Measuring Wealth Inequality : data and methods

Salvatore Morelli

ECON 85600

PhD Program in Economics and Stone Center on Socio-Economic Inequality The Graduate Center, City University of New York

17 October 2018
The meaning of wealth

1. Reserve for future consumption due to expected life cycle needs
2. Insurance against future unexpected shocks
3. Freedom to plan ahead circumventing capital constraints
4. Control over resources and other people’s lives – power, and social status
5. Transfer of economic advantage to future generations
Plan of the lecture

1. Different windows of observations on wealth
2. Clarifying definitions: which assets to include? Asset valuation; Unit of analysis
3. Different methodologies to estimate wealth distribution and inequality: focus on household survey data and estate/inheritance tax data
Different windows of observation on wealth

A favorite sentence by Tony Atkinson

“The available economic statistics are our main windows on economic behavior. In spite of the scratches and persistent fogging, we cannot stop peering through it and trying to understand what is happening”


CAVEAT: the features of every source of data vary country by country!
Different windows on wealth

- Annual wealth tax – wealth register
- Estate or inheritance taxes
- Capital income tax
- Household survey

External Wealth & Population Totals
Different windows on wealth

Hybrid method (e.g. WIDlab DINA; Alvaredo et al. 2016)

Administrative tax data

Household survey

External Wealth (NA) & Population Totals
Different windows on wealth

Hybrid method (e.g. WIDlab DINA Plus; Alstadsæter et al. 2017)

- Administrative tax data
- Household survey
- External Wealth (NA)
- Off shore Wealth
There is no such thing as ‘the’ distribution of wealth.
The definition and composition of (non-human) wealth

1. HDW (Household Disposable Wealth) = non financial + financial assets – liabilities (excluding non disposable and non marketable assets)

2. HRW (Household Reserve Wealth) = HDW + accumulated reserves (excluding unfunded pensions)

3. HLW (Household Lifetime Wealth) = present net value of all streams of all future income flows (also from government). M. Feldstein defined it as “Total Wealth”.
Inequality of what among whom?

1. Geographical scope

2. Unit of analysis

3. The valuation method
Geographical scope

Figure 5. Piecing together different series for the UK top 1% wealth share 1911-2012

Different units of analysis


D’Alessio (2018), Bank of Italy Discussion Paper
Method of valuation

Market prices?

Following Atkinson and Harrison (1978, p. 5)
1. Realization valuation (“cash value”)
2. “Going concern” valuation (“replacement cost”)

Substantial implications for wealth distribution
DATA & METHODS

Insights from the US, the UK and Italy
The object of analysis: the pyramid of wealth.
Different windows on the pyramid of wealth

Household survey data

99th percentile
50th percentile
1th percentile
Declining cooperation of survey respondents

Source: Alvaredo, Atkinson, Morelli (2016) – Fiscal Studies
Survey data underestimate wealth concentration

The top 1% wealth share in the UK

Solution 1: Filling in the upper wealth tail

The top 1% wealth share in the UK

Solution 2: Replacing individuals in the upper wealth tail

Top 1% wealth share in the United States (Capitalized incomes vs. SCF, tax units)

Solution 3: Reweighting household survey data

Compliance function (Italy 2008)

Source: Morelli and Munoz, work in progress
Solution 4: oversampling wealthy households

Figure 1: Wealth share of the wealthiest 1 percent and associated confidence intervals; combined APS and LS and APS alone; 1989–2013

APS: Area Probability Sample
LS: List Sample

Source: Kennickel, 2018, Discussion paper
Different windows on the pyramid of wealth

Estate and inheritance tax data

\[ W = E \times \frac{1}{m} \]
Estate statistics: advantages

Coverage

• Wide coverage (in recent years: nearly 50% of population in the UK, more than 50% in Italy, and approx. 4% in the US)

• In the UK, the estate tax data are not only linked to the administration of the inheritance tax forms but also to the legal process of probate that is granted by a court formally empowering an executor to administer the possession of a deceased person. In the UK, since 1960, the probate cannot be granted if the inheritance tax form has not been submitted irrespectively of where a tax liability exists.

• In Italy, the administration of the inheritance tax is linked to the legal transfer of the ownership of real estate properties. For this reason, irrespectively of the inheritance tax liabilities the tax form has to be filed if a real estate property is involved in the bequest.

• None of the two points above apply to the US where only estate above the exemption threshold feature in the tax forms ($5.49 million per individual in 2017)

• This allows, among other things, to estimate an internally consistent wealth total. (NOT in the US)
Adult population coverage in Italy

Full adult population vs. identified wealth holders

Source: Acciari, Alvaredo, and Morelli (in progress)
Adult population coverage in the UK

Figure C2. Excluded population as percentage of total adult population

Source: Alvaredo, Atkinson, and Morelli (2018)
Adult population coverage in the US

Source: Data elaboration from Kopczuck and Saez (2004)
Estate statistics: advantages reliability of the information

• In the UK, HMRC recommends getting items over £500 professionally valued (70% of estates assessed professionally). Moreover, the estate executors need to swear an oath “the use of Inheritance Tax forms means that the forms are completed by responsible persons, often professionals, who can be held to account by beneficiaries. This is a strength of the data as it will mean assets are independently valued and lead to a near complete record”. (ONS- 2014)

• In Italy, legal proof of the assets ownership is often required for most important assets (e.g. real estate, bank accounts, investment funds etc.). The valuation is directly recorded from official documentation and not self-reported. The inheritance tax-form and all required documentation is double-checked by a tax-authority official who has to compute the value of the inheritance tax due.
Estate multiplier method

• Starting point: the net value of property of a deceased person (estates)

• Death as “sampling device” → Grossing-up factors: inverse of mortality rates by strata (e.g. age, gender, marital status etc.) : \( Wi = Ei / mi \)
The estate (wealth at death) distribution in the tax forms

Source: Acciari, Alvaredo, and Morelli, work in progress.
The wealth distribution following the estate multiplier method

Source: Acciari, Alvaredo, and Morelli, work in progress.
Mortality rates

Source: Acciari, Alvaredo, and Morelli, *work in progress.*
Mortality multipliers

Source: Acciari, Alvaredo, and Morelli, work in progress.
The application of multipliers does not radically change the distribution.

Main problems with the estate method

A. The identified population is not necessarily representative of the whole population.

B. Missing non-taxable wealth

C. $E_i$ may be under-reported due to tax evasion and avoidance. (e.g. “differential avoidance and evasion”)

D. Average estimated $W_i$ biased if wealth is correlated with mortality rates within each “strata”. (e.g. “differential mortality”)
A. Main problems with the estate method: representativity of the identified population

The identified population is not necessarily representative of the whole population. To be precise, the derived population is informative about the living individuals who would likely file an estate/inheritance tax form if they happened to die. The standard assumption is that every individual at the top of the distribution would be represented in the data. Therefore the representativity problem affects the bottom of the distribution only.

• In Italy and the UK this is likely to be true. BUT, given the very high exemption threshold, this is probably NOT true in the US. (this point has not been discussed in the literature)
B. Main problems with the estate method: missing non-taxable wealth and different wealth value of the tax base

1) In Italy, private (and public) pensions, government bonds, severance payments, and life insurance are typically not included in the tax base.

2) In the UK, pension wealth is not taxed and insurance is taxed but its realization value is reported (which is much higher than the cash surrender value).

3) In the US, cash surrender value for insurance and private pensions are estimated. (unfunded private and public pensions are not included)
C. Main problems with the estate method: lower assets value due to the selected sample and underreporting of assets

1) Tax avoidance (e.g. Inter-vivos gifts, selling of assets, establishment of trusts, manipulation of fiscal residency)

2) Tax evasion (e.g. undeclared assets or declared at lower value, inflation of liabilities, international tax sheltering including undeclared off-shore wealth)

3) Medical expenses and deteriorated health conditions reduces accumulation and increases dissaving (selected sample on health characteristics) → lower wealth value
estate-based statistics: problems and solutions (C1)

Under-reporting of wealth to avoid Inheritance Tax: inter-vivos transfers.

What is potential effect on the share of wealth held by rich groups? This is less straightforward than expected at a first glance.

1) Not all gifts are avoidance
2) Not all gift escape the data (in the UK, all gifts within 7 years are reported; In Italy, all gifts ever done should be in principle reported: dual taxation system in place) ....Although very little data and research is available in the UK and Italy, in the US there is some evidence that individuals hold on to their wealth to the very last moments to signify important motive to wealth holding <Kopczuk 2007>
Presence of unrealized capital gains discourage inter vivos gifts (step-up basis)
3) Even when the gifts are not directly recorded the estate method is such that it attenuates the problem as recipients are subject to mortality.
4) The combination of these two latter points also lead to a problem of double counting that need to be dealt with
5) Finally, the effect on the top shares depend on how the gifts and donation done for tax avoidance purposes are distributed across the wealth distribution and how they impact on the relative wealth.
estate-based statistics: problems and solutions (C1)

Under-reporting of wealth to avoid Inheritance Tax: wealth held in trusts

**Note:** wealth held in trusts almost entirely escape inheritance tax returns. This is a very effective tax avoidance scheme as the property is transferred to trustees and the wealth escape the tax base.

**Solution:** capitalize distributed capital income from trusts.

**Lesson from UK data:** asset transfers to trusts is subject to IHT and trustees are typically liable for capital income tax. Total estimated wealth held in trust is approx. £30 billion (E.g. approx. 1% of total wealth: effect on Top1 % much lower than 1 pp).

**US:** similar value and effect on US estate statistics in Kopczuk and Saez (2004). Total trust value is estimated to be around 5% in recent years in Saez and Zucman (2016).

**Lesson from Italian data:** capital income from trusts reported in individual returns. The estimated wealth held in trusts is very small. However, in Italy most of capital income is withheld at the source. More research is needed
estate-based statistics: problems and solutions (C2)

Under-reporting of wealth: tax evasion in off-shore accounts

**Note:** wealth held in off-shore accounts entirely escape inheritance tax returns

**Solution:** estimate off-shore wealth belonging to top wealth groups and add it back.

**UK:** in Alvaredo, Atkinson, and Morelli (2018) we assume 4% or 8% of total financial wealth is held in off-shore accounts and assume that 90% of it evades taxes and it is entirely distributed to top1%. Rough adjustments and extreme distributional assumptions (E.g. effect on Top1 % between 1.5 and 2.8 pp.). More recently, Alstadstaeter, Johannesen, and Zucman (2017) estimated more precisely UK wealth held off-shore and imputed it to the top of the UK wealth distribution following their findings for Sweden. They have done that for the UK and France.

**Italy:** new estimates of wealth held in off-shore accounts are derived and imputed to the top of the distribution. (Acciari, Alvaredo, and Morelli , in progress)

**US:** As discussed in Saez and Zucman (2016) and Alstadstaeter, Johannesen, and Zucman (2017) the effect for the US is smaller: 4% of financial wealth distributed according to capital income distribution
estate-based statistics: problems and solutions (C2)

Under-reporting of wealth: tax evasion in off-shore accounts

Total off-shore wealth = 2% of personal net wealth in 2007 (allocated within the top 1% group)

Source: Data on off-shore wealth based on Alstadsæter, Johannesen, and Zucman (2017). Evolution since 1995 assumed in line with changes in overall European off-shore wealth.

Source: Acciari, Alvaredo, and Morelli, work in progress
estate-based statistics: problems and solutions (C2)

Under-reporting of wealth: tax evasion in off-shore accounts

Figure 9: Effect of offshore wealth on the dynamic of the top 0.01%

Panel B: Top 0.01% wealth share in the United Kingdom

Alstadstaeter, Johannesen, and Zucman (2017)
estate-based statistics: problems and solutions (C2)

Under-reporting of wealth: tax evasion in off-shore accounts

Figure 9: Effect of offshore wealth on the dynamic of the top 0.01%

Panel A: Top 0.01% wealth share in France

Alstadstaeter, Johannesen, and Zucman (2017)
The probability of death may affect wealth: Real wealth shock (health expenditure and labor income) VS “deathbed” estate planning.

• **Note:** No information in the UK and Italy.

• **Solution:** more research on the channels. Matching estate statistics with mortality statistics identifying sudden death and deaths occurring after negative health conditions (by types)

• **US evidence:** The onset of terminal illness reduces by 5 to 20 % wealth value reported in tax forms but this is not due to real wealth shocks. Health expenditure incidence on large fortunes is small and the strength of the channel may be higher at the bottom of distribution. (Kopczuk 2007)
Estate-based statistics: problems and solutions (D)

Wealth class affects the probability of death (negative correlation).

Note: wealth levels affect the mortality rates as rich live longer. If we do not take into account this mortality differential we would underestimate the relevance of the wealthy and their total wealth within the living population. Renewed interest in the US literature as the work by Saez and Zucman suggested that this mechanism is substantially biasing the top wealth shares based on estate statistics and may help to reconcile difference between estate-based concentration measure and capitalization-based measures.

• Solution: adjustment of mortality rates introducing a wealth gradient reflecting the increasing longevity advantage of the wealthy.

• Lesson from UK data: Thanks to confidential data from inheritance tax reports we were able to simulate what happens to top wealth concentration assuming a steeper wealth/multipliers gradient. Results suggest that multipliers do not substantially change the estate distribution → mortality wealth gradient currently generates small bias.

• US: the effect can also be properly tested on US data but was never done. More recently, a work by Raugh and Johnson have explored how total estimated wealth in the US may vary using richer information about mortality rates. They did not explore the distributional implications.

• Italy: In Italy, mortality rates for income or wealth classes do not exist. However, ISTAT has recently published mortality data by education classes which we are planning to exploit.
D. Wealth gradient of adjustment factors of mortality multipliers by age & gender. No adjustment occurs for age class below 45 years hold.
Top 1% vs. simulated shares (internal total)

Source: Alvaredo, Atkinson and Morelli (2018)
Different windows on the pyramid of wealth

Capital income tax data

Giffen’s method

\[ Y = W * r \]
Main problems with the capitalization method

A. A substantial share of capital incomes are non-taxable. Assets need to be imputed

B. Capital income Yi may be under-reported due to tax evasion and avoidance. (e.g. “differential avoidance and evasion”)

C. Cov(W,r) >0 within each asset class? (e.g. “differential returns”)

D. Var(r) for each individual due to heterogeneous risk preference and to idiosyncratic shocks

E. Ranking by capital income substantially determines the ranking of individuals by net wealth.
Different windows on the pyramid of wealth

Rich list data

99th percentile

50th percentile

1st percentile
Capitalized income tax data vs rich lists: US

Forbes 400 (top .00025%) and top .01% Wealth Shares

Top 0.00025%, Forbes magazine (left-hand scale)

Top 0.01%, capitalized income (right-hand scale)

Source: Saez and Zucman (2016) - QJE
Estate tax data vs rich lists: UK

Share of total wealth %

- Estate-based top 0.5% wealth share
- ST Rich List-based top 0.001% wealth share

<table>
<thead>
<tr>
<th>Surname</th>
<th>Name</th>
<th>Title</th>
<th>year of death</th>
<th>Net estate (£ 2015)</th>
<th>ratio probate/ST Rich List around year of death (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heselden</td>
<td>James William</td>
<td></td>
<td>2010</td>
<td>396,735,310</td>
<td>206.7</td>
</tr>
<tr>
<td>Harding</td>
<td>Matthew Charles</td>
<td></td>
<td>1996</td>
<td>324,477,439</td>
<td>112.7</td>
</tr>
<tr>
<td>Lascelles</td>
<td>George Henry Hubert</td>
<td>The Earl of Harewood</td>
<td>2011</td>
<td>286,181,307</td>
<td>(*)</td>
</tr>
<tr>
<td>Cavendish-Bentinck</td>
<td>Alexandra Margaret Anne</td>
<td></td>
<td>2008</td>
<td>273,077,872</td>
<td>143.6</td>
</tr>
<tr>
<td>Cholmondeley</td>
<td>George Hugh</td>
<td></td>
<td>1990</td>
<td>242,350,308</td>
<td>262.7</td>
</tr>
<tr>
<td>Dennis</td>
<td>Felix</td>
<td></td>
<td>2014</td>
<td>197,557,406</td>
<td>39.1</td>
</tr>
<tr>
<td>Doughty</td>
<td>Nigel Edward</td>
<td></td>
<td>2012</td>
<td>181,152,119</td>
<td>132.9</td>
</tr>
<tr>
<td>Harrison</td>
<td>George</td>
<td></td>
<td>2001</td>
<td>147,547,063</td>
<td>82.4</td>
</tr>
<tr>
<td>Diggens</td>
<td>Ronald William</td>
<td></td>
<td>1997</td>
<td>126,937,173</td>
<td>171.9</td>
</tr>
<tr>
<td>Wheatcroft</td>
<td>Frederick Bernard</td>
<td></td>
<td>2009</td>
<td>119,574,124</td>
<td>79.1</td>
</tr>
</tbody>
</table>

(*) The individual disappears from the list several years before death, in spite of probate showing wealth above the minimum of the list.

Some conclusions

• The relevance of Personal Wealth is increasing in economically advanced countries. Its concentration is much higher than income concentration and it is increasing.

• Literature on wealth inequality is very lively and our understanding of wealth concentration at the top is improving fast (yet far from perfect!)

• DINA (joint use of tax, household survey and NA data) method is a fruitful avenue of research. Tax data and household surveys are complements and not substitutes.

• The reconciliation of findings across data sources remains an important exercise. Important to keep track of the adjustments at each step.

• The relevance and reliability of different data sources have to be assessed on a country by country basis
References

Wealth concentration is similar in all age and gender groups. Wealth concentration cannot be explained only by a pure life-cycle accumulation process and age differences.

Figure 1: Upper Lorenz curves for different age and gender groups: 2012 all population

Notes: upper Lorenz of total population. Wealth only refers to tax-data adjusted for missing population and its wealth. In fact, reported wealth cannot be adjusted using NA data as such adjustments cannot be done across age and gender factors.
Figure 12.2. Aggregate wealth reported in household surveys relative to National Accounts across wealth components and countries

Source: National Account Personal Wealth from World Income and Wealth database. Only starred (*) countries reflects data on Personal wealth of the household sector, whereas other countries also include Non-Profit sector serving households. Household survey information for European countries derived from HFCS data (US data from SCF)
Top 1% - US wealth concentration

- US-estate method
- US-capitalization method
- US-SCF adjusted