

# Measuring welfare: Consumption, Income, and Wealth

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U. Rome “Tor Vergata”

IARIW-TNBS Conference on Measurement of Income, Wealth and Well-being in Africa

November 10, 2021

# Outline

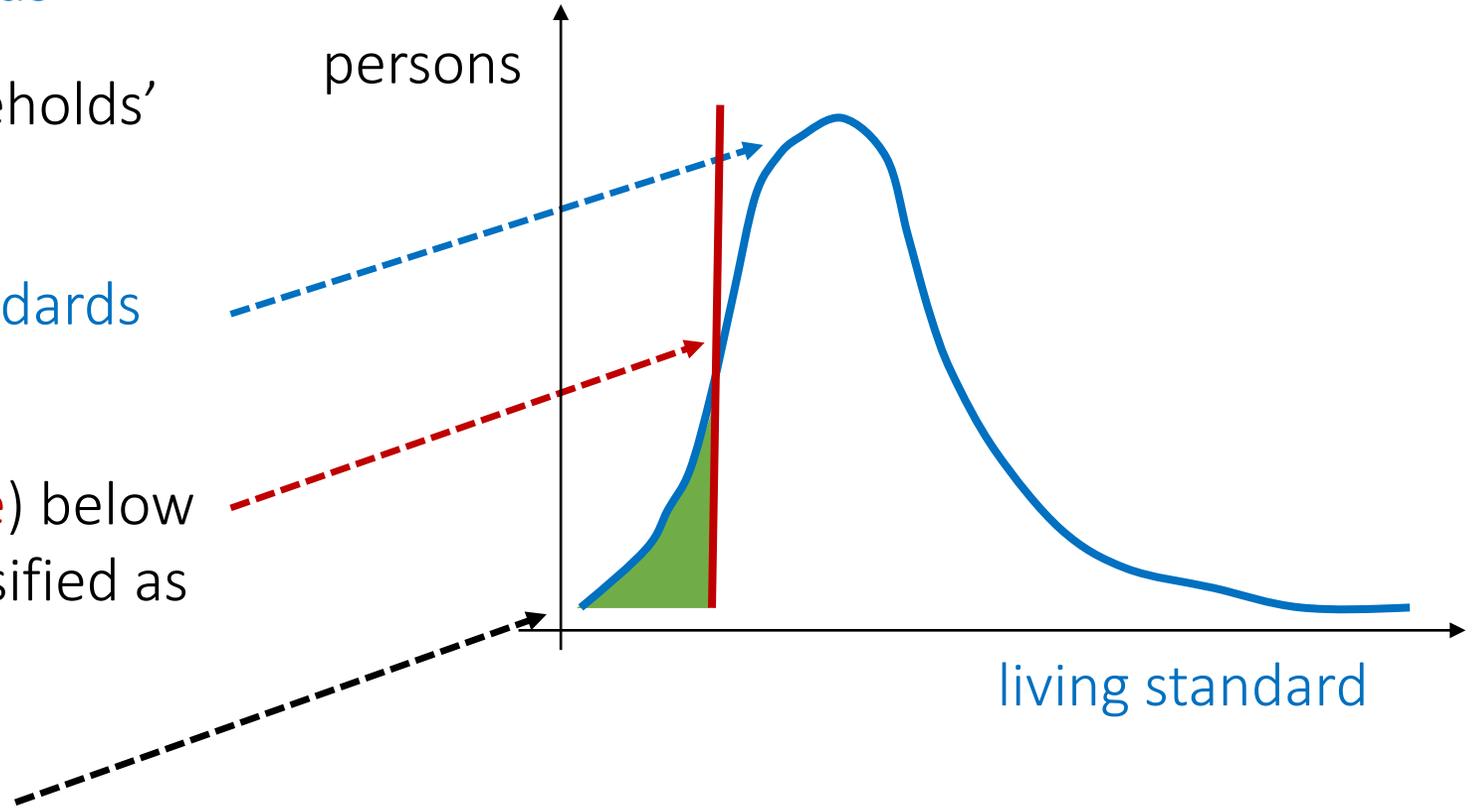
1. Measuring welfare?
2. Income
3. Practicalities

Welfare?

# Measuring poverty and inequality

five building blocks

- 1) a **concept of living standards**
- 2) high-quality **data** on households' living standards
- 3) a **distribution of living standards** (inequality)
- 4) a critical level (**poverty line**) below which individuals are classified as "poor"
- 5) a **poverty measure**



# What is the standard of living?



Amartya  
Sen



Tony  
Atkinson



Angus  
Deaton

# Amartya Sen

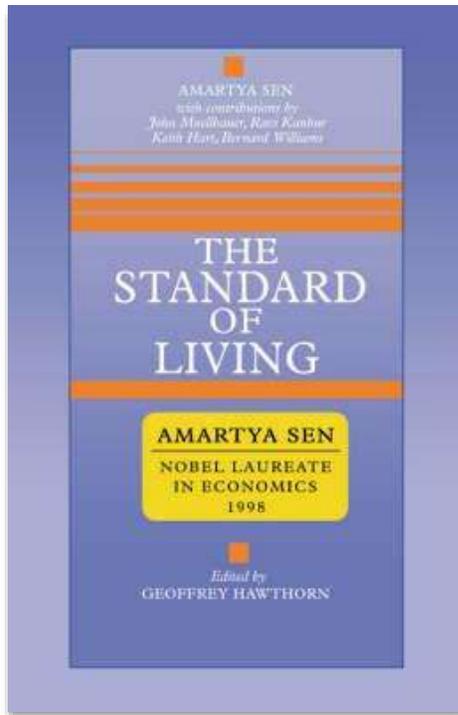
(1933-)



- 1998 Nobel Prize in Economics
- Why?
- “(...) for his contributions to [welfare economics](#)”

# Amartya Sen

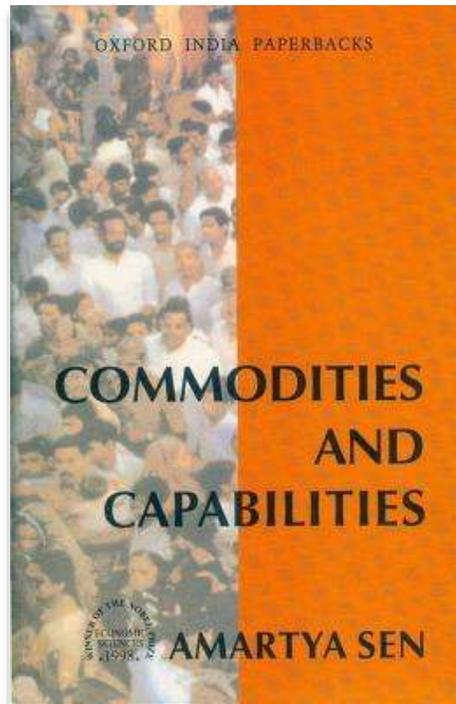
The standard of living, 1987, p. 2.



«The **living standard** cannot be defined completely afresh by us ‘professionals’, and **we must not sacrifice all the richness of the idea** of the living standard to get something nicely neat and agreeably simple»

# Amartya Sen

Commodities and Capabilities, 1987.



According to Sen, the standard of living has multiple meanings:

- happiness
- fulfillment
- money
- health
- freedom
- ...

Most [economists](#) have not been very interested in the [plurality](#) of focus.

# Mainstream economists

- Mainstream economists have picked the term 'utility'.
- Originally, utility was a synonym of **satisfaction**, that is, the **psychic pleasure** that originates from owning or consuming goods.

This is how **laypeople** would use the term **utility**.

- **Modern economists** use a specific and technical definition of utility which has become a cornerstone of the **standard microeconomic theory**.

# Tony Atkinson

(1944-2017)



«The **typical economist**, when asked to consider the problem of poverty, has in mind the **standard microeconomic theory** of a household taking decisions about which goods and services to buy from a given income».

[Atkinson, 2019: 6]

# Angus Deaton

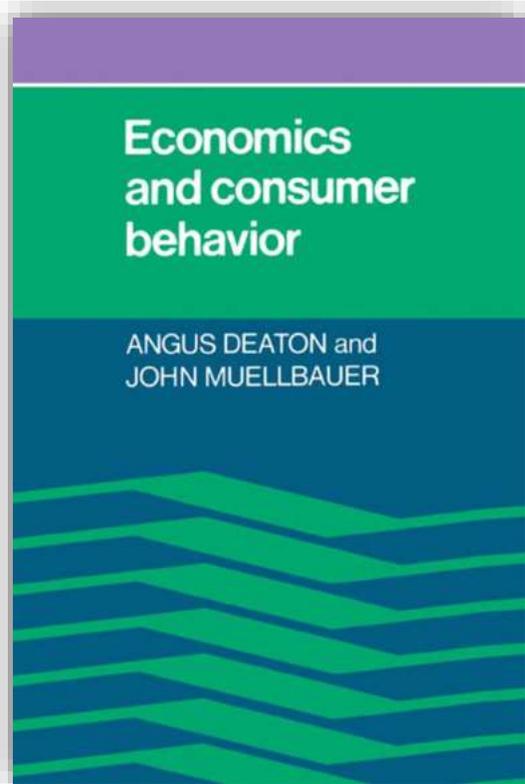
(1945-)



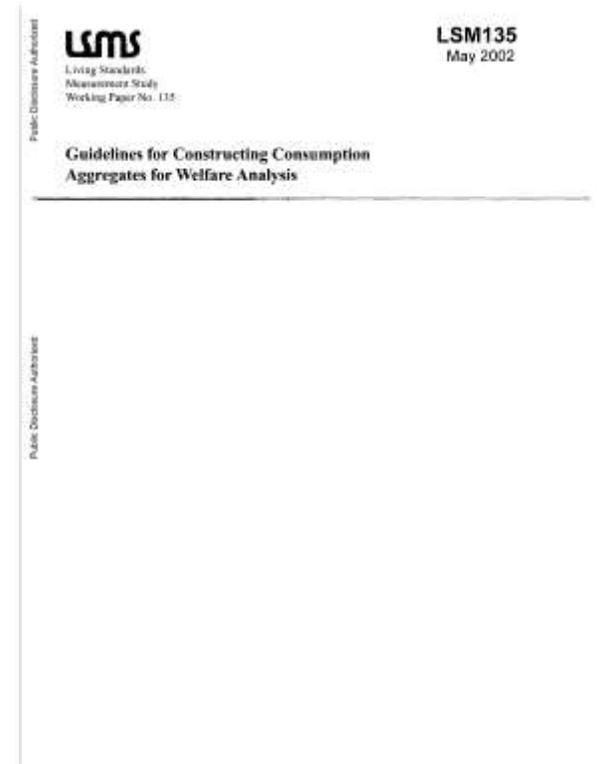
2015 Nobel Prize in Economics  
“(...) for his analysis of consumption,  
poverty, and [welfare](#)”

# Two key references

Deaton and Muellbauer  
(1980)



Deaton and Zaidi  
(2002)



# Deaton and Zaidi (2002)



This paper needs no introduction – only 2% of the World Bank’s publications surpass **1,000** downloads (Doemeland and Trevino, 2014). DZ has more than **8,000**.

DZ's very first recommendation: standard of living = MMU

**Box 1. Summary of Theoretical Issues and Recommendations**

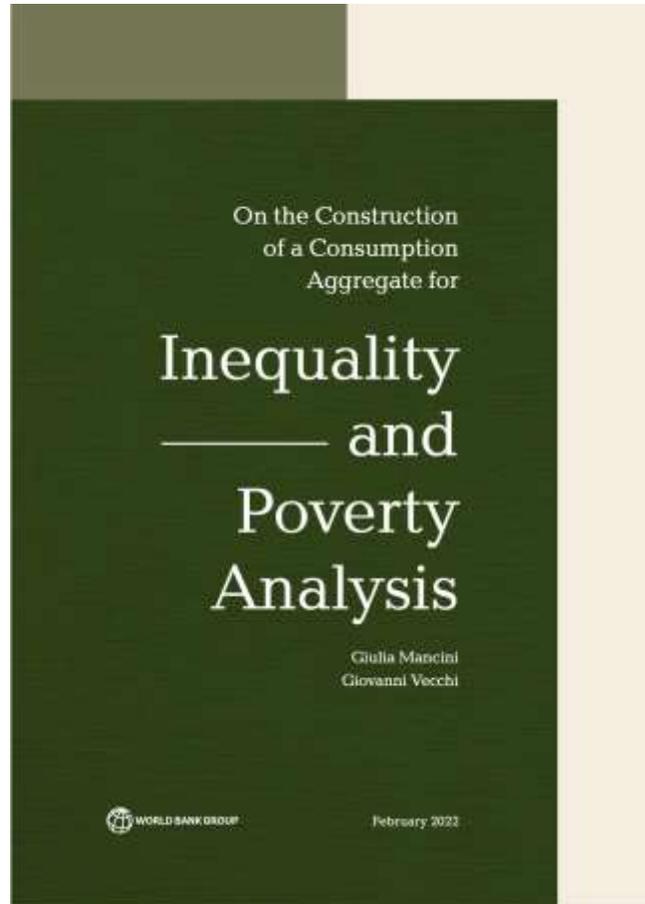
<b>Issue</b>	<b>Recommendation</b>
<p><b>Money Metric Utility (MMU) vs. Welfare Ratio(WR)</b></p> <p>MMU is the amount required to sustain a level of living and requires that consumption be adjusted by a Paasche price index that reflects the prices the household faces and whose weights are different for each household.</p> <p>WR is an indication of how much better or worse off a household is than a reference household (usually at the poverty line) and requires consumption to be adjusted by a Laspeyres price index that reflects the prices faced by the reference household but whose weights are the same for all households.</p> <p>The use of MMU can cause difficulties in analyzing the impact of redistributive policy but, on the other hand, WR does not necessarily represent welfare correctly. The latter is the more serious drawback in practice.</p>	<p>Attempt should be made to use Money Metric Utility and to calculate the Paasche price indices with individual household weights.</p>

... MMU?

$$MMU = \frac{x}{Paasche\ index}$$

where  $x$  is nominal **consumption** expenditure.

# Mancini and Vecchi (2022)



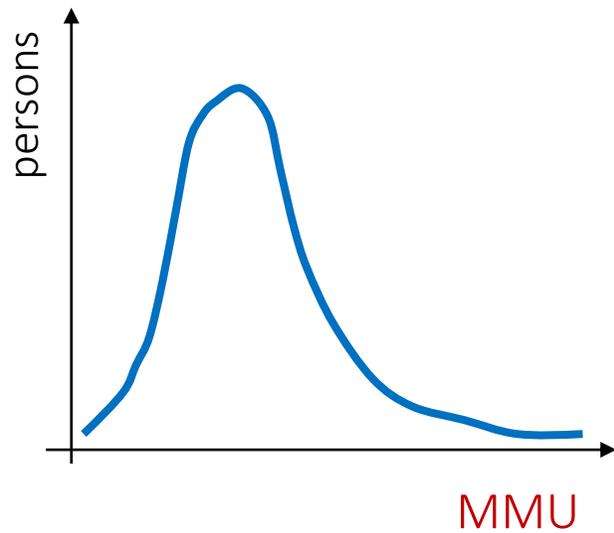
- March 2002, the World Bank has released new *Guidelines*.
- **MMU (consumption) confirmed.**
- Available here:  
<https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099225003092220001/p1694340e80f9a00a09b20042de5a9cd47e>

# Question

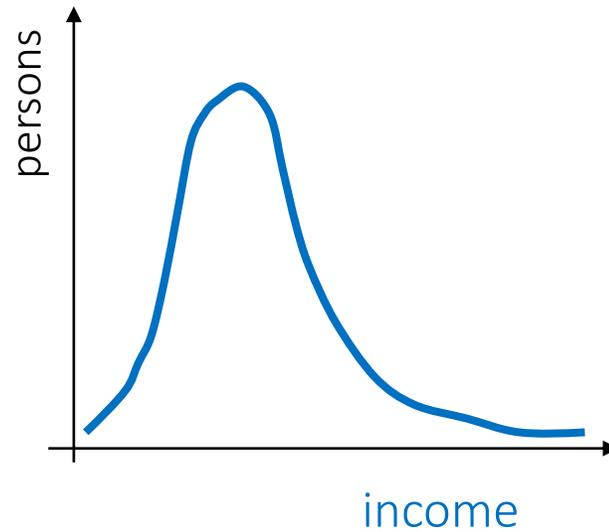
- Other options to proxy [standard of living](#)?

# Options to proxy standard of living

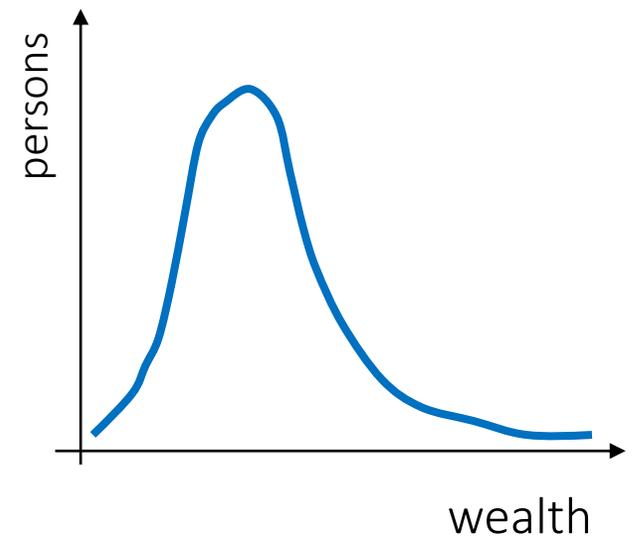
Option 1  
Consumption



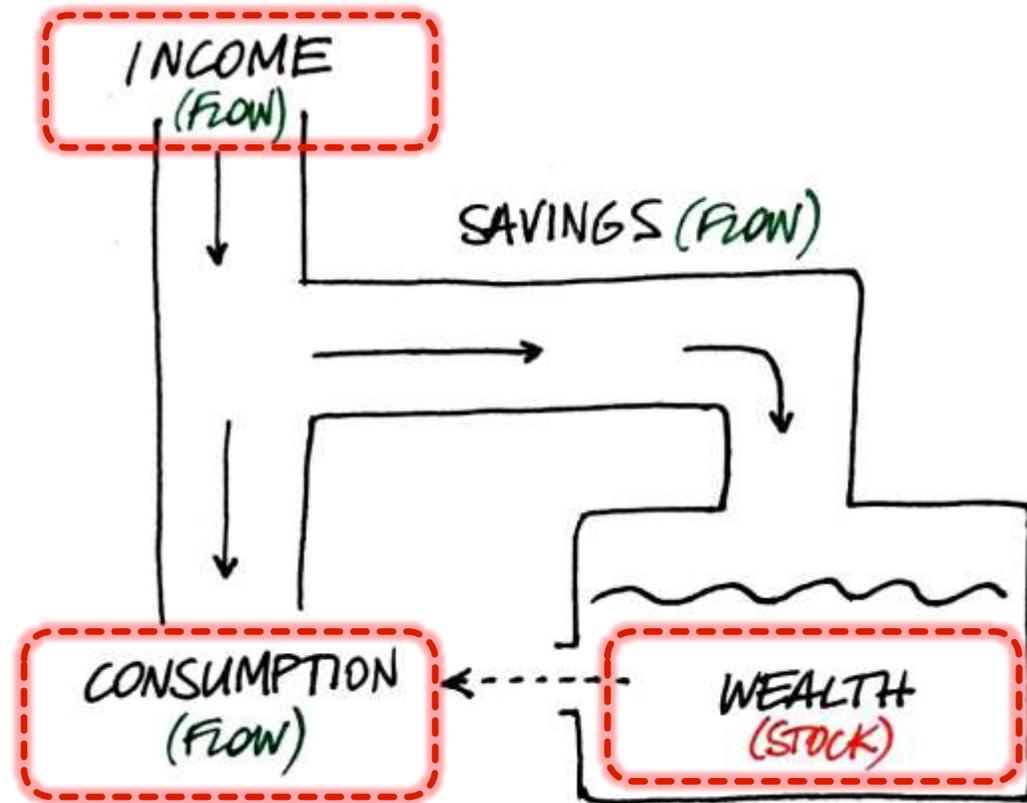
Option 2  
Income



Option 3  
Wealth



# Income, consumption, savings and wealth



- Income, consumption and wealth are three separate, but related entities.
- The discussion of their respective roles in welfare measurement is a long standing one.
- We start from the [Stiglitz-Sen-Fitoussi Report](#).

# Stiglitz, Sen and Fitoussi

- In 2008, the President of the French Republic, Nicolas Sarkozy, created the “Commission on the Measurement of Economic Performance and Social Progress” (CMEPSP).
- The key idea was, in a nutshell, “to go beyond GDP”.



J. Stiglitz

A. Sen

J.P. Fitoussi

# The Stiglitz-Sen-Fitoussi (2009) report

## Other Members

Bina AGARWAL	<i>University of Delhi</i>
Kenneth J. ARROW	<i>Stanford University</i>
Anthony B. ATKINSON	<i>Warden of Nuffield College</i>
François BOURGUIGNON	<i>School of Economics,</i>
Jean-Philippe COTIS	<i>Insee,</i>
Angus S. DEATON	<i>Princeton University</i>
Kemal DERVIS	<i>UNPD</i>
Marc FLEURBAEY	<i>Université Paris 5</i>
Nancy FOLBRE	<i>University of Massachusetts</i>
Jean GADREY	<i>Université Lille</i>
Enrico GIOVANNINI	<i>OECD</i>
Roger GUESNERIE	<i>Collège de France</i>
James J. HECKMAN	<i>Chicago University</i>
Geoffrey HEAL	<i>Columbia University</i>
Claude HENRY	<i>Sciences-Po/Columbia University</i>
Daniel KAHNEMAN	<i>Princeton University</i>
Alan B. KRUEGER	<i>Princeton University</i>
Andrew J. OSWALD	<i>University of Warwick</i>
Robert D. PUTNAM	<i>Harvard University</i>
Nick STERN	<i>London School of Economics</i>
Cass SUNSTEIN	<i>University of Chicago</i>
Philippe WEIL	<i>Sciences Po</i>

- Six Nobel laureates contributed to the production of the SSF report (ca. 300 pages).
- We focus on [Recommendation 3](#).

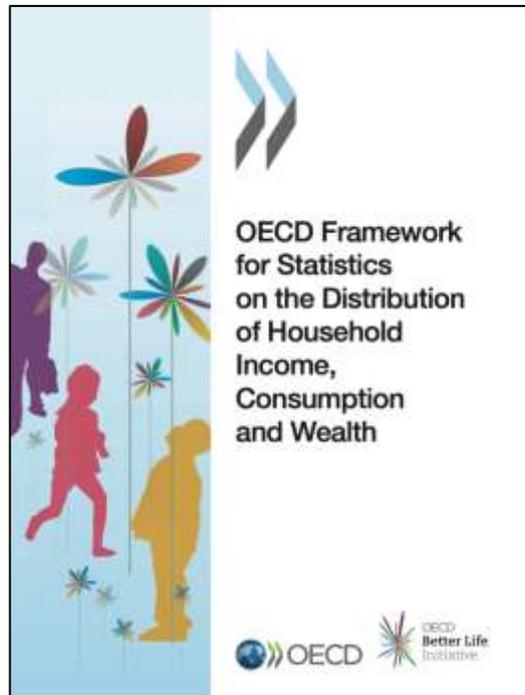
## Recommendation 3

Income and consumption are crucial for assessing living standards, but in the end they can only be gauged in conjunction with information on wealth. A household that spends its wealth on consumption goods increases its current well-being but at the expense of its future well-being (...) we need comprehensive accounts of assets and liabilities (...)

Underlying Recommendation 3 is an **intertemporal framework**.

# OECD (2013)

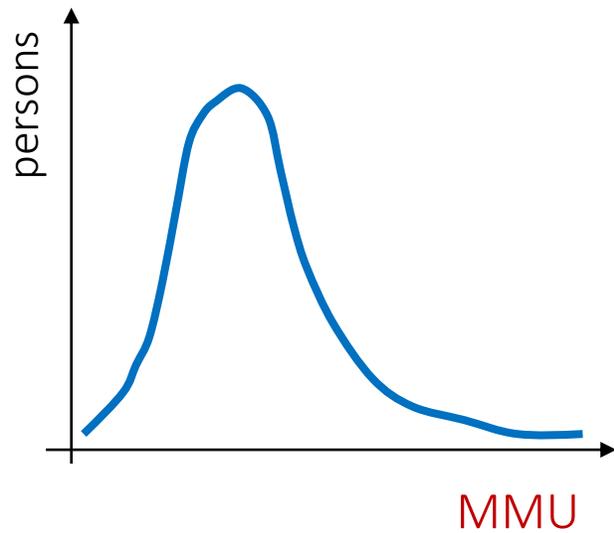
the joint distribution of consumption, income, and wealth



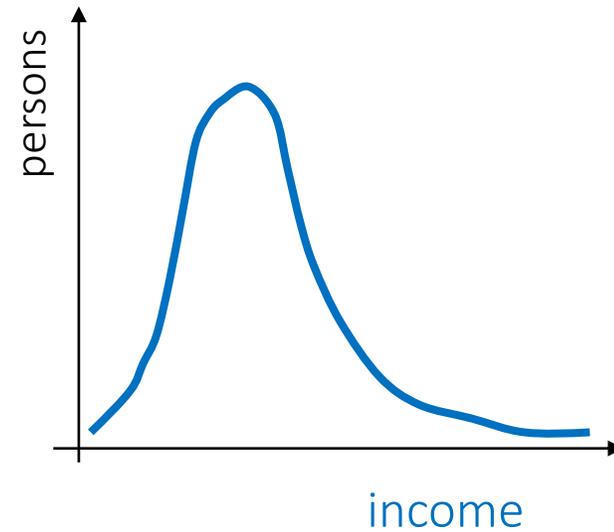
This publication presents an internationally agreed framework to support the **joint analysis** of micro-level statistics on household **income**, **consumption** and **wealth**.

# Options to proxy standard of living

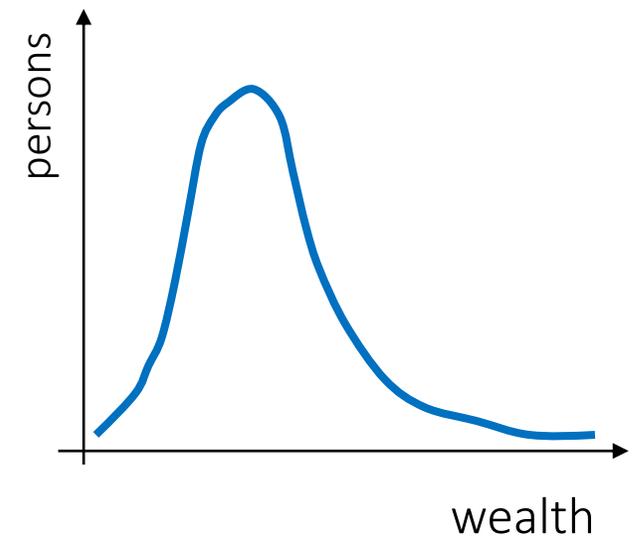
Option 1  
Consumption



Option 2  
Income

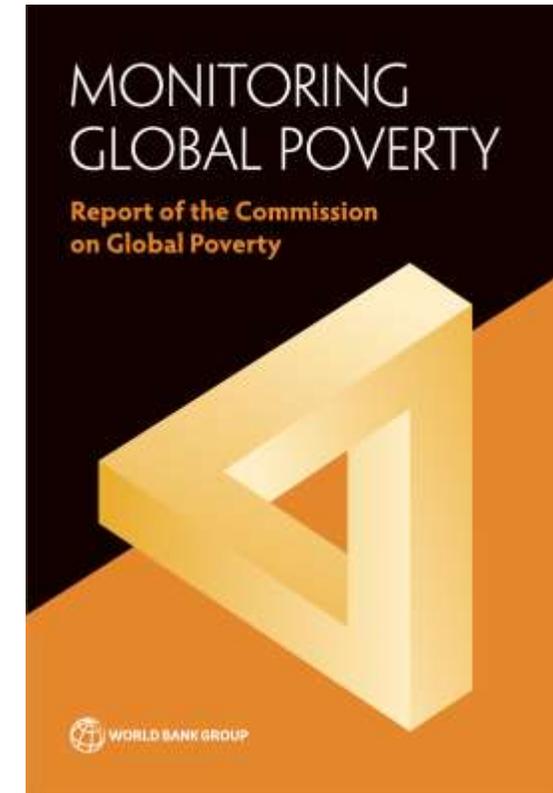


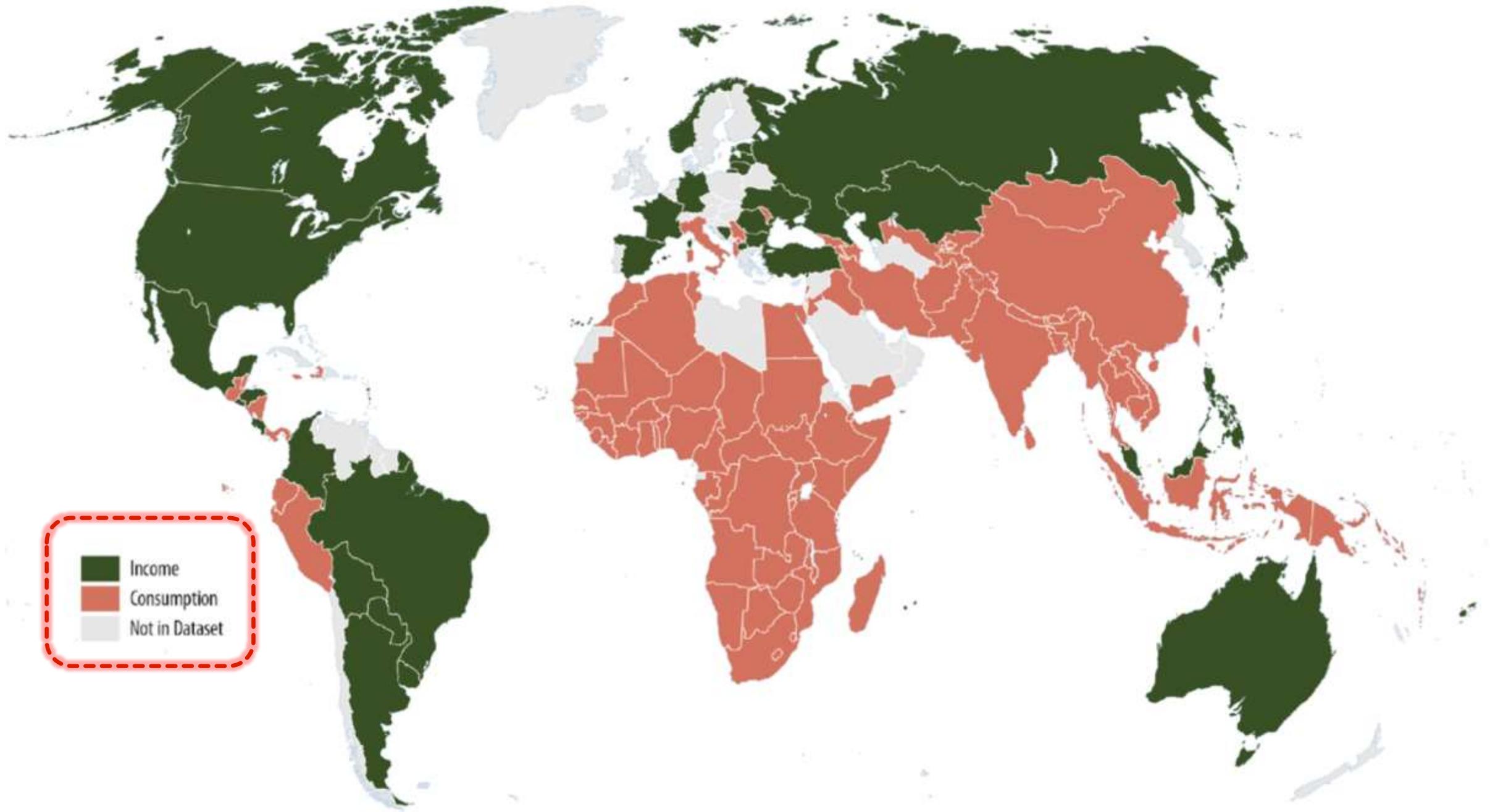
Option 3  
Wealth



## Option 2: Income

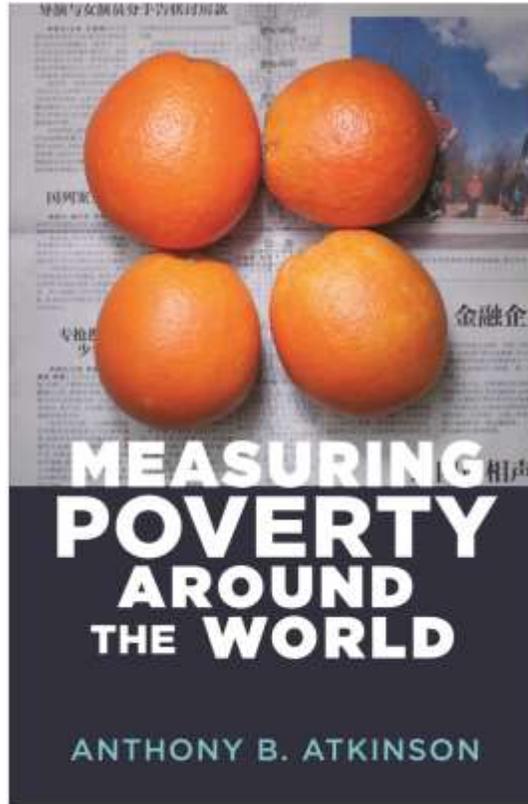
- «Among economic measures of living standards, the **main competitor** to a consumption based measure is a measure based on income» (Deaton and Zaidi 2002: 13)
- «In some countries, notably in Latin America, income is **the only available** indicator of economic welfare.» (World Bank 2015: 32)
- World Bank (2016), **recommendation 4**.





Source: Appendix A

# Atkinson (2019)



- Should we go for income or consumption?  
It depends.
- **Consumption** is “better” for **low-** and **middle-income countries**, where **material deprivation** is a priority.
- **Income** is “better” in contexts where living standards are ‘high’ and/or the focus is on **minimum rights to resources**, and **inequality**.

Additional reasons to focus on income?

# The incomes of the poor

the RIGA database

- Income (and wealth) help **explain why** households are poor or vulnerable
- One example: The Rural Income Generating Activities (**RIGA**) project
  - Database on sources of income, with 35 surveys covering 19 countries in Africa, Asia, Eastern Europe and Latin America



# Income sources among rural households



## Are African households (not) leaving agriculture? Patterns of households' income sources in rural Sub-Saharan Africa <sup>☆</sup>



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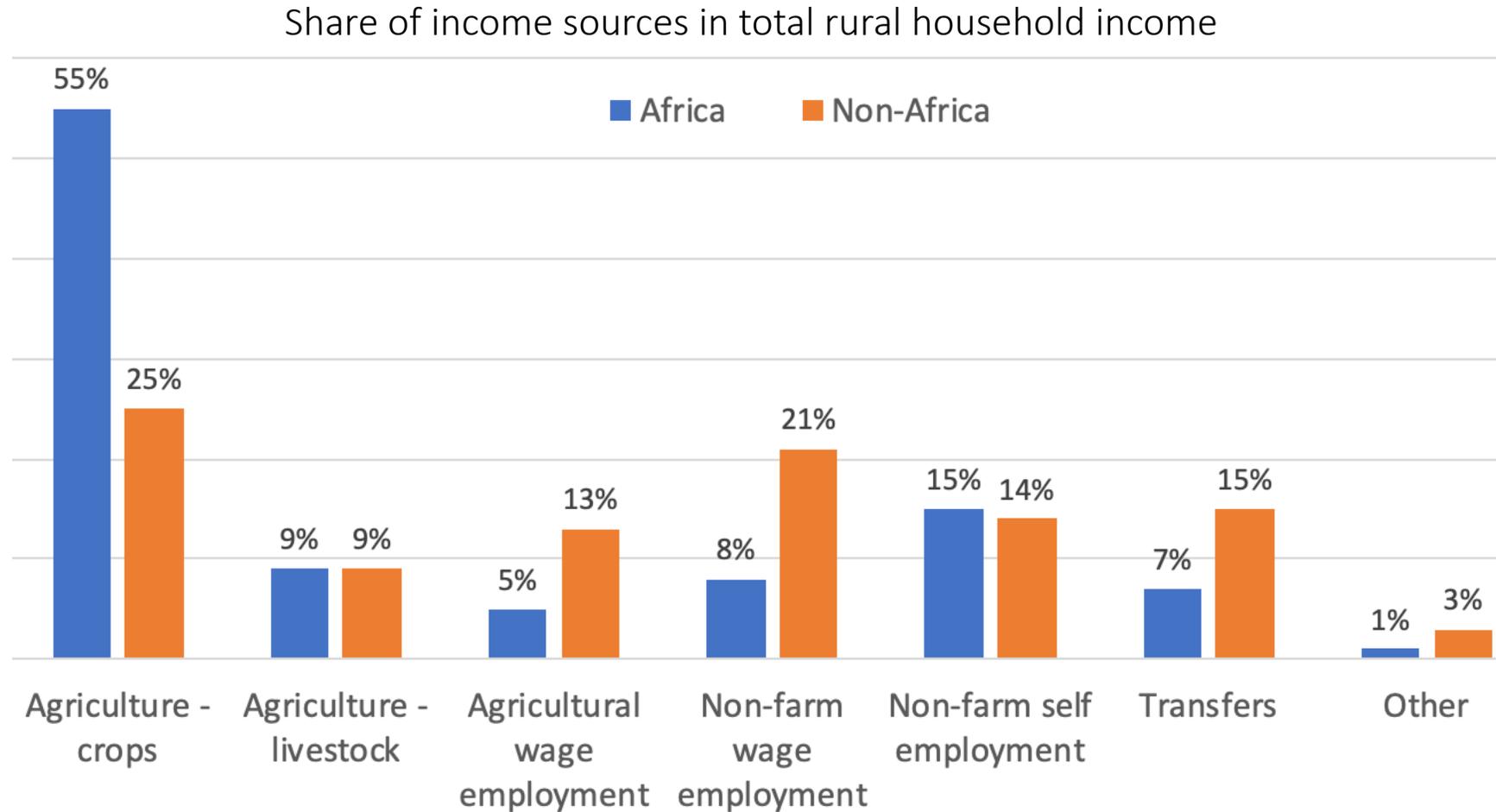
Income  
Non-farm employment  
Agriculture  
Africa  
LSMS

### ABSTRACT

This paper uses comparable income aggregates from 41 national household surveys from 22 countries to explore the patterns of income generation among rural households in Sub-Saharan Africa, and to compare household income strategies in Sub-Saharan Africa with those in other regions. The paper seeks to understand how geography drives these strategies, focusing on the role of agricultural potential and distance to urban areas. Specialization in on-farm activities continues to be the norm in rural Africa, practiced by 52 percent of households (as opposed to 21 percent of households in other regions). Regardless of distance and integration in the urban context, when agro-climatic conditions are favorable, farming remains the occupation of choice for most households in the African countries for which the study has geographically explicit information. However, the paper finds no evidence that African households are on a different trajectory than households in other regions in terms of transitioning to non-agricultural based income strategies.

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Reliance on farm income is greater in Africa, and is associated with households being poorer



# Gender gaps

Data on income (and wealth) are needed to analyze economic inequality between **men** and **women**

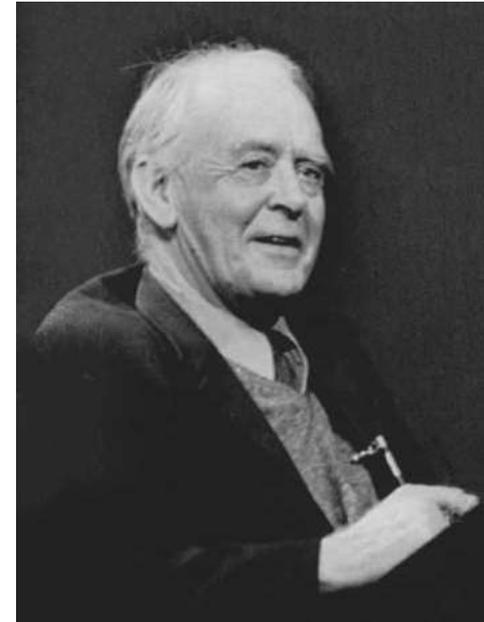


Income?

# How do economists define income, exactly?

- Economists use the seminal definition of income provided by [John Hicks](#) (1904-1989).
- A British economist, Hicks was awarded the Nobel prize in 1972.
- Here we need his book *[Value and Capital](#)*, published in 1939:

“**income** is the value of what a person could **consume** in a given year, if she chose to keep her **wealth** constant”.



# Toward an operational definition of income

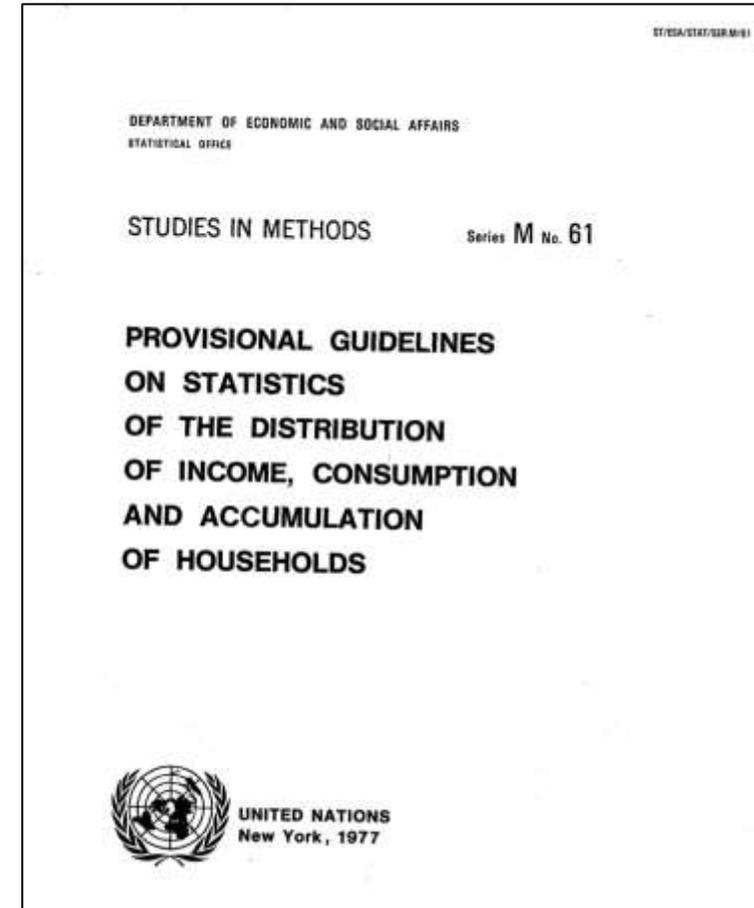
- We need a definition that is **concrete, detailed**, useful for the purposes of **data collection**.
- To collect **data** on income, we need to answer a number of **practical questions**. A few examples:
  - Should we interview **individuals** or **households**?
  - Should the revenue realized by **selling an asset** (e.g., a car, etc.) count as income?
  - Should **in-kind receipts** count as income?
  - ...
- Where to find answers?

# A bit of history

- How did **international standards for the measurement of income** through household surveys come about?
- Throughout the years, many **cross-country initiatives** aimed at producing **standard definitions** and sets of **guidelines**.
- Next two slides: main **historical milestones**.

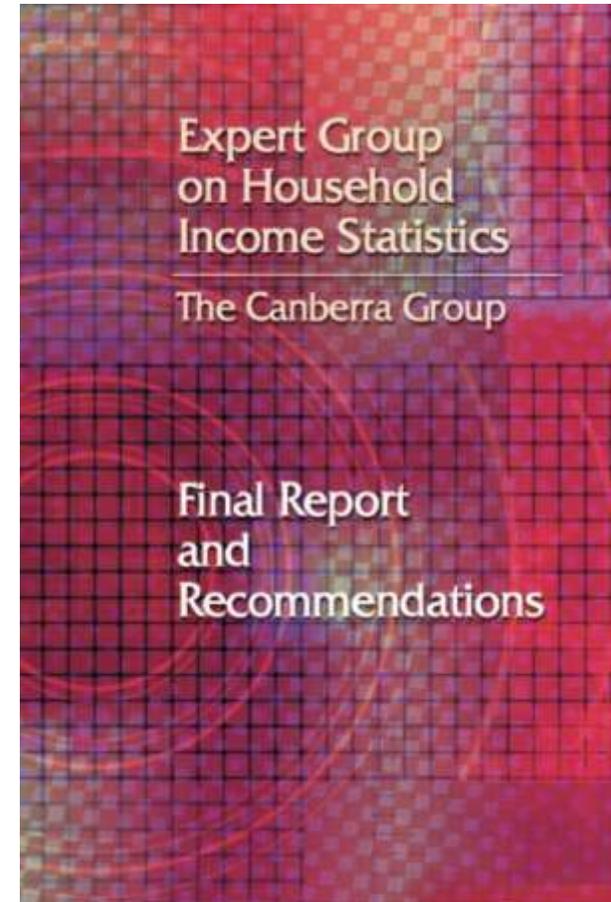
# Early efforts

- **Mid 1960s**  
Preparatory studies, under the aegis of the **United Nations Statistical Commission**.
- **United Nations (1977)**  
First set of guidelines for household income measurement.



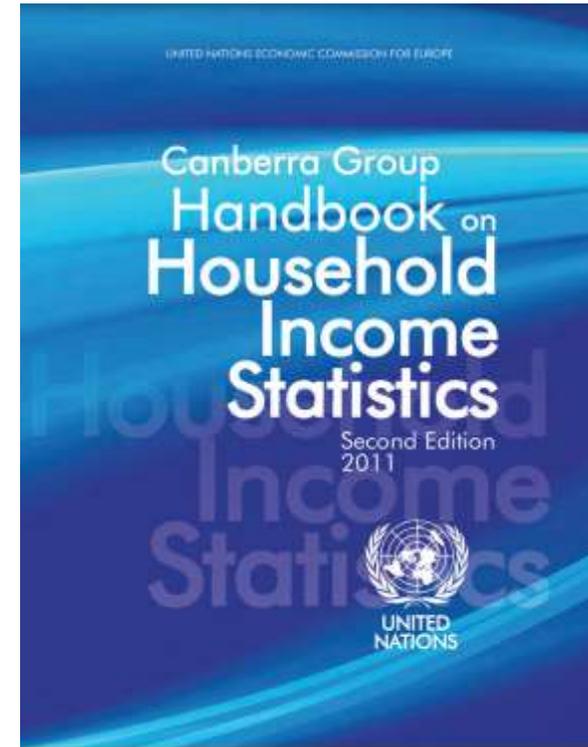
# 1990s-2000s

- **1996 – Birth of the Canberra Group.** The Group includes experts from NSOs, government departments and research agencies.
- **2001 – A new international standard.** the Canberra Group's Final Report and Recommendations ([Canberra Handbook](#)) is published.



# 2010s

- 2011  
Updated edition of Canberra Handbook.  
The conceptual definition of income established by ILO (2004) is adopted.
- We focus on this publication.



# Canberra's definition of household income

# Definition of household income

Canberra Handbook (2011: 9-10)

“Household income consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals, but excludes windfall gains and other such irregular and typically one-time receipts.”

“Household income receipts are available for current consumption and do not reduce the net worth of the household through a reduction of its cash, the disposal of its other financial or non-financial assets or an increase in its liabilities.”

# 1 Reference unit

“Household income consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals, but...

- Ultimately, individual living standards are determined not by individual income alone, but by the **pooled income** of all household members.
- In this context, the statistical reference unit is the **household**.

# Definition of household

UNECE (2009), Canberra (2011: 25)

A private household is either (a) a person living alone in a separate housing unit or who occupies, as a lodger, a separate room (or rooms) of a housing unit but does not join with any of the other occupants of the housing unit to form part of a multi-person household or (b) a group of two or more persons who combine to occupy the whole or part of a housing unit and to provide themselves with food and possibly other essentials for living. The group may be composed of related persons only or of unrelated persons or of a combination of both. The group may also pool their income.

- This definition is very important, in practice.
- DJ will elaborate on this, after the lunch break.

## 2 Coverage

“Household income consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals, but...

- We want to capture all economic resources coming into the household.
- That means:
  1. capturing both monetary and in-kind receipts, and
  2. making sure that our measure of income is comprehensive, that it includes all income components.

### 3 No windfall gains

“Household income consists of all receipts whether monetary or in kind (goods and services) that are received by the household or by individual members of the household at annual or more frequent intervals, but excludes windfall gains and other such irregular and typically one-time receipts.”

- Goal: measuring **typical** income over the course of a given reference period, normally one year
- Exceptional receipts are **not representative of income during the reference period.**

# Windfall gains



- Gambling winnings
- Other examples?

## 4 No net worth reduction

“Household income receipts are available for current consumption and do not reduce the net worth of the household through a reduction of its cash, the disposal of its other financial or non-financial assets or an increase in its liabilities.”

- **Net worth** is the value of a household's assets, net of liabilities (*i.e.* net wealth).
- Examples: **sale of assets, loans obtained, withdrawals from savings...**
- Are these income receipts?
- **No**, because they are linked to a reduction of net worth.

# Recap

- Based on the **Canberra Handbook**, we got started with the task of defining household income.
- The term household has been defined.
- Next, we have examined the rationale for **excluding** certain items.
- Now we turn to discussing which items should be **included**.

# Building up

- The Canberra Handbook identifies **four main income components**:
  1. income from **employment**;
  2. **property** income;
  3. income from the production of household services for **own consumption**;
  4. current **transfers** received.
- Defining 1) - 4) requires attention to **detail**: we must look at the components one by one.

# 1. Income from employment

# Definition of income from employment

- Income from employment comprises **payments**, both cash and in kind, received in exchange for participation in economic activities **in a strictly employment related capacity**.
- Income from employment consists of **employee income** and **income from self-employment**.

# Employee income

- Includes both the **wage** itself, and **all cash and non-cash benefits** received on top of it.
- Operationally, the construction of employee income requires 9 (nine!) pieces of information.

# Employee income

<b>1</b> Wages and salaries	<b>2</b> Cash bonuses and gratuities	<b>3</b> Commissions and tips
<b>4</b> Directors' fees	<b>5</b> Profit-sharing bonuses and other profit-related pay	<b>6</b> Shares offered as part of employee remuneration
<b>7</b> Free or subsidized goods and services from an employer	<b>8</b> Severance and termination pay	<b>9</b> Employers' social insurance contribution

# 1/9 Wages and salaries

- **Wages** are usually computed by multiplying an hourly pay rate by the number of hours worked.
- A **salary** is a fixed sum paid for a specific period of time worked, such as weekly or monthly.
- There is no internationally agreed upon definition of ‘wages and salaries’
- In this context, wages and salaries indicates any **remuneration paid in cash for time worked or work done in all jobs**, plus the **remuneration for time not worked** (such as annual holidays)

SECTION 10: NON-FARM HOUSEHOLD BUSINESSES

NOW SOME QUESTIONS ABOUT NON HOUSEHOLD MEMBER EMPLOYEES (NUMBERED IN QUESTION 18) WORKING IN THE BUSINESS - IF MORE THAN 12 NON-HOUSEHOLD MEMBER EMPLOYEES ASK THE RESPONDENT TO SELECT THE 12 HIGHEST PAID.

+

Employee number	10.20. What is their sex?		10.21. Which age bracket are they in?		10.22. What is their status within the business?				Tanzania Shillings		10.25. FOR AMOUNT MENTIONED IN Q22 OR Q23 – What period of time does that payment refer to?				10.26. How many days did the employee work in the last month?	
	Male.....1	Female ..2	Adult (18+) ..1	Child (<18) ..2	Working Proprietor.....1	Paid regular employee.....2	Paid Casual worker .....3	Unpaid helpers/Family Workers ...4	10.23. How much do they receive for wages & salaries?	10.24. How much do they receive for payments in kind?	Day.....1	Week.....2	Month.....3	Other (specify).....94		
1	1	2	1	2	1	2	3	4			1	2	3	4		
2	1	2	1	2	1	2	3	4			1	2	3	4		
3	1	2	1	2	1	2	3	4			1	2	3	4		
4	1	2	1	2	1	2	3	4			1	2	3	4		
5	1	2	1	2	1	2	3	4			1	2	3	4		
6	1	2	1	2	1	2	3	4			1	2	3	4		
7	1	2	1	2	1	2	3	4			1	2	3	4		
8	1	2	1	2	1	2	3	4			1	2	3	4		
9	1	2	1	2	1	2	3	4			1	2	3	4		
10	1	2	1	2	1	2	3	4			1	2	3	4		
11	1	2	1	2	1	2	3	4			1	2	3	4		
12	1	2	1	2	1	2	3	4			1	2	3	4		

## 2/9 Cash bonuses and gratuities

- This category includes payments for work done that are not strictly wages or salaries, *i.e.* they are **not linked to time worked, and/or they are given in addition to usual compensation.**
- **Cash bonuses and gratuities** are end-of-year or one-time bonuses, that supplement salary.
- For example, some employees may receive an extra month's salary at the end of the year.

## 3/9 Commissions and tips

- This category includes payments for work done that are not strictly wages or salaries, *i.e.* they are **not linked to time worked, and/or they are given in addition to usual compensation.**
- **Commissions** are earned by salespeople based on sales made.
- **Tips** go beyond the amount of the bill of a service worker, and are given voluntarily by clients.



# Self-employment income

- The basis for the measurement of income from self-employment is the concept of **net income: value of gross output less operating costs**.
- **Profits** occur when receipts are greater than operating expenses, while a **loss** occurs when operating expenses are greater than receipts.

# Components of self-employment income

Canberra Handbook (2011: 11-13)

<b>1</b>	<b>2</b>	<b>3</b>
Profit or loss from unincorporated enterprises	Goods and services produced for barter	Goods produced for consumption

# 1/3 Profit/loss from unincorporated enterprise

- Unincorporated enterprise?
- An unincorporated enterprise is a business which is **not** considered as a **legal entity** separate from the owner.
- Examples include small family businesses like farms and retail shops, or self-employed taxi drivers, lawyers and health professionals.

# Components of employment income: Recap

Canberra Handbook (2011: 11-13)

- 1** ~~Income from employment~~
- a ~~Employee income~~
  - ✓ Wages and salaries
  - ✓ Cash bonuses and gratuities
  - ✓ Commissions and tips
  - ✓ Directors' fees
  - ✓ Profit-sharing bonuses and other forms of profit-related pay
  - ✓ Shares offered as part of employee remuneration
  - ✓ Free or subsidised goods and services from an employer
  - ✓ Severance and termination pay
  - ✓ ~~Employers' social insurance contributions~~
- b ~~Income from self-employment~~
  - ✓ ~~Profit/loss from unincorporated enterprise~~
  - ✓ Goods and services produced for barter, less cost of inputs
  - ✓ Goods produced for own consumption, less cost of inputs

# Three more income components

- ~~1. income from employment;~~
2. property income;
3. income from the production of household services for own consumption;
4. current transfers received.

## 2. Property income

# Definition

- This is the income that is generated from the **ownership of assets**.
- It consists in returns from:
  - **financial** assets (e.g. interest, dividends)
  - **non-financial** assets (e.g. rents)
  - **intellectual** assets (e.g. royalties)
- Straightforward, no special caveats

# Components of property income

Canberra Handbook (2011: 13)

<b>1</b> Income from financial assets	<b>2</b> Income from non- financial assets	<b>3</b> Royalties
---	--	-----------------------

3. Income from the production of household services for own consumption

# Definition

- **Services** produced **within the household** for the household's **own consumption**, and not for the market (**net** of the expenses that go into their production) are considered income, similarly to goods produced for own consumption.
- Most of these components are **difficult to measure**, and most are ultimately excluded from the actual computation of income.

# Components of income from household services

Canberra Handbook (2011: 14)

<b>1</b>	<b>2</b>	<b>3</b>
Net value of owner-occupied housing services	Value of unpaid domestic services	Value of services from household consumer durables

# 1/3 Net value of owner-occupied housing services

- For owner-occupiers, housing services is the imputed value of the **services received** (i.e. value of inhabiting the dwelling) less the value of the housing **costs incurred**.
- This corresponds to the **imputed market rent** less the current expenses of the household in their role as a landlord.



## 2/3 Value of unpaid domestic services

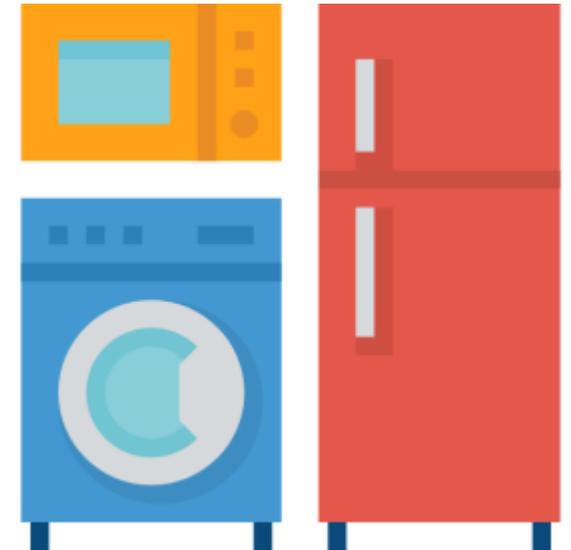
- Unpaid domestic services include own-produced services such as laundry, cooking meals, caring for adults and children, housekeeping, as well as unpaid volunteer work.
- In the operational definition of income, the value of unpaid domestic services is **excluded**.
- Q. Why?
- A. **Difficult to measure.**



Johannesburg (2013) Guinness World Record for most people hand-washing clothes simultaneously

# 3/3 Value of services from household consumer durables

- Income from services of household consumer durables, such as washing machines and refrigerators, refers to the imputed value of the flow of services provided by these items.
- In the operational definition of income, the value of the services from consumer durables are **excluded**.
- Q. Why?
- A. **Difficult to measure.**



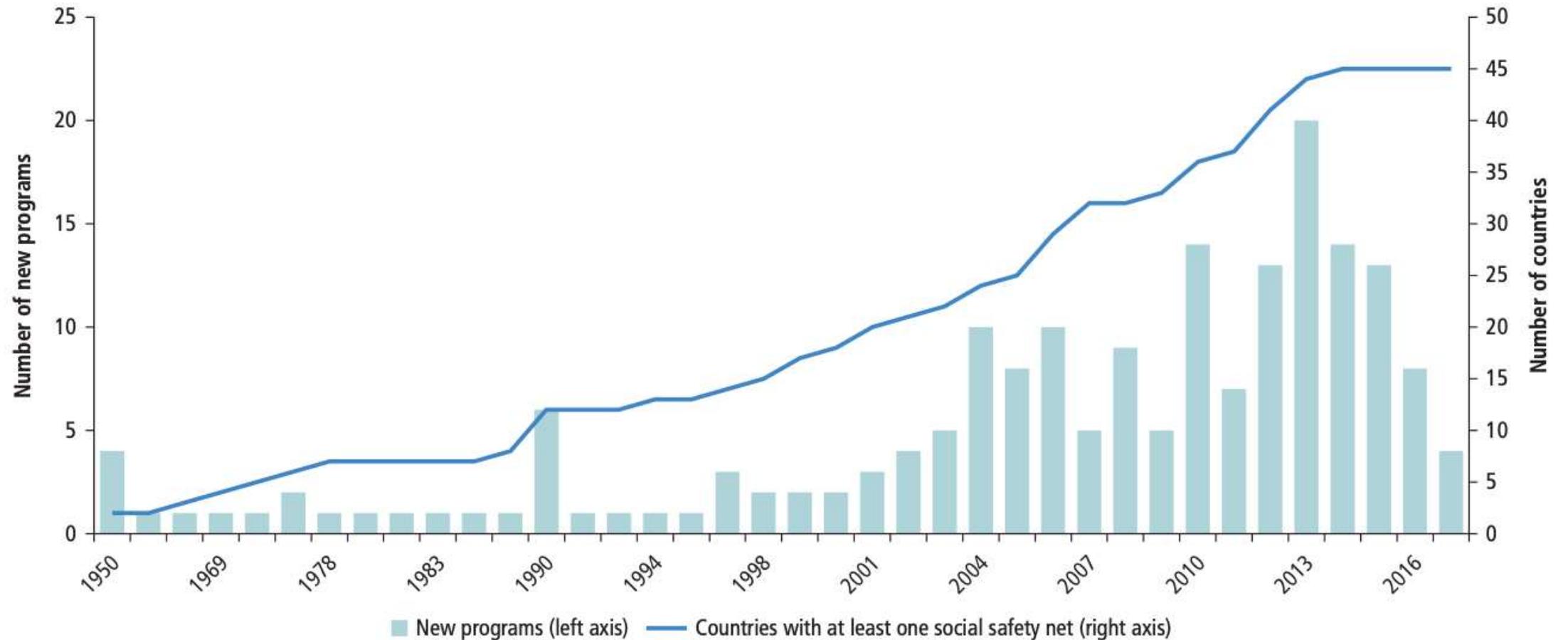
## 4. Current transfers received

# Definition

- **Transfers** are receipts (from other households, from the government, from charities...) for which the recipient does not provide anything in return.

# The importance of government transfers

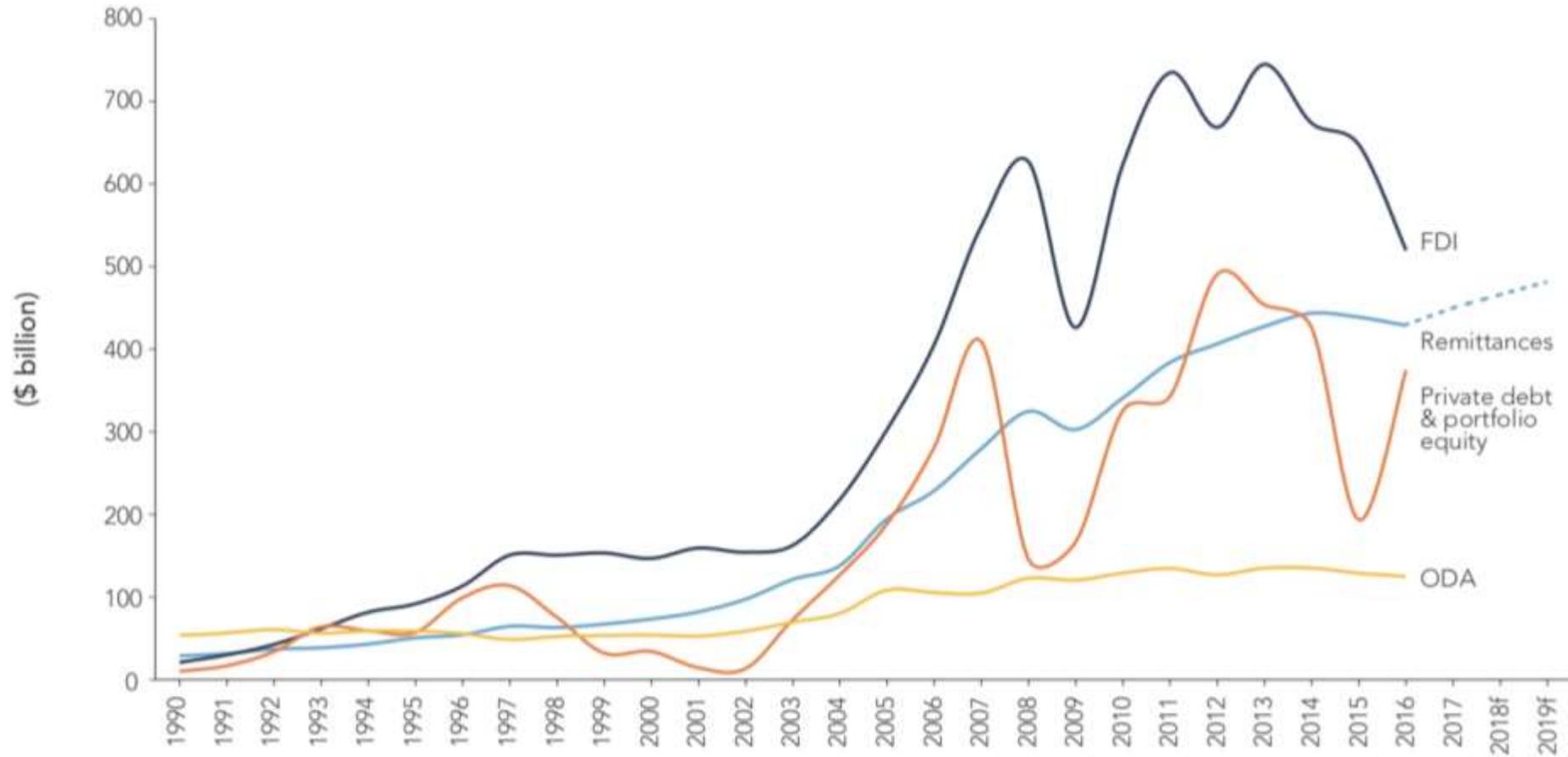
Social safety nets are rapidly expanding in Africa



Source: Beegle, Coudouel, Monsalve (2018)

# The importance of private transfers

Remittance flows vs. other capital flows to developing countries (World Bank 2017)



Source: World Bank Migration and Development Brief 28 (2018)

# Components of income from transfers

Canberra Handbook (2011: 15)

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Social security pensions / schemes	Pensions and other insurance benefits	Social assistance benefits	Current transfers from non-profit institutions	Current transfers from other households

# Aggregation

# Aggregation

- Aggregating income components in different ways produces specific income measures, suitable for different analytical purposes.
- **Total** and **disposable** income are the main income aggregates one can produce.

# The aggregation plan

- **Q:** What's an aggregation plan?
- **A:** Formula for adding up elementary income components.
- Two examples:
  - 1) Canberra
  - 2) Italy: Survey of Household Income and Wealth

# Canberra

Canberra (2011: 11)

---

## Income from employment

- Employee income
- Income from self-employment

+ Property income

+ Income from household production of services for own consumption

+ Current transfers received

---

= *Total income*

- Current transfers paid

- Direct taxes (net of refunds)
- Compulsory fees and fines
- Current inter-household transfers paid
- Employee and employers' social insurance contributions
- Current transfers to non-profit institutions

---

= *Disposable income*

---

# Italy's Survey on Household Income and Wealth (SHIW)

Variable name	Description <sup>(1)</sup>
Y	Net disposable income
YL	Payroll income
YL1	Net wages and salaries
YL2	Fringe benefits
YT	Pensions and net transfers
YTP	Pensions and arrears
YTP1	Pensions
YTP2	Arrears
YTA	Other transfers
YTA1	Financial assistance (wage suppl., etc.)
YTA2	Scholarships
YTA3	Alimony and gifts
YTA31	received
YTA32	paid (-)
YM	Net self-employment income
YMA1	Self-employment income
YMA2	Entrepreneurial income
YC	Property income
YCA	Income from real-estate
YCA1	Actual rents
YCA2	Imputed rents <sup>(2)</sup>
YCF	Income from financial assets <sup>(3)</sup>
YCF1	Interest on deposits
YCF2	Interest on government securities
YCF3	Income from other securities
YCF4	Interest payments (-)

Y = YL + YT + YM + YC

# Recap

- We have discussed the income components based on Canberra (2011)
- The devil truly is in the details: not all definitions are clear on their face, the inclusion of some items and exclusion of others is not intuitive, and so on. Being specific is crucial.
- Armed with this knowledge, we can design a questionnaire that collects income data that are **comprehensive** (nothing is left behind), and that **match the needs of users** (allowing them to construct relevant aggregates).

Practicalities

# Two topics

- Questionnaire
- Data

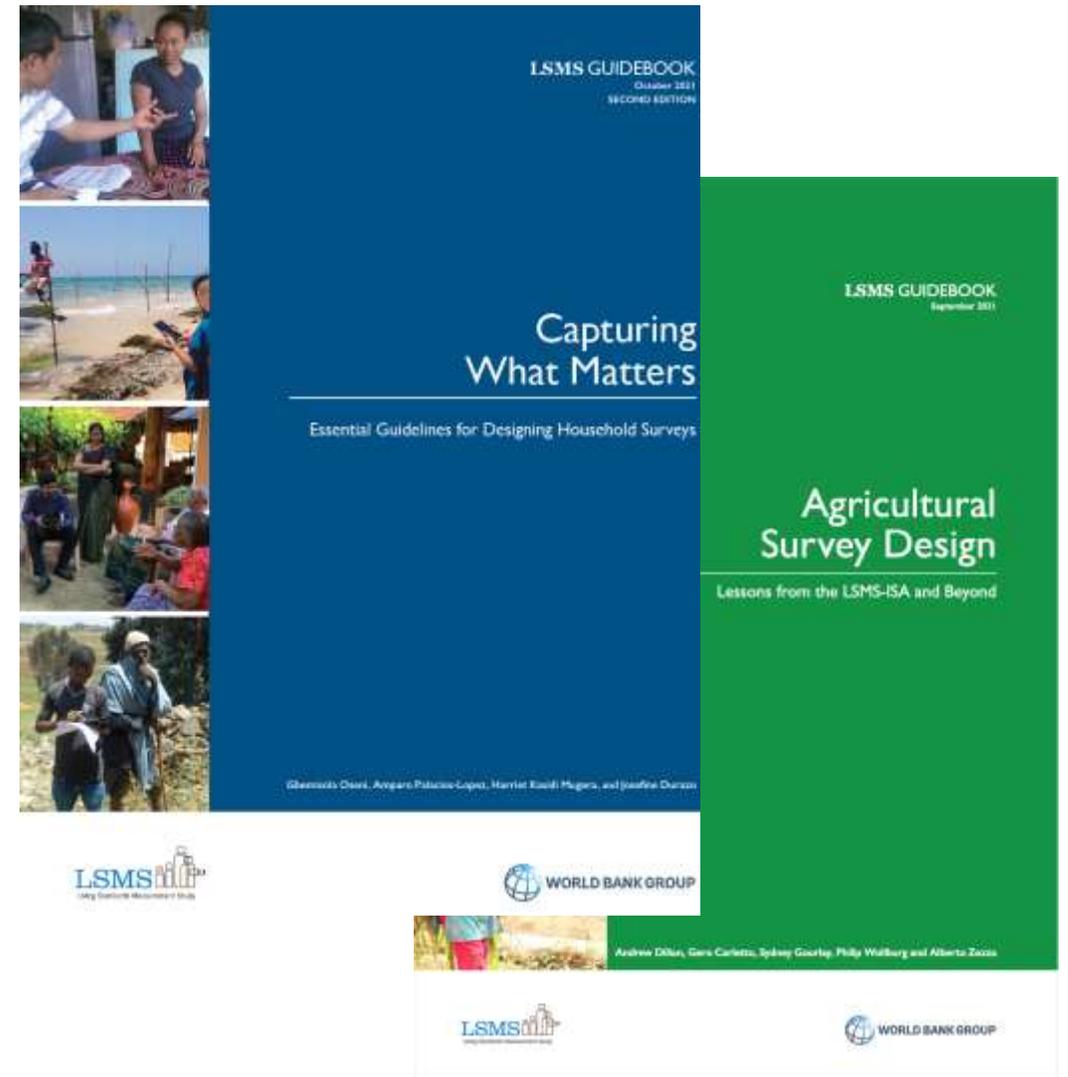
# Useful material

- C4D2 training initiative:

<https://www.worldbank.org/en/programs/lsms/C4D2/C4D2-training>

- LSMS Guidebooks:

<https://www.worldbank.org/en/programs/lsms/lsms-guidebooks>



# Questionnaire – A check list

1. **Where** to place income and wealth questions in the structure of the questionnaire?
2. **Who** should the respondent(s) be?
3. How to write 'good questions'?
4. What is the optimal recall period?
5. How to minimize reticence and non-response?
6. Is there an optimal length for the questionnaire?

# On respondent selection

Fisher et al. (2010)

Is it sufficient to interview the **household head** to obtain accurate information on **household income**?

NO

 www.elsevier.com/locate/worlddev World Development Vol. 38, No. 7, pp. 966–973, 2010  
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0305-750X/\$ - see front matter

**doi:10.1016/j.worlddev.2009.11.024**

## Who Should be Interviewed in Surveys of Household Income?

MONICA FISHER  
*International Food Policy Research Institute – Lilongwe, Malawi*

JEFFREY J. REIMER  
*Oregon State University, Corvallis, OR, USA*

and

EDWARD R. CARR\*  
*University of South Carolina, Columbia, SC, USA*

**Summary.** — This study tests the null hypothesis that it is sufficient to interview only the household head to obtain accurate information on household income. Results show that using a husband's estimate of his wife's income does not produce statistically reliable results for poverty analysis. Estimates of the wife's income provided by the husband and wife are in agreement in only 6% of households. While limiting interviews to one person has the advantage of reducing the time and expense of household surveys, this appears detrimental in terms of accuracy, and may lead to incorrect conclusions on the determinants of poverty.  
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Table 1. Summary statistics for *CombinedInc* and *HusbandInc*

Variable	Mean or proportion	95% Confidence interval
Percent households in which <i>CombinedInc</i> = <i>HusbandInc</i>	6.06	[1.28–10.84]
Percent households in which <i>CombinedInc</i> > <i>HusbandInc</i>	65.66	[56.14–75.18]
Percent households in which <i>CombinedInc</i> < <i>HusbandInc</i>	28.28	[19.25–37.31]
All households: Percent difference between <i>CombinedInc</i> and <i>HusbandInc</i> (base income is <i>HusbandInc</i> )	26.31	[10.60–42.02]

When the husband is the only respondent, total household income is *underestimated* by 26%.

Conclusion:

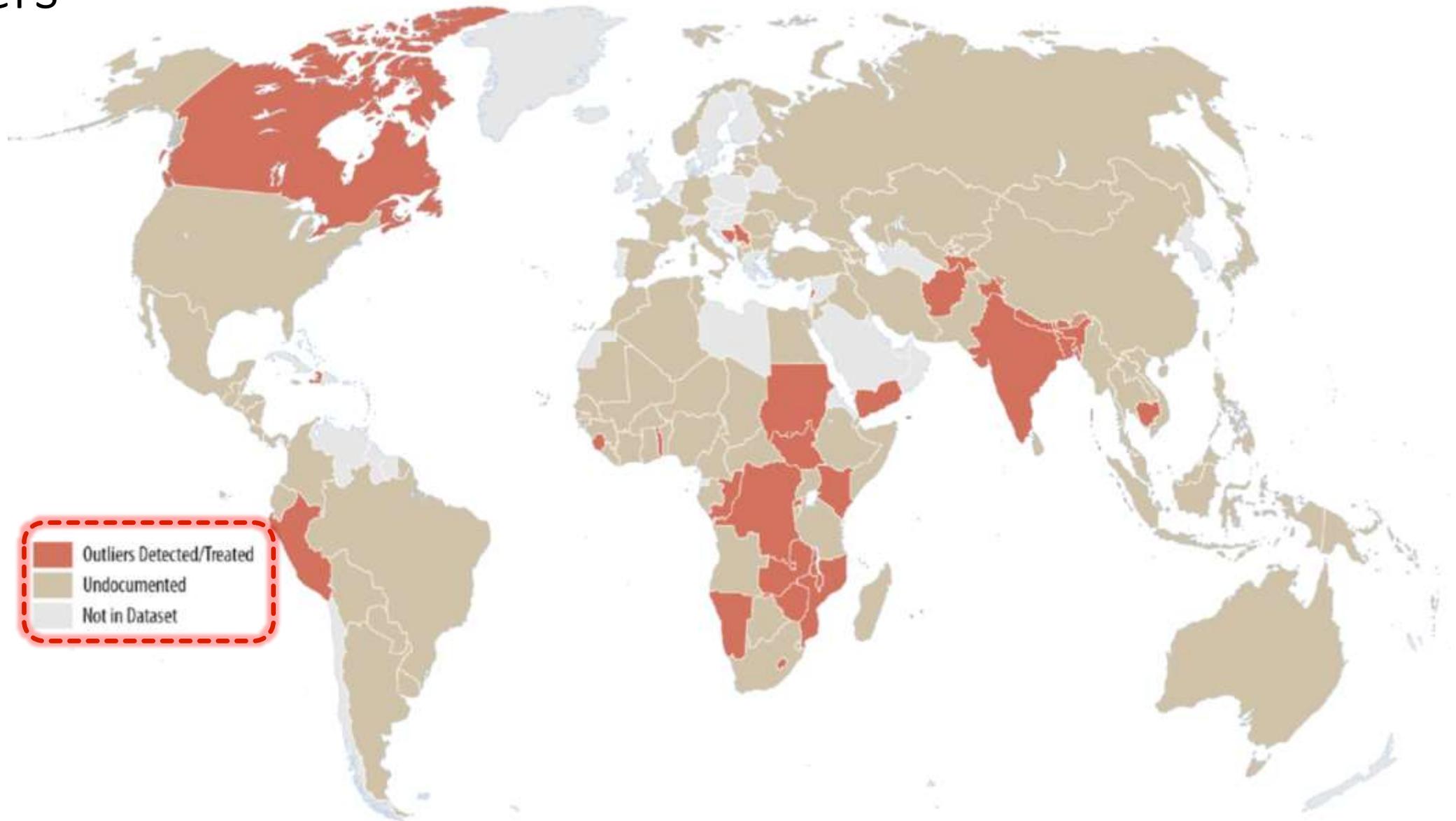
while limiting interviews to one person has the advantage of reducing the time and expense of household surveys, this appears detrimental in terms of accuracy, and may lead to incorrect conclusions on the determinants of poverty.

Data

### 3. Data issues

- **Data validation** is a complex activity aimed at verifying that data intended for analytical purposes are **reliable**.
- Outliers

# Outliers



# What data challenges are specific to income (or wealth)?

- Both **negatives** and **zeros** are, in principle, legitimate values for income and wealth variables.
- In the presence of negative values, the **Gini index can exceed 1**, and the **Lorenz curve can go below zero**.
- **Inequality estimates** are **highly sensitive** to their inclusion (or exclusion), even when the number of these values is small.

# outdetect

Belotti et al. (2022) have provided a new Stata command, `outdetect`, that facilitates the assessment of the incidence of outliers and their potential impact on selected statistics of interest.

```
ssc install outdetect
```

```
. use malawi17, clear
```

```
. outdetect pcinc, replace
```

```
Warning: pcinc has 127 zero values. Used in calculations.
```

```
Warning: pcinc has 544 negative value(s). Used in calculations.
```

outdetect set-up:

**Normalization:** Yeo and Johnson (2000)

**Z-score:**  $(x - \text{median})/q$

$\alpha = 3$

**Outlier detection target:** top and bottom  
**(12447 observations are used)**

---

Incidence of outliers:

	Freq.	Percent	Share
Bottom	<b>356</b>	<b>2.86</b>	<b>24.79</b>
Top	<b>1080</b>	<b>8.68</b>	<b>75.21</b>
Total	<b>1436</b>	<b>11.54</b>	<b>100.00</b>

---

# Impact evaluation

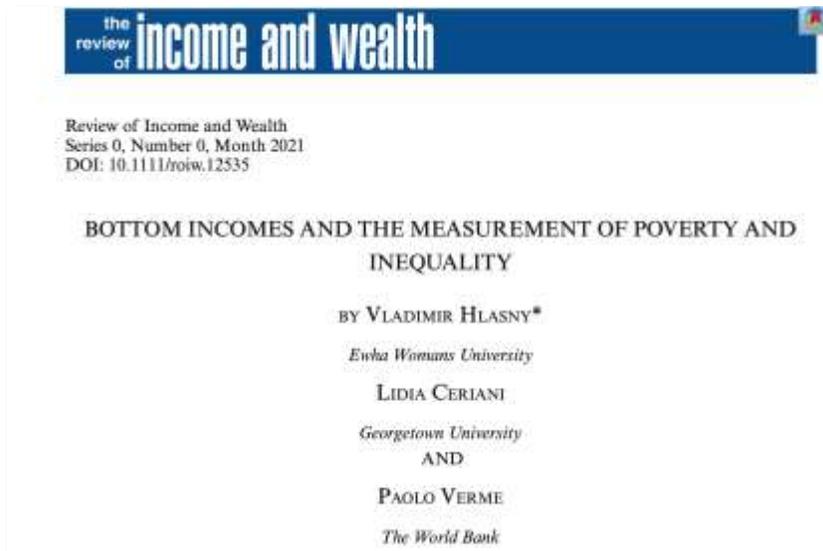
Statistics for raw and trimmed pcinc:

	Raw	Trimmed
<b>Summary stats</b>		
Mean	698.23	138.86
Median	112.96	105.64
SD	35714.74	119.13
CV(%)	5115.07	85.79
IQR	174.44	137.02
<b>Inequality</b>		
Gini	0.9302	0.4540
MLD	1.8528	0.3913
Theil	5.2877	0.3083
CV2	1308.0905	0.3680
A(0.125)	0.4508	0.0387
A(1)	0.8432	0.3238
A(2)	0.9989	0.9948
p90/p10	27.1919	14.3151

This is a sensitivity exercise: what would happen if we excluded all observations that were flagged as outliers from calculations?

For example, Gini would go down by... 47.6 percentage points!

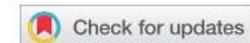
# On the presence of zero and negative incomes



- 80% of 354 examined surveys contain **negative incomes**, 83% contain **zero values**
- Negative incomes are often not trivial in size

# Zero-inflated distributions

JOURNAL OF APPLIED STATISTICS  
<https://doi.org/10.1080/02664763.2019.1671961>



## Evaluation of robust outlier detection methods for zero-inflated complex data

M. Templ <sup>a</sup>, J. Gussenbauer<sup>b</sup> and P. Filzmoser<sup>c</sup>

<sup>a</sup>Zurich University of Applied Sciences, Winterthur, Switzerland; <sup>b</sup>Statistics Austria, Vienna, Austria; <sup>c</sup>Vienna University of Technology, Vienna, Austria

# Treatment of outliers

- Main methods of dealing with outliers:
  - 1) removing them from the dataset (trimming)
  - 2) reducing the weights of outliers (trimming weight)
  - 3) changing the values of outliers (winsorisation, imputation)
  - 4) using robust estimation techniques (M-estimation).
- No consensus: “Any way of treating outliers which is not totally inappropriate prevents the worst.” (Huber 1981: 4)
- Documentation, transparency, and reproducibility. And multiple imputation!

# References

- Atkinson, A. B. 2019. *Measuring Poverty around the World*. Princeton and Oxford: Princeton University Press.
- Deaton, A. and S. Zaidi. 2002. “Guidelines for Constructing Consumption Aggregates for Welfare Analysis.” LSMS Working Paper no. 135.
- Deaton, A. and J. Muellbauer. 1980. *Economics and Consumer Behavior*. Cambridge: Cambridge University Press.
- Amendola, N. and G. Vecchi. 2022. “Durable Goods and Welfare Measurement.” *Journal of Economic Surveys* 36, no. 4: 1179-1211.
- Belotti, F., G. Mancini, and G. Vecchi. 2022. “Outlier Detection for Welfare Analysts Using Stata.” Unpublished manuscript, University of Rome “Tor Vergata.”
- Canberra Group. 2001. *Expert Group on Household Income Statistics: Final Report and Recommendations*. Ottawa: The Canberra Group.
- Hlasny, V., L. Ceriani, and P. Verme. 2021. “Bottom Incomes and the Measurement of Poverty and Inequality.” *Review of Income and Wealth*.
- Mancini, G. and G. Vecchi. 2022. *On the Construction of a Consumption Aggregate for Inequality and Poverty Analysis*. Washington, DC: World Bank.
- Templ, M., J. Gussenbauer, and P. Filzmoser (2020). “Evaluation of Robust Outlier Detection Methods for Zero-inflated Complex Data.”, *Journal of Applied Statistics* 47, no. 7: 1144-1167.

Thank you for your attention!