Household Income Volatility and Economic Security Indices

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Jason Loughrey
Agricultural Economics and Farm Survey Department
Rural Economy and Development
Teagasc
Athenry, Co. Galway
Email: jason.loughrey@teagasc.ie
Economic Mobility

- Economic Mobility in the Irish Income Distribution
  - Income Distribution tends to be slightly more compressed when analysed with longitudinal data relative to the cross-section
    - Especially among working age adults
  - Net Wealth Distribution is much more unequal than Income Distribution (Lawless et al 2015)
    - Liquid Net Wealth Distribution?
- Economic Mobility can also be interpreted as Income Volatility which can be associated with Economic Insecurity and Economic Risk

Economic Risk

- Some academic literature in Ireland on economic risk and volatility at the household level but largely deals with isolated dimensions
  - Case for a single integrated measure of economic security similar but not necessarily identical to Hacker et al (2014)
    - Absence of sufficient Liquid Net Wealth to deal with large income drop, increase in out of pocket medical expenditure or debt service costs
    - No Single Data source to construct an index
    - Requires Microsimulation or statistical matching techniques
Why are these topics important?

1. High income volatility can translate partially into higher risk and therefore welfare losses where people are risk averse (Bartels and Bonke 2013)
2. Fragile employment and negative income shocks are significantly related with mortgage arrears (McCarthy 2014)
3. Self-reported job insecurity is associated with a small elevated risk of coronary heart disease partly attributable to lower socioeconomic status and established risk factors (Virtanen et al 2013, BMJ)
4. In an era of “globalization, deregulation, and technological change increasing the competitive pressures and risks faced by workers”, macroeconomic stability hides high income volatility at the household level (Dynan et al 2012)
5. Job instability reduces fertility intentions and pushes women to postpone first childbearing (Modena 2014)
6. The relationship between the liberalisation of agricultural policies, farmers exposure to competitive market forces and degree of risk (Hardaker et al 2004)
7. Earnings instability may however increase longitudinal mobility or re-ranking in the income distribution (Gottshalk and Spolaore 2002)
Permanent Shocks

“Because permanent shocks, such as those experienced by many displaced workers, are even more consequential than transitory ones, it makes good sense to include them in the measurement of earnings volatility” Shin and Solon (2012)
METHODOLOGY
The Arc Percentage Change

The Standard Deviation of Percentage Changes in Disposable Income

\[ I = \sqrt{\text{Variance} \left[ 100 \left( E_{it} - E_{it-1} \right) / E_{i\tau} \right]} \]

where \( E_{i\tau} = (E_{it} + E_{it-1}) / 2 \) for each individual \( i \) with earnings \( E_{it} \) in year \( t \).

\( E_{i\tau} \) is the two year longitudinal average of household \( i \)'s income. Household Income changes are bounded above by 200% and below by -200%.

DATA
**Data Sources**

Survey of Income and Living Conditions
- Household and Individual Level microdata
- Demographic and Economic Variables including Income disaggregated by source
- Unbalanced Panel Component
- Four Year Rotating Panel from 2005 onwards

Teagasc National Farm Survey
- Longer unbalanced Panel 2005-2013
- Approximately 900-1100 farms each year

**Excluded from SILC Estimates**

1. Households where main earner is a student
2. Households where main earner is retired
### Survey of Income and Living Conditions Data

<table>
<thead>
<tr>
<th>Survey Year</th>
<th>Households Included in the Analysis</th>
<th>Households with a Lag</th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2,322</td>
<td>3,147</td>
<td>5,836</td>
</tr>
<tr>
<td>2007</td>
<td>2,199</td>
<td>2,972</td>
<td>5,608</td>
</tr>
<tr>
<td>2008</td>
<td>2,052</td>
<td>2,870</td>
<td>5,247</td>
</tr>
<tr>
<td>2009</td>
<td>1,917</td>
<td>2,758</td>
<td>5,183</td>
</tr>
<tr>
<td>2010</td>
<td>1,883</td>
<td>2,569</td>
<td>4,642</td>
</tr>
<tr>
<td>2011</td>
<td>1,355</td>
<td>1,915</td>
<td>4,333</td>
</tr>
<tr>
<td>2012</td>
<td>1,697</td>
<td>2,383</td>
<td>4,592</td>
</tr>
</tbody>
</table>
RESULTS
Result is similar to a three household economy where households have percentage changes of +40, +30 and -10 per cent respectively in a given year.

Result is robust under trimmed data.
Volatility of Total Household Disposable Income
2006-2012

Volatility

Percentage Change in Household Income

Volatility

Year

Percentage

Average
10th Percentile
90th Percentile

Percentage

2006 2007 2008 2009 2010 2011 2012

-100 -80 -60 -40 -20 0 20 40 60 80 100

-100 -80 -60 -40 -20 0 20 40 60 80 100
Share of Households with Large Income Changes

NB: Excludes Households where the main earner is either student or retired
Income Volatility for Three Income Groups

NB: Excludes Households where the main earner is either student or retired.
Equivalised Income by Income Group Using Panel Data

Income Group Based on Lagged Position in Distribution

Year

2006 2007 2008 2009 2010 2011 2012

Equivalised Income

Low Income

Middle Income

High Income

The Irish Agriculture and Food Development Authority
Equivalised Income by Income Group Using Panel Data

Income Group Based on Current Position in Distribution

Income Inequality appears slightly higher if expressed in these terms
Equivalised Income by Income Group Using Trimmed Panel Data

Income Group Based on Current Position in Distribution with trimming of bottom and top one per cent

Equivalised Income

Year

- Low Income
- Middle Income
- High Income
Equivalised Income by Income Group Using Trimmed Cross-Section Data

Equivalised Income

Year

Low Income
Middle Income
High Income

Income Group Based on Current Position in Distribution

All Households Represented except the top and bottom one per cent
See Madden (2014)
Some Observations

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- Income Volatility clearly highest among the bottom one-third of the income distribution during the recession
- Longitudinal Data gives a slightly more dispersed income distribution than the Cross-Sectional Data
- Despite this, the distribution is more compressed if expressed according to lagged position in the distribution
- Researchers rely upon the Cross-Sectional Data for estimating Gini Coefficients etc.
Possible factors include the following:

- **Variation in Income Mobility**
  - Escape from short-term poverty became more uncertain and less likely during recession
  - Variation between social classes of the same income group (Mühlau 2014)

- **Variation in the probability of re-employment in the immediate future** (Conefrey et al 2013)
  - Probability less than ten per cent for long-term unemployed with low education level
  - Probability of re-employment of 27-30 per cent for recently employed with high education and less than 45 years old

- **Loss of Low-Wage Employment**

- **Reduced Hours of Employment**

**More Research needed on the drivers of income mobility during this time**
Household Income Volatility in the United States

Not strictly comparable with Irish results but household income volatility appears significantly higher in the U.S. since the mid 1990s.

Source: Dynan et al (2012)
EVIDENCE FROM THE FARM
Farm Income Volatility by Farm System 2005-2013

Source: Teagasc National Farm Survey
Loss of Off-Farm Employment combined with high farm income volatility

Source: Teagasc National Farm Survey

The Irish Agriculture and Food Development Authority
BUILDING AN ECONOMIC SECURITY INDEX
Economic Insecurity

- Economic Insecurity can be understood as a psychological response to the possibility of hardship-causing economic loss Hacker et al (2010)
  - Hacker et al (2010) define this as “difficulty making ends meet if experiencing an economic loss of 25 percent or larger”
  - The ESI focuses on available household income, adjusted for household size.
  - Available household income is also reduced by the estimated cost of debt-service for families with negative financial wealth holdings (i.e., more debt than wealth) and increases in out of pocket medical expenditures.
Defining the ESI

\[ r_{it} = \begin{cases} 
1 & \text{if } \left[ \frac{(Y_t - M_t - D_t)/e_t}{(Y_{t-1} - M_{t-1} - D_{t-1})/e_{t-1}} - 1 \right] \leq -0.25 \\
0 & \text{Otherwise } HH \text{ is Economically Secure} 
\end{cases} \]

Where

\( Y \) = Total Disposable Household Income
\( M \) = Total Household Medical Out of Pocket Expenditure
\( D \) = Household Debt Service (where net liquid financial wealth < o)
\( E \) = Household Equivalence Scale

with \( r_{it} \) taking the value of 1 (insecure) or 0 (secure) for each individual, the value of the ESI in year \( t \) is the weighted sum of the indicator values for the sample.
Economic Security Index

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\[ ESI_i = \sum_{i=1}^{N_t} w_{it} r_{it} \]

Where

\( N_t = \text{sample size in } t \text{ and } (t - 1) \)
\( W_{it} = \text{sampling weights} \)
\( r_{it} = \text{economically secure or insecure} \)
## Data Requirements

### Ireland
- Income Drop
  - Survey of Income and Living Conditions
- Debt Service and Medical Expenditure
  - Household Budget Survey
  - Survey of Income and Living Conditions
- Liquid Financial Wealth
  - Household Finance and Consumption Survey??

### United States
- Income Drop
  - Current Population Survey
- Debt Service and Medical Expenditure
- Consumer Expenditure Survey
- Liquid Financial Wealth
  - Survey of Income and Program Participation
## Medical Expenditure and Debt Service

### Medical Expenditure

- Household Budget Survey lacks a panel component.
  - hinders the imputation of rise in out of pocket medical expenditures
- SILC contains number of questions on health status, access to private health insurance and hospital stay but no expenditure amounts

### Debt Service

- Household Finance and Consumer Survey 2013
- Sample Size of 5,419 households
- Liquid Net Wealth
- Imputation of rise in debt service costs appears more promising than medical expenditures
Clues from HCFS

- Median Net Wealth in the state €104,900
- Median Net Liquid Assets to Income Ratio 7.5%
- Median Household Savings in the state €4,500 (Any financial asset €6,300)
- Median Household Savings of household with one adult and one child €300 (Any financial asset €500)
- Median Household Savings of household with two adults €6,500 (Any financial asset €10,000)
- Ability to make ends meet under a 25% drop in disposable income for a nine month period?
Concluding Remarks

- **Volatility of Household Income was relatively high in 2006 and 2012 (approx. 30-40%)**
  - Relatively Large Share of Households experience gains or losses in excess of 25%
  - Volatility rose sharply among the bottom one-third of the income distribution (excludes retired and student heads)
  - Volatility higher for farm households relative to non-farm households in 2009 and 2011
  - Analysis can be extended back to 1995 using the Living in Ireland microdata and performed at the individual level

- **Building an Economic Security Index may require matching datasets but HFCS looks extremely valuable on its own**
  - The statistical matching of SILC and HFCS could prove useful
  - Both contain income data as well as socio-demographic variables
  - Allow for estimating the ability to make ends meet under a large drop in income dependent on liquid net wealth
  - Quality of the Matching could be tested using a split HFCS

- **Incorporating out of pocket medical expenditures is much more challenging**
  - Methodologies are readily available to match the SILC and HBS data but absence of panel component in the HBS hinders the imputation of rise in out of pocket medical expenditures

- **Income Volatility does not necessarily equal risk. The uncertainty over working hours may not be captured well by income volatility statistics**
  - Need further research on both subjective and objective measures of risk attached to uncertain working hours and security of employment and income etc.
THANK YOU FOR LISTENING
COMMENTS AND QUESTIONS ARE VERY WELCOME
References

Appendix

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Disposable income
The components of disposable household income are gross household income less:
- Employer’s social insurance contributions
- Regular inter-household cash transfer paid
- Tax on income and social insurance contributions
- Tax deducted at source from individual private pension plans

Gross income
The components of gross household income are:
- Direct Income:
  - Employee income
  - Gross employee cash or near cash income
  - Gross non-cash employee income
  - Employer’s social insurance contributions
  - Gross cash benefits or losses from self-employment
- Other direct income:
  - Value of goods produced for own consumption
  - Pension from individual private plans
  - Income from rental of property or land
  - Regular inter-household cash transfers received
  - Interests, dividends, profit from capital investments in unincorporated business
  - Income received by people aged under 16
Further Caveats Apply

Borrowing from Madden (2014)


1. Restrictions in medical card availability
2. Cuts to home help hours,
3. Cuts in the availability of special needs teachers
4. Employer provided health insurance
5. Employer Provided Sports club membership