

Distributional Characteristics of Income Insecurity in the U.S., Germany and Britain

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Economic Insecurity: Measurement, Causes and Policy
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Outline

- 1 Economic Insecurity and “Income Insecurity”
 - Background and context
 - Measuring income insecurity
- 2 Empirical Results
 - Cross-national comparisons
 - Distributional characteristics

A Working Definition of Economic Insecurity

- Many tentative definitions for economic insecurity.
- A state of anxiety about future economic well-being.
- Emphasis on the individual or household level.
- Threats (real or perceived) to income or wealth from unemployment, illness, unexpected expense, widowhood, crime etc.

Anatomy of Economic Insecurity

- Quantifiable income or wealth risk and barriers to smoothing.
- Additional psychological costs stemming from risk.
- Loss aversion (Tversky and Kahneman), Identity (Akerlof and Kranton) etc (see Osberg (1998)).
- Narrative bias.

Measurement issues

We attempt to identify problems that complicate the measurement of economic insecurity.

- 1 The insecurity of an individual is highly dependent on unobservable personal characteristics.
- 2 Insecurity is a 'forward looking' phenomena. Should be measured *ex ante* rather than *ex post*.

Measuring Income Insecurity

How can insecurity be measured?

- We simplify by focusing on household income volatility which we regard as an important component of economic insecurity.
- ① Income used for daily household expenses, also acts as a barometer for job security, health etc.
- ② Panel data on incomes widely available.

We call our results measurements of “income insecurity”.

Measuring Income Insecurity

There are a number drawbacks to the approach.

- ① We ignore the expectational issues that are important in defining economic insecurity.
- ② Some income fluctuations may drive insecurity, others may not.
- ③ A study of household volatility is *ex post* rather than *ex ante*.
- ④ Income is an imperfect indicator of household economic welfare.

Measuring Income Insecurity

These drawbacks may not be too serious in practice.

- 1 The law of large numbers allows relative comparisons to be made that ignore expectations and the role that particular fluctuations play in driving insecurity.
- 2 Past volatility is likely to have some bearing on a household's anticipated risk.

Empirical Method

- We produce a single summary measure for each household over the entire time-frame.
- Take $x_i = (x_{i1}, x_{i2}, \dots, x_{iT})$ as income stream of household i with insecurity measure $I(x) \rightarrow \mathbb{R}_+$.
- What properties should $I(x)$ exhibit?

Empirical Method

1. *Scale invariance*: High income households can be insecure, which distinguishes insecurity from vulnerability. $I(x) = I(\lambda x)$ for $\lambda \in \mathbb{R}_{++}$
2. *Normalization and non-negativity*: It is useful to insist $I(x) = 0$ if $x_t = \bar{x}$ for all $t \in T$ and $I(x) > 0$ when any $x_t \neq \bar{x}$.

Empirical Method

3. *Inter-temporal transfers*: A transfer of income from a high period to a low period should reduce the measure. $I(x) > I(x')$ where $x' = (x_1, x_j + \varepsilon, x_k - \varepsilon, \dots, x_T)$ and $x_j < x_k$ and $\varepsilon < x_k - x_j$.
4. *Diminishing transfers*: The measure should be increasingly sensitive to periods of low income. $I(x') > I(x^*)$ where $x^* = (x_1, x_l + \varepsilon, x_m - \varepsilon, \dots, x_T)$, $x_l - x_m = x_j - x_k$ and $x_l < x_j$.

Empirical Method

- These are axioms of inequality measurement.
- An inequality measure will capture insecurity to the degree that it is defined by the axioms.
- A sensible measure is the Atkinson (1970) index that has a convenient welfare interpretation.

$$I(x) = 1 - \frac{1}{\bar{x}} \left(\frac{1}{T} \sum_{t=1}^T x_t^{1-\alpha} \right)^{\frac{1}{1-\alpha}}$$

Here α determines the degree of concavity to the social welfare function as in the standard Atkinson index.

- A number of authors have used this or a related approach. See Osberg et al (1998), Makdissi and Woden (2003), Cruces (2005a; 2005b; 2006) and Allanson (2008).

Empirical Results

- We take data from CNEF on the U.S., Germany and Britain.
- Pre-govt and post-govt household incomes are taken from 1991 to 2007.
- These are equalized using the square root of the household size.
- Households are weighted by size and longitudinal weights are employed
- At what rate of economic growth is insecurity constant? Avoid this issue by mean-standardizing the waves.

Empirical Results

- Atkinson's index is applied to each household in each country for both pre-govt and post-govt incomes.
- Insecurity estimates are then averaged.
- A range of values for α are chosen.
- Estimates are given for several different treatments of the data.
- Gini coefficients and correlations between income and insecurity are also given.

Empirical Results

Table 1. Income Insecurity estimates for the United States, Germany and Britain

		United States		Germany		Britain	
		Pre-Govt	Post-Govt	Pre-Govt	Post-Govt	Pre-Govt	Post-Govt
1.	n	1,172	1,172	850	850	620	620
2.	\bar{x}^*	30,275	22,775	22,514	15,812	12,421	9,671
3.	$\bar{I}(0.1)$	0.0106	0.0061	0.0086	0.0030	0.0163	0.0049
4.	$\bar{I}(0.3)$	0.0323	0.0183	0.0269	0.0090	0.0499	0.0148
5.	$\bar{I}(0.5)$	0.0548	0.0307	0.0472	0.0151	0.0852	0.0241
6.	$\bar{I}(0.5)$ Omitted	0.0514	0.0279	0.0410	0.0138	0.0846	0.0224
7.	$\bar{I}(0.5)$ Trimmed	0.0523	0.0289	0.0472	0.0148	0.0791	0.0221
8.	$G(x^*)$	0.3586	0.3069	0.2756	0.2171	0.3081	0.2372
9.	$G(x^{CE}; 0.5)$	0.3545	0.3001	0.2829	0.2166	0.3221	0.2391
10.	$\rho(I(0.5); x^*)$	-0.093	0.2223	-0.3185	0.0098	-0.4722	-0.1496

Empirical Results

- For pre-govt incomes ordering is Britain > U.S. > Germany.
- For post-govt incomes ordering is U.S. > Britain > Germany.
- Governments reduce insecurity in all cases.
- These rankings are insensitive to changes in approach.

Empirical Results

- The difference between the pre-govt and post-govt insecurity levels gives a measure of the 'activeness' of the governments.
- German govt is most active, U.S. govt the least active.

Empirical Results

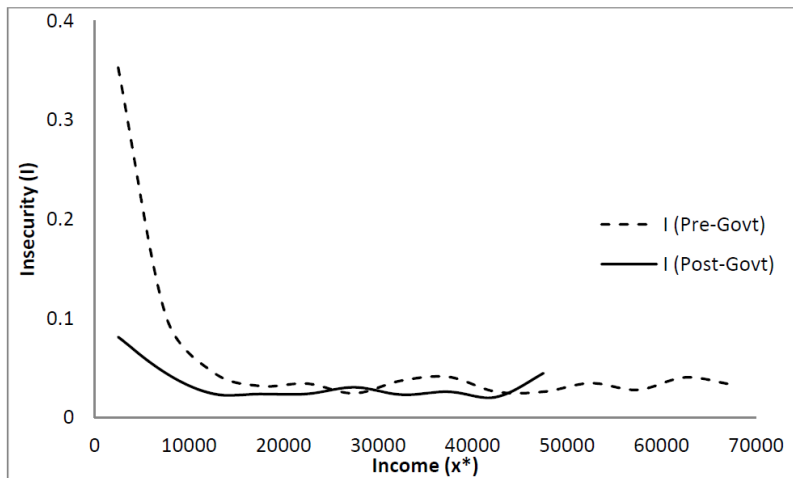
- Correlations between insecurity estimates and incomes prompt us to consider the distribution of insecurity over income.
- Positive correlations are an egalitarian characteristic - higher incomes carry higher risk. Converse for negative correlations.
- U.S. has largest (most positive) correlations - Britain has the smallest (most negative) correlations.

Empirical Results

- Plot averaged insecurity level against long-run income for the three countries.
- Dashed line for pre-govt income, solid line for post-govt income.
- Axes are spliced together.

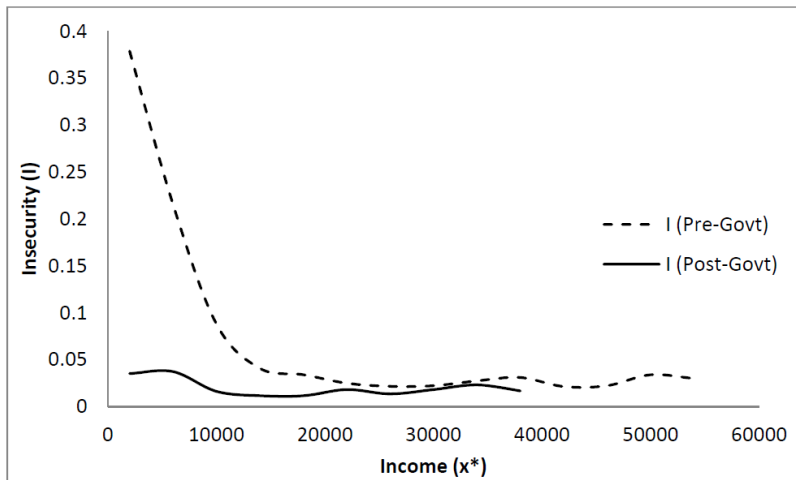
Empirical Results

Figure 1. Average U.S. insecurity estimates against long run income



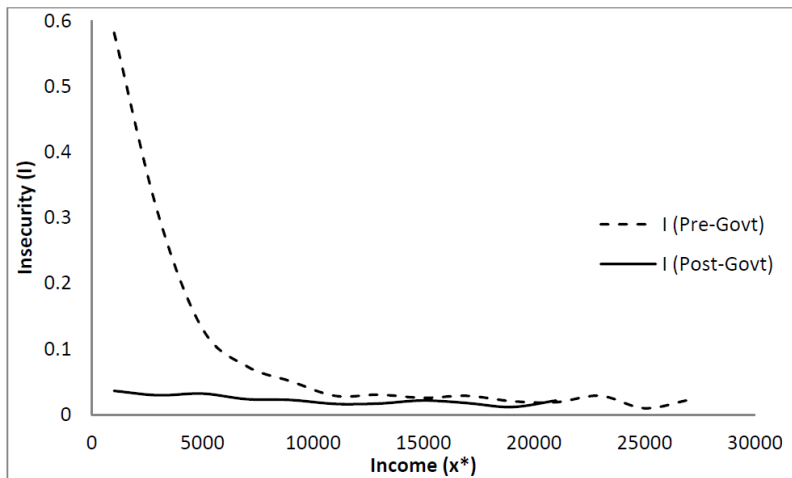
Empirical Results

Figure 2. Average German insecurity estimates against long run income



Empirical Results

Figure 3. Average British insecurity estimates against long run income

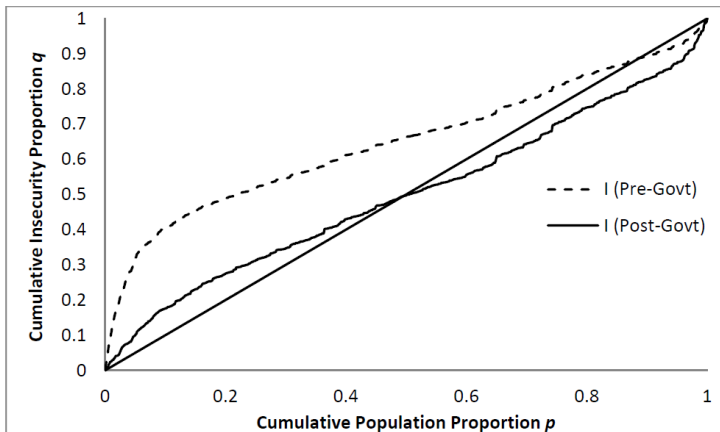


Empirical Results

- Results can also be illustrated with concentration curves.
- Sample ordered in terms of pre-govt income.
- Cumulative population shares are plotted against cumulative income shares.
- Again dashed line for pre-govt income, solid line for post-govt income.

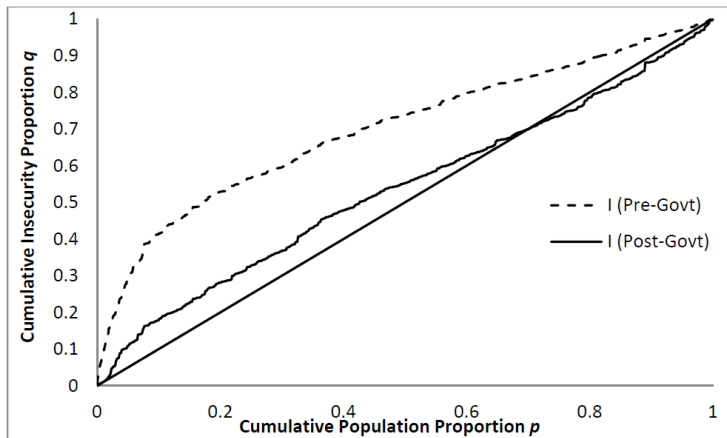
Empirical Results

Figure 4. Concentration Curves for Pre-Government and Post-Government Insecurity in the U.S.



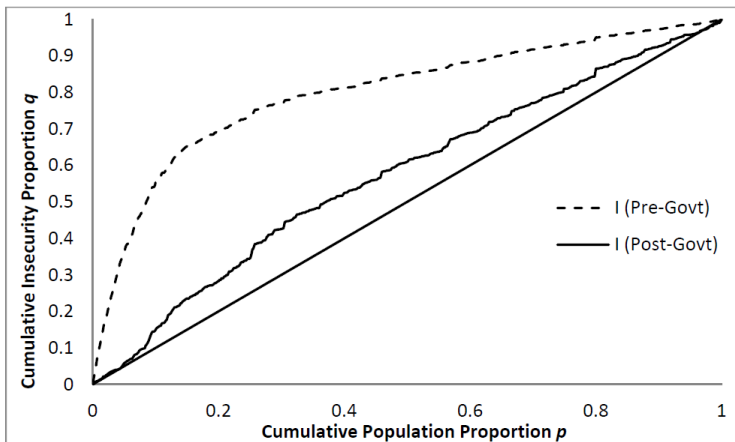
Empirical Results

Figure 5. Concentration Curves for Pre-Government and Post-Government Insecurity in Germany



Empirical Results

Figure 6. Concentration Curves for Pre-Government and Post-Government Insecurity in Britain



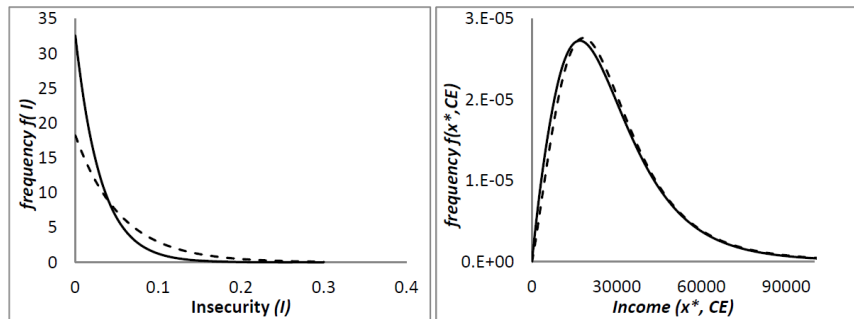
Empirical Results

Last we consider

- 1 The distribution of the insecurity measurements
- 2 How the distribution of income is affected is adjusted for insecurity.

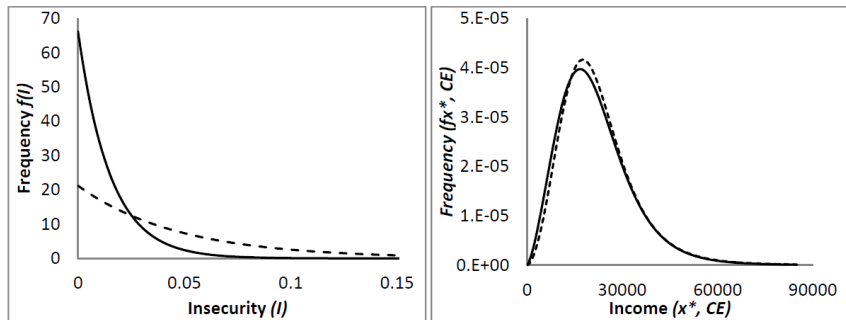
Empirical Results

Figure 7. U.S. pre-government and post-government insecurity distributions (A ; left panel) and pre-government income distributions (x^* , x^{CE} ; right panel)



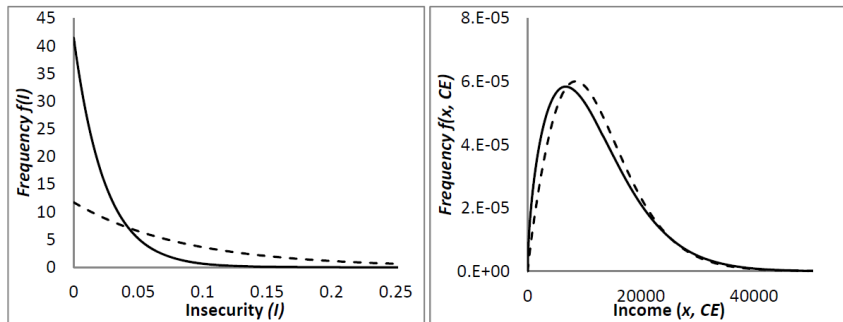
Empirical Results

Figure 8. Germany pre-government and post-government insecurity distributions (I ; left panel) and pre-government income distributions (x^* , x^{CE} ; right panel)



Empirical Results

Figure 9. Britain pre-government and post-government insecurity distributions (A ; left panel) and pre-government income distributions (x^* , x^{CE} ; right panel)



Summary

- A longitudinal application of Atkinson's index is an appropriate ex-post measure of income insecurity.
- Pre-govt insecurity is highest in Britain, lowest in Germany.
- Post-govt insecurity is highest in U.S., lowest in Germany.
- Insecurity is heavily distributed on low income households, however governments are effective in insulating against this.