

Beyond GDP?

Welfare across Countries and Time

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GDP per person \neq Welfare

Utility depends on:

- Consumption
- Life Expectancy
- Leisure
- Inequality
- ...

But GDP per person “only” measures income...

Motivating Example: France vs. the U.S.

GDP per person in France is 70% of that in the U.S.

But compared to the U.S., France has:

- More leisure
- Less inequality
- Longer life expectancy

Which country delivers higher welfare?

Evaluate outcomes using a particular set of preferences:

- Expected utility “behind the Rawlsian veil” in each country-year
- Flow measure of welfare, not PDV
- Fraction of U.S. consumption which makes “Rawls” indifferent

Theory Underlying the Calculations

Let Rawls “live” for a year as a random person in some country, facing their mortality rates and their consumption/leisure distribution.

Basic assumptions:

- Flow utility $u(c, \ell) = \bar{u} + \log c + v(\ell)$
- Log normally distributed consumption
- Cross-section mortality rates summarized by life expectancy e

Expected utility behind the Rawlsian veil of ignorance:

$$V(e, c, \ell, \sigma) = e \left(\bar{u} + \log c + v(\ell) - \frac{1}{2} \sigma^2 \right)$$

Consumption-Equivalent Welfare

What makes Rawls indifferent between the U.S. and country i ?

Scaling U.S. consumption by some proportion λ_i .

$$V(e_{us}, \lambda_i c_{us}, \ell_{us}, \sigma_{us}) = V(e_i, c_i, \ell_i, \sigma_i)$$

Decomposing Welfare Differences

$$\begin{aligned} \log \lambda_i = & \frac{e_i - e_{us}}{e_{us}} (\bar{u} + \log c_i + v(\ell_i) - \frac{1}{2} \sigma_i^2) && \text{Life Expectancy} \\ & + \log c_i - \log c_{us} && \text{Consumption} \\ & + v(\ell_i) - v(\ell_{us}) && \text{Leisure} \\ & - \frac{1}{2} (\sigma_i^2 - \sigma_{us}^2) && \text{Inequality} \end{aligned}$$

(Can do the same thing over time for a given country.)

Data and Calibration

Data Sources

Consumption, c

- Penn World Tables 6.3 (National Accounts + ICP)

Life expectancy, e

- World Bank

Leisure, ℓ

- Annual hours worked per worker (OECD)
- Average weekly hours worked in manufacturing (ILO)
- Employment / adult population (PWT, World Bank)

Inequality, σ

- United Nations World Income Inequality Database
- Gini Coefficients $\rightarrow \sigma$ under log normality

Basic Parameterization

Leisure, $v(\ell)$

- Constant Frisch elasticity of labor supply = 1.0
- Weight on leisure term from static F.O.C. for U.S., with a marginal tax rate of 0.387.

Intercept in flow utility, \bar{u}

- A 40 year old in U.S. has value of remaining life = \$4 million.

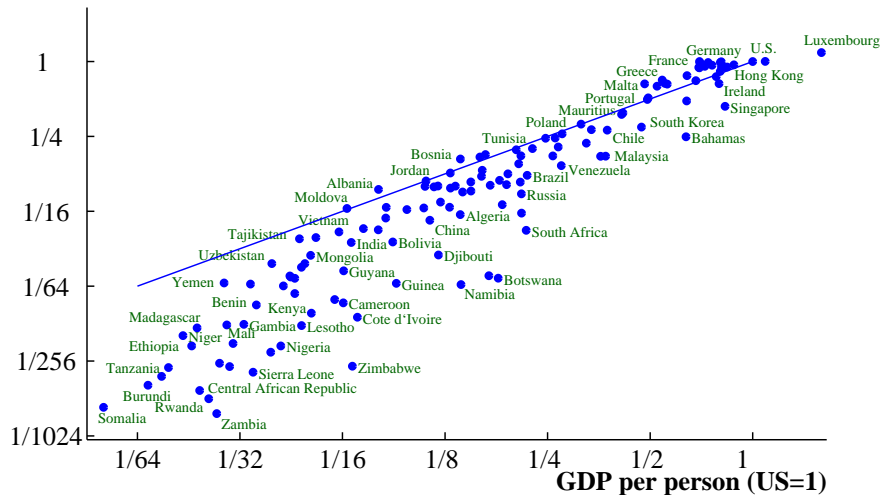
Main Results

Key Point 1:

- (a) GDP per person highly correlated with welfare across the broad range of countries: 0.95.
- (b) Nevertheless, differences are often important: typical deviation is 46%.

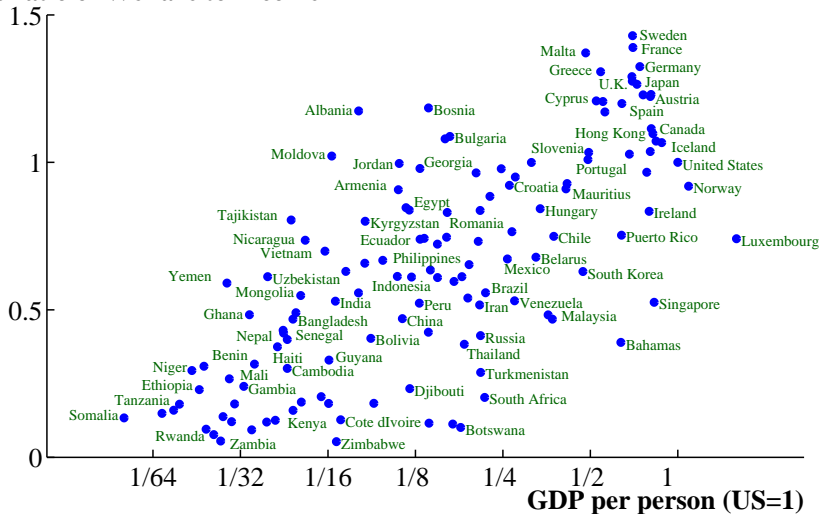
Welfare and Income are correlated 0.95 in 2000

Welfare, λ



They differ on average by about 46%

The ratio of Welfare to Income



Key Point 2: Western Europe is much closer to the U.S. when we take into account Europe's longer life expectancy, additional leisure, and lower inequality.

U.S. vs. Western Europe in 2000

	Welfare		Log	Life	<i>— Decomposition —</i>		
	λ	Income	Ratio	Exp.	<i>C/Y</i>	Leis.	Ineq.
U.S.	100	100	.000	.000	.000	.000	.000
France	97.4	70.1	.329	.119	-.055	.140	.125

Life expectancy, leisure, and inequality all contribute more than 10 percentage points to French welfare.

Key Point 3: Many developing countries are much poorer than incomes suggest because of a combination of shorter lives and extreme inequality.

China and South Africa in 2000

	Income	Welfare
United States	100	100
China	11.3	5.3
South Africa	21.6	4.4

- China: Below U.S. on every dimension
- South Africa:
 - Life expectancy = 56 years → factor of 4!
 - Inequality → 40%

Hong Kong vs. Singapore in 2000

	Income	Welfare
United States	100	100
Hong Kong	82.1	90.0
Singapore	82.9	43.6

C/Y: 71% in Hong Kong vs. 43% in Singapore

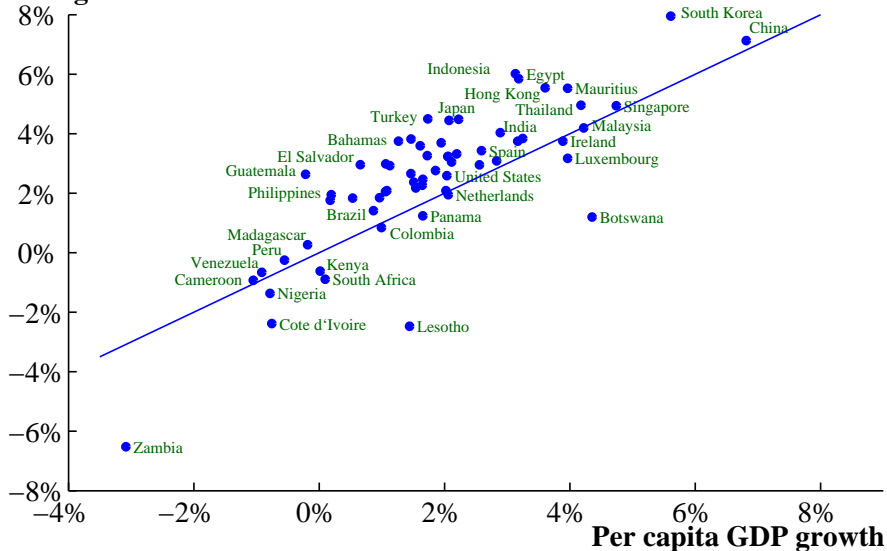
Key Point 4: Growth rates, 1980–2000

- Welfare: 2.5%
- Income: 1.8%

Life expectancy adds more than 1.0%, except in Africa

Growth Rates, 1980–2000: Correlated 0.82

Welfare growth



Key Point 5: The mean absolute deviation between welfare growth and income growth is 0.99 percentage points.

Growth Rates: Advanced Countries

Country	Welfare λ	<i>— Decomposition —</i>					
		Income	Diff	Life Exp.	C/Y	Leis.	Ineq.
Japan	4.45	2.07	2.38	1.39	0.31	0.55	0.13
France	3.60	1.61	1.98	1.44	-0.09	0.34	0.29
U.K.	3.32	2.19	1.13	1.25	-0.03	0.08	-0.17
U.S.	2.59	2.04	0.55	1.09	-0.11	-0.18	-0.25

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Growth Rates: Stars

Country	Welfare λ	Income	Diff	Life Exp.	<i>Decomposition</i>		
					C/Y	Leis.	Ineq.
S Korea	7.95	5.61	2.34	2.41	-0.74	0.51	0.16
Indones.	6.02	3.13	2.89	2.60	0.59	-0.22	-0.08

Rising life expectancy adds more than 2 percentage points to growth.

Growth Rates: Developing Countries

Country	Welfare			<i>Decomposition</i>			
	λ	Income	Diff	Life Exp.	C/Y	Leis.	Ineq.
Brazil	<u>1.76</u>	<u>0.18</u>	1.59	<u>1.88</u>	0.23	-0.44	-0.08
Btswana	<u>1.20</u>	<u>4.35</u>	-3.16	<u>-2.72</u>	-0.88	0.29	0.16
SAfrica	-0.89	0.10	-0.99	-0.32	0.14	0.15	<u>-0.96</u>

Key Points are all *qualitatively* robust.

Sensitivity of *magnitudes* in decreasing order of importance:

- CV versus EV
- \bar{u} — U.S. value of life
- K/Y : current level versus steady state
- Coefficient of relative risk aversion
- Parameterization of utility from leisure

Micro Calculations using Household Surveys

Countries:

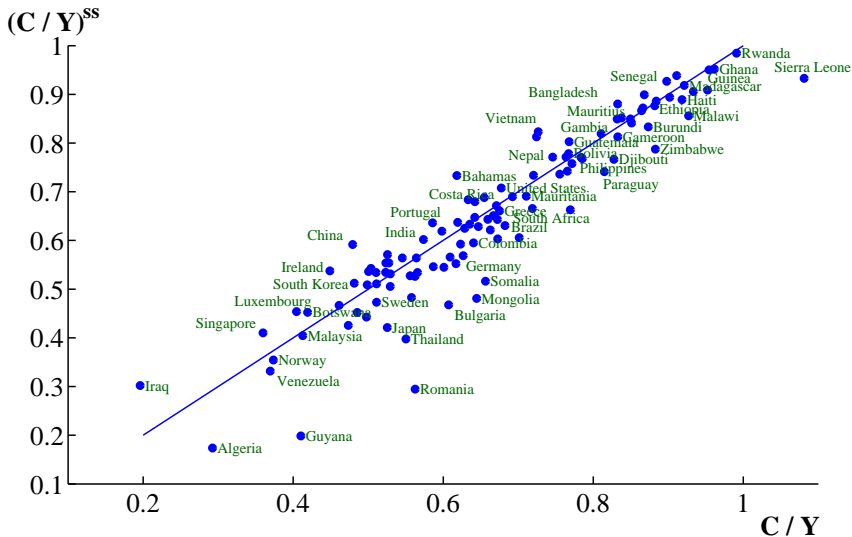
- U.S., India, Mexico, South Africa (more to come)

Advantages:

- Make sure consumption (not income) inequality
- Allow arbitrary (non-normal) distribution of consumption
- Drop durables (lumpy)
- Better measure of hours worked if non-OECD
- Incorporate inequality in leisure
- Adjust for age composition of population
- Incorporate survival rates by age
- Uniform use of sampling weights

Additional Tables and Figures

Adjusting the Consumption Share for Transition Dynamics

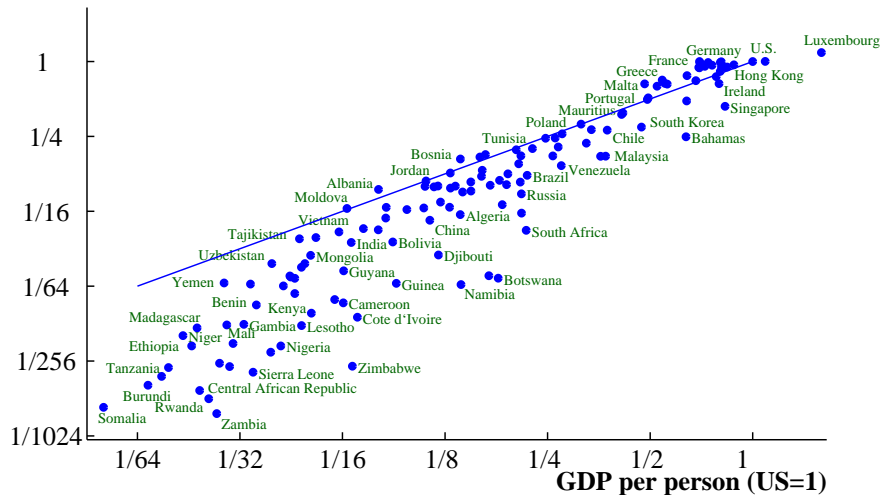


Robustness — Summary Results

Robustness check	<i>Median abs. deviation</i>		# of countries with negative flow utility
	Levels	Growth rate	
Benchmark case	0.379	0.99	0
Equivalent variation	0.269	0.93	0
Compens. variation	0.442	1.03	0
$\gamma = 1.5, \bar{c} = 0$	0.329	0.61	52
$\gamma = 1.5, \bar{c} = .088$	0.386	0.86	6
$\gamma = 2.0, \bar{c} = .271$	0.414	0.96	6
θ from FOC for France	0.413	1.05	0
Frisch elasticity = 1.9	0.383	0.98	0
Value of Life = \$3m	0.286	0.73	14
Value of Life = \$5m	0.464	1.39	0

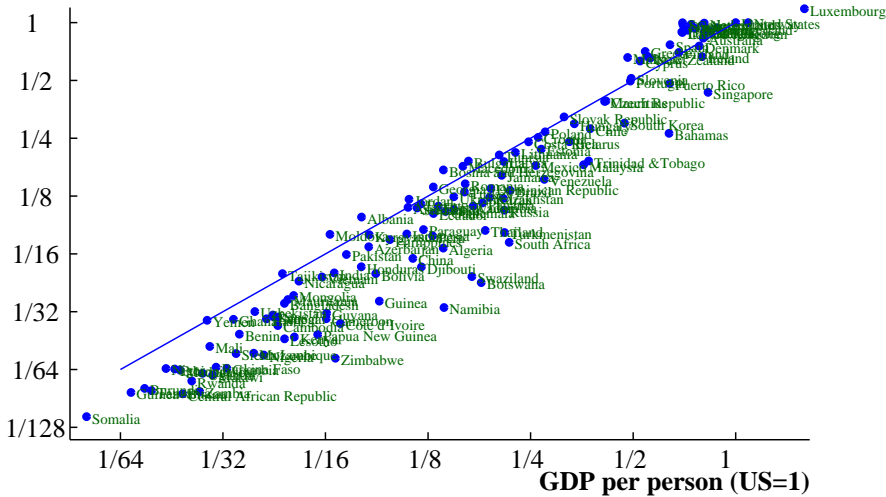
Baseline Welfare Measure, 2000

Welfare, λ



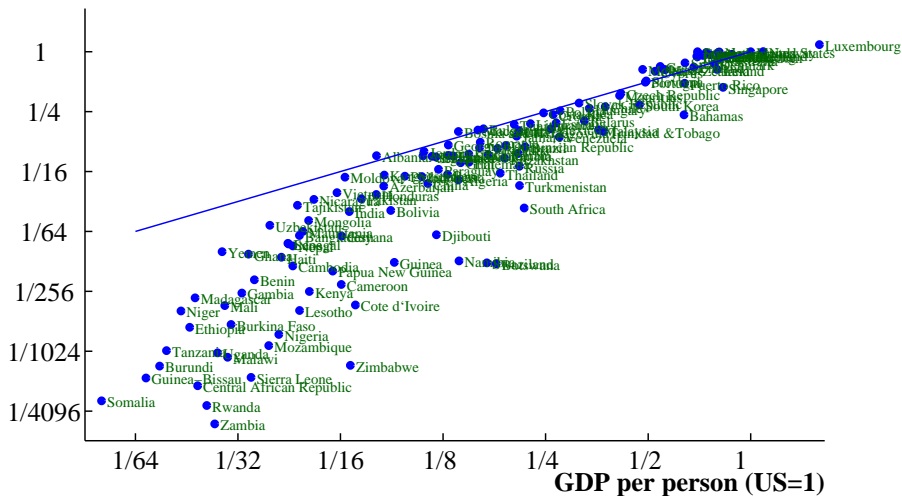
Equivalent Variation, 2000

Welfare, λ



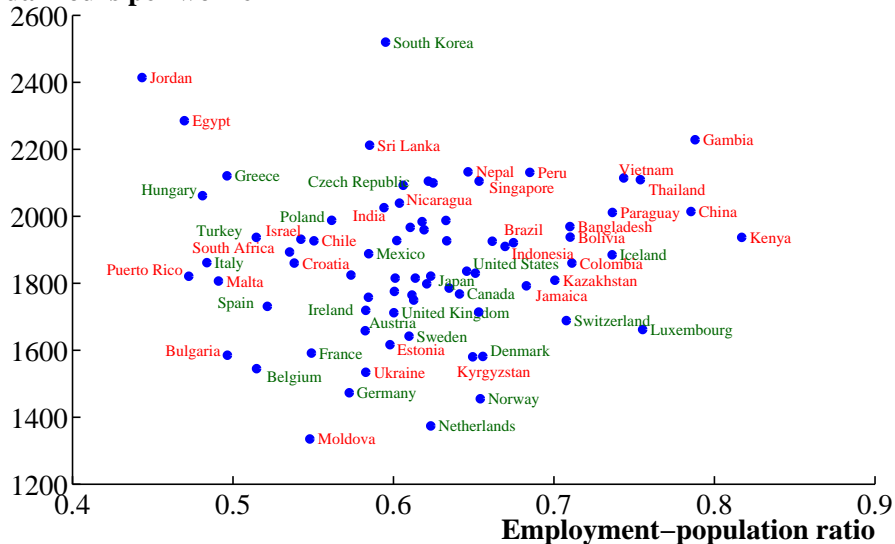
Compensating Variation, 2000

Welfare, λ



Intensive and Extensive Margins of Work

Annual hours per worker



Within-Country Inequality

Standard deviation of log consumption

