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Income inequality and asset prices under redistributive taxation ☆

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ABSTRACT

Our simple model features agents heterogeneous in skill and risk aversion, incomplete financial markets, and redistributive taxation. In equilibrium, agents become entrepreneurs if their skill is sufficiently high or risk aversion sufficiently low. Under heavier taxation, entrepreneurs are more skilled and less risk-averse, on average. Through these selection effects, the tax rate is positively related to aggregate productivity and negatively related to the equity risk premium. Both income inequality and stock prices initially increase but eventually decrease with the tax rate. Investment risk, stock market participation, and skill heterogeneity all contribute to inequality. Cross-country empirical evidence supports the model's predictions.

1. Introduction

In recent decades, income inequality has grown in most developed countries, triggering widespread calls for more income redistribution.[1] Yet the effects of redistribution on inequality are not fully understood. We analyze those effects through the lens of a simple model with heterogeneous agents and incomplete markets. We find that redistribution affects inequality not only directly, by transferring wealth, but also indirectly through selection, by changing the composition of agents who take on investment risk. Through the same selection mechanism, redistribution also affects aggregate productivity and asset prices, which, in equilibrium, feed back into inequality.

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[1] For example, Alvaredo et al. (2013), Atkinson et al. (2011), and many others document the growth in inequality. Piketty (2014), the Occupy Wall Street movement, and others call for redistribution.

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Income inequality has been analyzed extensively in labor economics, with a primary focus on wage inequality.[2] While wages are clearly the main source of income for most households, substantial income also derives from business ownership and investments in financial markets, whose size has grown alongside inequality.[3] We examine the channels through which financial markets and business ownership affect inequality. To emphasize those channels, we develop a model in which agents earn no wages; instead, they earn business income, capital income, and tax-financed pensions. In our model, investment risk and differences in financial market participation are the principal drivers of income inequality.

Our model features agents heterogeneous in both skill and risk aversion. Agents optimally choose to become one of two types, "entrepreneurs" or "pensioners". Entrepreneurs are active risk takers whose income is increasing in skill and subject to taxation. Pensioners live off taxes paid by entrepreneurs. Financial markets allow entrepreneurs to sell a fraction of their own firm and use the proceeds to buy a portfolio of shares in other firms and risk-free bonds. Since entrepreneurs cannot diversify fully, markets are incomplete.

In equilibrium, agents become entrepreneurs if their skill is sufficiently high or risk aversion sufficiently low, or both. Intuitively, low-skill agents become pensioners because they would earn less as entrepreneurs, and highly risk-averse agents become pensioners because they dislike the idiosyncratic risk associated with entrepreneurship. These selection effects are amplified by higher tax rates because those make entrepreneurship less attractive. When the tax rate is high, only agents with the highest skill and/or lowest risk aversion find it optimal to become entrepreneurs. Therefore, under heavier taxation, entrepreneurs are more skilled and less risk-averse, on average, and total output is lower.

Inequality initially increases but eventually decreases with the tax rate. When the tax rate is zero, all agents choose to be entrepreneurs because pensioners earn no income. As the rate rises, inequality rises at first because agents who are extremely risk-averse or unskilled become pensioners. Such agents accept the low consumption of pensioners in exchange for shedding idiosyncratic risk, thereby increasing consumption inequality.[4] As the tax rate rises further, inequality declines due to the direct effect of redistribution.

There are three sources of inequality: investment risk, stock market participation, and heterogeneity in skill. Investment risk causes differences in ex post returns on entrepreneurs' portfolios, in part due to idiosyncratic risk and in part because entrepreneurs with different risk aversions have different exposures to stocks. While entrepreneurs participate in the stock market, pensioners do not. Entrepreneurs consume more than pensioners on average, in part due to higher skill and in part as compensation for taking on more risk. Finally, not surprisingly, more heterogeneity in skill across entrepreneurs implies more inequality.

To explore the welfare implications of redistribution, we analyze inequality in expected utility, which we measure by certainty equivalent consumption. Inequality in expected utility is smaller than consumption inequality, in part because pensioners not only tend to consume less than entrepreneurs but also face less risk. An increase in the tax rate reduces inequality in expected utility but it also reduces the average level of expected utility. In addition, the model yields a right-skewed distribution of consumption across agents.

The model's asset pricing implications are also interesting. First, the expected stock market return is negatively related to the tax rate. The reason is selection: a higher tax rate implies lower average risk aversion among stockholders, which in turn implies a lower equity risk premium. Second, the level of stock prices exhibits a hump-shaped relation to the tax rate. On the one hand, a higher tax rate reduces stock prices by reducing the after-tax cash flow to stockholders. On the other hand, both selection effects mentioned earlier push in the opposite direction. When the tax rate is higher, entrepreneurs are more skilled, on average, resulting in higher expected pre-tax cash flow, and they are also less risk-averse, resulting in lower discount rates. Both selection effects thus induce a positive relation between stock prices and the tax rate. The net effect is such that the stock price level initially rises but eventually falls with the tax rate. This asset price pattern feeds back into income inequality through the investment risk component, contributing to its hump-shaped pattern.

Last but not least, the model implies a positive relation between the tax rate and aggregate productivity. The reason, again, is selection: a higher tax rate implies that those who create value in the economy—entrepreneurs—are more skilled. At the same time, heavier taxation implies fewer entrepreneurs and more pensioners, and thus lower total output. In short, a higher tax rate makes the economy smaller but more productive.

While our main contribution is theoretical, we also conduct simple cross-country empirical analysis to examine the model's predictions. We use data for 34 OECD countries in 1980 through 2013. We measure the tax burden by the ratio of total taxes to GDP, inequality by the top 10% income share and the Gini coefficient, productivity by GDP per hour worked, the level of stock prices by the aggregate market-to-book ratio, and market returns by the returns on the country's leading stock market index. The evidence is broadly consistent with the model. The tax burden is strongly positively related to productivity, as predicted by the model. The relation between inequality and the tax burden is negative, consistent with the model, but it does not exhibit concavity. The relation between the average stock market return and the tax burden is negative, as predicted, but not always significant. The relation between the level of stock prices and the tax burden is concave and negative, as predicted, but the negativity is significant only after the inclusion of macroeconomic controls.

[2] See, for example, Autor et al. (2008), among many others.

[3] Non-wage income is earned by households across the whole income distribution, and it is the dominant source of income at the top. Kacperczyk et al. (2015) show that non-wage income represents 44% of total income for households that participate in financial markets in 1989–2013.

[4] In our simple model, consumption equals income, so consumption inequality equals income inequality.