



SYMPOSIUM ARTICLE

# Intergenerational and intragenerational cooperation

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## Abstract

This paper is a contribution to a symposium on Michael Otsuka's book, *How to Pool Risk Across Generations*. Following Otsuka, one may distinguish three distinct systems of cooperation within a standard pension arrangement: the retirement system, the longevity risk pool and the investment risk pool. It is important to observe, however, that only the retirement system constitutes a genuine system of intergenerational cooperation, the other two are essentially intragenerational, in that they pool risks among members of a cohort. Otsuka is faulted for being occasionally less than clear on these distinctions.

**Keywords:** pensions; retirement; intergenerational cooperation; annuities; savings

## 1. Introduction

I first acquired a philosophical interest in pensions many years ago, after getting into a debate with some consequentialists who thought they could strike a death blow against Rawlsianism by suggesting that the 'basic structure' could not possibly institutionalize a system of cooperation, because it extended over multiple generations, and future generations were unable to reciprocate with respect to the benefits they received. My initial response involved pointing out that one of the standard variants of the folk theorem in game theory involved cooperation being sustained in a repeated game with overlapping generations, through a system of indirect reciprocity (Heath 1997). Within such a system of cooperation, there is no requirement that the person *from whom* one receives a benefit be the same as the person *to whom* one provides a benefit, and so there is no reason that non-contemporaneous generations cannot cooperate. Since the model is mildly technical, I tried to illustrate it through reference to a real-world example of such a system of intergenerational cooperation in action, settling on 'pay as you go' (PAYG) pension schemes as the most clear-cut case (Heath 2013).

That choice proved somewhat fraught, since PAYG pension schemes turn out to be a lot more complicated than I initially realized. As a result, as I responded to

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various counterarguments over the years, I was forced to become less confused about the system of cooperation that these pensions institutionalize (Heath 2021). I was fairly confident that I had it all figured out, until I read Michael Otsuka's book, which made me realize that I had still been confused on several points. I mention this in part by way of consolation for those who find Otsuka's book itself confusing – the subject matter, I am inclined to say, is intrinsically difficult. There are several reasons for this, the most important being the ease with which one can fall victim to a 'money illusion' in thinking about these systems, getting distracted by the bookkeeping, while failing to see through to the real effects occurring in the realm of goods. The central achievement of Otsuka's book, it seems to me, stems from its 'climbing the mountain' structure, where he shows (in the somewhat opaque jargon that is endemic in this literature), not just that 'CDC converges on DB' but that 'notionally funded PAYG DB also converges on funded DB' (Otsuka 2023: 76). This amounts to a powerful demonstration of the importance of seeing past the bookkeeping, in order to focus on the real effects of such systems (not least because normative evaluation must focus on the latter). It also tends to explain why, as Otsuka laments, the discussion has to date been dominated by 'actuaries, financial economists, regulators, and other pensions professionals' (Otsuka 2023: 7).

Even though I finished reading the book feeling less confused about pensions than I had been before reading it, there are certain formulations adopted by Otsuka that seem to me likely to perpetuate misunderstanding, and so I will focus my critical remarks on these. One of the reasons that PAYG pensions are confusing, I now realize, is that they institutionalize three quite different systems of cooperation, only one of which is *intergenerational*, with the other two being *intragenerational*. Furthermore, only the intragenerational forms of cooperation are risk-pooling; the intergenerational cooperative system does not actually pool risks (which leads me to register a mild complaint about the title of Otsuka's book, for suggesting otherwise). For clarity, I will refer to the intergenerational system of cooperation as 'the retirement system', the other two (following Otsuka) as 'the longevity risk pool' and 'the investment risk pool'. The latter two systems of cooperation arise in order to offer protection against risks arising from the specific way that the retirement system is organized in our society.

## 2. Retirement

The basic function of every retirement scheme is to allow individuals an escape from the baseline human condition, often expressed by the imperative 'work until you die'. In principle, relief from this condition can be achieved without any need for cooperation (as Otsuka observes), simply through the stockpiling of necessary consumption goods. This would involve an individual overproducing while young and productive, creating a surplus of goods that can be stored and consumed at a later date. In most cases, however, this strategy is subject to overwhelming practical difficulties (e.g. spoilage, theft), and so the more sensible approach involves overproducing while young but transferring the surplus product to an even younger person, in return for a promise to be repaid in consumption goods at a later date. Historically, this arrangement has most often been institutionalized within families,

with parents providing for their children, then expecting to be looked after in their twilight years. (Compliance has typically been motivated not just by natural sympathy, but also by ‘artificial virtues’ such as filial piety.) On the other hand, the development of markets makes it possible to improve the stockpiling strategy, by allowing individuals to accumulate non-perishable goods with the expectation that these can later be exchanged for consumption goods. Note, however, that despite the appearance of self-sufficiency induced by having a cellar full of such goods, this is also a system of cooperation, because the strategy depends upon the willingness of younger workers to produce the perishable consumption goods that one needs and to exchange them for the commodities that one has stockpiled.

The introduction of *credit* allows for further refinement of this system. Instead of overproducing while young in order to accumulate stores of non-perishable goods, one can instead overproduce in order to lend to others. One can think of this as accumulating IOUs that can be redeemed at a later date (or favours that can be called in). The simplest way of doing this is through the accumulation of money, or a money balance at a bank (keeping in mind that depositors are creditors of the bank). The advantages of this system are multiple, including the fact that it eliminates all actual stockpiling (even though it maintains the *illusion* of stockpiling). In this case the cooperative nature of the system is self-evident, in the sense that when an individual retires, there is nothing in the cellar, so to speak, merely a mark in a ledger showing that this person is entitled to a certain quantity of consumption goods (as denominated in some currency). Younger people still have to do all the work to produce the goods, and are obviously in a position to defect on the arrangement, by renegeing on the IOUs (e.g. through hyperinflation).

The system described so far is one that involves no more than deferred consumption. The credit system, however, creates the opportunity for a significant enhancement, by having the surplus production directed to the creation of capital goods rather than consumption goods (which we often describe by saying that the money is not just saved, but rather *invested*). This changes the terms of the intergenerational bargain quite substantially, because foregoing some quantity of consumption today, in order to redirect the effort toward the production of capital goods, makes it substantially easier to produce that same quantity of consumption goods in the future. As a result, the expectation has developed that individuals should be able to forego a great deal less than they expect subsequently to consume, because they are entitled to a share of the economic growth that their foregone consumption facilitates. In bookkeeping terms, we express this as the expectation that individuals should be entitled to retire on their savings *plus interest* (or plus their accumulated investment returns). As anyone who has ever met with an investment advisor knows, the ‘miracle of compound interest’ allows one to retire with a substantially larger sum of money than one has given up over the course of one’s working life.

This arrangement is what underlies the fantastic deal that many of us in developed countries have come to take for granted, which is that we are able to sacrifice only about 20% of our earnings per year while working, with the expectation of being able to live in relative comfort without working for another

18 years on average, and without burdening our own children.<sup>1</sup> This ‘invest now to consume later’ arrangement is one of the most important systems of intergenerational cooperation in our society, and it is clearly sustained by indirect reciprocity. My chief complaint about Otsuka’s work in the past, which I shall reiterate here, is that he is less than fully clear about the difference between the stockpiling system (which is autarkic) and the investment system (which is cooperative). In particular, the discussion of Robinson Crusoe in Chapter 1 moves far too quickly, for my taste, from saving coconuts on a desert island to saving money in a capitalist economy. As one can see from Otsuka’s discussion in note 1 on page 58, my previous effort to express this was confusingly put, because it was mixed in with a discussion of how pension systems operate and how they are financed. This is in part why I have said nothing so far in the present discussion about pensions (except insofar as one considers a large pile of saved money to be a ‘pension’, which I do not).

### 3. Risk Pooling

So where do pensions come into the story? As Otsuka observes, the retirement system, despite offering enormous benefits, brings with it two very important risks. The first is longevity risk, or the concern that one might outlive one’s savings. Most developed countries have mean life expectancy at age 65 of around 19 more years (18 for men and 20 for women), but with a standard deviation of seven years, which means that a fairly significant fraction of the population can be expected to live for quite a bit longer than average. The second major risk is slightly more arcane, arising from the fact that the investment model of retirement is inherently more risky than the deferred consumption model, because investments may or may not work out as planned. Historically, the stock market has offered a significant premium over low-risk investment returns (i.e. interest on government bonds), but with a standard deviation above 15% in almost all OECD countries (Jorion and Goetzmann 1999: 964). These are both gigantic risks, and as a result, there are important cooperative gains to be achieved by pooling them.<sup>2</sup>

The most common strategy for pooling longevity risk is what led to the creation of ‘pensions’ *strictu sensu*. In traditional societies, where support of the elderly was the primary responsibility of family members, longevity risk is not particularly acute (childlessness is a much more serious concern). While children may be burdened by a particularly long-lived parent or grandparent, few seniors with living descendants were likely to find themselves completely indigent. With the emergence of the retirement system, however, in which the elderly rely upon complete strangers to provide them with the necessities of life, the possibility of being cut off entirely from support (i.e. by running out of money) becomes quite real. An attractive solution to this problem is for individuals to pool their retirement savings, allowing the unspent balances of those who die young to subsidize the retirement of those who die at a more advanced age. This is the mechanism that functions in the background of a life

<sup>1</sup>In order to make it more palatable, most of the sacrifice of present earnings is concealed from us in the form of employer contributions, which are basically payroll deductions that do not show up on one’s pay stub.

<sup>2</sup>For an analysis of the distinctive mechanism of cooperative benefit in risk pooling arrangements, see Heath (2006).

annuity, in which individuals make a large upfront payment to a financial institution in return for a guaranteed, fixed periodic payment from the age of retirement until death. Because financial institutions sell annuities to many, many people, they are able to use the outsized revenue from those who die early to make up the losses imposed by those who live a long time. A defined benefit pension has the same structure, making it essentially a set of collectively purchased life annuities.

This risk pool, it should be emphasized, is sustained by its own system of cooperation. *Ex ante* everyone has an interest in participating, but as an early death becomes imminent for some, those individuals have an incentive to withdraw from the pool, rather than have their excess savings transferred to those who suffer the ‘misfortune’ of living longer. It is important to note though that this system of cooperation is not intergenerational – the redistribution that occurs is strictly within the cohort. As a result, a standard defined benefit pension scheme takes an intragenerational system of cooperation (the longevity risk pool) and grafts it onto an intergenerational system of cooperation (the retirement system). Both elements – the transfers going on between plan members and the work done by younger generations to sustain the elderly – tend to be obscured by the accounting system (except in the case of PAYG DB, where the transfer from young to elderly is explicit).

My own reflections on this subject have tended to stop at this point, in part because I remain comfortably employed in the public sector with a defined benefit pension plan. Yet as Otsuka goes on to observe, there has been a large-scale shift over the past half-century away from defined benefit toward defined contribution plans, which are largely just individual savings plans offering no protection against longevity risk. As a result, individuals typically want to use their savings to purchase life annuities at the age of retirement, which has the untoward effect of heightening their exposure to investment risk. (It is worth noting, in this context, that due to large-scale market failure in this sector most financial institutions will not sell life annuities to individuals under a certain age. Otsuka passes over this without comment, but the existence of this market failure seems to me important in explaining why even a more egalitarian society would nevertheless want to offer citizens a contribution-based public pension.) Because the value of stocks fluctuates so much, and yet individuals are not able to spread their annuity purchases over many years, those who happen to retire during a bear market will wind up severely disadvantaged, for the remainder of their lives, compared with those who convert their stocks to annuities during a bull market. The solution proposed by Otsuka is, in effect, an investment risk pool, that guarantees a certain value of savings upon withdrawal by distributing the fluctuations in value over multiple cohorts (Otsuka 2023: 19). This is also essentially a system of intragenerational cooperation, in that it is unlikely to spread its costs and benefits out over more than a 10-year period.

My only hesitation about this aspect of Otsuka’s discussion is that it risks overstating the gains to be achieved through the stock market. When only a few pension funds participate, it is possible for their members to enjoy some fraction of the ‘equity premium’ these investments earn. But if the model were to be universalized, it seems to me, providing retirees with returns that exceeded the average rate of growth would constitute an unwarranted intergenerational transfer. This issue shows up in Otsuka’s discussion of notionally funded DB schemes, but there he defends payment of returns corresponding to the rate of growth in the

economy, rather than the rate of return on private investment, on the grounds that there is no risk assumed (Otsuka 2023: 74). And yet he also would like to see risk pooling arrangements created to insulate individuals from variability of investment returns. Without getting more deeply into the mysteries of the equity premium, it seems that if one genuinely succeeded in the latter ambition, it would eliminate the case for providing a return to private investment that exceeded the rate of growth.

This is a relatively minor point though. Where I did take more serious exception was to some of Otsuka's casual formulations of the logic of pensions, such as when he claims that 'funded pensions involve *intrapersonal transfers*', which involve 'a consumption-smoothing transfer of resources from one's young, healthy, and productive self to one's elderly, infirm, and unemployable self' (Otsuka 2023: 2). This is misleading in multiple ways. One is not actually transferring resources between one's earlier and later self, since the goods that are eventually consumed are not the same as those that were given up earlier. At best one is transferring a *claim* on resources (that are, ultimately, produced by others). Strictly speaking though, one is not even transferring the claim, one is simply choosing to hold onto it rather than exercising it immediately. And yet by not exercising it right away, one is freeing up resources that may be used by others. This creates the potential for a mutually beneficial arrangement, in which capital is made available for investment, with the providers of capital being rewarded with an increase in the value of their deferred claim. It is important to insist that this core system of intergenerational cooperation is one in which every member of society is a participant, regardless of whether they choose to finance their retirement through private savings or a collective pension. Otsuka is not always as clear on this as he might have been. Where his discussion is strongest is in showing how this core system only becomes fully satisfactory when its most important downstream risks are neutralized through supplementary risk pooling arrangements.

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