Do Welfare States Reduce Poverty?
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Abstract

A standard analysis of the anti-poverty effect of taxes and income transfers is to compare pre-tax-transfer poverty and post-tax-transfer poverty. A critical shortcoming of the standard approach is that it treats pre-tax-transfer poverty as given and ignores potential effects of taxes and transfers on pre-tax-transfer poverty. Using cross-national variation, this study examines potential endogeniety of pre-tax-transfer poverty. The results suggest that both the generosity and efficiency of the tax/transfer system may influence the level of pre-tax-transfer poverty. If this is true, the standard approach overestimates the anti-poverty effectiveness of generous and/or targeted welfare systems.

1. Introduction

Western capitalist societies are generally referred to as welfare states. A common and fundamental feature of welfare states is active government intervention to secure a minimum standard of living for all citizens. During past decades, Western welfare states have devoted diverse efforts to increase the living standard of the least well-off members. However, in spite of considerable welfare efforts, a substantial number of citizens in welfare states do not experience socially-acceptable minimum standards of living. Therefore, poverty alleviation is a continuing concern of social policies in welfare states.

Because poverty is so persistent in welfare states, a fundamental question is raised: Do welfare states in fact achieve any success in reducing poverty? A standard approach to analyzing the anti-poverty effectiveness of welfare states is comparing pre-tax-transfer poverty and post-tax-transfer poverty. To estimate these two measures, scholars distinguish diverse sources of household income into two components. First, pre-tax-transfer income (or, market income) is defined by the sum of income from market (or private) sources such as wages and salaries, income from self-employment, capital income, benefits from private pensions or insurance, and other private transfers. Adding government transfers to pre-tax-transfer income equals gross income. Finally, subtracting taxes from gross income leads to post-tax-transfer income (or, disposable income). The difference between pre-tax-transfer income and post-tax-transfer income is the "re-distributive" effect of welfare-state intervention[1].

Based on this standard approach, a number of studies have analyzed the anti-poverty effectiveness of taxes and income transfers in welfare states (e.g., Atkinson, Rainwater, and Smeeding, 1995; Burniaux, Dang, Fore, Förster, d'Ercole, and Oxley, 1998; Förster, 1993; Jäntti

and Danziger, 1998; Mitchell, 1991). They consistently found that welfare states do achieve a substantial reduction of poverty, although the anti-poverty effectiveness of the welfare state differs greatly from country to country. However, a critical shortcoming of the standard approach has been neglected in these studies. In the standard approach, the level of pre-tax-transfer poverty is treated as the counterfactual of the welfare-state intervention. In other words, an implicit assumption of the standard approach is that taxes and income transfers do not influence the level of pre-tax-transfer poverty.

This assumption may be unrealistic. Even studies based on the standard approach have often recognized the weaknesses of this assumption (e.g., Aguilar and Gustaffson, 1987; Förster, 1993; Lambart and Pfähler, 1988; Ringen and Uusitalo, 1992). Taxation and welfare transfers may affect diverse aspects of human behavior, and hence are likely to alter pre-tax-transfer income and poverty. If this is true, the level of pre-tax-transfer poverty may not be exogenous. To the extent that pre-tax-transfer poverty is influenced by taxes and transfers, the standard approach overestimates the 'net' anti-poverty effect of the welfare state.

The aim of this study is to investigate potential endogeniety of pre-tax-transfer poverty. In this study, the similarities and differences of welfare states are summarized by two major characteristics of their tax/transfer systems: 1) the overall level of welfare efforts and 2) the degree of selectivity or targeting. Using cross-national variation, this study analyzes whether these two factors are related to the level of pre-tax-transfer poverty. In other words, the central question in this study is: Are countries with higher levels of welfare efforts and/or with more targeted welfare systems likely to have a higher level of pre-tax-transfer poverty? The answer to this question provides empirical evidence for the potential weakness of the standard approach.

2. Prior Studies

Following the standard approach mentioned above, a number of recent studies analyzed the anti-poverty effectiveness of the welfare state. These studies consistently found that there are large differences between the extent of pre-tax-transfer poverty and that of post-tax-transfer poverty, which implies that taxes and income transfers in welfare states achieves great success in reducing poverty. For example, Jäntti and Danziger (1998) report that the proportional decline in the poverty rate due to taxes and transfers ranges from 25 percent (in the United States) to 80 percent (in Belgium, Luxembourg, and Sweden) among welfare states[2].

According to the standard approach, the difference between pre-tax-transfer poverty and post-tax-transfer poverty is defined as the poverty reduction effectiveness of the welfare state. Poverty reduction effectiveness is determined by two major characteristics of the transfer system. First, countries with more generous welfare programs are likely to achieve a higher level of poverty reduction. Second, the distributional aspects of the transfer system also affect the anti-poverty effectiveness. Given the overall level of welfare benefits, the more benefits are targeted toward the poor, the larger poverty reduction effectiveness is.

Traditionally, comparative studies of welfare states have largely focused on the first factor—countries' the overall level of welfare effort. In these studies, welfare efforts are typically measured by the amount of government expenditure on welfare programs as a percentage of the gross domestic product (GDP). Recently, with the increasing budgetary pressure in welfare states, the second factor has received increasing attention. Given budgetary restrictions, it is an attractive idea to concentrate limited resources on those most in need. To consider the distributional features of welfare benefits, the literature has often used the concept

of efficiency. The measures of efficiency in analyzing anti-poverty effects of welfare transfers were introduced by Weisbrod (1969) and further developed by Beckerman (1979). Beckerman defines the poverty reduction efficiency by the proportion of welfare benefits actually contributing to the reduction of poverty.

In sum, a country's final poverty outcome (i.e., post-tax-transfer poverty) is determined by three factors: 1) the extent of poverty generated from the market economy (i.e., pre-tax-transfer poverty), 2) the overall level of welfare efforts, and 3) the poverty reduction efficiency of the transfer system. Some studies have analyzed cross-national statistical relationships among these factors. For example, using the Luxembourg Income Study (LIS) database, Mitchell (1991) and Mitchell, Natsem, and Gruen (1994) report the following relationships among 10 welfare states:

$$P_{post} = 9.89 - 1.64 * Generosity - 0.13 * Efficiency \qquad R^2 = 0.72$$
$$(t = 7.2) \qquad\qquad (t = 5.5)$$

where *ESS* is effective social expenditure (defined by the amount of social expenditure multiplied by Beckerman's measure of poverty reduction efficiency), P_{post} and P_{pre} are the post-tax-transfer poverty gap ratio and the pre-tax-transfer poverty gap ratio in which the poverty line is set equal to 50 percent median equivalent income of each country.

$$P_{post} = 9.89 - 1.64 * Generosity - 0.13 * Efficiency \qquad R^2 = 0.72$$
$$(t = 7.2) \qquad\qquad (t = 5.5)$$

where *generosity* is measured by the ratio of total social transfers to the pre-transfer poverty gap and *efficiency* represents Beckerman's measure of poverty reduction efficiency.

Similarly, based on the LIS data from 15 welfare states, Kenworthy (1999) reports the following relationship:

$$P_{post} = -0.75 \times socex + 0.0006 \times GDP \ per \ capita + 0.63 \times P_{pre} \qquad adj \ R^2 = 0.71$$
$$(t = 2.92) \qquad (t = 1.16) \qquad (t = 5.05)$$

where P_{post} and P_{pre} are the post-tax-transfer poverty rate and the pre-tax-transfer poverty rate where the poverty line is defined by 40 percent of median equivalent income in the United States and converted to other countries using purchasing power parities (PPP), and *socex* is social welfare expenditure as a percentage of GDP.

The above results imply that countries with higher levels of welfare expenditure and/or poverty reduction efficiency are likely to have lower levels of post-tax-transfer poverty, if the level of pre-tax-transfer poverty is held constant. However, those findings are no more than a tautology. According to the standard approach, poverty reduction effectiveness is defined by the difference between pre-tax-transfer poverty and post-tax-transfer poverty. Poverty reduction effectiveness should be equal to the product of overall level of welfare transfers and poverty reduction efficiency. In other words, the standard approach implies the following relationship by definition[3]:

$$P_{post} = P_{pre} - (generosity \times efficiency) \qquad (1)$$

where *generosity* represents the overall level of income transfers and *efficiency* is Beckerman's measure of poverty reduction efficiency.

As shown in equation (1), post-tax-transfer poverty is a function of pre-tax-transfer poverty, the overall level of income transfers, and the poverty reduction efficiency of transfer programs. Therefore, it is not surprising that the above regression models estimate highly significant coefficients and R^2s. What is ignored in those models is that P_{pre} in the right-hand side of regression equation may be influenced by *generosity* and *efficiency* and, therefore, should not be treated as exogenous.

Theoretical arguments suggest that income transfers and taxes necessary to finance them may alter pre-tax-transfer income in various ways. Taxes and transfers may have impacts on diverse aspects of social behavior such as family formation and dissolution, fertility, child rearing practice, and accumulation of human capital (Nakamura and Nakamura, 1990). Taxes and transfers may also change consumption and saving behavior. Transfer programs such as social security and unemployment insurance may cause changes in the macro economy including inflation, unemployment, and the substitution of capital for labor (Citro and Hanusheck, 1991; Nakamura and Nakamura, 1990). Furthermore, providing public transfers may reduce private transfers between families (Lampman and Smeeding, 1982). Any changes in these diverse socio-economic aspects can lead to changes in pre-tax-transfer income and poverty.

Among the potential effects of taxes and transfers on pre-tax-transfer income and poverty, work-incentive effect has been of particular concern. Opponents of the welfare state argue that welfare benefits are likely to deteriorate the work efforts of recipients, and push them into the poverty trap (e.g., Murray, 1984). According to theories in labor economics, both the generosity and the efficiency aspects of the tax/transfer system may affect the work incentives for the poor. A generous welfare state tends to provide more benefits to the poor. Assuming that leisure is a normal good, an increase in non-labor income (i.e., welfare benefits) will decrease labor supply.

Perhaps the efficiency aspect of the tax/transfer system invokes more serious discussion about work incentives. Higher levels of poverty reduction efficiency can be achieved by concentrating a given level of welfare benefits on the poor. In targeted (or, income-tested) welfare programs, the level of benefits tends to be reduced as the earnings of recipients increase. Therefore, the potential recipients of income-tested programs face very high implicit tax rates

(or, more precisely, benefit reduction rates). For example, Atkinson (1995a) illustrated that the marginal tax rate for low-income families imposed in the UK tax-transfer system[4] is 96 percent. Gensler (1993) estimates that the implicit tax rate on earned income faced by a poor single female-headed household in the United States ranged from 58 to 64 percent during 1979-1990, averaging 60.4 percent over the 12 year period. For a married couple with children, the implicit tax rate on the husband's earnings lies between 42 percent and 48 percent, with an average of 45.2 percent.

Labor economists have argued that very high marginal tax rates imposed by income-tested programs create substantial disincentive effect on labor supply. To illustrate the relationship between poverty reduction efficiency and potential disincentive effects, Figure 1 shows budget constraints under two special types of tax/transfer systems. The horizontal axis of the figure represents individuals or households arrayed in ascending order of their incomes, and the vertical axis represents the level of their incomes. The solid lines represent pre-tax-transfer income and the dotted lines represent post-tax-transfer income.

The left portion of Figure 1 shows pre-tax-transfer income and post-tax-transfer income under a universal benefit K and a flat-rate tax imposed on every family. Suppose that the full amount of tax revenue is spent on welfare benefits. The tax rate is set to be:

$$\tau = \frac{N \times K}{\sum Y_i}$$

where N is the total number of families, K is the level of the universal benefit, and Y_i is the income of ith family. Therefore, area ($A+B$) should equal area C. For comparison, the right portion of Figure 1 shows a minimum-guarantee welfare program and a flat-rate tax imposed on families with income above the guaranteed level. In this case, area A should equal area C.

Given the poverty line, the aggregate amount of the pre-transfer poverty gap is (A+D) and that of post-tax-transfer poverty gap is D. The total amount of net transfers (benefits minus taxes) is (A+B). Within the (A+B) amount, only A is actually contributing to the reduction of the poverty gap. The B amount is either received by the pre-tax-transfer non-poor or raises the incomes of recipients above the poverty line. Therefore, according to Beckerman's definition, poverty reduction efficiency is given by A/(A+B).

Figure 1. Budget Constraints under Two Special Types of Tax-Transfer Systems

Universal Benefit with Flat-Rate Tax   **Minimum Guarantee with Flat-Rate Tax**
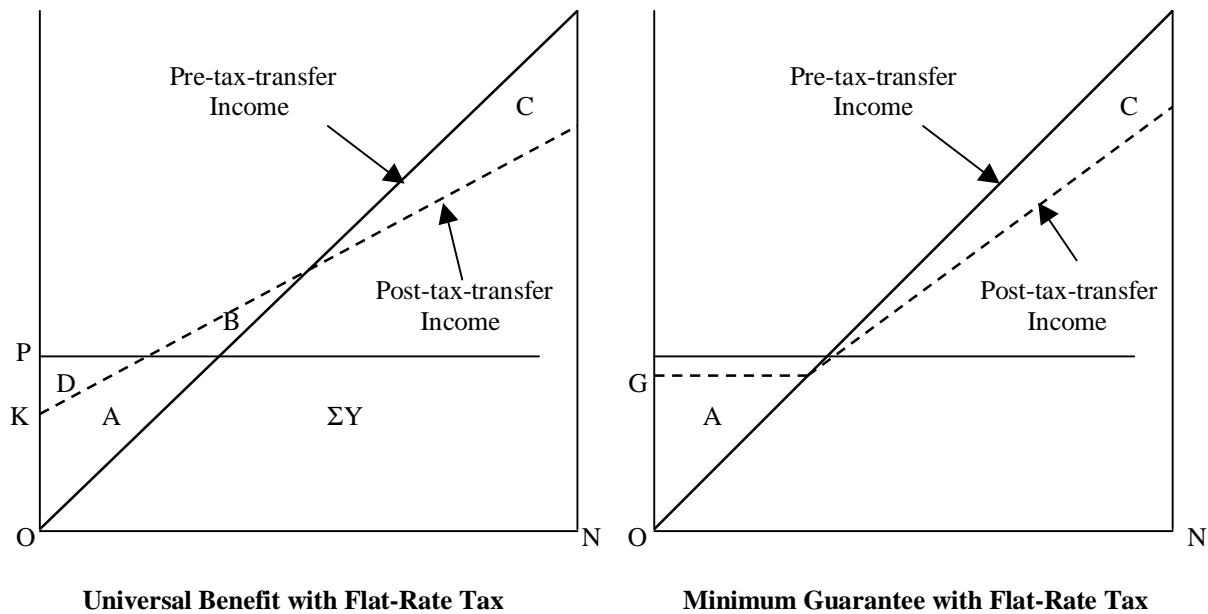
With respect to poverty reduction effect, the universal welfare system is inefficient because a substantial portion (area *B* in Figure 1) of net transfers does not contribute to poverty reduction. On the other hand, the minimum-guarantee program is highly efficient. The full amount of net transfers (area *A* in Figure 1) is received by the poor and contributes to the reduction of poverty. Therefore, the minimum guarantee program achieves 100 percent poverty reduction efficiency.

However, by imposing 100 percent marginal tax rate on recipients, the minimum-guarantee program is likely to have a larger disincentive effect. As shown in Figure 1, the minimum-guarantee program produces a kinked, non-convex budget constraint. According to the conventional utility-maximizing model of labor supply, those with incomes below the guaranteed level would cease to work. Also, some families with incomes just above the guaranteed level may choose to receive benefits rather than taking jobs. This example illustrates why targeted—hence, efficient—welfare systems are likely to have a larger disincentive effect on labor supply.

In sum, the above theoretical arguments suggest that the level of pre-tax-transfer poverty may not be exogenous. Both the generosity and the efficiency of the welfare state may influence the level of pre-tax-transfer poverty. If this is true, the standard pre-post comparison may overestimate the relative success of a generous and/or a targeted welfare system in poverty alleviation, by neglecting the feedback effect of taxes and transfers on pre-tax-transfer income.

3. Data and Method

For the empirical analyses, this study uses the LIS database. Among the 22 countries included in the Wave 3 (1989-1992) or Wave 4 (1993-1997) LIS databases, this study analyzes 11 Western welfare states[5]. A problem faced in the cross-national comparison of poverty is the measurement of poverty. Several issues in poverty measurement are controversial, and little professional consensus on a single measure has emerged. Specific methods of poverty measurement adopted in this study are as follows. First, the poverty threshold is defined by 50 percent of median equivalent disposable income of households in each country. Second, for the equivalence scale, this study uses one recommended by the National Research Council in the

United States (Citro and Michael, 1995)[6]. Third, the poverty gap ratio is presented as a summary index of poverty. It is defined by the aggregate poverty gap as a percentage of total post-tax-transfer income of households[7].

As discussed above, it is expected that the level of pre-tax-transfer poverty is related to two major characteristics of the welfare system— the generosity and the poverty reduction efficiency of income transfers. Traditionally, the generosity of the welfare state has been measured by the amount of welfare expenditure as a percentage of GDP. From the micro-data, a corresponding measure is the ratio of transfer income to total income. However, these two measures do not reflect cross-national differences in tax systems. Countries spending relatively less money on welfare programs may make a greater effort toward redistribution through their tax system. On the other hand, countries with higher levels of social expenditure tend to levy greater tax burdens on their citizens. From the standpoint of households, a certain amount of tax reduction gives virtually the same benefits as the same amount of welfare transfer. Therefore, cross-national comparisons of the anti-poverty effect of the welfare state should consider differences in the tax systems as well as differences in the benefit systems. In this sense, this study measures the generosity of the welfare state by the aggregate amount of positive net transfers (transfers minus taxes)[8]. Similar to the poverty gap ratio, the amount of net transfers is presented as a percentage of total post-tax-transfer income. In Figure 1, it is given by $(A+B)/\Sigma Y_i$. Poverty reduction efficiency is defined by the proportion of net transfers contributing to the reduction of the poverty gap. It is given by $A/(A+B)$ in Figure 1.

Using these estimates of key variables from 11 western countries, this study investigates whether countries with more generous and/or more targeted—hence, efficient—welfare systems are likely to have higher levels of pre-tax-transfer poverty. However, a shortcoming of statistical

analyses based on cross-sectional data is that it is impossible to ascertain unambiguously the causal relationship among variables. Unless a strong theoretical framework implies the relationship, associations among variables based on cross-sectional data do not necessarily imply causal relationships among those variables. Although arguments in Section 2 suggest that the generosity and the poverty reduction efficiency of the welfare state may influence the level of pre-tax-transfer poverty, it is possible that the causal order is in the opposite direction. For instance, an increase in unemployment (hence, an increase in pre-tax-transfer poverty) necessitates increases in welfare expenditures on unemployment benefits. An increase in unemployment benefits leads to increases in the generosity of the welfare state. If many people who receive unemployment benefits are pre-tax-transfer poor, an increase in unemployment benefits is also likely to increase the poverty reduction efficiency of welfare benefits.

In this sense, this study analyzes longitudinal relationships, as well as cross-sectional associations among variables. A major advantage of longitudinal analysis is that it can provide much stronger evidence for causal relationships among variables. Early efforts for causal modeling with longitudinal data often analyzed cross-lagged correlation between variables. This approach is based on the assumption that "the future cannot cause the past" (Hsiao, 1979, p.322). According to this approach, if X causes Y, it is expected that the values of the X variable in earlier years (X_{t-1}) are related to the values of the Y variable in later years (Y_t). However, as shown in Figure 2, the value of a cross-lagged correlation between X_{t-1} and Y_t is determined not only by a direct effect of X_{t-1} on Y_t (path a in the figure) but also the effect of Y_{t-1} on Y_t (path b) and a simultaneous correlation between X_{t-1} and Y_{t-1} (r). Therefore, to measure the direct effect of X_{t-1} on Y_t, it is necessary to control the effect of Y_{t-1} on Y_t. This can be accomplished by analyzing partial correlation between X_{t-1} and Y_t, holding Y_{t-1} constant.

Figure 2. Longitudinal Relationship between Two Variables
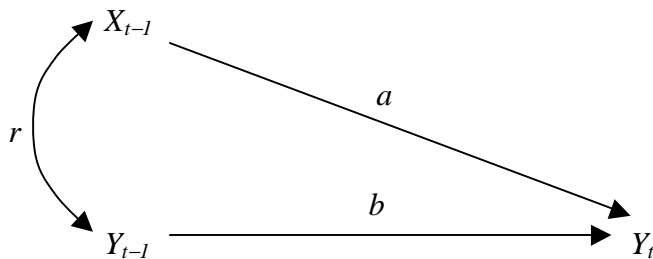
For the longitudinal analysis, two datasets are constructed. The first is a pooled time-series data set, using all 4 waves of the LIS database. In this dataset, each of country-and-time-specific values contributes one observation. For instance, the X variable derived from Wave 1 data for the United States is related to the Y variable from Wave 2 data for the United States. Similarly, the X variable from Wave 3 data for the United Kingdom are related to the Y variable from Wave 4 data for the United Kingdom. According to this strategy, countries providing data for all 4 waves contribute three observations each. Belgium has only one wave of information, and hence is not included in the dataset. Denmark (providing data for Waves 2 and 3) and Finland (providing data for Waves 2, 3 and 4) contribute one and two observations, respectively. In sum, the dataset consists of 27 observations.

A potential problem of the pooled time-series data is that time-series variation within a country is treated the same as cross-country variation. For a sensitivity test, the same analysis is done with another dataset in which each country contributes only one observation. This dataset consists of ten countries in which the X variable in the earliest wave (i.e., Wave 1 data, if available) is related to the Y variable in the latest wave. Using these two data sets — the pooled time-series data set and the alternative data set —, this study examines the potential effects of the generosity and the poverty reduction efficiency of welfare states on the levels of pre-tax-transfer

poverty. For statistical analyses, this study relies mostly on partial correlation between variables[9].

4. Empirical Results

Figure 3 presents cross-sectional associations among the generosity of the welfare state (*generosity*), the poverty reduction efficiency of net transfers (*efficiency*), and the level of pre-tax-transfer poverty (P_{pre})[10]. The left portion of Figure 3 shows a weak association between *efficiency* and P_{pre}. The correlation coefficient is 0.316 (p=0.343), which is not significantly different from zero. The right portion of Figure 3 shows a very strong association between *generosity* and P_{pre}.[11] The correlation coefficient is 0.767 (p=0.006), implying that more generous welfare states are likely to have a higher level of pre-tax-transfer poverty. For example, two countries with the most generous welfare systems — Sweden and Belgium — also have the highest pre-tax-transfer poverty ratios. On the other hand, the United States is the least generous welfare state and has the second lowest pre-tax-transfer poverty ratio.

Since *efficiency* and *generosity* are negatively correlated with each other ($r = -0.345$), it is expected that the association between *efficiency* and P_{pre} becomes stronger if the *generosity* variable is held constant. For example, the level of *generosity* is about the same in Australia (where net transfers account for 10.2 percent of total disposable income of households), Canada (10.8 percent), and Finland (10.5 percent). However, these three countries differ substantially in *efficiency*. Australia achieves the highest level of *efficiency* (70.6 percent), Canada is in the middle range (52.5 percent), and Finland has the second lowest level of *efficiency* (43.5 percent). Interestingly, the rank of P_{pre} among the three countries coincides with the rank of *efficiency*. P_{pre}

is the highest in Australia (9.44 percent of total post-tax-transfer income), in the middle in Canada (7.04 percent), and the lowest in Finland (4.92 percent).

As expected, the partial correlation between *efficiency* and P_{pre} (holding *generosity* constant) is highly significant. The partial correlation coefficient is 0.965 (p<0.001). Also, the partial correlation coefficient between *generosity* and P_{pre} (holding *efficiency* constant) is 0.984 (p<0.001). These very high coefficients imply that countries with more generous and/or efficient welfare systems are likely to have higher levels of pre-tax-transfer poverty.

**Figure 3. Cross-Sectional Associations among
Generosity, Efficiency and Pre-Tax-Transfer Poverty**
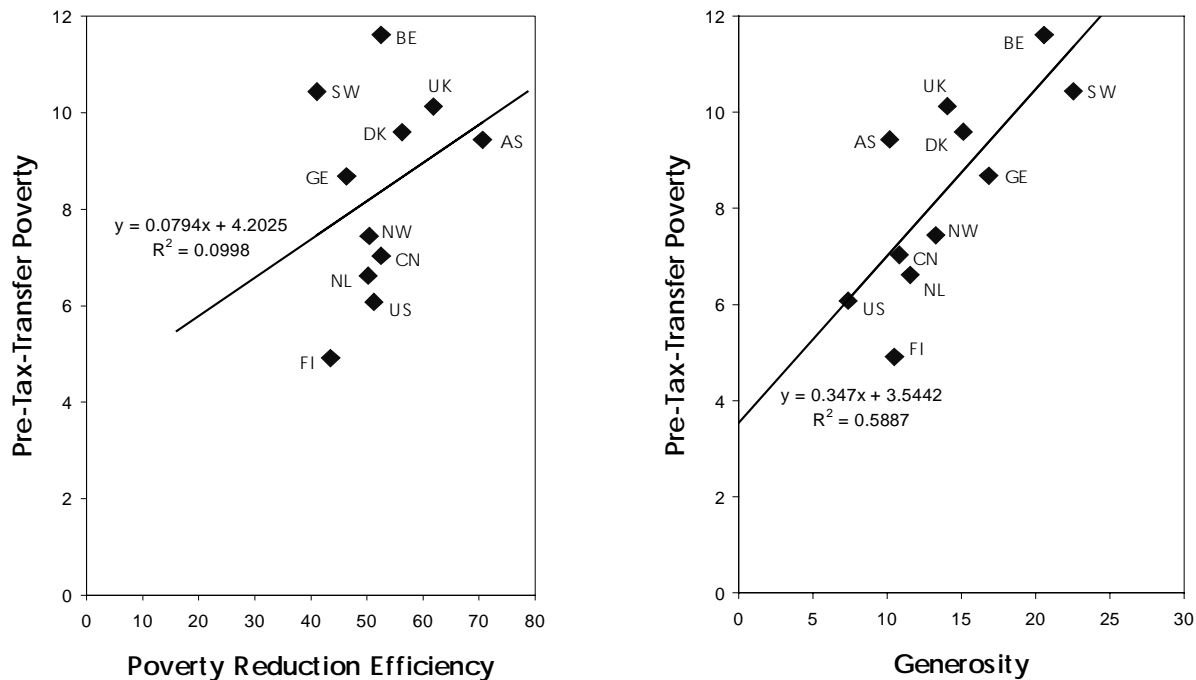
Source: Author's computation in Appendix Table 1.

The results of the longitudinal analysis suggest that the cross-sectional association between *efficiency* and P_{pre} and between *generosity* and P_{pre} may stem from causal effects of

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efficiency and *generosity* on P_{pre}. The pooled time-series data estimate the partial correlation coefficient between *efficiency* in year (t−1) and P_{pre} in year (t)[12] to be 0.288 (p=0.163). The partial correlation coefficient between *generosity*$_{(t−1)}$ and $P_{pre, (t)}$[13] is 0.265 (p=0.200). The alternative data estimate more significant correlations. The partial correlation coefficient between *efficiency*$_{(t−1)}$ and $P_{pre, (t)}$ is 0.790 (p=0.020), and between *generosity*$_{(t−1)}$ and $P_{pre, (t)}$ is 0.769 (p=0.026). These results imply that countries with higher levels of generosity and/or efficiency in earlier years are likely to produce higher levels of pre-tax-transfer poverty in later years.

In sum, the findings of this study suggest that the standard analysis of the anti-poverty effects may overestimate the achievements of welfare states in poverty alleviation. Countries with more generous and/or more selective transfer programs obviously achieve a greater reduction of poverty. Therefore, given the level of pre-tax-transfer poverty, they are likely to achieve lower levels of post-tax-transfer poverty. However, this is true only if we treat pre-tax-transfer poverty as constant. The results of this study suggest that pre-tax-transfer poverty may be endogenous and should not be treated as constant. In other words, a higher level of *generosity* and/or *efficiency* is likely to increase pre-tax-transfer poverty. If we take into account the feedback effect of *generosity* and *efficiency* on pre-tax-transfer poverty, the anti-poverty achievements of generous and/or selective welfare systems may not be very successful.

To illustrate this point, Figure 4 shows relationships among the components of post-tax-transfer poverty. Mitchell's (1991) and Mitchell, et al.'s (1994) regression models mentioned above basically estimate the direct linear effects of *generosity* and *efficiency* on P_{post}, (presented by β_1 and χ_1 in Figure 4), holding P_{pre} constant. However, if P_{pre} is in fact endogenous, *generosity* and *efficiency* influence P_{post} in two ways: 1) through direct effects (β_1 and χ_1) and 2)

through indirect effects through P_{pre}. Therefore, the total effect of *efficiency* on P_{post} is given by summing the direct effect (β_1) and indirect effect ($\beta_2 \times \alpha$). Similarly, the total effect of *generosity* on P_{post} is given by $\chi_1 + \chi_2 \times \alpha$. The estimation of total effects can be done by calculating the path coefficients for Figure 4, or equivalently by simply leaving out P_{pre} from the regression equation.

Figure 5.6. Relationship among Components of Post-Tax-Transfer Poverty
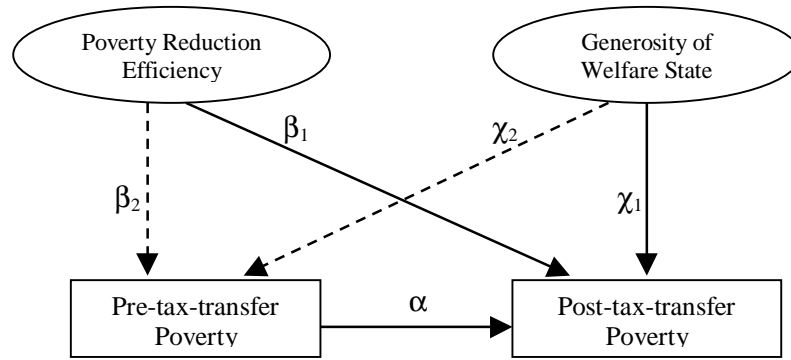
Instead of calculating the path coefficients, this dissertation adopts the simpler approach, applying the following regression model with and without P_{pre}.

$$P_{post} = \alpha + \beta \times P_{pre} + \chi \times efficiency + \delta \times generosity \qquad (2)$$

First, equation (2) estimates all three variables on the right-hand side. The result is:

$$P_{post} = 6.143 + 0.992 \times P_{pre} - 12.595 \times efficiency - 0.474 \times generosity \qquad (3)$$
$$(0.343) \qquad (5.898) \qquad (0.157) \qquad (R^2 = 0.724)$$

Since regression model (2) is an *ad hoc* modification of equation (1) which holds by definition, it is not surprising that all three coefficients are highly significant. To allow the endogeniety of pre-tax-transfer poverty, the second model leaves out P_{pre} from equation (2). The result is:

$$P_{post} = -0.374 + 3.848 \times efficiency - 0.028 \times generosity \qquad (4)$$

$$(2.153) \qquad\qquad (0.039) \qquad (R^2 = 0.394)$$

In this model, neither coefficient is significantly different from zero. This result implies that if the indirect effects of *generosity* and *efficiency* via P_{pre} on P_{post} are taken into account, countries with more generous and/or more selective—and hence, efficient—welfare systems do not necessarily produce lower levels of post-tax-transfer poverty. Moreover, the coefficient of *efficiency* has a positive sign. In other words, countries with more efficient welfare systems are likely to produce—contrary to the expected—higher levels of post-tax-transfer poverty. To summarize, Figure 5 shows the bivariate relationship between *generosity* and P_{post} and between *efficiency* and P_{post}.

The left portion of Figure 5 shows a negative association between the generosity of the welfare state and the level of post-tax-transfer poverty. The correlation coefficient between *generosity* and P_{post} is −0.390 (p=0.236). The United States and Australia have the least generous welfare system and the highest level of post-tax-transfer poverty. On the other hand, the Belgian welfare system is the second most generous and produces a relatively lower level of post-tax-transfer poverty. However, the association between *generosity* and P_{post} is not very strong. For example, Canada and Sweden are very different with respect to the level of generosity (Canada is among the least generous welfare states and Sweden has the most generous welfare system), yet the level of post-tax-transfer poverty is about the same.

The right portion of Figure 5 shows a moderate positive association between *efficiency* and P_{post}. Australia achieves the highest level of poverty reduction efficiency, yet the level of post-tax-transfer poverty in Australia is the second highest among the 11 countries. On the other

hand, the welfare systems in European countries are less efficient in reducing poverty but achieve lower levels of post-tax-transfer poverty.

Figure 5. Bi-Variate Relationship between *Efficiency* and P_{post} and between *Generosity* and P_{post}.
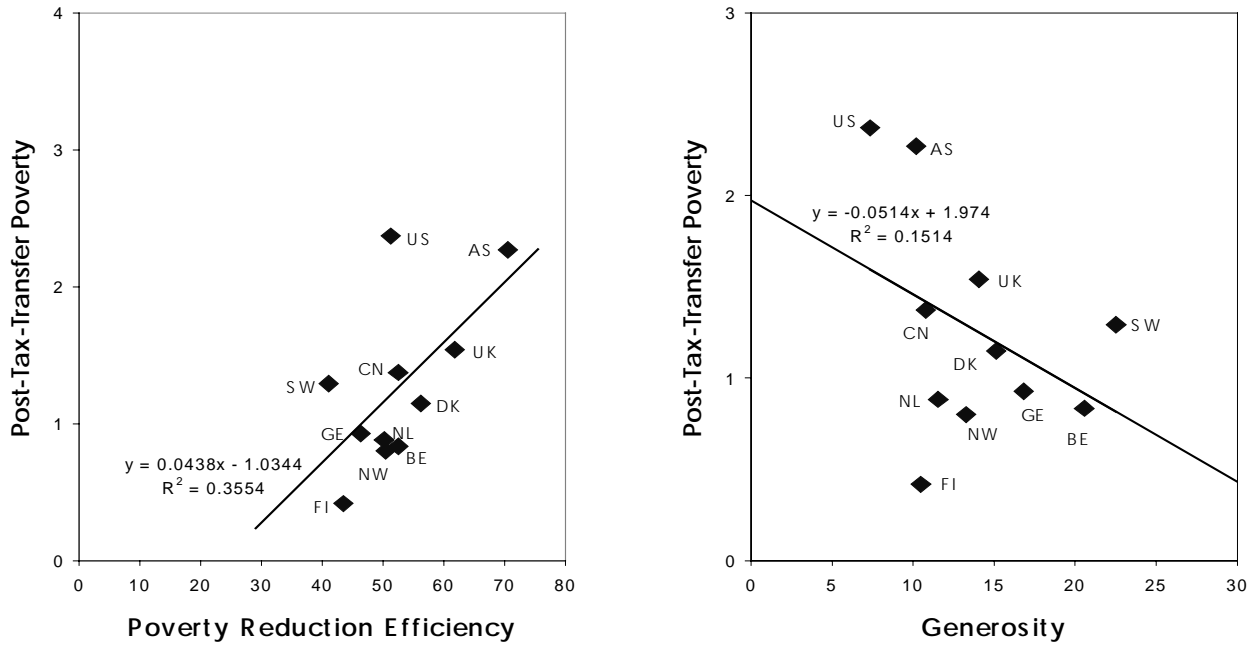
The positive association between *efficiency* and P_{post} is counterintuitive. According to the standard approach, higher levels of efficiency should be associated with lower levels of post-tax-transfer poverty, if other factors (i.e., the extent of pre-tax-transfer poverty and the level of generosity) are held constant. On the other hand, the bivariate association presented in Figure 5 does not treat other factors as constant. As shown in the regression results (3) and (4), allowing for the potential endogeniety of P_{pre} produces a weak positive correlation between *efficiency* and P_{post}. The bivariate association in Figure 5 further allows *generosity* to be varied, resulting in a more strong positive association between *efficiency* and P_{post}.[14]

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5. Conclusion

Traditionally, the anti-poverty effectiveness of taxes and income transfers has been analyzed by comparing poverty estimates from the pre-tax-transfer income distribution and those from the post-tax-transfer income distribution. In this standard approach, the difference between pre-tax-transfer poverty and post-tax-transfer poverty is defined as the anti-poverty effect of taxes and transfers. Existing studies based on the standard approach have shown that countries with more generous and/or more targeted welfare systems are likely to achieve lower levels of post-tax-transfer poverty, given the level of pre-tax-transfer poverty. However, this relationship holds by the definition of the standard approach. A critical weakness of the standard approach is that it treats pre-tax-transfer poverty as given. In other words, the standard approach assumes pre-tax-transfer poverty as the counterfactual of welfare-state intervention and ignores the feedback effects of taxes and transfers on pre-tax-transfer poverty.

This study examined the potential effects of the tax/transfer system on pre-tax-transfer poverty, using cross-national variations of these factors. The results suggest that pre-tax-transfer poverty may be endogenous, and hence should not be treated as given. Countries spending more money for welfare transfers are likely to produce higher levels of pre-tax-transfer poverty. Also, more targeted welfare systems are likely to increase pre-tax-transfer poverty. If the feedback effects of the generosity of the welfare state and poverty reduction efficiency on pre-tax-transfer poverty are taken into account, countries with more generous and/or more targeted welfare systems do not necessarily produce lower levels of post-tax-transfer poverty.

The findings of this study have implications for social policies and future research. First, it should be noted that expanding welfare programs is not an indubitable panacea for eradicating poverty. Although countries with more generous welfare systems achieve greater reduction in poverty, they are also likely to produce higher levels of pre-tax-transfer poverty. Therefore, when expanding social welfare programs, policymakers should bear in mind the potential distortional effects of welfare programs and taxes necessary to finance them on the market economy.

Second, given the increasing budget difficulties of the government, an attractive policy option is targeting the benefits to those most in need. Since the economic recession of the early 1970s, welfare states have suffered substantial budget deficits, thus, the concepts of targeting and efficiency have commanded a wide support, especially among policymakers (Mitchell, et al., 1994; Morris, 1988). According to the standard analysis of anti-poverty effect (i.e., pre-post comparison), targeted welfare systems can obviously achieve greater efficiency in poverty alleviation.

However, selective welfare systems are not free of costs. Potential shortcomings of targeted welfare systems include 1) impacts on the work incentives, 2) administrative costs, 3) stigma, and 4) political support for welfare programs (Subbarao, Bonnerjee, Braithwaite, Carvalho, Ezemenari, Graham, and Thompson, 1997; Atkinson, 1995b; Besley, 1989; Garfinkel, 1982; Grosh, 1994; Kanbur, Keen, and Tuomala, 1994; Sen, 1995; van de Walle, 1998). In particular, the findings of this study suggest that countries with more targeted welfare systems are likely to have more distortional effects on the market economy. In spite of the apparent efficiency, these costs may offset the merits of targeting in social policy.

Third, although this study finds that taxes and income transfers are likely to have distortional effects on the market economy, determining the sources and magnitude of the

distortional effects is a challenge for future research. Among the diverse sources of distortional effects, the work disincentive effects of taxes and welfare benefits have attracted considerable concern among scholars and policymakers. It will be of interest to examine how much the work efforts of people differ between generous welfare states and countries with parsimonious welfare programs. In addition to the overall level of welfare benefits and the degree of targeting, other characteristics of taxes and welfare programs may influence work incentives. For example, Gustafsson (1992, 1995) argues that differences in the labor force participation among Germany, the Netherlands, and Sweden are partly due to differences in taxation (e.g., joint versus separate taxation for married couples) and the public day-care system. Work incentives may also be influenced by program rules. For instance, the government may require work as an eligibility condition for welfare benefits. Future research is required to examine the relationship between labor supply and diverse characteristics of the welfare state.

The work disincentive effects of taxes and welfare benefits are affected by a variety of moral, cultural, and economic conditions of a society, and hence are likely to differ from country to country. At a national level as well as at a cross-national level, future efforts should be devoted to determining the sources and magnitude of work incentive effects. These efforts will help fight poverty in a more efficient way while minimizing the potential costs of welfare policies.

Endnotes:

[1] Exactly speaking, this is the redistributive effect of taxes and income transfer programs. In addition to direct income transfers, the welfare state makes diverse efforts to reduce poverty. Examples of other important welfare policies include health care, education and training, food, housing, interventions in the labor market, and other welfare services. Although all of these policies are more or less related to the poverty outcomes of a country, this study focuses on the effect of taxes and government-provided income transfers in reducing poverty. This is because taxes and income transfers are major tools for income redistribution in the welfare state and have more direct effects on poverty.

[2] In other words, the result implies that taxes and transfers pull 25-80 percent of the pre-tax-transfer poor out of poverty.

[3] For a detailed discussion on the decomposition of post-tax-transfer poverty, see Kim (2000).

[4] Combined effect of income taxes, National Insurance contributions, and three income-tested welfare programs (Family Credit, Community Charge Benefit, and Housing Benefit).

[5] The 11 countries analyzed in this study are Australia, Belgium, Canada, Denmark, Finland, Germany, the Netherlands, Norway, Sweden, the United Kingdom, and the United States. Five former-communist countries (the Czech Republic, Hungary, Poland, Russia, the Slovak Republic) and two non-western countries (Israel and Taiwan) are not analyzed in this study. Moreover, four western countries are excluded from the analysis because some critical income variables are not available in the data for these countries. Italy, Luxembourg, and Spain provide only net income variables, which makes it impossible to calculate pre-tax-transfer income. Tax information in the data for France is incomplete.

[6] In notational terms, it is given by:
$$Equivalent\ Scale = (A + 0.7 \times C)^{0.7}$$
where A is the number of adults and C is the number of children in the household.

[7] The poverty gap ratio is defined by:
$$Poverty\ Gap\ Ratio = \frac{\sum_{i=1}^{q}(Z - Y_i)}{\sum_{i=1}^{N} Y_i}$$
where q is the number of the poor, N is total population size, Z is the poverty line, Y_i is the post-tax-transfer income of an individual i.
In Figure 1, the pre-tax-transfer poverty gap ratio is given by $(A+D)/\Sigma Y_i$ and the post-tax-transfer poverty gap ratio is $A/\Sigma Y_i$, where ΣY_i is the total area under the dotted line.

[8] If defined by the amount of net transfers rather than "positive" net transfers, the value would be close to zero because positive values in lower income classes are offset by negative values in higher income classes. In an ideal case, if income taxes are the only sources of government revenue and the full amount of tax revenues are transferred to households, the sum of net transfers would be zero. Therefore, only the positive values of net transfers are counted in the calculation.

[9] Although the correlation analysis provides a good summary of association among variables, the statistical or predictive power of the correlation analysis is weak. Applying the Ordinary Least Square estimation is likely to produce inefficient or biased estimates because assumptions about the error term are usually violated in pooled time-series data (e.g., heteroskedasticity and autocorrelation). There are some statistical methods to deal with the heteroskedasticity and autocorrelation problem. However, with a very small number of observations, the ability to estimate more complicated models is highly limited.

[10] Appendix Table 1 provides the estimates of the pre-tax-transfer poverty gap ratio, the post-tax-transfer poverty gap ratio, the generosity of the welfare state, and the poverty reduction efficiency of net transfers. Values used in Figure 1 are derived from the most recent wave available in each country.

[11] This result is quite different from Kenworthy's (1998) finding. Kenworthy found a very low correlation (0.18) between the generosity of welfare state and the level of pre-tax-transfer poverty. In addition to slight differences in the countries analyzed, there are two major reasons for the disagreement between the two studies. First, Kenworthy used the head-count ratio as a measure of poverty, whereas the analysis in this study is based on the poverty gap ratio. Second, as a measure of the generosity of the welfare state, Kenworthy's study used the traditional macro-level measure of welfare spending.

[12] Holding $generosity_{(t-1)}$ and $P_{pre,\ (t-1)}$ constant.

[13] Holding $efficiency_{(t-1)}$ and $P_{pre,\ (t-1)}$ constant.

[14] Some argue that the generosity of the welfare state may be endogenous, influenced by the poverty reduction effectiveness of the welfare system (e.g., Korpi and Palme, 1998; Morris, 1988; Saunders, 1994). Higher levels of poverty reduction efficiency are achieved by concentrating given amount of welfare benefits on the poor. However, according to their arguments, more targeted welfare systems tend to receive less political support, and thereby are likely to induce a lower level of welfare spending. Therefore, although targeted welfare systems are likely to achieve a greater redistributive effect *per unit* of social expenditure, the total amount of social expenditure may not be independent of the degree of targeting. In fact, Korpi and Palme (1998) found a negative association between the degree of targeting and the amount of welfare expenditure. Their finding is confirmed by this study, which also found a moderate negative correlation between *generosity* and *efficiency* (r = −0.345). However, as mentioned above, it should be noted that cross-sectional association between *generosity* and *efficiency* does not necessarily imply that *efficiency* causes *generosity*. The causal ordering may be in the opposite direction. It is also possible that the association is attributed to a spurious relationship. Future research is required to determine causal relationship between *generosity* and *efficiency*.

Appendix Table A1. Poverty Estimates in Welfare States

Country		Wave 1	Wave 2	Wave 3	Wave 4
Australia	Pre-tax-transfer poverty ratio (P_{pre})	7.08	7.09	7.19	9.44
	Post-tax-transfer poverty ratio (P_{post})	1.57	1.47	1.58	2.27
	Generosity of welfare state	7.70	7.86	8.22	10.18
	Poverty reduction efficiency	71.7	71.5	68.4	70.6
Belgium	Pre-tax-transfer poverty				11.61
	Post-tax-transfer poverty				0.83
	Generosity of welfare state				20.60
	Poverty reduction efficiency				52.5
Canada	Pre-tax-transfer poverty	5.32	5.64	6.33	7.04
	Post-tax-transfer poverty	1.69	1.52	1.43	1.37
	Generosity of welfare state	6.45	7.67	9.69	10.80
	Poverty reduction efficiency	56.6	54.3	50.7	52.5
Denmark	Pre-tax-transfer poverty		8.34	9.60	
	Post-tax-transfer poverty		1.33	1.15	
	Generosity of welfare state		15.92	15.13	
	Poverty reduction efficiency		44.5	56.3	
Finland	Pre-tax-transfer poverty		3.49	3.40	4.92
	Post-tax-transfer poverty		0.50	0.50	0.42
	Generosity of welfare state		6.89	7.25	10.48
	Poverty reduction efficiency		44.2	40.8	43.5
Germany	Pre-tax-transfer poverty	7.47	8.64	7.91	8.68
	Post-tax-transfer poverty	0.65	0.55	0.70	0.93
	Generosity of welfare state	16.01	17.06	15.02	16.83
	Poverty reduction efficiency	43.4	47.6	48.2	46.4
Netherlands	Pre-tax-transfer poverty	9.31	8.72	7.54	6.62
	Post-tax-transfer poverty	2.01	1.13	1.31	0.88
	Generosity of welfare state	15.31	16.18	13.26	11.56
	Poverty reduction efficiency	48.0	48.4	47.9	50.2
Norway	Pre-tax-transfer poverty	6.46	5.98	6.13	7.45
	Post-tax-transfer poverty	0.74	0.59	0.62	0.80
	Generosity of welfare state	11.08	10.01	11.43	13.27
	Poverty reduction efficiency	52.0	54.2	48.5	50.4
Sweden	Pre-tax-transfer poverty	9.37	9.79	11.49	10.44
	Post-tax-transfer poverty	0.82	1.21	1.04	1.29
	Generosity of welfare state	21.01	19.60	24.07	22.53
	Poverty reduction efficiency	41.6	45.5	43.7	41.1
U.K.	Pre-tax-transfer poverty	7.20	10.19	8.75	10.13
	Post-tax-transfer poverty	0.88	1.51	1.38	1.54
	Generosity of welfare state	11.46	16.15	11.41	14.05
	Poverty reduction efficiency	55.8	54.9	65.7	61.8
U.S.	Pre-tax-transfer poverty	6.24	6.47	6.81	6.08
	Post-tax-transfer poverty	2.64	2.92	2.81	2.37
	Generosity of welfare state	7.04	7.07	8.11	7.37
	Poverty reduction efficiency	52.9	53.1	50.6	51.3

Source: Author's calculation from the LIS database.

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