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## **PARETO'S REVENGE**

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**Pareto's Revenge**

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## 1. Introduction: PI, PE, PO

Consider a project or a policy reform. In general, this change will create winners and losers. Some people will be better off, others will be worse off. Making an overall judgment on social welfare depends on weighing up the gains and losses across individuals.<sup>1</sup> How can we make these comparisons? In the 1930s, a strong school of economic thought led by Lionel Robbins held that economists qua economists have no business making such judgments.<sup>2</sup> They only have a basis for declaring an improvement when no such interpersonal comparisons of gains and losses are involved. Only a change which makes nobody worse off and at least one person better off, can be declared an improvement.

Such a change is called a Pareto Improvement (PI). If no such changes are possible, the state of affairs is described as being Pareto Efficient (PE), a Pareto Optimum, or Pareto Optimal (PO). Named after Vilfredo Pareto,<sup>3</sup> PI and PE are central to post 1945 high economic theory. After all, PE makes an appearance in the two fundamental theorems of Welfare Economics. These are that every competitive equilibrium (CE) is PE, and every PE allocation can be achieved as a CE, under certain conditions. Through these theorems, the post second world war economic theory of Kenneth Arrow and Gerard Debreu links back to Lionel Robbins and Vilfredo Pareto, and thence to Adam Smith's Invisible Hand of competitive markets.<sup>4</sup> From there the links come full circle back to stances taken in current policy debates on the role of markets and government.

## 2. From PI to Social Welfare Functions

The central importance of PI and PE is thus not to be doubted. Yet I for one grew up in economics distrusting and disliking this building block of my discipline. I bristled when I read in my Cambridge tutor's paper: "It should not be necessary to point out that, despite its slightly misleading name, the concept of a Pareto Optimum is completely objective and that our discussions are of a positive rather than a normative nature."<sup>5</sup> I recall warming to Amartya Sen saying in a seminar that "A society can be Pareto Optimal and still be perfectly disgusting."<sup>6</sup> This captured one of my main concerns with PI, namely, its seeming conservative implications in the face of a redistributive impulse.<sup>7</sup> Suppose the change is a redistribution that takes a dollar away from a billionaire to give to a pauper. The PI rule says that society cannot be declared to be better off. I was outraged.

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<sup>1</sup> In what follows, projects and policies will be used interchangeably, with "policies" or "policy reform" being used most of the time. For the conceptual similarities between projects and policy reform, see Kanbur (1990).

<sup>2</sup> Robbins (1932, 1938).

<sup>3</sup> Pareto (1906).

<sup>4</sup> Arrow (1951), Debreu (1959).

<sup>5</sup> Farrell (1959).

<sup>6</sup> Sen (1970).

<sup>7</sup> Sen's objections went beyond the fact that redistribution from rich to poor would be stymied by the PI criterion. He argued that there are factors other than wellbeing outcomes in evaluating a state of affairs. See Kanbur (2004b). For a recent defense of economists against the charge that they are innocent of ethics, see Dasgupta (2004).

Later, in more pragmatic policy settings, I was not so much outraged as frustrated by the PI criterion. There are almost no policy interventions that make nobody, nobody at all, worse off. If economists stuck to PI, then they could not pronounce on the wellbeing of society at all in any realistic policy setting. An earlier generation's frustrations, and fear of professional irrelevance, had led to the propagation of the "compensation principle" (CP).<sup>8</sup> This states that society can be declared to be better off after a change if the gainers can compensate the losers sufficiently to leave the latter as well off as before, while still leaving some gains in their own hands. Of course, the crucial issue was whether this compensation was actually paid or not. If it was, then PI was satisfied, and CP had no additional cutting power. But if the compensation was not paid, then it was not clear by what logic the change was being declared to be an improvement. The only logic that seemed to work was through a particular set of value judgments—specifically, that gains and losses could simply be aggregated, in unweighted fashion. If that were the case, then why not make the value judgments explicit, and allow a broader range of weighting schemes?

And so we come to the current, standard approach in economics for evaluating changes. We apply an explicit social welfare function, sometimes called the Bergson-Samuelson social welfare function after Abram Bergson and Paul Samuelson, which specifies how gains and losses are to be evaluated.<sup>9</sup> So society can be pronounced to be better off even if the change in question is not a Pareto Improvement because one or more individuals are made worse off. It just depends on how gains and losses are weighted. One such social welfare function, in income space might be:

$$W = \sum_{i=1}^n \log y_i$$

Where  $y_i$  is the  $i$ th person's income and there are  $n$  individuals. Social welfare is simply the sum of the logarithm of incomes. With such a function, change in social welfare is given by:

$$dW = \sum_{i=1}^n \left(\frac{1}{y_i}\right) dy_i$$

Thus the poor get a higher weight than the rich--changes in incomes are weighted by the inverse of current incomes. Of course, other social welfare functions will lead to other weightings of gains and losses.

Another specific social welfare function is the well known FGT<sup>10</sup> family of poverty indices:

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<sup>8</sup> For a discussion of the history, see Kanbur (2003), and the references to Robbins (1938), Harrod (1938), Hotelling (1938), Kaldor (1939) and Henderson (1947). For a sociologist's response to Kanbur (2003), see Cernea (2003).

<sup>9</sup> Bergson (1938), Samuelson (1950).

<sup>10</sup> Foster, Greer and Thorbecke (1984).

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - y_i}{z} \right)^\alpha$$

Where  $y$  is income of the  $i$  th person,  $z$  is the poverty line, there are  $q$  poor people, and  $\alpha$  is the degree of poverty aversion. A policy reform or other intervention can now be evaluated simply by calculating the new poverty index. In particular, since

$$dP_\alpha = \frac{1}{n} \sum_{i=1}^q \left[ -\frac{\alpha}{z} \left( \frac{z - y_i}{z} \right)^{\alpha-1} \right] dy_i$$

it follows that income change for those at income  $y$  is weighted by

$$-\frac{\alpha}{z} \left( \frac{z - y_i}{z} \right)^{\alpha-1}$$

Once again (if  $\alpha$  is greater than 1), income changes of poorer people receive a higher weight.

### 3. Pareto's Revenge (On Me)

It seems, then, that after almost a century of soul searching, economists have gotten away from the restrictiveness of the PI criterion, and are using explicit weights for evaluating gains and losses.<sup>11</sup> I should be happy. But I am uncomfortable. Why? I see two problems, one of normative analysis, and one of positive analysis.

Normatively, I have no qualms about weighing up a rich person's gains or losses against those of a poor person (and this was the reason why as a young man I castigated PI as being too conservative in its implications). But I do have a problem in allowing the decrease in poverty of one person to compensate for ("wash away") some of the increase in the poverty of another. While the conflicts of policy reform are often presented as a battle between a rich interest group protecting its privileges against a poor majority, the dirty little secret of policy reforms is that in general they also pit some poor against other poor. There are poor who work in protected sectors, in the government's employ, in state owned enterprises, as well as in export sectors and in private enterprises. Restructuring of any sort will have negative effects on some poor, even as it confers benefits on other poor. Using an index of poverty submerges the increased pain of the poor who lose into the joys of those who gain.<sup>12</sup>

<sup>11</sup> For a standard statement in a modern text book, see Stiglitz (1999). For specific uses in the context of cost-benefit analysis of projects, see Little and Mirrlees (1969) and UNIDO (1972).

<sup>12</sup> For an early exercise that did this explicitly for poverty indices in the context of "structural adjustment", see Kanbur (1987).

This not just a philosophical curiosum. Data from across the world reveal that national level trends in poverty indices are composed of trends at the sub-national level (rural versus urban, or north versus south, or one ethnicity versus another) that go in opposite directions.<sup>13</sup> So even when the national poverty falls, significant numbers of poor are getting worse off by significant amounts. Or consider the famous Millennium Development Goal of halving the proportion of people living in poverty between 1990 and 2015. Current projections show that this may well be met at the world level because of the performance of India and China, even though the same projections indicate it is very likely that poverty in Africa will increase. It is greatly to be welcomed that poverty in India and China will decrease. But are we comfortable with the value judgments that allow the increase in African poverty to be totally aggregated into this decrease and thus to disappear? But this is what we accept when we accept a global poverty measure that aggregates across all individuals, albeit with weights.<sup>14</sup> The problem is not with the weights. The problem is with the fact of aggregation, with whatever weights.

To make my concerns concrete, consider the poverty index  $P_\alpha$  with  $\alpha = 1$ . Consider two poor people at the same level of income. A policy reform can make one person better off by 100 at the expense of making the other worse off by 30. The absolute poverty gap will decrease by 70. Suppose that at some cost this reform could be modified to give each of the two poor people an increase of 30 (10 units, 70 minus 60, being the cost of the redesign). The poverty gap will decrease by 60. The  $P_\alpha$  index will fall by less in the second case, and yet it has the virtue that no poor person has been made worse off. Of course it can be said that what I am worried about is inequality among the poor, and this can be taken care of by increasing the value of  $\alpha$ . But for every  $\alpha$ , I can produce a similar argument. My concern is really one of aggregation. I am unhappy with combining the losses of a poor person with the gains of another poor person (and certainly with the gains for a rich person). It can then be objected that I risk policy paralysis since any policy is bound to make at least some poor worse off. But what I am reflecting is a value judgment, and this cannot be held hostage to practicality, at least not in this form.

But discussions of practicality lead me to my second reason for discomfort. In the above example the policy reform was simply implemented by the policy dictator. Those who lost meekly accepted their lot. All that was left was for the philosopher kings to evaluate the outcome—that was the normative discussion rehearsed above. But in reality losses will not be meekly accepted. There will be resistance. Depending on how we specify the institutions of resistance and decision making, the reform may or may not go through. Even if it does, the process of resistance will have used up real resources, leaving less of the overall gains from the reform. If we further assume that losers will fight harder per unit of loss than gainers per unit of gain, then it may well be the case that the first policy reform discussed above, the one where overall poverty falls more but some poor lose out, may be less feasible politically than the second one, where overall poverty falls less but all poor gain. If only the second is feasible, then a comparison between the first and the second is truly only of academic interest.

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<sup>13</sup> Kanbur (2001).

<sup>14</sup> Kanbur (2004a)

Thus I find myself willing to sacrifice gains in overall surplus to ensure that the pattern of gains involves gains for all, in particular gains for all poor. This is because first of all I am unwilling to compensate an increase in the poverty of one by the decrease in the poverty of another. Secondly, I am concerned that when policies that reduce poverty involve losses for some, whether rich or poor, the political economy might be such that such policies may not go through.<sup>15</sup> Hence I put special weight on policies that do not make some of the poor worse off, and on poverty reduction policies that do not make worse off those who would block such policies if they were indeed made worse off. While this does not make me a full blown Paretian (I would still favor policies that redistribute from rich to poor that were not blockable by the rich), it brings me quite a long way in the direction of the Pareto Improvement criterion. In my youth I rejected the Pareto Improvement criterion because of what I saw as its conservative implications. Now I am drawn back to it for both normative and positive reasons. This is Pareto's revenge (on me).

#### **4. Redistributive Mechanisms**

But does this not lead once again to policy impotence, since very few policies can be found that do not create losers, especially poor losers? My answer is first of all that this stance forces us to think of policy reform as a package, a combination of measures such that we come close to satisfying the Pareto Improvement criterion. The crafting of such packages requires us to be knowledgeable and creative, more so than for single reform packages. Thus trade reform is one thing. Trade reform plus short term compensation and long term training for those made unemployed is quite another. Privatizing state owned utilities is one thing. Privatization plus protecting service to the poor something else. High interest rates to stem the outflow of capital is one thing. High interest rates plus short term targeted subsidies to exporting firms is another. And so on.

It appears that, belatedly, the importance such packaging of policies is being realized. As David Wessel of the Wall Street Journal notes in his discussion of US policy and politics:<sup>16</sup>

"All over America, there are people who played by the rules yet are losing their jobs -- some because workers elsewhere do the same work for less, others because computers do things that once only humans did.... It is small comfort to tell them, though it's true, that we're richer today than our grandparents imagined because we haven't walled ourselves off from the rest of the world nor sought to restrain the advance of technology.... Those of us who benefit from low-cost imports -- or who have well-paid export jobs that wouldn't exist if we didn't allow imports and outsourcing -- must not ask those who lose jobs to go it alone.... Candidates need to confront those who offer slogans, not solutions. Protectionists would block imports of factory goods or outsourcing of service jobs, ignoring the likelihood that interfering with the forces of trade and technology will prevent the creation of more jobs than it will save. Free traders with secure jobs proclaim that the only way to get the benefits from open markets is to tolerate the pain of people they'll never meet. Gene Sperling, a former Clinton adviser, offers this pithy put-down: "Protectionists have nothing to say to the future. Free traders have nothing to say to the present."

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<sup>15</sup> There is now a large literature on the political economy of policy change. Some examples of papers are Alesina and Drazen (1991), Fernandez and Rodrik (1991), Coate and Morris (1995), Grossman and Helpman (1996), Stiglitz (1998).

<sup>16</sup> Wessel (2004)



Even as committed a free trader as Jagdish Bhagwati fully recognizes the importance of compensation, and bemoans the fact the developing countries do not have such schemes. In recent testimony before the US Congress he says:<sup>17</sup>

“Freer trade therefore is a virtuous policy, whether you are focused on economic gains or on social agendas. It truly deserves bipartisan support. Yet, when it comes to the poor countries, while they have come to appreciate market access for their exports, they remain fearful of imports --- a phenomenon not entirely unfamiliar to our Congress where steel protection, textile quotas and tariffs, farm subsidies, the Byrd Amendment which makes a yet further mockery of anti-dumping actions, and much else still mars our profession of free trade. But where we have managed to ease the potential adjustment costs, for political and economic reasons, by building into virtually every trade legislation some provision for adjustment assistance -- this is true of the NAFTA legislation and also of the latest fast-track legislation ---, I am afraid that the poor countries which are opening up to trade more ambitiously do not have such programs. They simply do not have the funds to do so.”

Thus the idea of policy reform as a package of the primary change plus compensation which ensures that losses to the losers are minimized, or sets of policies that together ensure that losses are minimized, moving closer to the Pareto Improvement criterion in other words, is gaining ground. But Bhagwati’s proposal is only for trade. What about technology? What about state owned enterprises? What about agricultural price reform? The myriad policy changes, many necessitated by a changing global environment that cannot be predicted, will require different and specific complementary policies and interventions in each case if we are to ensure that PI is satisfied, or at least get close to it. The information requirements in this design are huge, and the need for real time policies responses creates a need for real time compensatory policies. Such “just in time” design and implementation may be a tall order, although there is no reason why we should not strive for it.

But the complexities of designing specific policy packages, the outcomes of each package respecting the PI criterion, could be minimized or removed altogether if there was an overall redistributive mechanism in society such that no one was allowed to fall below a socially accepted minimum. This mechanism, operating independently of this or that policy reform initiative or project, would raise resources from those above the minimum to finance the raising up of those below the minimum, to the minimum. Suppose for a moment that such a mechanism existed. Then one could evaluate individual policy change proposals purely in terms of their impact on total surplus. The distributional aspects would be taken care of by the overall distributional mechanism. The specifics of gains and losses for particular policies or projects would not be a concern, as they would have to be in a Bhagwati-type “trade adjustment assistance fund” proposal. The overall redistributive mechanism would certainly take care of my normative concerns detailed above, since by definition poverty would not decline provided only policies and projects that increased “the size of the pie” were accepted. My second set of concerns, on political economy issues and resistance to reform, would be addressed only to the extent that resistance came from poor losers, since their losses would be made whole, but this is better than nothing. For changes

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<sup>17</sup> Bhagwati (2003).

where some of the losers were above the minimum, specific compensation would indeed have to be enacted to minimize resistance.

One may well ask, can we not view the current system of government transfers and programs as constituting such a redistributive mechanism? So what is new in what is being said? In one sense the answer is that there is nothing that is new (there is rarely anything new under the sun). But it provides us with a line of defense for redistributive systems. It also provides, potentially, a framework for design of some of these systems. It suggests that we should view the myriad programs in current systems not just on their own terms and on a case by case basis, but as an overall redistributive system one of whose objectives is that it tries to make whole the losses from economic shocks, and from government economic policy reforms and projects.

Here are some basic design principles that emerge from the above discussion:

\*At the core of the design is the transfer of purchasing power to those below the social minimum. This is not to be apologized for, or hidden, or necessarily ranked below other so called “productive” government expenditures. Rather, what is called for is a social consensus, based on the recognition of the fact that redistribution is the key to achieving the PI criterion.

\*Another core principle is that the short term matters. If someone has been made unemployed as a result of trade liberalization, it is cold comfort to be told that they are bound to find a job in five years’ time as the economy as a whole picks up.

\*There can be more than one method of transfer, and the combination will vary from country to country. While the tax system will do the job in developed countries and urban areas of developing countries, public works and other such tools may be needed in rural areas. Subsidizing basic education and health is another example. Subsidizing basic foods, or basic inputs to agriculture, should not be shunned either.

\*Each method of transfer will have its own economic and social costs. The economic costs are clear—the costs of “distortion” beyond the straightforward fiscal costs. The social costs will vary from society to society, and within societies. Put another way, the social acceptability of a method of transfer, the extent to which it is considered dignified and appropriate will vary. Different methods will need to be used to achieve the final goal of purchasing power transfer.

\*The general system of redistributive transfers will not be able to do everything. There will be plenty of room left for specific design of complementary transfers and compensations for many policy reforms. But having a general system will reduce the intensity of pressure on any given policy reform.

Now, given these general principles, the specifics of the overall redistributive mechanism would have to be debated, of course. As already noted, it would consist of several components, and would vary greatly from country to country. Some ways of

redistributing have fewer costs than others, depending on the circumstances; the detailed designs should try to minimize these costs.<sup>18</sup> And we may not end up with a perfect system. But our stance should be that a less than perfect system, and the costs associated with such a system, may well be worth having if it allows a wider range of projects and policy reforms to pass the normative and political economy tests without the need for specific compensation in each case.

## **5. Conclusion: Redistribution and Pareto**

As I indicated at the start, in my youth I felt strongly (very strongly) that Pareto (actually, PI, PE and PO) was antithetical to my redistributive instincts. If I accepted PI as a normative criterion then I could not support implementation of redistribution from rich to poor. So I was happy with the standard economic procedure of using an egalitarian social welfare function, which weighted gains and losses to individuals by their wealth or income status. But over time I have developed discomfort with this procedure, because it aggregates the losses of some poor in to the gains of other poor, and because it is innocent of the resistance of the losers from change. For both these reasons, I would tend to favor policies and projects that made nobody (especially no poor person) worse off, even if the overall social surplus from such interventions was lower than for other interventions that made some people worse off. But since there will be very few pure changes of this type, I am led to packages of policies (including in the package redistributive compensation to make whole the losses of losers, especially poor losers) that satisfy the PI criterion (especially applied to the poor). Since design of specific packages for each contingency is complicated, I have argued that generalized redistributive mechanisms can play this role, reducing the need for particular compensation in each and every case. Thus, while I started out with a distrust of Pareto because it stood in the way of generalized redistribution, I have ended up by arguing for a generalized redistribution mechanism to ensure that the PI criterion is more likely to be satisfied for any given policy reform or project. Pareto's revenge is indeed complete.

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<sup>18</sup> There is a large literature on such design issues. See Akerlof (1978), Kanbur (1987), Kanbur, Keen and Tuomala (1994).

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