

**Incorporating Equity in Regulatory
and Benefit-Cost Analysis:
Don't Let the Ideal
be the Enemy of the Useful**

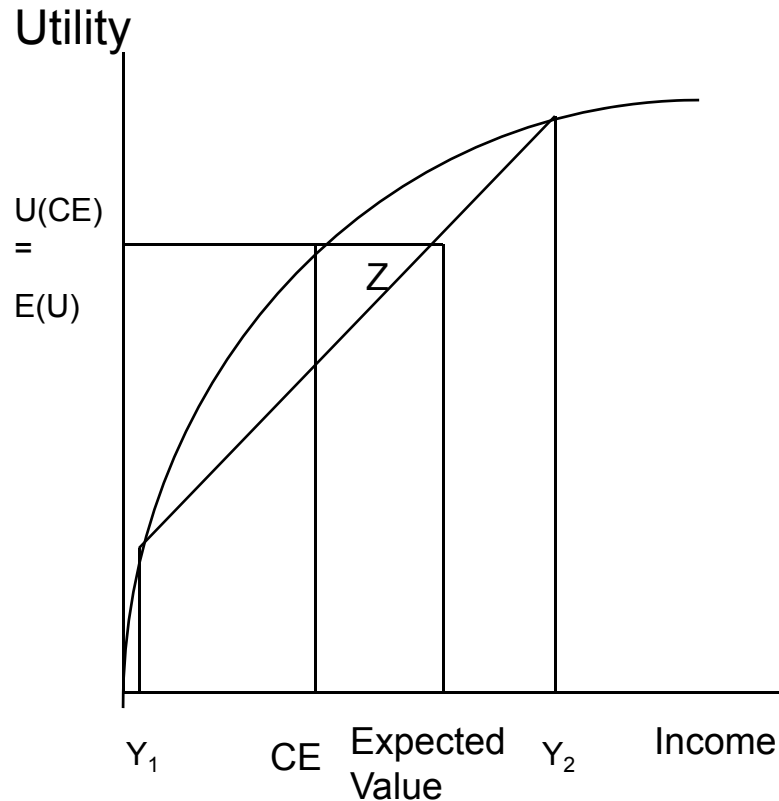
Scott Farrow

UMBC

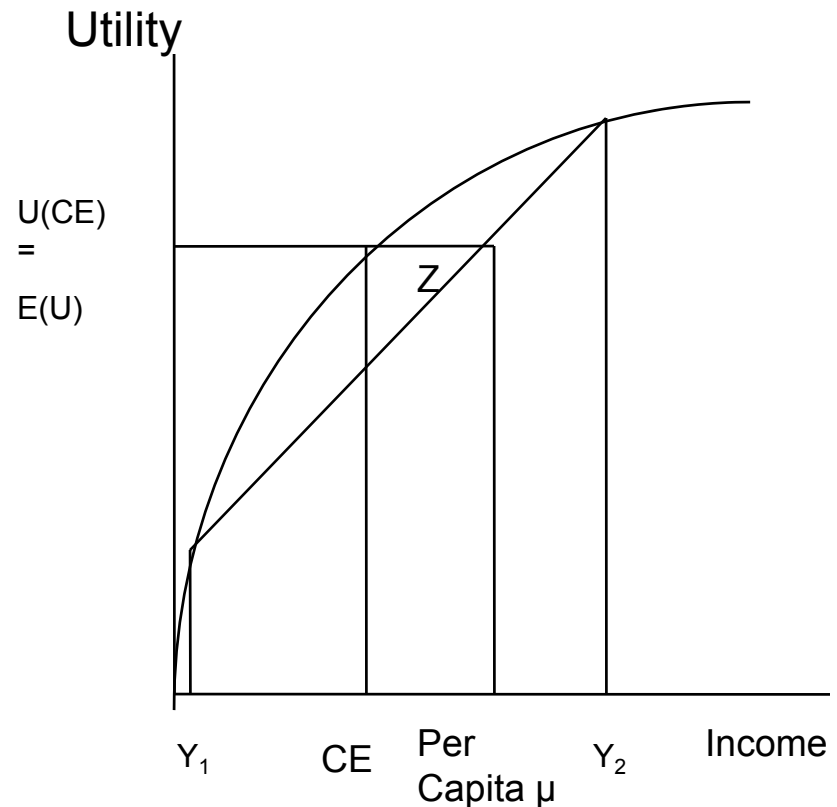
Risk and Inequality Aversion

Formally two sides of the same coin

Risk Aversion



Inequality Aversion



Outline:

OMB Guidance and Distribution

- Target audience
- Criteria
- Descriptive distributional analysis
- Normative distributional analysis
- Recommendation summary

Target Audience & Criteria

- Who is OMB guidance for?: governmental applied analysts to support governmental decision-makers
- Criteria (think GAO)
 - Standard setting bodies (none)
 - Professional literature...what level?
 - Government advisory groups

Charge to analysts

- **Distribution: signal exists-enforce and elaborate**
“Your regulatory analysis should provide a separate description of distributional effects (i.e., how both benefits and costs are distributed among sub-populations of particular concern) so that decision makers can properly consider them along with the effects on economic efficiency. ... Where distributive effects are thought to be important, the effects of various regulatory alternatives should be described quantitatively to the extent possible, including the magnitude, likelihood, and severity of impacts on particular groups.” (OMB, A-4)

Recommendation 1--Scorecard: OMB should consistently expect data or discussion on the distributional impacts of a regulation as requested in existing guidance.

Current Gap: Added Guidance on Descriptive Practice

- Standard textbook distributional analysis:
 - Decomposition of welfare effects among consumers, producers, government, 3rd parties
- Inequality descriptive statistics--Census and others regularly compute (many developed by economists)

Table 1: Summary inequality statistics reported by U.S. Census Bureau

Income Distribution Measures Using Money Income and Equivalence-Adjusted Income: 2006 and 2007

Measure	2006				2007			
	Money income		Equivalence-adjusted income		Money income		Equivalence-adjusted income	
	Estimate	90-percent confidence interval ¹ (±)	Estimate	90-percent confidence interval ¹ (±)	Estimate	90-percent confidence interval ¹ (±)	Estimate	90-percent confidence interval ¹ (±)
Shares of Aggregate Income by Percentile								
Lowest quintile.....	3.4	0.04	3.7	0.03	3.4	0.04	3.7	0.03
Second quintile.....	8.6	0.10	9.4	0.07	8.7	0.10	9.6	0.07
Middle quintile.....	14.5	0.16	15.0	0.11	14.8	0.16	15.3	0.12
Fourth quintile.....	22.9	0.25	22.5	0.17	23.4	0.25	22.9	0.17
Highest quintile.....	50.5	0.56	49.4	0.36	49.7	0.54	48.5	0.35
Top 5 percent.....	22.3	0.51	22.2	0.33	21.2	0.48	21.1	0.31
Summary Measures								
Gini index of income inequality.....	0.470	0.0047	0.454	0.0029	0.463	0.0045	0.445	0.0028
Mean logarithmic deviation of income...	0.543	0.0103	0.607	0.0076	0.532	0.0103	0.588	0.0075
Theil.....	0.417	0.0003	0.397	0.0002	0.391	0.0002	0.371	0.0001
Atkinson:								
e=0.25.....	0.099	0.0022	0.095	0.0015	0.095	0.0018	0.090	0.0012
e=0.50.....	0.192	0.0035	0.186	0.0023	0.185	0.0030	0.178	0.0020
e=0.75.....	0.289	0.0044	0.288	0.0029	0.281	0.0039	0.279	0.0027

¹ A 90-percent confidence interval is a measure of an estimate's variability. The larger the confidence interval in relation to the size of the estimate, the less reliable the estimate. For more information, see "Standard Errors and Their Use" at <www.census.gov/hhes/www/p60_235sa.pdf>.

Source: U.S. Census Bureau, Current Population Survey, 2007 and 2008 Annual Social and Economic Supplements.

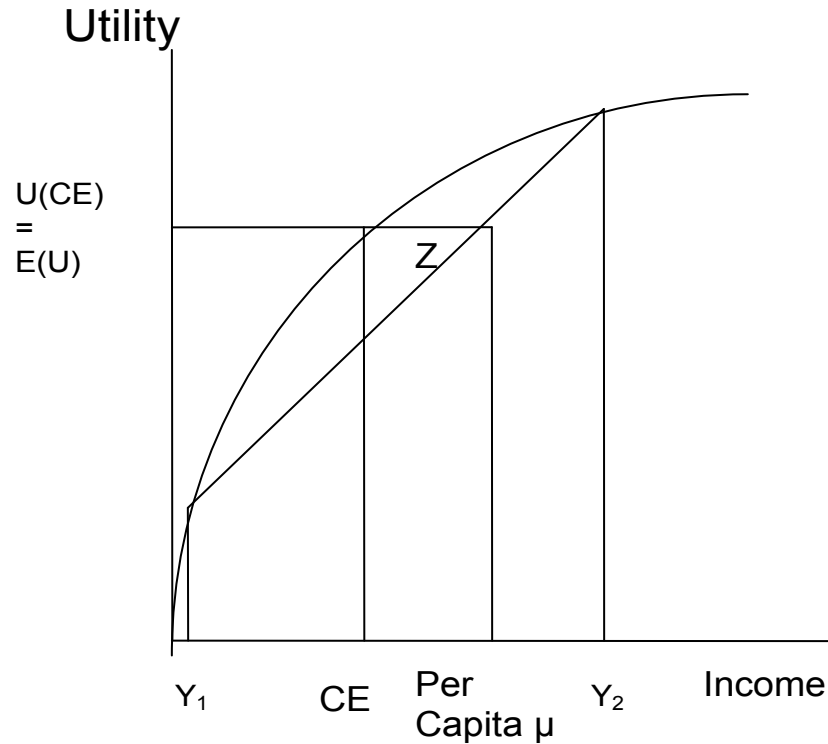
Figure 1: US Lorenz Curve and Gini Coefficient Definition



Data Source: U.S. Census Bureau, Current Population Survey, 1968 to 2008 Annual Social and Economic Supplements, from http://www.census.gov/hhes/www/income/histinc/p60no231_tablea3.pdf

Atkinson Measure and Inequality Aversion

Figure 1: Risk and Inequality Aversion



$$I(e) = 1 - \frac{CE(e)}{\mu} = \frac{Z}{\mu}$$

The proportion of mean income potentially given up to achieve same welfare with an equal (certain) income

Recommendation 2

- 2. OMB should meet with the U.S. Census Bureau and an interagency statistical group to provide guidance on methods and measures for the quantitative analysis and visual display of distributional measures.**
 - OMB should report the status quo estimates of its preferred measures every T years using nationwide data so that agency analysts have a ready comparison.**
 - OMB should include standard benefit-cost distributional “tableaus” in its guidance.**

Distribution and Normative Regulatory Analysis

1. Start with ad-hoc comparisons of descriptive equity stat of project to baseline
2. Pareto instead of Kaldor-Hicks: example

TABLE 18
COMPENSATION ANALYSIS: Basic Scenario

Category	Present Value	Minimum Expected Compensation	Net Effect
Benefits			
Transportation	1,788	0	1,788
Health	N.A./0	0	N.A./0
Multi-Industry/Construction	12,116	0	12,116
Multi-Industry/Operation	258,693	0	258,693
Natural resource income	357,808	0	357,808
Costs			
Agriculture (incl. bush)			
<u>Short Term</u>	378	-378	0
<u>Long Term</u>	234	-234	0
Livestock	56	-56	0
Health	N.A./0	N.A./0	0
Housing	144	-144	0
Job Search	145	0	145
Transportation	206	-206	0
Present Value Net Benefit	629,242	1,018	630,260
Present Value (Dollars)	\$1,258 million	\$2 million	\$1,260 million

Distribution and Normative Analysis: Sensitivity and Certainty Equivalent —We're there

3. Sensitivity of existing normative assumption on marginal utility of income
Empirical Atkinson weights for inequality
(based on constant elasticity of marginal utility of income)

$$\frac{U'_{yi}}{U'} = \left(\frac{y_i}{\bar{y}} \right)^{-e} = \left(\frac{\bar{y}}{y_i} \right)^e$$

Distributional weights based on values of inequality aversion, e , used by the U.S. Census Bureau and the UK Treasury

Population Quintile, Median, %	Mean US HH Income by Quintile: 2007	Default: $e=0$	$e=.25$	$e=.5$	$e=.75$	$e=1$
0-20	\$11,551	1	1.4	2.1	3.0	4.3
20-40	\$29,442	1	1.1	1.3	1.5	1.7
Median	\$50,233	1	1.0	1.0	1.0	1.0
40-60	\$49,968	1	1.0	1.0	1.0	1.0
60-80	\$79,111	1	0.9	0.8	0.7	0.6
80-100	\$167,971	1	0.7	0.5	0.4	0.3

Data source: US Census, 2008b; author's calculations

Normative Distributional Recommendations

1. **OMB should consult with the Department of Justice and convene a multi-disciplinary advisory panel to review whether a reasonable reading of legislation has identified sub-populations where the intent is not to make that group worse off as a result of Government actions.**
 - **If any such groups are found, OMB should request an estimate of the cost to compensate such sub-groups.**

2. **OMB should convene a multi-disciplinary advisory group to provide advice on methods to apply sensitivity analysis to the standard equal marginal utility of income assumption.**
 - **Further, OMB may consider, as it has for the discount rate, several “anchoring” values for an inequality aversion parameter in addition to the existing value of 0 that would be recommended for sensitivity tests in benefit-cost analyses.**