

## **Rios-Rull et al**

**The project.**—Redistribution of wealth is a central issue in the discussion of economic policy. It is also one of the arguments most frequently used to justify the intervention of the government. In spite of its importance, formal attempts to evaluate the distributional implications of policy have had little success. The main reason is that researchers have failed to come up with a quantitative theory that accounts for the observed earnings and wealth inequality in sufficient detail. .

**The facts.**—In the U.S. economy, the distributions of earnings and, especially, of wealth are very concentrated and skewed to the right. For instance, their Gini indexes are 0.63 and 0.78, respectively, and the shares of earnings and wealth of the households in the top 1 percent of the corresponding distributions are 15 percent and 30 percent, respectively.

**The question.** In this article we ask whether we can construct a theory of earnings and wealth inequality, based on the optimal choices of ex ante identical households that face uninsured idiosyncratic shocks to their endowments of efficiency labor units, that accounts for the U.S. distributions of earnings and wealth.

**Findings:** We also find that, even though the roles played by the intergenerational transmission of earnings ability and the life cycle profile of earnings are quantitatively significant, they are not crucial to accounting for the U.S. earnings and wealth inequality.

**Finally**, as far as the policy experiment of abolishing estate taxation is concerned, we find that the steady-state implications of this policy change are to increase output by 0.35 percent and the stock of capital by 0.87 percent, and that its distributional

implications are very small.

First, we define labor earnings as wages and salaries of all kinds plus a large fraction (85.7 percent) of business and farm income. Thus defined, earnings is a component of income, namely, the income obtained from labor. Next, we define income as revenue from all sources before taxes but after transfers.<sup>2</sup> Finally, we define wealth as the net worth of the household. Thus defined, wealth is both the stock of unspent past income and the source from which one of the components of income, capital income, is obtained.

Measures of U.S. Earnings, Income, and Wealth

Table 1 Concentration

Variable	Gini Index	Coefficient of Variation	Top 1% to Bottom 40% Ratio
Earnings	.611	2.65	158
Income	.553	3.57	73
Wealth	.803	6.53	1,335

TABLE 2  
DISTRIBUTIONS OF EARNINGS AND WEALTH IN THE U.S. ECONOMY (%)

GINI	QUINTILE					TOP GROUPS (Percentile)		
	First	Second	Third	Fourth	Fifth	90th-95th	95th-99th	99th-100th
A. Distribution of Earnings								
.63	-.40	3.19	12.49	23.33	61.39	12.38	16.37	14.76
B. Distribution of Wealth								
.78	-.39	1.74	5.72	13.43	79.49	12.62	23.95	29.55

## Households:

$$u(c, l) = \frac{c^{1-\sigma}}{1-\sigma} + \chi \frac{(\ell - l)^{1-\sigma_2}}{1-\sigma_2}$$

$$\tau_{SS} = \begin{bmatrix} \tau_{\varepsilon\varepsilon} & \tau_{\varepsilon R} \\ \tau_{R\varepsilon} & \tau_{RR} \end{bmatrix}$$

$\tau_{\varepsilon\varepsilon}$  :

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 TRANSITION PROBABILITIES OF THE PROCESS ON THE ENDOWMENT OF EFFICIENCY LABOR  
 UNITS FOR WORKING-AGE HOUSEHOLDS THAT REMAIN AT WORKING AGE ONE PERIOD  
 LATER,  $\Gamma_{\varepsilon\varepsilon}$  (%)

FROM $s$	To $s'$			
	$s' = 1$	$s' = 2$	$s' = 3$	$s' = 4$
$s = 1$	96.24	1.14	.39	.006
$s = 2$	3.07	94.33	.37	.000
$s = 3$	1.50	.43	95.82	.020
$s = 4$	10.66	.49	6.11	80.51

$\tau_{eR}$ ,  $\tau_{RR}$  are diagonal matrices.  $\tau_{R\varepsilon}$ , probability of newborn heir going into an endowment category is a weighted average of the stationary distribution and parent's retirement endowment. However a further recalibration of  $\tau_{R\varepsilon}$  is needed to reflect that younger households have lower earning ability than average or senior households.

## Decision

$$v(s, a) = \text{Max}_{c, z \in A, l} u(c, l) + \beta \sum_{s' \in S} \tau_{ss'} v(s', a)$$

$$c + z = y - T(y) + a$$

$$y = ar + e(s)lw + \omega(s)$$

$$a'(z) = \begin{cases} z - T_E(z) & \text{if } s = R \text{ and } s' \in \epsilon \\ z & \text{otherwise} \end{cases}$$

$$\omega(s) = 0 \text{ if } s \in \epsilon, \omega \text{ otherwise}$$

## Production:

$Y(K, L)$  is Cobb-Douglas. Pick  $e(s = 1) = 1$

## Government policy, every period

$$T = T(y) + T_E(z)$$

$$G + Tr = T$$

$$Tr = \int \omega(s) ds$$

$$T_E(z) = \begin{cases} 0 & z < \bar{z} \\ \tau_E(z - \bar{z}) & \text{if } z \geq \bar{z} \end{cases}$$

$$T(y) = a_0 \left( y - (y^{-a_1} + a_2)^{\frac{1}{a_1}} \right) + a_3 y$$

## Markets clear:

$$K = \int a dx$$

$$L = \int l(s, a) e(s) ds$$

$$T = \int T(y) dx + \int (\xi_{s \in R} \gamma_{s \in \mathcal{E}}) T_E z(s, a) dx$$

$$r = f_1(K, l) - \delta, \quad w = f_2(K, L)$$

$\xi$  is the indicator function,  $\gamma_{s \in \mathcal{E}} = \sum_{s' \in \mathcal{E}} \tau_{ss'}$



# Parameters

39 parameters chosen:

TABLE 2  
PARAMETER VALUES FOR THE BENCHMARK MODEL ECONOMY

	Parameter	Value
Preferences:		
Time discount factor	$\beta$	.924
Curvature of consumption	$\sigma_1$	1.500
Curvature of leisure	$\sigma_2$	1.016
Relative share of consumption and leisure	$\chi$	1.138
Productive time	$\ell$	3.200
Age and employment process:		
Common probability of retiring	$p_{re}$	.022
Common probability of dying	$1 - p_{ee}$	.066
Earnings life cycle controller	$\phi_1$	.969
Intergenerational earnings persistence controller	$\phi_2$	.525
Technology:		
Capital share	$\theta$	.376
Capital depreciation rate	$\delta$	.059
Government policy:		
Government expenditures	$G$	.296
Normalized transfers to retirees	$\omega$	.696
Income tax function parameters	$a_0$	.258
	$a_1$	.768
	$a_2$	.491
	$a_3$	.144
Estate tax function parameters:		
Tax-exempt level	$\underline{z}$	14.101
Marginal tax rate	$\tau_E$	.160

TABLE 5  
 RELATIVE ENDOWMENTS OF EFFICIENCY LABOR UNITS,  $e(s)$ , AND THE  
 STATIONARY DISTRIBUTION OF WORKING-AGE HOUSEHOLDS,  $\gamma_\xi^*$

	$s = 1$	$s = 2$	$s = 3$	$s = 4$
$e(s)$	1.00	3.15	9.78	1,061.00
$\gamma_\xi^*$ (%)	61.11	22.35	16.50	.0389

# Findings

TABLE 6  
VALUES OF THE TARGETED RATIOS AND AGGREGATES IN THE UNITED STATES AND IN THE BENCHMARK MODEL ECONOMIES

	$K/Y$	$I/Y$	$G/Y$	$Tr/Y$	$T_E/Y$	$h$	$CV_c/CV_l$	$\epsilon_{40/20}$	$\rho(f, s)$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Target (United States)	3.13	18.6%	20.2%	4.9%	.20%	30.0%	3.00	1.30	.40
Benchmark	3.06	18.1%	20.8%	4.4%	.20%	31.2%	3.25	1.09	.25

NOTE.—Variable  $h$  (col. 6) denotes the average share of disposable time allocated to the market. The statistic  $CV_c/CV_l$  (col. 7) is the ratio of the coefficients of variation of consumption and of hours worked.

TABLE 7  
DISTRIBUTIONS OF EARNINGS AND OF WEALTH IN THE UNITED STATES AND IN THE BENCHMARK MODEL ECONOMIES (%)

ECONOMY	GINI	QUINTILE					TOP GROUPS (Percentile)		
		First	Second	Third	Fourth	Fifth	90th–95th	95th–99th	99th–100th
A. Distributions of Earnings									
United States	.63	-.40	3.19	12.49	23.33	61.39	12.38	16.37	14.76
Benchmark	.63	.00	3.74	14.59	15.99	65.68	15.15	17.65	14.93
B. Distributions of Wealth									
United States	.78	-.39	1.74	5.72	13.43	79.49	12.62	23.95	29.55
Benchmark	.79	.21	1.21	1.93	14.68	81.97	16.97	18.21	29.85

**TABLE 8**  
**DISTRIBUTIONS OF CONSUMPTION IN THE UNITED STATES AND IN THE BENCHMARK**  
**MODEL ECONOMIES (%)**

ECONOMY	GINI	QUINTILE					TOP GROUPS (Percentile)		
		First	Second	Third	Fourth	Fifth	90th- 95th	95th- 99th	99th- 100th
United States:									
Nondurables	.32	6.87	12.27	17.27	23.33	40.27	9.71	10.30	4.83
Nondurables+*	.30	7.19	12.96	17.80	23.77	38.28	9.43	9.69	3.77
Benchmark:									
Wealthiest 1%									
excluded	.40	5.23	12.96	13.55	20.41	47.85	12.77	14.89	3.83
Entire sample	.46	4.68	11.58	12.07	18.68	52.99	12.82	13.45	11.94

\* Includes imputed services of consumer durables.

TABLE 9  
 EARNINGS AND WEALTH PERSISTENCE IN THE UNITED STATES AND IN THE BENCHMARK  
 MODEL ECONOMIES: FRACTIONS OF HOUSEHOLDS THAT REMAIN IN THE SAME QUINTILE  
 AFTER FIVE YEARS

ECONOMY	QUINTILE				
	First	Second	Third	Fourth	Fifth
A. Earnings Persistence					
United States	.86	.41	.47	.46	.66
Benchmark	.76	.55	.65	.80	.80
B. Wealth Persistence					
United States	.67	.47	.45	.50	.71
Benchmark	.81	.80	.80	.75	.89

# Other Models

TABLE 1  
DISTRIBUTIONS OF EARNINGS AND OF WEALTH IN THE UNITED STATES AND IN  
SELECTED MODEL ECONOMIES

	Gini	Bottom 40%	Top 5%	Top 1%
A. U.S. Economy				
Earnings	.63	3.2	31.2	14.8
Wealth	.78	1.7	54.0	29.6
B. Aiyagari (1994)				
Earnings	.10	32.5	7.5	6.8
Wealth	.38	14.9	13.1	3.2
C. Castañeda et al. (1998)				
Earnings	.30	20.6	10.1	2.0
Wealth	.13	32.0	7.9	1.7
D. Quadrini (1998)				
Earnings	...	...	...	...
Wealth	.74	...	45.8	24.9
E. Krusell and Smith (1998)				
Earnings	...	...	...	...
Wealth	.82	...	55.0	24.0
F. Huggett (1996)				
Earnings	.42	9.8	22.6	13.6
Wealth	.74	.0	33.8	11.1
G. De Nardi (1999)				
Earnings	...	...	...	...
Wealth	.61	1.0	38.0	15.0