Pareto weights in practice: A quantitative analysis across 32 OECD countries

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We develop a quantitative heterogeneous-agents general equilibrium model that reproduces the income inequalities of 32 countries in the Organization for Economic Co-operation and Development. Using this model, we compute the optimal income tax progressivity and redistribution for each country under the equal-weight utilitarian social welfare function. A policy reform to adopt the optimal progressivity is supported by the majority of the population. Finally, we uncover the Pareto weights in the social welfare functions of each country that justify the current redistribution policy.

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1. Introduction

The unequal distribution of economic resources and opportunities has been a primary concern for social scientists and policy makers. Income and wealth inequality is widespread across the world, and all societies adopt various redistribution policies to alleviate this problem. Fig. 1 plots the Gini coefficients of incomes (for both before and after taxes/transfer) for 32 countries in the Organization for Economic Co-operation and Development (OECD) based on the OECD database. The Gini coefficient of income before tax and transfers ranges from 0.34 (South Korea) to 0.58 (Ireland). The “improvement rate” in income inequality (measured by the percentage decrease in the income Gini coefficients between before and after taxes/transfer) ranges from 5% in Chile to 49% in Ireland.

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1 Alesina and Glaeser (2004) provide a detailed survey of a broad range of sources, their interactions, and the socio-economic consequences of income and wealth inequality.
2 Out of the 34 OECD countries, we exclude Mexico and Hungary from our analysis because of data availability.
3 The specific measures and degree of income redistribution caused by individual policies differ considerably across countries. Progressive income taxation and a variety of income transfer programs are typical redistribution policies intended to reduce the inequality of disposable income. There are also indirect transfer programs, which redistribute wealth through providing goods and services that individuals would have otherwise purchased at their own expense. Examples include free education, health care and child care. Different countries have a variety of policy tools. For example, according to the OECD (2015),

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Understanding and comparing redistribution policies across countries in a unified framework is not an easy task. Economists’ ability to quantitatively evaluate the political outcome of redistribution policies is limited because it requires modeling a complex political process and aggregating individual preferences. However, recent developments in quantitative general equilibrium heterogeneous-agents models enable us to take first steps in addressing these issues. We can compute the optimal income tax policy under various welfare criteria and simulate voting outcomes of alternative policies. We can even uncover the welfare weights (so-called Pareto weights) that would justify each country’s current redistribution policy. To our knowledge, this is the first study that compares how societies (or governments) aggregate individual preferences over the redistribution policies, and does so across a large set of countries. We relate our estimated Pareto weights to each country’s Democracy Index, electoral turnout rates, and the social perception about income redistribution in the World Values Survey, all of which are often used in political science and sociology.

More specifically, we ask three questions: (i) What is the optimal progressivity of income tax for each country under the equal-weight utilitarian social welfare function? (ii) What would be the outcome of the voting simulation on the fiscal reform to adopt the optimal tax? (iii) What are the Pareto weights in the social welfare function that justify the progressivity of current income tax (which is suboptimal according to the equal-weight criteria) in each country? We examine these questions through the lens of the model seen in Aiyagari (1994), where households face uncertainty about future earnings. As a result of the precautionary savings and labor supply motive to insure against this future uncertainty, the cross-sectional wealth distribution emerges as an equilibrium.

We calibrate the model to reproduce the income distribution for each of the 32 OECD countries. The stochastic process of individual productivity shocks (which is the source of cross-sectional income inequality) is chosen to match the before-tax income Gini in the data. Summarizing the progressivity of the income tax/transfer system (especially for cross-country comparison) is not a simple task because of the complexity of the tax and transfer schedule. One practical way is to assume a specific parametric form of tax function with a few parameters. We assume that the individual income tax schedule follows the log-linear tax function, which is widely used in various literatures (e.g., Benabou, 2002; Heathcote et al., 2016). We choose the progressivity of income tax to match the change in the income Gini after taxes and transfers. Thus, for each country, the model closely matches the before- and after-tax income Gini coefficients. The progressivity of tax in our model turns out to be remarkably close to that in the data, indicating that our model captures important characteristics of income inequality and redistribution in these countries.

According to our benchmark model, the optimal tax progressivity—measured by the exponent of the log-linear tax function—under the equal-weight utilitarian social welfare function ranges from 0.13 (South Korea) to 0.39 (Ireland). The optimal progressivity in the income tax schedule is higher than the current level in 4 out of the 32 OECD countries we

Fig. 1. Before-tax and after-tax income inequality.

the top statutory personal income-tax rate ranges from 15% (Czech Republic) to 57% (Sweden) and the property tax share of total tax revenue varies from a mere 1.1% (Estonia) to 13% (U.S.).
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