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**Intergenerational Problems of Stability and Justice:
Public Goods and Just Saving**

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I. Introduction

Although alternative conceptions exist, normative economics has long been beholden to the utilitarian standard of justice. So, while contemporary American society seems to have moved away from the standard of justice as fairness proposed by John Rawls, we would do well to revisit some of the more compelling reasons for accepting Rawls' system since it provides a rare alternative to utilitarian and cost-benefit orthodoxy. One of the greatest and most persistent problems for theories of justice is the problem of justice between generations that is, what we are owed by previous generations and what we owe our successors. The difficulties inherent in the utilitarian standard are well established and will only be mentioned implicitly here, in discussion of the Wicksell criterion¹ and the problem of collecting willingness-to-pay information from later generations.

Rawls notes that the question of justice between generations "subjects any ethical theory to severe if not impossible tests." (TOJ p. 251) and the difference principle Rawls argues for in *A Theory of Justice* is inapplicable to the problem of justice between generations. Specifically, the fact that there "is no way for later generations to help the least fortunate earlier generation...[means that] the difference principle does not hold for the question for justice between generations." (TOJ p.254) Curiously, despite Rawls' warning, there is vein of literature that endeavors to show that the difference principle yields time inconsistent preferences when applied to the problem of justice between generations (see Dasgupta 1974). Rawls, however, argues instead for a just savings

¹ Rawls describes Wicksell's idea as that "if the public good is an efficient use of social resources, there must be some scheme for distributing the extra taxes among different kinds of taxpayers that will gain unanimous approval" (TOJ p.250)

principle that assigns to each generation a level of saving in order that the institutions of justice as fairness may be implemented and maintained. After exploring public goods that may be required both for the implementation and the stability of the institutions of justice as well as those that create special problems to which the just savings principle cannot be applied, I consider what form this principle might take.

II. The Provision of Public Goods Not Required for Justice: Stability and Welfare

The Exchange Branch and the Benefit Principle

In addition to the four branches of government, the allocation branch, the stabilization branch, the transfer branch, and the distribution branch, Rawls suggests that the government ought to include a fifth, exchange branch. Its role is to provide public goods that are not necessary for justice but are desired by the community and which satisfy Wicksell's unanimity criterion. This branch "includes a separate representative body. The reason for this is to emphasize that the basis of this scheme is the benefit principle and not the principles of justice." (TOJ p. 250) Members of this body must have full knowledge of individual preferences, since application of the benefit principle requires being able to collect willingness-to-pay information and relative valuations of public and private goods.

"If a sufficiently large number of them [citizens] find the marginal benefits of public goods greater than that of goods available through the market, it is appropriate that ways should be found for the government to provide them....[the] fifth branch of government, the exchange branch...is

authorized by the constitution to consider only such bills as provide for government activities independent from what justice requires, and these are to be enacted only when they satisfy Wickesell's unanimity criterion." (TOJ p. 249)

Since public goods are often financed through a combination of taxes and debt, and the benefits of these goods accrue to multiple generations, the representative body ought to include the preferences of future generations in the cost benefit calculus. Of course, collecting willingness-to-pay information from future generations is rather difficult, and so the provision of public goods may be biased against them. In fact, the very notion of using the unanimity criterion with respect to intergenerational public goods is problematic. There may be many important public goods that are not required for justice that will not be provisioned because we cannot collect on the willingness-to-pay of future generations. That is, it may be the case that there are public goods for which the benefits exceed the costs over the course of the next two generations, but that there is no scheme of taxation and benefit allocation for the present generation alone which would allow it to pass the unanimity criterion. However, if a society is able to conceptualize future generations such that it could include their relative valuations of the good then the good would pass the Wicksell criterion and the society could deficit finance it.

However, Rawls has established that “justice as fairness applies to the basic structure of a society...[and] is a conception for ranking social forms viewed as closed

systems” (TOJ. p.229); he has little to say about justice between states². If societies are not allowed to deficit finance public goods that are not required for justice, then some goods important for reasons of welfare or stability may never be provided.

Furthermore, it is not always clear which goods are required for justice and which are the sort that are left to the exchange branch. Goods such as education, which may be needed to ensure the stability of the basic structure, may at first appear to be within the domain of the exchange branch. It also seems very likely that the costs of public education or the subsidization of private schools would exceed the willingness to pay of current generations. The benefits of education largely accrue to the children of the generation that is making the decisions. Rawls concedes that, “there is likely to be confusion between government activities and public expenditures required to uphold just background institutions and those that follow from the benefit principle... [t]o be sure, it is often hard to distinguish between the two kinds of government activities, and some public goods may appear to fall into both categories. I leave these problems aside here, hoping that the theoretical distinction is clear enough for present purposes.” (TOJ p. 251) It’s not clear at all, however, that this distinction is sufficient to discriminate between expenditures that are required for justice and those that are determined by the benefit principle.

The application of the Wicksell criterion to the public goods provisioned by the exchange branch runs into two difficulties. First is the problem of collecting relative valuations of a public good from future generations. Second is the problem of financing a good that passes the unanimity test because of the relative valuations of future

² Rawls touches very briefly in §58 in TOJ on the topic of conscientious refusal. There is virtually no theoretical apparatus in place for justice between states and the proper place for debt financing.

generations, but which we cannot tax because we are in a closed society. The problem of collecting relative valuations from future generations remains important since nearly all public goods will be intergenerational in the sense that even if they are financed entirely by the current generation, succeeding generations will need to maintain them or deal with their decay. There may be public goods that we can expect will be extremely beneficial for future generations but will not pass the Wicksell test unless we are able to incorporate their preferences into the cost-benefit calculus. The problem of conceptualizing the preferences and willingness-to-pay of future generations is complicated because preferences are malleable, and the current generation will create the conditions that will help determine these preferences. This gives rise to another potential problem.

If the current generation can manipulate the preferences of later generations, and we retain the motivational psychology of mutual disinterestedness, then each generation may be enticed to lower the expectations of its successors if by doing so they can finance public goods that would otherwise fail the Wicksell criterion. Admittedly, disinterestedness characterizes parties behind the veil and not in the exchange branch. However, I will retain this weak assumption since, in any case, we might not think that lower expectations fulfilled are worse than higher expectations fulfilled. Hence, even a sense of obligation to successor generations might not preclude lowering their expectations. I consider two cases, one in which the later generations never form preferences for a good that is consumed in an earlier generation, and another in which the preferences of later generations are deliberately manipulated so that they are made willing to pay for the benefit of the earlier generations.

Consider a natural resource such as a large lake, useful for both recreation and as a source of coolant for large industrial plants. The just savings principle is inapplicable to the problem of preserving the lake for future generations because it is not required for reasons of justice. Suppose also that the current generation is considering placing a publicly financed plant or factory on the bank of the river. Assume that the benefits of the plant will outweigh the costs to the current generation, but that the impact of the plant on the lake over the current generation will make it unusable for the next generation. Assume also that the representative body of the exchange branch includes parties from future generations.

It may very well be the case that if the next generation had the preferences of the current generation, that the plant would not in fact pass the Wicksell criterion since the costs to the next generation of losing the use of the lake might be considerable. However, if the next generation does not have a defined preference for the use of the lake for recreation purposes because its members have grown up never expecting the lake to be usable and never really known what they're missing, then their willingness-to-pay for the lake's preservation may well reflect this. They may be indifferent to its destruction so long as it happens at the beginning of their generation.

More succinctly, the generation at time t receives benefits from state of affairs x_1 of the quantity $f(x_1)$. The future generation receives neither benefit nor disutility from x_1 since they do not have a defined preference for x_1 . Although $f(x_1)$ at time $t+1$ might be sufficiently negative to cause x_1 to fail the Wicksell criterion, the social utility function of this generation is $g(x)$, not defined for x_1 . That is, the public good that brings about state of affairs x_1 may be provisioned for, seemingly to the benefit of generation t and at the

expense of generation $t+1$, because the preferences of generation $t+1$ are undefined on $g(x_1)$.

Similarly, consider the public provision of an extravagantly large national defense system (x_2), the benefits of which exceed the costs to generation t because the system is funded through external borrowing³, and so the costs exceed the benefits for generation $t+1$. The defense system may pass the Wicksell criterion if generation $t+1$ has a social utility function, $h(x_2)$, that assigns a net *positive* value to policies that were ‘necessary’ for previous generations. Again, $f(x_2)$ at time $t+1$ may yield a very negative value that would cause the defense program to fail the Wicksell criterion, but $h(x_2)$, a utility function shaped by generation t , may actually assign a net positive value to x_2 . By educating successive generations in the virtues of patriotism and filial piety, current generations can, in some sense, exploit later ones by shaping their utility functions to derive net positive values from, say, paying for a war fought years ago or from financing the social welfare system of the aged.

The representative body for the exchange branch must include representatives from future generations if the Wicksell criterion is not to reject intergenerational public goods, which on the definition I began with, seems to be most of them. However, there are two problems with including the preferences of future generations in the cost-benefit calculus. First, we cannot collect on the willingness-to-pay of future generations if we do not allow external borrowing, which Rawls does not consider. Secondly, we do not know how to conceive the preferences of future generations or constrain current generations

³ I have noted that Rawls’ theory deals with a closed system, but it seems to me that since deficit financing is a possibility in our world, since it is perhaps a necessity for developing states aiming to establish just institutions, and since it is the only means of provisioning intergenerational public goods that pass the Wicksell criterion over generations but not within the current one, then it deserves mention here.

from manipulating the preferences of later generations in order to satisfy the Wicksell criterion. Neither problem can be resolved by the just savings principle, which is only concerned with financing the institutions of justice, and neither problem admits of an easy answer.

III. Just Savings: Financing and Maintaining the Institutions of Justice

Research and Development

Rawls primary tool for dealing with problems of intergenerational justice is the just savings principle. The first problem of determining, or at least putting constraints on, a just savings principle involves defining savings. For Rawls, savings may be collected through bequest and inheritance tax or progressive income taxes. This is complicated, however, by Rawls definition of capital. Rawls would have each generation pass to its successors a quantity of real capital, which “is not only factories and machines, and so on, but also the knowledge and the culture, as well as the techniques and skills that make possible just institutions and the fair value of liberty.” (TOJ p.256) It’s not entirely clear, however, how one could save a fraction of the culture, techniques, or skills of a society or whether we ought to think that all features of the culture or all particular skills contribute positively to the social product or reinforce the conditions for justice. For the purposes of this section I will stick with productive capital of the first sort, the means of production.

I consider here two cases of society in its very early stages of development: one in which savings is insufficient to bring about the realization of the institutions of justice because the background institutions are only effective once they are fully implemented,

and a second case in which the background institutions can be put together incrementally, thereby having positive effects on growth at each stage along the developmental path.

Rawls argues that, “saving is demanded as a condition of bringing about the full realization of just institutions and the equal liberties. If additional accumulation is to be undertaken, it is for other reasons. It is a mistake to believe that a just and good society must wait upon a high material standard of life. What men want is meaningful work in free association with others, these associations regulating their relations to one another within a framework of just basic institutions.” (p. 257) It’s clear, however, that this framework cannot be established without sufficient capital. Rawls argues that this capital is secured through a savings process. If, however, a society is in its earliest stages of economic development, it may require the public provision of research and development to even secure the social product required for implementing the institutions of justice. Consider the following:

1. Define a society’s social product at time t as Y_t , but let Y_t be the same for all t until the background institutions of justice are fully realized.

The justification for this is that in the absence of background institutions, particularly those in the allocation and stabilization branches of government, important features of the economy go unregulated and the conditions for growth do not exist. The allocation branch is responsible for price stabilization and “identifying and correcting...the more obvious departures from efficiency caused by the failure of prices to measure accurately social benefits and costs.” (TOJ. P.244) The function of the stabilization branch is the

maintenance of reasonably full employment. Together, the two branches are “to maintain the efficiency of the market economy generally.” (TOJ. P. 244)

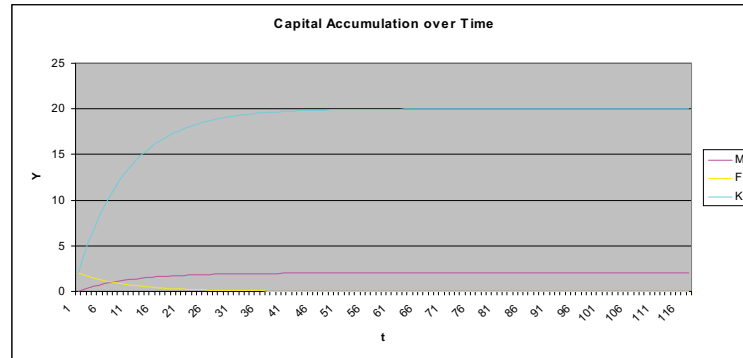
2. Let the savings rate for each (and every) generation be the fraction of social product ς . Since each generation is at the same level of income and wealth (savings is only undertaken to implement the background institutions) then each has an equal share of the savings burden.
3. Let capital saved for the implementation of the background institutions depreciate at rate ρ .
4. The maximum amount of capital (K) that can be accumulated over time is equal to $Y(\frac{\varsigma}{\rho})$. That is, the social product at $t = 1$, the depreciation rate, and the savings rate, determine the amount of capital that can be marshaled over time, in a static (non-growth) economy, toward the implementation of the institutions of justice.

If we assume that the depreciation rate and Y_1 are fixed, then only the savings rate is variable. It may be the case for a society in its early stages of economic development that only a very low savings rate is possible and so the society can never accumulate sufficient capital to meet the implementation needs of the institutions.

In the case below, the society has an initial social product of 10, with a depreciation rate of 0.1 and a savings rate of 0.2, allowing for a maximum total accumulation of 20. In the case that the costs of implementing the institutions are greater than 20, the society will never be able to put them in place. Insofar as these institutions are required for growth, neither will the society ever improve its standard of living. Generally:

1. The quantity of social product added to the stock of capital is $F_t = \zeta Y - \rho K_{t-1}$ (since Y is fixed over the duration of the ‘pre-justice’ stage, capital can be added to the stock until maintenance costs are equal to the amount saved by each generation.)

2. The maintenance cost of the inherited capital stock is $M_t = \rho K_{t-1}$
3. $K_t = K_{t-1} + F_t$



The Public Provision of Research and Development

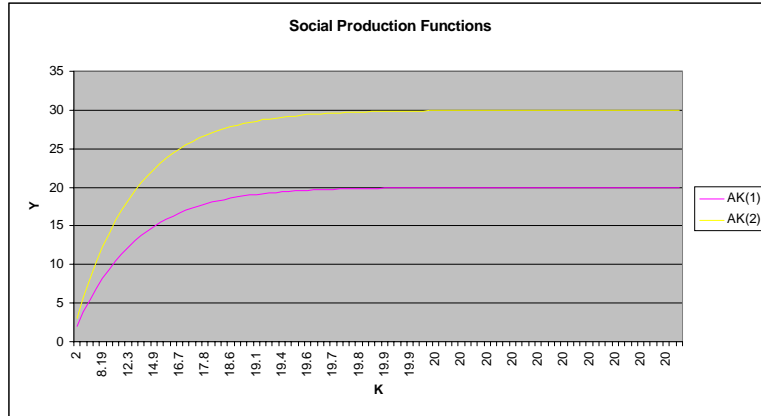
We can overcome this “injustice trap” by increasing the social product through research and development of technological improvements. Unfortunately, the absence of the appropriate legal, political, and economics structures at this stage makes it unlikely that this investment will take place in the private sector. Firstly, if it’s the case that the society’s social product is barely able to meet subsistence needs, then there will be a budget constraint that simply restricts anyone from researching and developing new technologies. Secondly, there may well be an incentive problem resulting from absence of the background institutions.

We would not expected private individuals to invest time and resources in research and development if the future gains to be had from increased productivity were not worth the initial investment. In the absence, or underdevelopment, of the legal

apparatus for protecting intellectual property rights, then potentially fruitful technologies will not be developed. This may be overcome if investment in research and development can be provisioned by the state. For example, consider a research program that will return to the firm 80 productive units with probability of 0.5 and which costs 10 units to undertake. Consider also that without an effective economic and legal structure to protect the intellectual property rights of the firm, the new technology may be appropriated by other firms. If there are greater than four firms in the industry, then the expected return on the research program will be less than the costs of financing the project, although the total expected social return is considerable greater than the cost. In such a case, the state may exact a tax on firms in the industry that funds the research program, providing an expected net benefit to the society of 30 units. Such investments may be essential to the development of a society that is inadequately endowed at the first stage of development.

1. Let Y_t be a standard Cobb-Douglas production function: $Y_t = A_t K_t^\alpha L_t^{1-\alpha}$
2. Assume that population/labor inputs are constant and $L = 1$

Research into new technologies that increase the productivity of capital and labor supplies affect the 'A' coefficient on the production function. Technological improvements that increase the value of 'A' may allow the society caught in the 'injustice trap' to marshal enough resources to meet the implementation and maintenance needs of the background institutions.



- The A coefficient on the AK(2) function is greater than on the AK(1) function

So, in the event that the society does not have sufficient initial output to meet the implementation requirements of the institutions of justice, research and development of production technology is required. Since the productivity problem exists in the absence of the institutions of justice, then we might expect that the private sector will not invest in research and development of new technologies. Research must then be provisioned as a public good by the state. For a developing society of modest means, public investment in research and development is necessary for justice.

Capital Accumulation and Meeting the Material Requirements of Just Institutions

“Eventually, once just institutions are firmly established and all the basic liberties effectively realized, the net accumulation asked for falls to zero.

At this point a society meets its duty of justice by maintaining just institutions and preserving their material base. The just savings principle applies to what society is to save as a matter of justice. If its members wish to save for other purposes, that is another matter.” (TOJ p. 255)

It is of some concern that the ‘natural fact’ that later generations benefit from the work of early generations is not fully accounted for by Rawls. Within a generation, the natural lottery allocates talents asymmetrically and so just institutions and the basic structure work so as to prevent this arbitrary outcome from determining individuals’ life prospects. However, “[t]here is no way for later generations to help the situation of the least fortunate earlier generation. Thus the difference principle does not hold for the question of justice between generations and the problem of saving must be treated in some other manner.” (TOJ p. 254)

In this section I will take up the two different accounts of the derivation of the just savings principle offered in TOJ and JAFAR. I will only briefly consider the account in TOJ, noting some of the problems already explicated in the literature and then critique the JAFAR account, arguing that this interpretation also has problems.

On the TOJ account, the parties select a savings principle from behind a veil that prevents them from knowing to which generation they belong, or, equivalently, at what stage of civilization their society is in. They select this principle as representatives of a family line. They care, at least, about their immediate descendents and choose a principle such that they would wish all earlier generations to have followed it. A savings principle is a “rule that assigns an appropriate rate (or range of rates) to each level of advance, that is, a rule that determines a schedule of rates.” (TOJ. P. 255) Arrow (1974) and Dasgupta (1974) have both shown a special case in which parties choosing a just savings principle, whose utilities depend on the marginal productivity of capital, their welfare and that of their immediate descendents at some discount rate, find that the maximum criterion calls for either zero net savings or yields a time inconsistent solution (i.e. the principle chosen

by one generation would not be chosen by another.) Rodriguez (1981) shows that this result is contingent upon the utility functions of the parties, and that if they recognize the altruism of their descendants as well, the time inconsistency problem vanishes. The TOJ account has the further undesirable feature of changing the motivation of the parties from one of mutual disinterestedness.

In response to the difficulties of the saving principle derivation in TOJ, Rawls offers an alternative account in JAFAR. Rawls attempts to preserve the present time of entry interpretation for the choice of the savings principle by requiring that the principle chosen must be such that the parties would want each previous generation to have followed it.

The correct principle, then, is one the members of any generation (and so all generations) would adopt as the principle they would want preceding generations to have followed, no matter how far back in time.

(JAFAR p.160)

I examine both the case of a society experiencing economic growth, and the case of a society that is not, exploring the problems associated with choosing a savings principles for each. For each of the following three cases, I assume that population size remains constant.

I define a growing economy as one for which $y_t > y_{t-1} \forall t$ where y is real social output, a linear function increasing on t . I consider two tax schemes for a growing economy. The first (schedule 1) assigns the same nominal savings rate to each generation

while the second (Schedule 2) assigns the same real savings burden on each generation, demanding more savings from wealthier generations.

If the parties choose Schedule 1, then the total savings of each generation will be greater than the one before, but assuming diminishing marginal utility of the social product on a concave function, the real burden of savings is greater for the previous generation. This result holds for all generations. Schedule 1 may be agreed to according to the JAFAR derivation because any generation would like each previous generation to have followed it, that is, to bear a greater share of the real savings burden.

Schedule 1

T	1	2	3	4	5
Output (Y)	10	15	20	25	30
Saving (ς)	2	3	4	5	6
$U(Y, \varsigma)$	A	B	C	D	E

* $A < B < C < D < E$, $\varsigma = 0.2$

Schedule 2 assigns an equal share of the real savings burden on each generation, varying the savings rate with the total output of the generation. Here, 'x' is equal to the amount that must be saved such that each generation consumes the same level of post-savings output. Parties behind the veil might choose this principle, since no matter what generation they belong to, they will bear the same real burden of savings.

Schedule 2

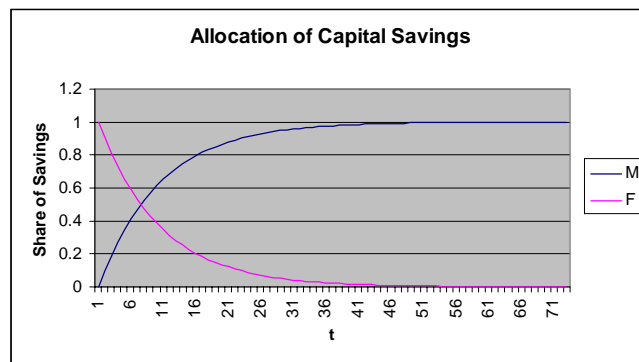
T	1	2	3	4	5
Y	10	15	20	25	30
ζ	Y_1-x	Y_2-x	Y_3-x	Y_4-x	Y_5-x
$U(Y, \zeta)$	A	B	C	D	E

*A=B=C=D=E

In the case of an economy that is not growing, schedule 1 assigns an equal share of the savings burden on each generation, and a just savings principle is easily derived if the social product for the first generation is sufficiently high to meet the maintenance requirements of the institutions of justice. Specifically, the implementation costs for the institutions of justice must be less than or equal to the initial social product of the society times the ratio savings/depreciation of capital. In this case, we can assign each generation the savings rate that is comprised of some contribution to the fixed costs of the institutions and the maintenance of the capital already invested. However, in the case where initial output is inadequate, or depreciation of capital occurs at too high a rate, it may be impossible to muster the capital to meet the implementation costs of the institutions. This may be an especially salient concern if we think that the background institutions for distributive justice also play an important role in fostering growth.

The following chart represents the share of savings allocated to capital formation and to maintenance of the inherited capital stock with a depreciation rate of 0.1 and a savings rate of 0.2. Each generation saves at the same rate (and assumes the same real savings burden assuming no-growth). The output and the depreciation rate are fixed and

only the savings rate is variable. If the society can save at a rate such that $Y(\frac{\xi}{\rho})$ is equal to the implementation cost of the institutions of justice, then the parties may choose this savings principle. Following the implementation of the institutions of justice, it may well be the case that social output will increase. From this point onward, assuming that the size of the institutions are independent of the size of social output, we probably have good reason to think that growth will ensue and the real savings burden will decrease.

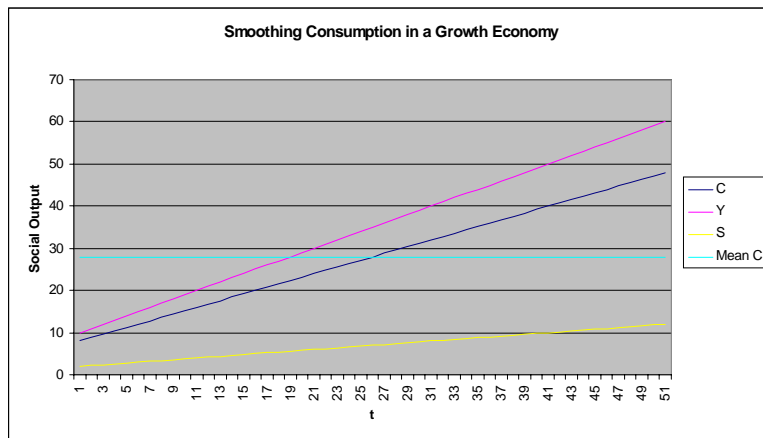


Another savings principle that may be chosen by the parties is one that allows dissaving by earlier generations. I have already noted that Rawls' theory is meant to apply to closed systems and that he has virtually nothing to say about deficit finance. However, if we loosen this constraint and consider a society that is able to borrow from outside agents to finance intergenerational public goods or to smooth consumption over time, then it may be the case that negative rates of savings would figure in prominently to a just savings principle. Rawls notes,

“It is a natural fact that generations are spread out in time and actual economic benefits flow only in one direction. This situation is unalterable, and so the question of justice does not arise. What is just or unjust is how institutions deal with natural limitations and the way they are set up to take advantage of historical possibilities.” (TOJ. p. 254)

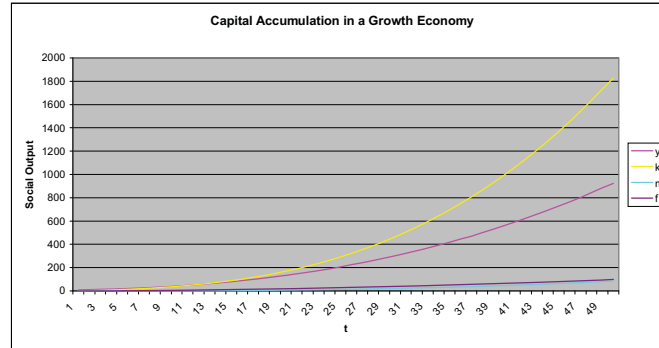
While it is a ‘natural fact’ that later generations benefit from the knowledge passed on to them by their predecessors as well as their technological improvements and capital savings, it seems as though the just savings principle fails to adequately deal with this natural limitation. The JAFAR derivation of the just savings principle, the constraint that whichever principle is chosen must be one that the choosing parties would have wanted all previous generations to have followed, seems to allow schedule 1 to be chosen. Recall that in the case of a growing economy, the real burden of savings is asymmetric. It seems as though Rawls’ emphasis on what we are owed from previous generations results in this bias; perhaps some consideration of what earlier generations may be owed from later ones ought to be integrated into the institutional management of intergenerational injustice.

The following chart shows that for a growth economy with a proportional savings rate (schedule 1), later generations enjoy higher levels of consumption than earlier ones. We can smooth consumption over generations and provide all generations in a finite series the same level of post-savings income by allowing earlier generations to borrow from external agents. A savings principle that allowed dissaving by earlier generations would, seemingly, also stand a chance of being chosen.

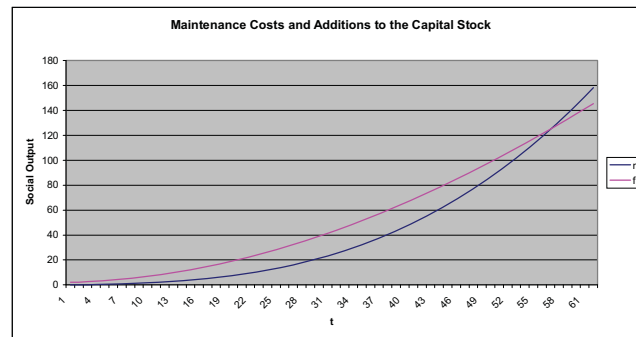


Finally, I consider an economy for which growth in social output is a function of capital (K). However, this is not due to the people in the society saving in order to increase productivity; the social output function (Y) is affected by the state of development of the institutions of justice. That is, the institutional justice variable in the growth equation is not a dummy variable taking a value of one when sufficient capital has been raised to install the entire institutional apparatus, but is instead a continuous non-linear function $[g(K)]$ of the amount of capital that has been raised and is represented, for simplicity, as the K function. We then retain Rawls' condition that the parties choosing the savings principle are required only to meet the demands of justice, but acknowledge that the institutions of justice facilitate growth and may also arise piecemeal, one bit at a time. This is a plausible story of development. The allocation branch, which is assigned with correcting gross market inefficiencies, is likely a corporation of smaller units, each responsible for a feature of the economy and which can be implemented individually before enough capital has been raised to erect the entire

branch. Note again the α coefficient on the production coefficient which can be increased through investment in technology.



1. $Y_t = Y_{t-1} + \alpha g(K_{t-1})$
2. $F_t = (\zeta Y_t - \rho K_{t-1})$
3. $K_t = K_{t-1} + F_t$
4. $M_t = \rho K_{t-1}$



- The case of an economy that grows along with the institutions of justice paints a much more encouraging picture of development.

I have considered the provision of public goods that satisfy the unanimity criterion and argued for the need to include future generations in the representative body

of the exchange branch, detailing some of the problems associated with the criterion and conceptualizing the preferences of future generations. I have also tried to illustrate through the example of intergenerational public goods the inadequacy of the just savings principles in dealing with some considerable problems of intergenerational justice. Finally, I have briefly evaluated the two derivations of the just savings principle and offered a few principles which abide by Rawls's conditions in both growth and non-growth economies. Despite the difficulties created by intergenerational justice for the Rawls' just savings principle, there is much to recommend it since similar problems are even more damaging to the utilitarian standard. Nonetheless, as the United States finds itself on the heels of unprecedented consumption and economic expansion, issues of intergenerational justice are more pressing than ever and it cannot shy away from the daunting challenge of ascertaining the obligations between generations.

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