

Chapter Summaries

Chapter 5: Applying the Social Welfare Function

Chapter 5 demonstrates how flexible-form social welfare functions can be used to make social welfare judgments about the distribution of income. Utility is assumed to be a function of income for this exercise. The pioneer in the use of flexible form social welfare functions was Anthony Atkinson.

The chapter begins with three general assumptions that Atkinson believed should hold for social welfare functions that are brought to data on household or individual incomes. His assumptions have been widely adopted by mainstream economists.

1. *Impersonality* – the marginal social welfare weights, W/U^h , should be equal for people in the same economic circumstances, in this case people with the same income. (Atkinson made the strong assumption that the social welfare function is utilitarian, with the marginal social welfare weight always equal to one for everyone. He incorporated a concern for inequality into the utility function.)
2. *Identical tastes* – everyone has the same utility function, U , so that $U^h = U(Y_h)$. People's utilities differ only because they have different incomes.
3. *Diminishing marginal utility of income* – the utility function bows downward to the horizontal axis, so that the marginal utility, the slope of the function, decreases as income increases.
4. The goal regarding the distribution of income is the interpersonal equity condition for a social welfare maximum, to equalize the social marginal utility of incomes across all people: $= (W/U^h)/U^h/Y_h$, for all h .
5. If non-distorting lump-sum taxes and transfers are possible, then the social marginal utilities are equalized by bringing everyone to the mean level of income.
6. Lester Thurow argued that the equality of incomes is the proper baseline for the United States, and that allowing inequality has to be justified.

7. The mainstream economic justification for allowing inequality is the inefficiencies that actual taxes and transfers give rise to. These inefficiencies of taxing and transferring are referred to as Okun's leaky bucket, and consist of deadweight efficiency losses in markets, administrative costs, and compliance costs.
8. The marginal benefit of transferring a dollar of income from the rich to the poor is the marginal utility of income of the poor, MU_Y^P . The marginal cost of the transfer is the marginal utility of income to the rich, MU_Y^R , plus the marginal cost of Okun's leaky bucket, MC_{OLB} . The redistribution is optimal when $MU_Y^P = MU_Y^R + MC_{OLB}$, which implies that $MU_Y^P > MU_Y^R$ and $Y_R > Y_P$. Incomes are not leveled to the mean. In addition to his three general assumptions, Atkinson had to choose a specific form of the individual's utility function and the social welfare function.
9. Atkinson assumed $U = \frac{1}{1-e} Y_h^{1-e}$, and $W = \sum_{h=1}^H \frac{1}{1-e} Y_h^{1-e}$. The parameter e is a measure of society's aversion to inequality. e is bounded by $e = [0, \infty]$, with $e = 0$ representing Benthamite/utilitarian indifference to inequality and $e \rightarrow \infty$ representing Rawlsian egalitarianism, with infinite weight given to the poorest individuals.
10. With these functions, $MU_P/MU_R = \left(\frac{Y_R}{Y_P}\right)^e$. With $e = 0$, $MU_P/MU_R = 1$ and there is no gain to redistributing. Only the total income matters for social welfare; social welfare is Benthamite/utilitarian. If $e \rightarrow \infty$, the poor get infinite weight relative to the rich on the margin even if the rich have just a penny more than the poor; social welfare is Rawlsian egalitarian.

The chapter then presents three applications using Atkinson's social welfare function.

11. *Social welfare and the Lorenz curve* – Atkinson's original motivation was to make social welfare judgments about changes in the distribution of income over time as represented by the Lorenz curve. Given two distributions A and B with equal means, if Lorenz curve A lies everywhere inside Lorenz curve B, then social welfare has to increase in moving from B to A for any aversion to inequality, e , except $e = 0$. This is so because distribution A can be achieved by a top-down redistribution from distribution B, from people with lower to people with higher social marginal utilities of income. If the Lorenz curves cross, then each distribution has to be evaluated by means of Atkinson's social welfare function. But this implies that society's aversion to inequality matters in selecting the distribution that generates the higher social welfare. Different values of e can give different rankings.
12. *The social cost of inequality* – Atkinson developed an income measure of the cost of inequality by means of the equally distributed equivalent income, Y_{ede} . Y_{ede} is the

income level that, if given equally to everyone, would generate the same social welfare as the given distribution of income. Y_{ede} is less than the mean level of income, Y_{mean} , unless either everyone already has the same income, Y_{mean} , or $e = 0$, society does not care about the distribution. Otherwise, the ratio Y_{ede}/Y_{mean} gives the proportion of total income that would be required to achieve the actual level of social welfare if incomes were equally distributed. For example, if the ratio is .7, the cost of the inequality is equivalent to .3 (30%) of total income.

13. *Does the U.S. care about inequality?* – Arnold Harberger used the Atkinson framework to show that if one assumes $e = 1/2$ for the U.S., then the inefficiencies of taxes and transfers represented by Okun’s leaky bucket would have to be \$.67 per dollar transferred to justify the ratio of incomes of the richest and poorest income classes, which was 9/1 at the time. He thought \$.67 was much too high. Therefore, he concluded that e in the U.S. must be much less than 1/2, and therefore close to Benthamite indifference. Since Harberger wrote, the gap between the richest and poorest income classes has risen above 14 to 1, which would imply even a lower e , but economists’ estimates of the inefficiency costs of taxing and transferring have been rising, which would imply a higher e . Still, society’s aversion to inequality does appear to be low in the U.S.

The chapter concludes with a discussion of social mobility, the movement of people through the distribution of income over time, which is a concept within process equity.

14. *Social mobility* is described by a transition probability matrix whose elements P_{ij} give the probability that a person who is in income class i at time t will be in income class j at time $t+1$.
15. Suppose the following three assumptions hold about the elements of the transition probability matrix:
1. all $P_{ij} > 0$ (movement between any two income classes is always possible);
 2. The P_{ij} are constant over time; and
 3. All history before time t is irrelevant to which income class a person is in at time $t+1$.
- Then a given transition probability matrix eventually brings the economy to the same final distribution of income no matter what the initial distribution of income is.
16. Social mobility therefore generates a tension between process and end-results equity. The government undertakes taxes and transfers to achieve the distribution of income that the social welfare function determines is optimal from society’s end-results view of distributive justice. But social mobility is always working to unravel that distribution and return to the distribution that is ultimately determined by the underlying transition probability matrix within the economy.