Income Risk and Public Insurance

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Course Content

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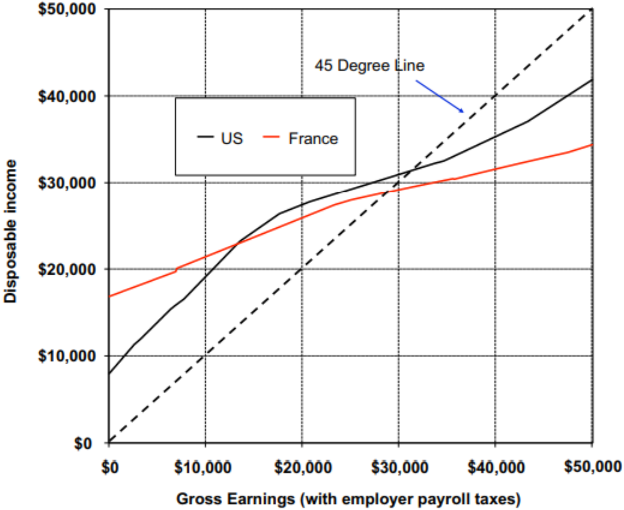
Income Tax and Disposable Income



Source: Piketty and Saez (2013)

Some Definitions

Symbol	Description
n_1^z	Labor hours supply by household with productivity z
$\bar{n}_1$	Aggregate (efficiency) hours labor
$w_1 z$	Wage rate per hour of labor
w_1	Wage rate per efficiency hour of labor
$h_1 = w_1 \bar{n}_1$	Aggregate labor income
$\text{rev} = \tau h_1$	Public revenue from labor income

Labor Market Variables

Income Risk and Insurance

- Period-one consumption: $c_1^z = a_0 + (1-\tau)w_1 z n_1^z + R$

$$v'(1-n_1^z) \geq (1-\tau)\, w_1 z\, u'(c_1^z) \qquad (= \text{if } n_1^z > 0)$$

  Therefore $\tau = 1$ implies $n_1^z = 0$

- Aggregate efficiency-labor hours:

$$\bar{n}_1 = \int_0^1 z(j)n(j)dj = p_1(z_1 n_1^{z_1}) + \cdots + p_S(z_S n_1^{z_S}) = E\left[z n_1^z\right]$$

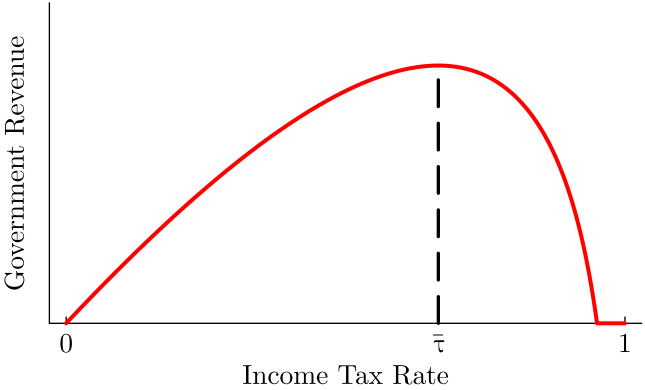
- Aggregate labor income $h_1 = w_1 \bar{n}_1$ (we use $w_1 = 1$)

Laffer Curve: $\qquad rev(\tau) = \tau h_1(1-\tau) \geq 0$

  $rev(0) = rev(1) = 0$

- Revenue maximization: $\bar{\tau} = 1/(1+e)$
- *Ex-ante* welfare maximization: $\tau^* = \lambda/(\lambda + e)$

Laffer Curve Example



Optimal Taxation with Calibrated Elasticities

Table 2 Optimal Linear Tax Rate Formula $\tau = (1 - g)/(1 - g + e)$

	Elasticity $e = .25$ (empirically realistic)		Elasticity $e = .5$ (high)		Elasticity $e = 1$ (extreme)	
	Parameter g (%) (1)	Tax rate τ (2)	Parameter g (%) (3)	Tax rate τ (4)	Parameter g (%) (5)	Tax rate τ (6)
A. Optimal linear tax rate τ						
Rawlsian revenue maximizing rate	0	80	0	67	0	50
Utilitarian (CRRA $= 1$, $u_c = 1/c$)	61	61	54	48	44	36
Median voter optimum ($z_{median}/z_{average} = 70\%$)	70	55	70	38	70	23
B. Revealed preferences g for redistribution						
Low tax country (US): Tax rate $\tau = 35\%$	87	35	73	35	46	35
High tax country (EU): Tax rate $\tau = 50\%$	75	50	50	50	0	50

Source: Piketty and Saez (2013)

Precautionary Savings and Income Risk

Source: Aiyagari (1994)

$$
\begin{aligned}
\underset{c\geq 0,a}{\text{Max}} \quad & \sum_{t=0}^{\infty} \beta^t E u(c_t) \\
\text{s.t.} \quad & c_t + a_t = (1+r)a_{t-1} + w z_t \\
& a_t \geq \underline{a}
\end{aligned}
$$

$\log z$ follows AR(1)

$$\log z_t = \rho \log z_{t-1} + \sigma \epsilon_t \qquad \epsilon \sim N(0,1)$$

Precautionary Savings and Income Risk

TABLE II

A. Net return to capital in %/aggregate saving rate in % ($\sigma = 0.2$)

$\rho \backslash \mu$	1	3	5
0	4.1666/23.67	4.1456/23.71	4.0858/23.83
0.3	4.1365/23.73	4.0432/23.91	3.9054/24.19
0.6	4.0912/23.82	3.8767/24.25	3.5857/24.86
0.9	3.9305/24.14	3.2903/25.51	2.5260/27.36

B. Net return to capital in %/aggregate saving rate in % ($\sigma = 0.4$)

$\rho \backslash \mu$	1	3	5
0	4.0649/23.87	3.7816/24.44	3.4177/25.22
0.3	3.9554/24.09	3.4188/25.22	2.8032/26.66
0.6	3.7567/24.50	2.7835/26.71	1.8070/29.37
0.9	3.3054/25.47	1.2894/31.00	−0.3456/37.63

Source: Aiyagari (1994)

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References I

Aiyagari, S. R. (1994). Uninsured Idiosyncratic Risk and Aggregate Saving. *The Quarterly Journal of Economics*, 109(3):659–684.

Piketty, T. and Saez, E. (2013). Optimal Labor Income Taxation. In *Handbook of Public Economics*, volume 5, pages 391–474. Elsevier.