , critiques privilege the collective interests.

Marginal Diminishing Utility of Consumption:

Critiques argue, that high discount rates on account of 'utility' function discriminate against future generations, by giving less weightage to their utility in the maximisation exercise. Further, there are difficulties about observing or measuring or comparing the utilities, say, of different people at different times (interpersonal comparisons of utilities) and utility of same person over different times. The high utility discount rates, will also lead to faster depletion of resources and environmental damage.

Opportunity Cost of Capital:

Opportunity cost discounting, refers to the rate of return on the project displaced by the investment project. Critiques argue that in case of land scape , in place of which an airport has been built; the aesthetic enjoyment lost, can not be justified, because 'enjoyment of beauty' can not be profitably invested. Markandya and Pearce (1988), while agreeing with the argument say, that ''it would not provide a reason for rejecting discounting altogether, some consumption flows should be discounted at a Social Time Preference Rate".

4. INTEREST OF FUTURE GENERATIONS:

In view of the discussions, about rationale of discounting and its critique in previous sections; we can say that higher discount rates discriminate against the interests of future generations on three accounts: Cost-benefit rules will pass the projects where social costs occur in future and social benefits in immediate period. Secondly, if social benefits occur in future, cost-benefit rules may not pass such cases. Thirdly, high discount rates will discourage

investments and thus future generations will inherit reduced resources (Pearce 1983).

Critiques of discounting call for (i) premium to discount rates to risk and uncertainty and (ii) lowering discount rates to take care of interests of environment and future generations. Proponents of discounting, while agreeing with these concerns, point out that these arguments undermine the very rationale of discounting. Pearce, (1983) proposes ‘certainty equivalence’ procedures to overcome problem of environmental risk; and in case of ‘irreversibility’ of environmental loss, they propose to treat it as a cost in valuation of project.

Further, proponents of discounting argue that “ through overlapping utility functions , future generations’ problem is automatically taken care of in current preferences” (Pearce 1983). Argument is based on the ground that while market discount rates reflect the ‘private’ role of individual; social discount rates reflect the ‘public’ role of individuals. In view of ‘public role’ of individuals, discounting will reflect ‘transfers’ to future. Further ‘state’, is also supposed to take care of ‘public interest’, which involves the future of country as a whole and therefore discount rate, of state will reflect interests of future generations.

5. A PARADOX:

In view of the discussion in this article, there is no doubt that positive discount rates ‘pass on ‘ the costs to future and benefits to present. The arguments in favour of positive discount rates, as well as arguments of its critiques carry strong reasoning. However, a paradoxical situation arises, if we agree with critiques’ arguments for ‘adjusting’ or ‘lowering’ the discount rates. Because, lowering discount rates will accelerate investments, consuming more natural as well as man-made resources, leaving less for the future generations. Suggestion of lowering it for ‘environmental’ projects, creates logistical problems of which is ‘genuine’ environmental project. Pearce (1983), concludes that, “ it is

better to define the rights of future generations and use these to circumscribe the overall cost-benefit rule, leaving the choice of discount rate to fairly conventional current-generation oriented considerations”

Let us examine, the above suggestion of streamlining the environmental damage in the Cost-Benefit rules. We can express it as follows:

NIBt = Bt-Ct-Dt

Where NIBt=Net Incremental Benefit ; Bt=Benefit ; Ct=costs ; Dt= Environmental Damage; t=time

However, the problem arises due to the fact, that the idea of incorporating environmental damage, as cost in CBA is not sufficient, because costs and benefits tend to arise in different time-span. As a result, due to logistics of a typical evaluation of a project, it will get discounted out of existence, purely through the mechanism of discounting factor.

6. SUSTAINABILITY; A WAY OUT OF PARADOX:

Is, there no way out ? The alternative of ‘’lowering’’ the discount rates, we have seen earlier, creates the paradox of faster consumption. Thus, neither incorporating environmental cost in CBA nor lowering of discount rates seems to be effective. The consensus, therefore, seems to be converging on the mechanism of ‘’sustainability’’, as a way out of paradox. Sustainability, envisages inclusion of ‘compensatory’ or ‘shadow’ projects in the portfolio, which cancel the damaging effects of other projects. Thus, sustainability argument, takes care of the problem of interests of future generations, by including certain numbers of environment-augmenting projects to offset the effects of ‘ depleting’ projects. Further, while proponents of ‘’strong-sustainability’’, envisage year by year cancelling; those for ‘’weak-sustainability’’, envisage project-wise cancellations. We can express it as follows:

PVD=0 in case of project wise, cancellation of environmental damage.

PVDt=0 in case of year wise, cancellation of environmental damage.

PVD means Present Value of Damage.

t=time.

6. CONCLUSION:

In view of discussion and analysis in the article, I endorse the view that '' In the context of measuring the economic worth of a project using 'present value' methods, ... any positive discount rate will discriminate against future generations' interests''. However, neither lowering the discount rates nor incorporating environmental costs in CBA, resolves the issue of safeguarding interests of future generations and environment.

Since cost-benefit analysis, is prima facie concerned with current-generations problems, the paradox of interests of future generations can not be resolved within the existing paradigm of discounting. Because, we need to arrive at 'present value' to have uniformity in predicting and identifying the costs and benefits of a project and due to existential problems like, inflation, any resource today, is bound to be valued more today in comparison to tomorrow. We can therefore, neither blame individuals for preferring present over future, nor discounting procedure for taking care of preferences of individuals.

In view of the analysis and discussion, in the article the ''strong-sustainability'' argument, by incorporating environment-augmenting projects to cancel the 'damaging' effects of depleting projects, seems to provide the solution to the issue of safeguarding the interests of future generations and the environment. This argument, also synchroniges with the current paradigm shift in development from 'economistic' to 'sustainable' development; which offers a win-win synergetic relationship between 'development' and 'environment'. ''Our Common Future'', The Brundtland report of the World Commission on Environment and Development, 1987 (cited in Sachs 1992:28), sums up the whole discussion succinctly :

''We have in the past been concerned about the impacts of economic growth upon environment. We are now forced to concern ourselves with the impacts of ecological stress--degradation of soils, water regimes, atmosphere, and forests--upon economic prospects''.

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