The stationary wealth distribution under progressive taxation ☆

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A R T I C L E   I N F O

A B S T R A C T

This paper considers the long-run distribution of capital holdings in a model with complete asset markets and progressive taxation. Households are assumed to be heterogeneous in their labor market productivity. We show that this model is capable of producing a nondegenerate determinate wealth distribution. However, it also predicts that capital and labor income will be negatively correlated. These results are robust to the introduction of elastic labor supply and borrowing constraints.

1. Introduction

This paper studies the long-run distribution of wealth in a model with three features: heterogeneous consumers, progressive income taxation, and complete asset markets. There have been several papers that derive the properties of long-run wealth distributions in models with complete markets. One prominent example is Becker (1980), which shows that an economy with heterogeneous discount factors leads to a collapse of the wealth distribution—only the most patient household has wealth above the minimum in the long run. Wang (1996) illustrates how an economy with heterogeneous risk aversion coefficients also has a degenerate long-run distribution of wealth, while Coen-Pirani (2004) shows that the assumption of expected utility can be critical for degeneracy.[1] Finally, Sarte (1997) shows that heterogeneity of discount factors may not lead to a degenerate wealth distribution if taxation is progressive.

Continuing this line of research, we examine the joint distribution of income and wealth under the following assumptions: homogeneous preferences, permanent exogenous wage differences, progressive taxation, and complete markets. Permanent differences in wages across individuals is supported by a large econometric literature; recent macroeconomic contributions are Flodén and Lindé (2001) and Heathcote et al. (2004), but there are many others. Furthermore, a wide range of models that study inequality in complete markets—such as Caselli and Ventura (2000), Krusell and Ríos-Rull (1999),

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[1] Two other notable papers, Chatterjee (1994) and Krusell and Ríos-Rull (1999), prove that the economy features no wealth mobility along the transition to a steady state.

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and Flodén (in press)—generate heterogeneity through permanent wage differences. We ask what predictions these models make when confronted with progressive income taxation, a feature common to all developed economies.[2]

We find that the stationary wealth distribution can be determinate and have wealth held by more than one type of agent; all agents, however, must face the same marginal tax rate. Under the additional assumption that the tax rate function is *marginal-rate progressive* (the marginal tax rate is monotone increasing in income), the stationary distribution of *income* is degenerate: all agents earn the same level of income in the stationary state. Moreover, wealth declines with productivity, implying that the covariance between wealth and income is 0 and that labor income and capital income are perfectly negatively correlated. These findings are quite robust, as permitting elastic labor supply or imposing an exogenous borrowing constraint does not reverse the sign of the correlation. In fact, including an exogenous borrowing limit leads to a nondegenerate long-run distribution of income in which high income agents are at the borrowing limit; that is, there appears a negative correlation between income and wealth as well. Our results stand in stark contrast to the data: both the correlation of labor income and capital income and the correlation of income and wealth are positive in the Survey of Consumer Finances. The existing study that links progressive taxation to inequality under complete markets—Sarte (1997)— does not make a distinction between sources of income and therefore cannot detect the anomalous correlations that we uncover.[3]

Our findings suggest that results from complete markets models with heterogeneity in wages and proportional income taxation are likely not robust to deviations toward nonlinear tax schedules; if the flat tax economy (which has an indeterminate wealth distribution) is calibrated to match the data, the stationary distribution of wealth for a model with a nearby progressive tax system will be strikingly different. This non-robustness would be of particular concern for complete market political economy models of redistribution, such as Krusell and Ríos-Rull (1999) and Azzimonti et al. (2006), where agents vote over flat tax systems.[4] In the data, high wage individuals tend to be wealthy as well, and they earn a higher percentage of their income from assets than individuals with lower wages do.[5] This distribution suggests that high wage individuals should prefer labor income taxes to capital income taxes; however, in our model high wage individuals would prefer capital taxes because they have very low wealth. As shown in Domeij and Heathcote (2004), in an incomplete market economy the lower wage households prefer capital taxes; we expect they do in the data as well, because low wage households do not hold many assets.

We do not view this paper as establishing a puzzle regarding either the correlation of income and wealth or that between labor income and capital income. Within a model environment based on Aiyagari (1994), the correlation between wealth and income is typically positive.[6] Rather, we see our results as uncovering a disturbing lack of robustness in complete market models with homogeneous preferences. To get the anomalous results we find here all we need is labor income to be distinct from capital income and wages to be heterogeneous. Whenever these conditions are satisfied, households respond by trading off one type of income for the other in order to minimize their marginal tax rate. Given the empirical evidence, we find neither requirement unreasonable.

We conclude the main part of the paper with a discussion on how to reconcile the model with the cross-sectional data. As suggested by our comment above, this reconciliation requires discount factor heterogeneity. The data imposes structure on the joint distribution of discount factors, wages, and marginal income tax rates. Specifically, the data can be reconciled with the model under two circumstances: either wages and discount factors are negatively correlated or wages and discount factors are positively correlated and the marginal tax rate function is sufficiently flat near the steady state level of income for a given individual. We find evidence in the literature that the first condition is not satisfied; generally, discount factors and wages are positively correlated. Estimates of US tax functions imply the second condition may be satisfied—Gouveia and Strauss (1994, 1999) find that US marginal tax rates are nearly the same for all levels of income once all exemptions and credits are taken into account. Thus, the model with heterogeneous discount factors may indeed be suitable for policy experiments, provided that risk sharing is not of primary importance.[7]

Of course abandoning the assumption of complete markets is also a potential resolution—in models with incomplete markets, Krusell and Smith (1998) and Hendricks (2007) show that preference heterogeneity can go a long way towards accounting for the concentration of wealth in the US; a different approach is taken in Castañeda et al. (2003). Since complete market economies are much easier to study analytically than incomplete market ones, it seems important to determine

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[2] These papers establish the presence of permanent differences across individuals in an OLG setting. In a dynastic setting, mean reversion across generations implies that quantitatively the importance of permanent wage differences may be small. For our question we do not need these permanent differences to be quantitatively large, only that they exist.

[3] Sarte (1997) combines human and physical capital into one aggregate, yielding an *Ak*-style model where capital and labor income cannot be distinguished.

[4] Our results could also impact the results of Ramsey optimal taxation in the presence of heterogeneous households, such as Flodén (in press). Optimal policy problems where progressive taxation is inherently valued are a new development—one early contribution is Golosov et al. (2006) contains a summary of the recent contributions.

[5] Budría Rodríguez et al. (2002) note that the fraction of income derived from labor and transfers varies over the wealth distribution from 98.2 percent in the lowest quintile to 60.0 in the highest and from 98.9 in the lowest 1 percent to 34.5 in the highest.

[6] The correlation between capital and labor income may still be a problem, however. It is also unknown whether our results would hold when asset markets are complete but enforcement frictions prevent agents from completely smoothing their marginal utility. We think they will, however, because it is known that enforcement friction models with production typically accumulate enough capital that the frictions effectively disappear.

[7] One experiment that we think would fall into this class is the effect of progressive income taxation on growth—see Li and Sarte (2003).