Risk Heterogeneity, Productivity and Social Insurance

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The framework

N workers partitioned in two categories: H high-skill workers and L low-skill workers

two categories of risks: a macroeconomic employment-risk exposure (p) and a personal one (π) (risks can be correlated)

The research question

how does the employment probability and the personal risk affects preferences on the desired (optimal) level of the tax rate (and public services) when workers have different productivities?

Motivation:

Overtaking the limit of existing models: "what is the impact of risk dispersion on the tax rate preferred by the decisive voter? […] Say that as a result of globalization, the probability of holding the job increases for the skilled workers and declines for the unskilled ones. What will be the impact on the tax rates that finance unemployment insurance? This is a difficult problem and I do not know how to solve it. Moreover, I could not find anyone who did. […]" (Przeworski, 2003)

But there is more than just a simple theoretical curiosity…

An example from the European Union (EU):

From mid 90s, labor supply of low-skill workers has been increasing and their wage levels are under pressure, while a higher labor demand for the more productive high-skill workers is lowering their unemployment risk and rising their wage levels.

Because of lowering immigration costs and increasing harmonization in labor market legislation a growing number of less educated and low-skill immigrants from the Eastern countries is expected in the fifteen countries of the Western EU member states

(Wildasin 1991 and 2000; Sinn and Ochel, 2003)

At a first glance…

The diverging probabilities that the high-skills and the low-skills experience in their respective carrier opportunities modify their positions as net contributors and net recipients. In probabilistic terms, the high-skills should experience an increasing positive difference - and the low-skills an increasing negative difference - between their respective funding of the public budget and benefiting from public transfers due to unemployment

Is such an intuition correct?

Some Questions:

1) Should we fear a “race to the bottom” due to the fiscal competition (and the difference between capital-labor mobility)?

2) (the Robin Hood paradox): It is generally argued that higher market inequality should imply a preference for higher taxation (the median voter is poorer) but there are relevant counterexamples, such as USA vs. Europe. Why?

Case 1: p and π uncorrelated

The representative high-skill worker is more productive than the low-skill one: $Y_j > Y_k$

Public finance is balanced:

$$NTr + NV = t[p(1-\pi)HY_j + (1-p)(1-\pi)LY_k]$$

$$Tr = t\widehat{Y} - V \qquad \widehat{Y} = p(1-\pi)\alpha + (1-p)(1-\pi)\beta$$

$$\alpha = \frac{H}{H+L}Y_j \qquad \beta = \frac{L}{H+L}Y_k$$

(strong) assumption: $\alpha > \beta$

(perhaps not too strong: sufficient condition is $\frac{Y_j}{Y_k} > \frac{L}{H}$)

Expected utility of high and low-skill is:

$$E(U_j(\bullet)) = p(1-\pi)U[(1-t)Y_j] + (1-p)U[t\hat{Y}] + (\pi-(1-p))U[V]$$

$$E(U_k(\bullet)) = (1-p)(1-\pi)U[(1-t)Y_k] + pU[t\hat{Y}] + (\pi-p)U[V]$$

Assume U is CRRA: $U(g) = (g)^{1-\sigma}$

The desired (optimal) level of t is:

$$t_i^* = \left\{\left[1+(1-\pi)s_i\left(\frac{Y_i}{\hat{Y}}\right)^{1-\sigma}\right]^{\frac{1}{\sigma}}\right\}^{-1} \quad i=j,k \qquad s_j = \left(\frac{p}{1-p}\right),\ s_k = \left(\frac{1-p}{p}\right)$$

N.B.: in the literature the expected income is replaced by the average one (because of l.l.n): $t\overline{Y} = t(\frac{\Sigma_i Y_i}{N})$

Here it is not possible to do so, since variations of p influence the relative share of high and low income workers who works

Main findings

For high-skill workers, the optimal t decreases as their macroeconomic risk lowers: $\partial t_j/\partial p < 0$ (Proposition 1)

For low-skill workers, the sign of $\partial t_k/\partial(1\text{-}p)$ depends on σ. There exists a threshold level σ°. For σ < σ°, the optimal t rises as their macroeconomic risk increases: $\partial t_k/\partial(1\text{-}p) < 0$. For σ > σ°, the opposite is true (Proposition 2)

Proposition 3: For both high and low-skill workers, the optimal t rises as their personal risk increases: $\partial t_i/\partial \pi > 0$

N.B. Prop. 2 shows that the intuitive conjecture of slide 5 is not fully confirmed (it applies only to high-skills and low-risk-averse low-skills)

Behavior of high-risk-averse low-productivity workers seems counterintuitive (the more they are risk-averse the less tax they desire?)

But…

Is it really such? Let the ex-post individual welfare function of k be the following C.E.S. function

$$W_k(Y_k, \widehat{Y}, V) = [(1-t)Y_k^{1-\sigma} + t\widehat{Y}^{1-\sigma} + V^{1-\sigma}]^{\frac{1}{1-\sigma}}$$

See that $W_k(\cdot)$ assumes the Leontiev form $min\{Y_k, Y, V\}$ as sigma tends to infinitive, i.e., she cares about the minimum, not the expected value

k does not choose a higher *t* since this would lower the *ex-post* income in case she remained employed, while in case she ended up under unemployment spell the increase in public budget due to the rise in the employment probability of the high-skill workers would more than compensate the reduction in transfers due to the decrease in the proportional tax rate *t*, which rises the ex-post transfers.

There exists a publicly-provided / private risk-insurance trade-off: labor income = self-protection from risks, *t* = cost-opportunity of relying on a publicly-provided protection. Proposition 2 shows that high risk-averse people prefer to self-insure themselves from risks

case 2: π and p are correlated ($p = p(\pi)$)

Assumption: $\partial\pi/\partial p < 0$ (several studies seem to confirm this, e.g. Sen, 1993)

How does this assumption changes the behavior of high and low skills?

See that p has now two effects on t: a direct one and an indirect one (through π)

For high-skills the effect on π reinforces the impact on t of a change in p: same direction (proposition 6)

Same is true for low-risk-averse low-skills (proposition 7)

For high-risk-averse low skills, the impact of p on t is ambiguous: t lowers *iff* the direct effect $((\partial t_j/\partial p)|\pi)$ is greater than the indirect one $((\partial t_j/\partial \pi)((\partial \pi/\partial p))$

We can now answer (at least qualitatively…) the questions posed before

Question: should we fear a “race to the bottom” due to the fiscal competition (and the difference between capital-labor mobility)?

Answer: It depends on the fraction of very high risk-averse low-skill workers. Unless it is large enough there will not be any "race to the bottom" of tax rate. Moreover, when the hypothesis of cross-correlation between the macroeconomic and the personal risks is added, it is even less likely that the median voter will orient the collective decision to cutting taxation.

Question (the Robin Hood paradox): It is generally argued that higher market inequality should imply a preference for higher taxation (the median voter is poorer) but there are relevant counterexamples, such as USA vs. Europe. Why?

Answer. There are two typical explanations:

1) the median voter is influenced in the US by the high-income individuals' opinion that less public intervention will boost market incentives and growth (Benabou, 2000, Benabou and Ok, 2001)
2) lower-than-mean income voter forecasts that a higher share of his personal income devoted to higher education will allow his son to increase his expected income if taxes (and public expenditures) are cut so that private firms will be able to raise profits and fund investments in new technologies (Hassler et al., 2004).

Our explanation is different: the preference for a lower *t* depends on the median voter being a high-risk-averse low skill, or that the fraction of high-risk-averse low skill workers is higher that the low-risk averse-ones (as a corollary, notice that in our model the "race to the bottom" is more likely in the US than in Europe)

But…

does it make sense to suppose that in the US low-skill workers are more risk-averse than the European ones? A plausible (?) conjectures: sigma endogenous (depending on the degree of inequality)

There is room for further analysis…