Asset-Based Measurement of Poverty

Andrea Brandolini
Banca d'Italia, Department for Structural Economic Analysis
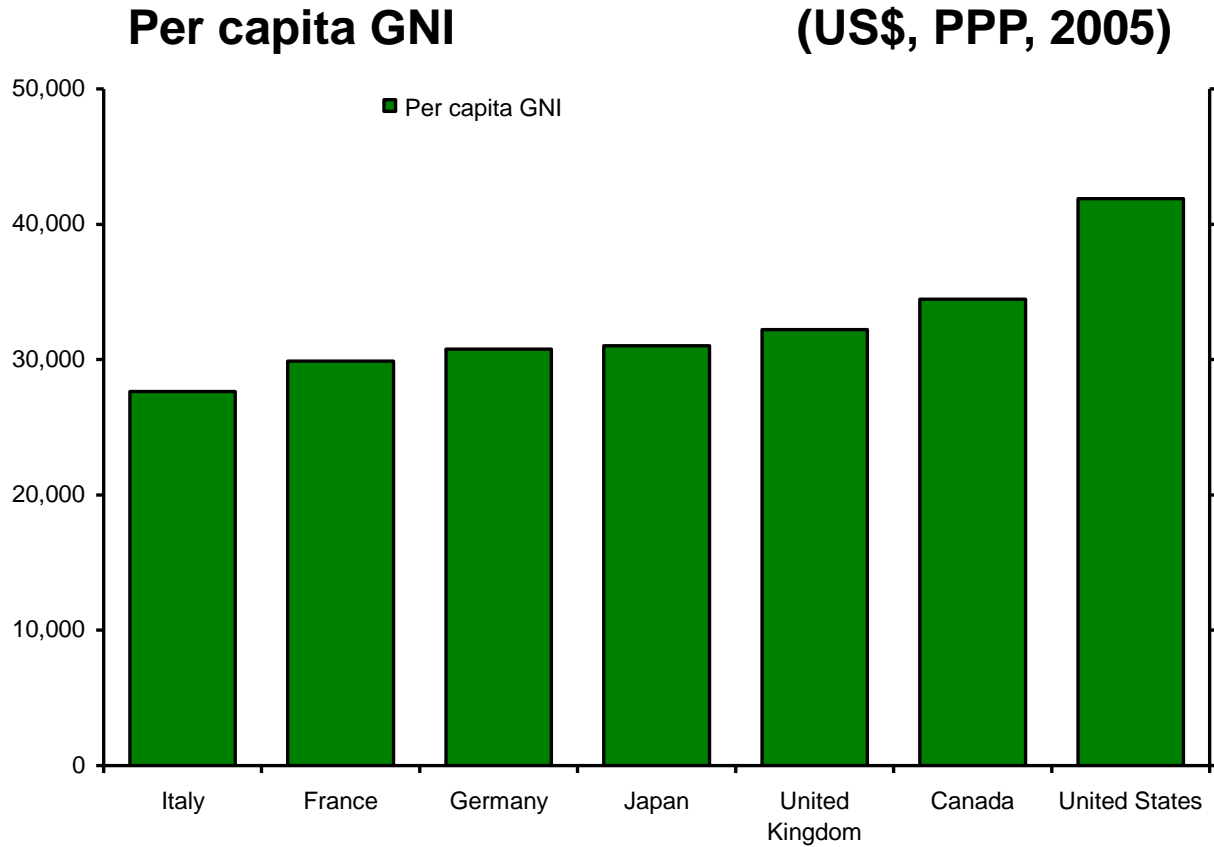
Silvia Magri
Banca d'Italia, Department for Structural Economic Analysis

Timothy M. Smeeding
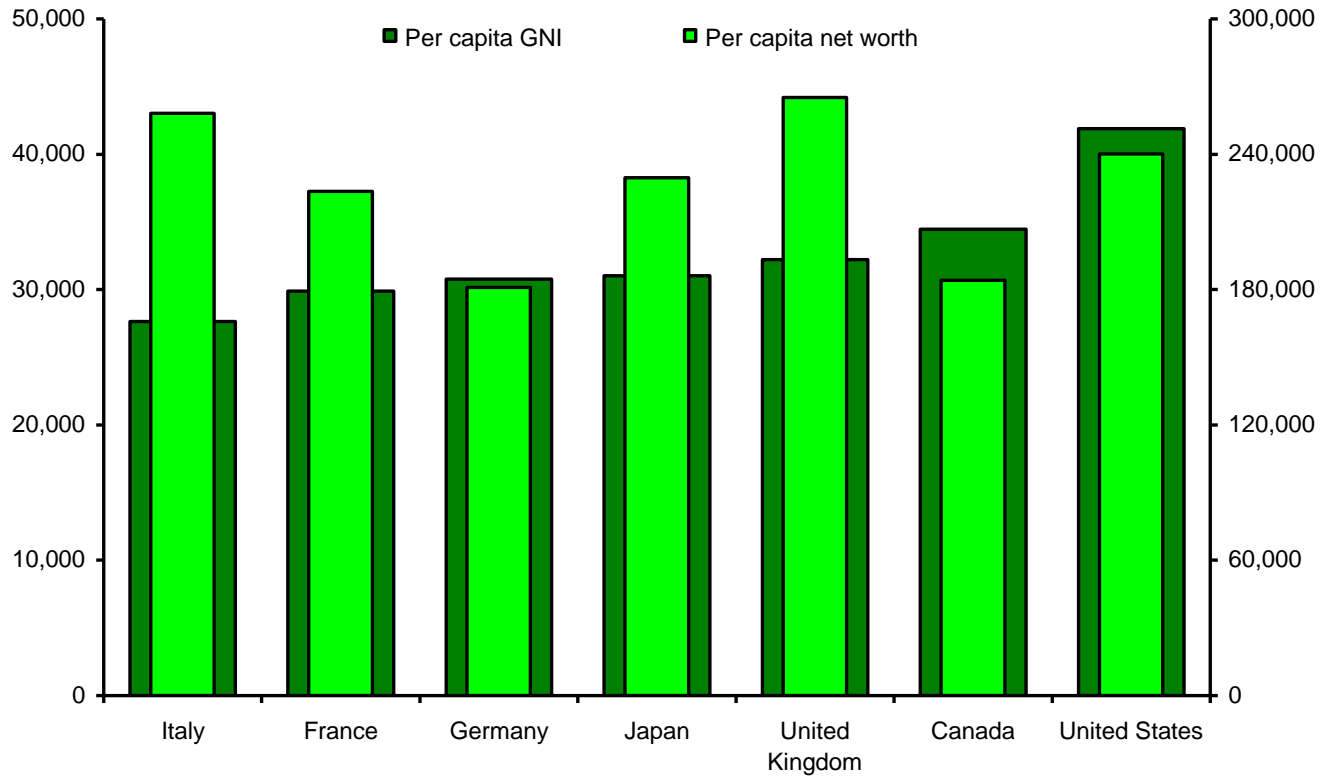*Institute for Research on Poverty and University of Wisconsin*

The problem (1)

Per capita GNI   **(US$, PPP, 2005)**

The problem (1)

Per capita GNI and net worth (US$, PPP, 2005)

The problem (2)

- How to account for wealth in measures of well-being?

- Here, *focus on poverty*

  - *Standard approach: income insufficiency*, relative to some socially acceptable minimal level

    - *US*: family's total money income before taxes < threshold that varies by family size and composition, is updated annually for inflation (absolute line)

    - *EU*: equivalized disposable income < 60% of national median value in each year (relative line)

  - *Role of wealth is absent*, except as reflected in reported income. But individuals can rely on real and financial assets to cope with the needs of everyday life and to face unexpected events

The problem (3)

- Two reasons to go beyond purely income-based measure of poverty

    1. *Well-being*: Income-poor have different living standards depending on net assets

        - A sudden income drop need not result in lower living conditions if the unit can decrease accumulated wealth, or if it can borrow

        - Income can be above the poverty threshold, yet a family can feel vulnerable because it lacks financial resources to face adverse income shock

        - Assets and liabilities are fundamental to smoothing out consumption patterns when income is volatile. Insurance role intertwined with private or public insurance mechanisms

The problem (4)

- Two reasons to go beyond purely income-based measure of poverty

  2. *Lifetime equity*: possession of tangible and intangible assets is a major determinant of the longer-term prospects of households and individuals

    - drop of current consumption below poverty line has a structural (more worrying) nature when permanent income falls below poverty line as well (Morduch 1994) or asset holdings below critical threshold (Carter and Barrett 2006)

    - chances in one's life depend on the set of opportunities open to a person which are, in turn, a function of the person's intellectual and material endowments

    - with capital market imperfections, individuals with low endowments may be stuck in a poverty trap

Aim & Outline

- Aim
  - develop tools to <u>monitor standard of living</u>: how net worth affects households' current economic well-being
  - <u>relevant for social policy</u>: assets may condition eligibility to means-tested public benefits

- Outline
  - Conceptual framework
    - Income-net worth
    - Asset poverty
  - Comparative results from the LWS

Conceptual framework (1)

- Decompose income and analyse bidimensional space

    $$CY = Y + r\,NW$$

    Y incomes from labour, pensions, transfers
    $r\,NW$ property incomes (r interest rate, NW net worth)
    Z poverty line

- Insufficiency of current income

    Poor if:

    $$CY = Y + r\,NW < Z$$

    $$\rightarrow \quad Y < Z - r\,NW$$

Conceptual framework (2)

- Underestimates resources at individual's disposal: in principle, people can spend all *NW*

  Total financial resources:

  $$FR = CY + NW = Y + (1+r)\ NW$$

  Poor if:

  $$FR = Y + (1+r)\ NW < Z$$

  $$\rightarrow \quad Y < Z - (1+r)\ NW$$

- Extreme to impose that all wealth should be suddenly decreased to sustain current living standards

- But people save to transfer resources over their future life: sensible that part of savings used for current spending, especially facing adverse circumstances

Conceptual framework (3)

Labour income Y

Z

poor if: $CY = Y + r\,NW < Z$
$\rightarrow$ $Y < Z - r\,NW$

NW **Net worth**

poor if: $FR = Y + (1+r)\,NW < Z$
$\rightarrow$ $Y < Z - (1+r)\,NW$
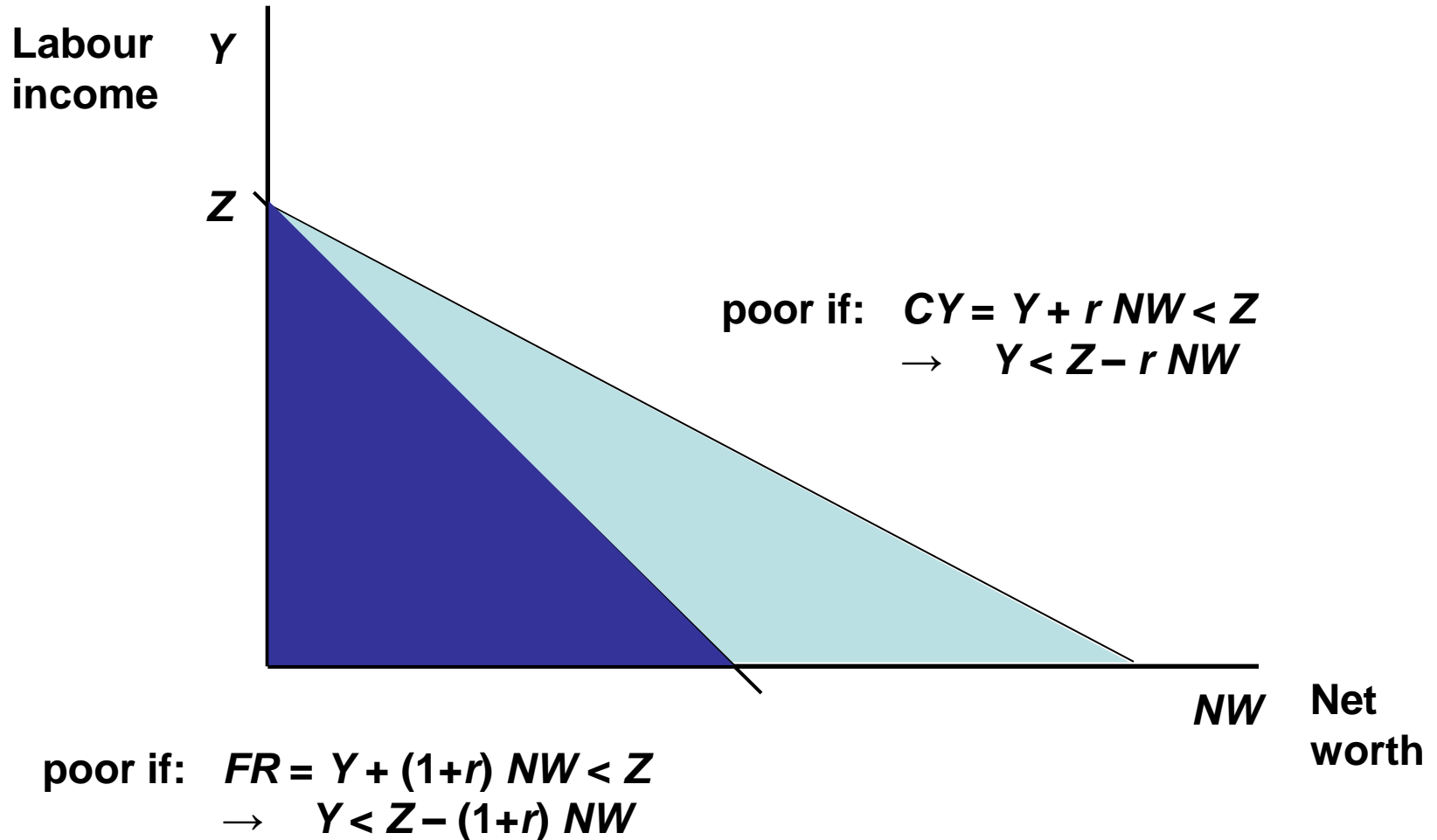
Conceptual framework (4)

- Intermediate solution

- Weisbrod and Hansen (1968): income-net worth

  - Convert net worth into constant flow of income, i.e. replace actual property incomes with n-year annuity value of net worth

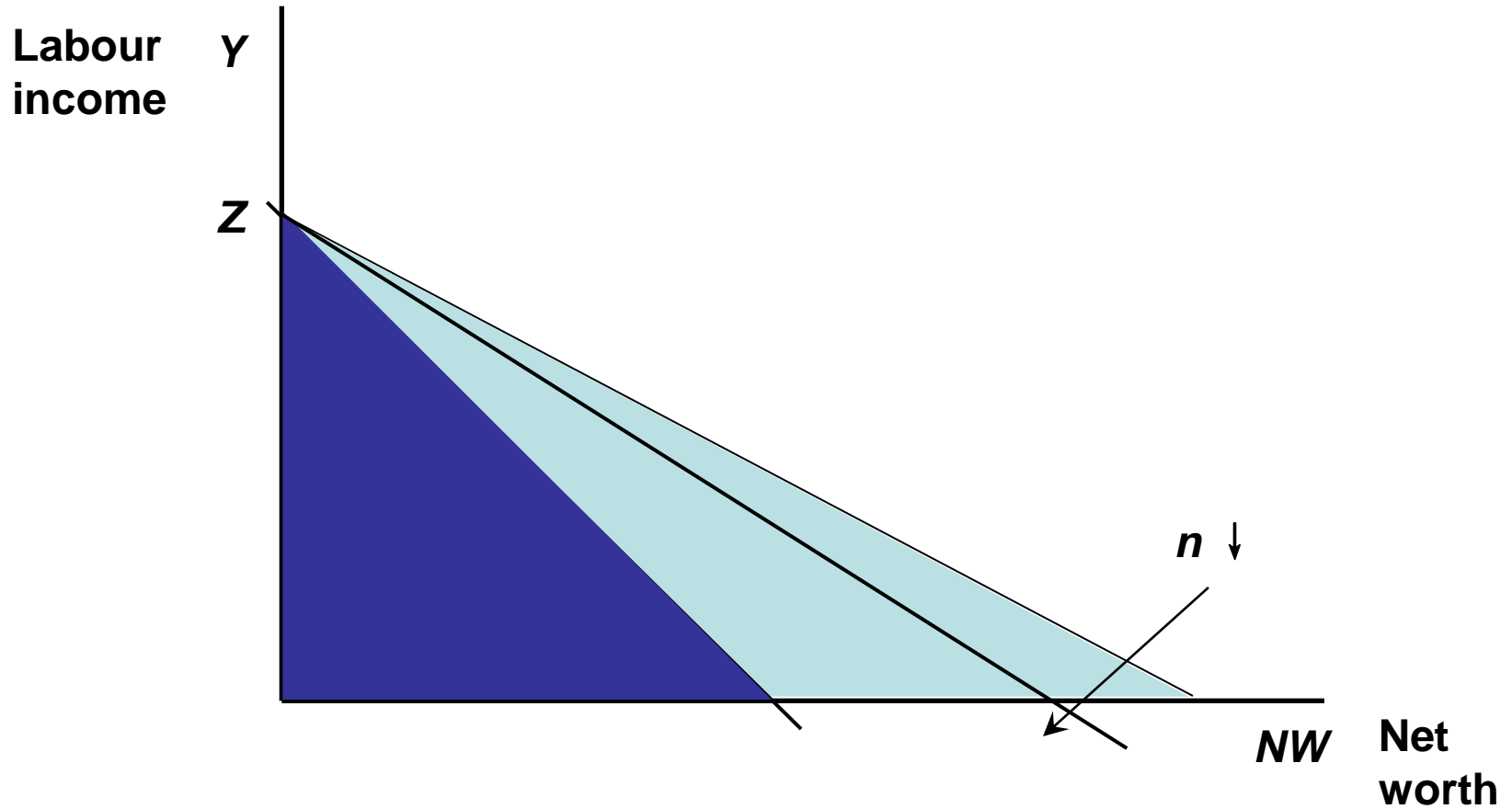$$AY = Y + \frac{\rho}{1 - (1+\rho)^{-n}} \, NW \qquad \begin{array}{l} n \ \text{length of annuity} \\ \rho \ \text{interest rate} \end{array}$$

$n \to \infty$ only interest, $AY=CY$

$n = 1$ all net worth, $AY=FR$

  - n = life expectancy   [hp: no wealth left at death]

Conceptual framework (5)

Conceptual framework (6)

- Theoretically neat solution but several measurement assumptions:

    - length of annuity (period over which individuals are supposed to spread evenly their wealth)

    - interest rate

    - wealth aggregate that is annuitized

    - treatment of couples (Rendall and Speare 1993)

    - population subgroups whose wealth is annuitized

    - allowance for bequests/precautionary saving

    - poverty threshold

Conceptual framework (7)
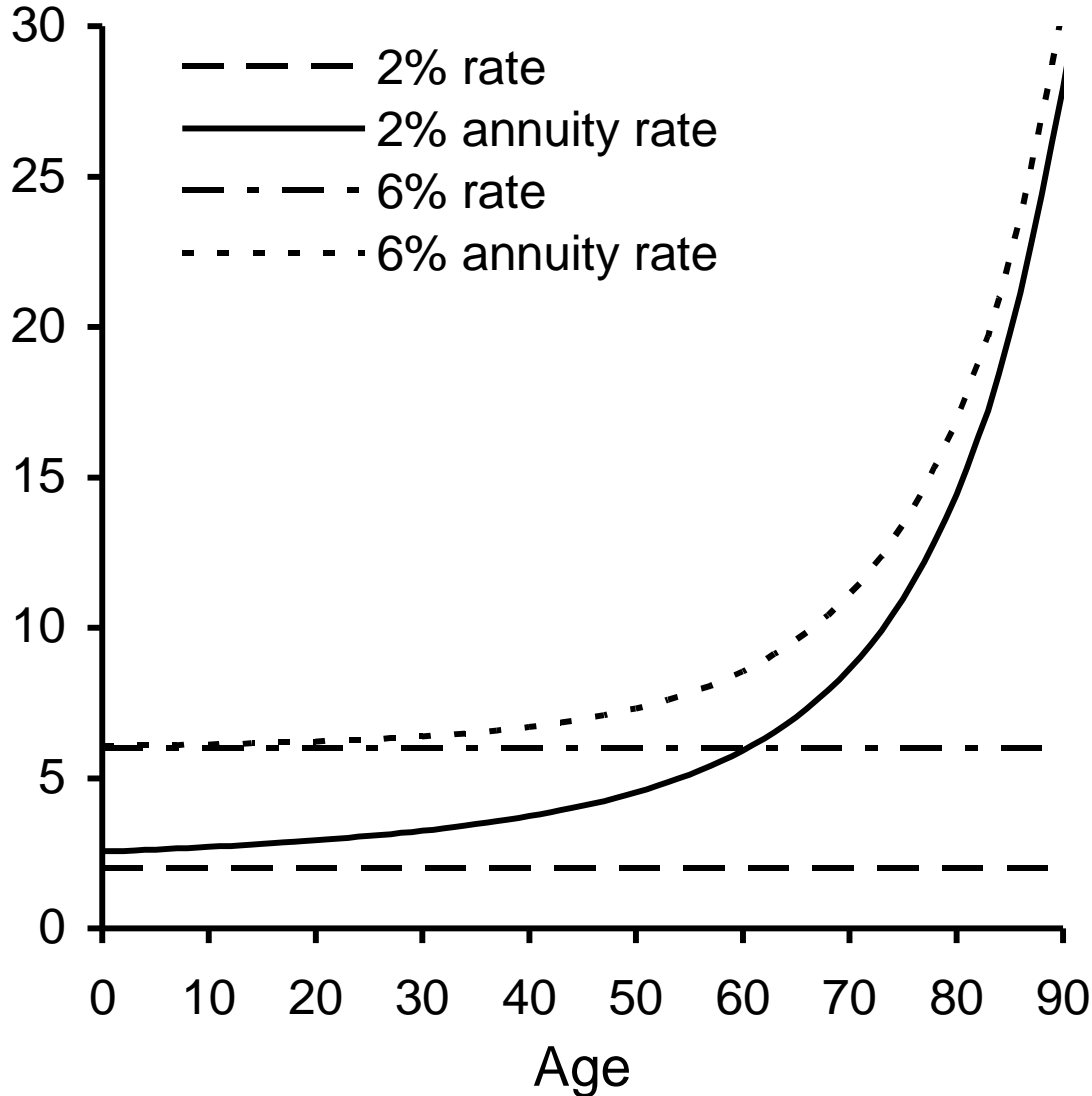
Percentage annuity rate by age

elderly look much better, on average

gender bias: women look worse, as they live longer

Conceptual framework (8)

- Weisbrod and Hansen (1968): income-net worth does not imply

   > "… either that people generally do purchase annuities with any or all of their net worth, that they necessarily *should* do so, or that they *can* do so"

- Yet, assumption that wealth spread evenly over lifetime is arbitrary (Projector and Weiss 1969; Atkinson 1975)

- Strong implications for the age structure of poverty

   – accumulated assets at older ages with a shorter annuity horizon increase income net worth of the elderly as compared to younger person with longer time horizons and fewer accumulated assets

- Little used in poverty literature

Conceptual framework (9)

| Authors | Country | Year | Source | Reference Population | Length of Annuity (n) | Annuity Interest Rate (ρ) | Wealth Concept | Impact on Mean | | Poverty Line | Headcount Ratio (%) | | Other Adjustments |
								Income (1)	Income–Net Worth		Income (1)	Income–Net Worth	
Carlin and Reinsel, 1973	U.S.	1966	Pesticide and general farm survey	All farm families	Life expectancy of wife assumed 2 years younger than spouse	6%	Net worth	$5,300 $4,200 (2)	$7,600 $6,100 (2)	$2,500	32	15	—
Taussig, 1973	U.S.	1967	Survey of economic opportunity			6%							
Moon, 1976	U.S.	1967	Survey of economic opportunity	All families with a person aged 65 and over	Average life expectancy of aged family member and spouse	4%	Net worth	$2,427 (2)	$3,743 (2)	$2.00	40.4	25.2	Downward adjustment of home equity
Irvine, 1980	Canada	1972	Statistics Canada and survey of consumer finance	All households	Stochastic process to retrieve mortality rate	5.5%	Net worth	$8,359	$12,160.5	—	—	—	Also estimates of future earnings and discounted value of lifetime earnings
Burkhauser and Wilkinson, 1982	U.S.	1969–1975	Retirement history study	Subsample of married men aged 58 through 63 who worked in 1969 but had retired in 1975	Life expectangy at the average age of the sample in 1969 and 1975	5%	Net worth	—	—	Bureau census poverty line $3257 in 1975	—	—	—

Conceptual framework (10)

Authors	Country	Year	Source	Reference Population	Length of Annuity (n)	Annuity Interest Rate (ρ)	Wealth Concept	Impact on Mean Income (1)	Impact on Mean Income–Net Worth	Poverty Line	Headcount Ratio (%) Income (1)	Headcount Ratio (%) Income–Net Worth	Other Adjustments
Burkhauser, Butler, and Wilkinson, 1985	U.S.	1969–1979	Retirement history study	Household aged 55–64		5%	Net worth	1969: $20,179 1979: $11,207	1969: $35,076 1979: $19,875	—	—	—	—
Crystal and Shea, 1990	U.S.	1983–84	Survey of income and program participation	All persons	Individual life expectancy	2%	Total assets	0–64: $22,780 65+: $23,109	0–64: $23,410 65+: $28,637	—	—	—	70% of home equity as fungible; adjustment for under-reporting.
Radner, 1990	U.S.	1984	Survey of income and program participation	All households	Expected remaining lifetime of the unit	2%	Financial assets (because of the higher liquidity)	$14,600 (2)	$14,600 (2) $16,600 (4)	—	—	—	—
Rendall and Speare, 1993	U.S.	1984	Survey of income and program participation	All households with a person aged 65 and over	Life expectancies of family head and spouse; infinite horizon for non-elderly	−0.40% 1.60%	Total assets	1.77 (3) 1.97 (3)	2.42 (3) 2.57 (3)	1.25 × SSA line	15.1 12	8.9 8.2	Correction for: remaining years of work lifetime; death of partner
Rendall and Speare, 1995	U.S.	1984	Survey of income and program participation	All households with a person aged 65 and over	Life expectancies of family head and spouse; infinite	−0.40% 2%	Total assets	—	—	1.25 × SSA line	—	—	Model including bequests
Short and Ruggles, 2005	U.S.	1996	Survey of income and program participation	All persons	Life expectancy of family head	2% 4% 2%/6%	Total assets Net worth Total assets/debt	—	—	Official	13.3	11.3 11 12.6	—
El Osta, Mishra, and Morehart, 2007	U.S.	2001	Agricultural and resource management survey	Farm households	Life expectancy of the unit	4%	Net worth	—	—	—	—	—	—
Wolff and Zacharias, 2007	U.S.	1989 1995 2001	Survey of consumer finance	All persons	Maximum life expectancy between head and spouse	Weighted average of historic real rates	Net worth less gross value of owner-occupied housing	$42,198 (2)	$45,392 (2)	—	—	—	Income adjusted by household production and public services

Conceptual framework (11)

- Impose less structure on data $\Rightarrow$ supplement income-based with asset-based poverty measures

- Exposure to potential risk that minimally acceptable living standard cannot be maintained if income falls (income-poverty refers to static condition)

  $\rightarrow$ *vulnerability* more than *poverty*

- asset-poor = wealth < fraction ζ of income poverty line

Conceptual framework (12)
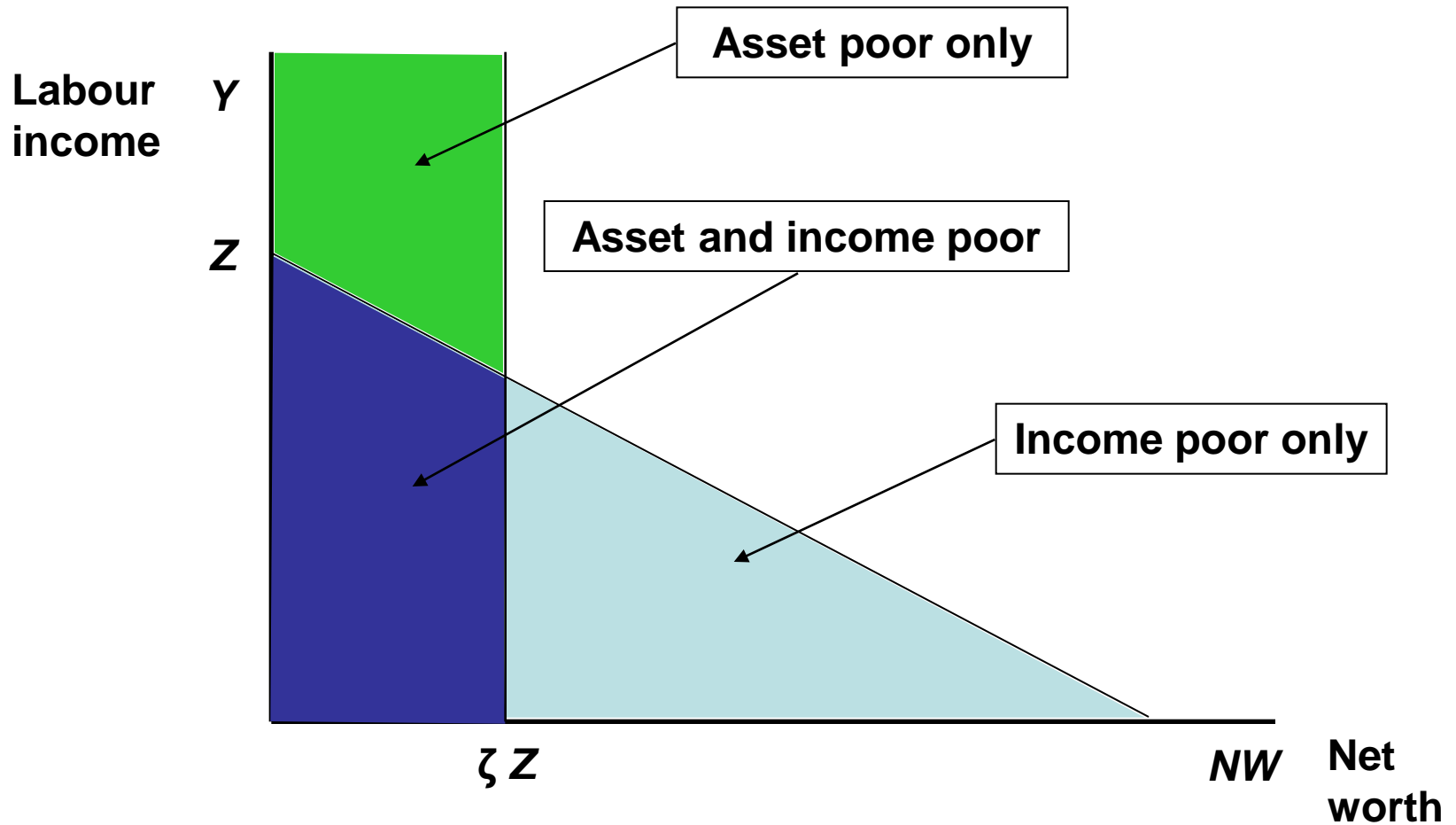
Conceptual framework (13)

- Measurement assumptions:

  - wealth aggregate
    - Haveman and Wolff (2004)
      net worth: indicator of "long-run economic security"
      liquid assets: indicator of "emergency fund availability"

  - Fraction of poverty line
    - ¼ (Haveman and Wolff 2004; Short and Ruggles 2005)
    - ½ (Gornick, Sierminska and Smeeding 2009)
    - studies of precautionary savings
      - Carroll, Dynan and Krane (2003): rise in probability of job loss by 1 p.p. raises wealth by 3 months earnings
      - Barceló and Villanueva (2009): temporary employees hold buffer of liquid wealth of 4-5 monthly earnings
      - Christelis, Jappelli, Paccagnella and Weber (2009): "financial fragility" ~ household's financial wealth does not exceed 3 months of household gross income

Some comparative results

- Application based on a novel database

Luxembourg Wealth Study

   – Broadly comparable database containing wealth variables for 10 countries

   – Based on existing datasets harmonized ex post

   – Caution: wealth is difficult to measure, definitions vary across countries

Difficulty of wealth measurement

- John Campbell's Presidential Address to the American Finance Association (*Journal of Finance,* 2006)

  "Positive household finance asks how households actually invest. While this is a conceptually straightforward question, it is hard to answer because the necessary data are hard to obtain. One reason is that households tend to guard their financial privacy jealously: Indeed, it may be more unusual today for people to reveal intimate details of their financial affairs than to reveal details of their intimate affairs. In addition, many households have complicated finances, with multiple accounts at different financial institutions that have different tax status and include both mutual funds and individual stocks and bonds. Even households that wish to provide data may have some difficulty answering detailed questions accurately."

LWS COUNTRIES (10) AND DATASETS (13)

❑ **Austria**	**Survey of Household Financial Wealth**	**2004**
❑ **Canada**	**Survey of Financial Security**	**1999**
❑ **Cyprus**	**Survey of Consumer Finances**	**2002**
❑ **Finland**	**Household Wealth Survey**	**1994-1998**
❑ **Germany**	**Socio-Economic Panel Study**	**2002**
❑ **Italy**	**Survey of Household Income and Wealth**	**2002-2004**
❑ **Norway**	**Income and Wealth Survey**	**2002**
❑ **Sweden**	**Wealth Survey**	**2002**
❑ **United Kingdom**	**British Household Panel Study**	**2000**
❑ **United States**	**Panel Study of Income Dynamics**	**2001**
	Survey of Consumer Finances	**2001**

➔ Varied group of participants

Bericht, Nachricht vom 21.12.2011

Das DIW Berlin trauert um seinen langjährigen Mitarbeiter PD Dr. Joachim R. Frick

Wir trauern um unseren Kollegen PD Dr. Joachim R. Frick. Er verstarb am 16. Dezember 2011 im Alter von 49 Jahren.

Joachim Frick war einer der Leiter der international anerkannten Infrastruktureinheit Sozio-oekonomisches Panel (SOEP). Auf dem Höhepunkt seines Wirkens wurde er Opfer einer heimtückischen Krebserkrankung. Er hat tapfer und beherzt den Kampf gegen die Krankheit aufgenommen und am Ende Frieden gefunden. Wir verlieren in Joachim Frick einen warmherzigen und verlässlichen Freund, einen geschätzten, engagierten und hochproduktiven Kollegen und einen international vernetzten Pionier der komparativen Panelanalyse. Wir werden ihn vermissen und ihm in Dankbarkeit für die mehr als 20 Jahre der Zusammenarbeit ein ehrendes Andenken bewahren.

http://www.diw.de/sixcms/detail.php?id=diw_01.c.390340.de

The Luxembourg Wealth Study database

Country	Type of source	Over-sampling of the wealthy	Sample size	No. of non-missing net worth	No. of wealth items
Austria	Sample survey	No			10
Canada	Sample survey	Yes	15,933	15,933	17
Cyprus	Sample survey	Yes	895	349	24
Finland	Sample survey	No	3,893	3,893	23
Germany	Sample panel survey	Yes	12,692	12,129	9
Italy	Sample survey (panel section)	No	8,011	8,010	34
Norway	Sample survey + admin. records	No	22,870	22,870	35
Sweden	Sample survey + admin. records	No	17,954	17,954	26
United Kingdom	Sample panel survey	No	4,867	4,185	7
United States	Sample panel survey	No	7,406	7,071	14
	Sample survey	Yes	4,442	4,442	30

➔ **Survey differ! Perfect comparability cannot be achieved, but much can be done to improve comparability**

LWS data

Country	Disposable income	Total financial assets	Net worth	Net worth to disposable income ratio
Austria (2004)	–	61.0	–	–
Canada (1999)	68.9	39.1	55.3	2.6
Finland (1998)	54.7	23.3	51.5	3.0
Germany (2002)	63.7	30.1	78.1	3.9
Italy (2002)	51.1	38.5	106.6	6.7
Norway (2002)	83.2	63.5	–	–
Sweden (2002)	61.9	44.3	–	–
UK (2000)	62.5	42.8	86.5	4.4
US-PSID (2001)	100.0	100.0	100.0	3.2
US-SCF (2001)	88.8	150.2	132.6	4.8

Source: elaborations on LWS data

- Net worth: business equity not included; missing in Austria, not comparable in Norway/Sweden
- Wealth-to-income ratios lower than for aggregate balance sheets
- Impact of different survey characteristics: compare two US sources
- Finland vs. Italy vs. US (PPP adjusted values)

Income-net worth (1)

**% share of income-poor and income-net worth-poor households
All households (head life expectancy, 2% rate, zero bequest)**

Country	National lines			US-PSID line		
	Income-net worth poor	Income poor	Difference	Income-net worth poor	Income poor	Difference
Finland (1998)	8.4	10.6	-2.2	30.8	39.8	-9.0
Germany (2002)	11.3	12.9	-1.6	25.8	30.6	-4.8
Italy (2002)	9.2	12.5	-3.3	29.8	42.3	-12.5
US-PSID (2001)	14.5	17.4	-2.9	14.5	17.4	-2.9
US-SCF (2001)	16.6	19.5	-2.9	23.7	27.5	-3.8

Source: elaborations on LWS data

- Two poverty lines – Square root equivalence scale – Adjustment only for heads 55+
- Replacing actual annual yield of net worth with its annuity value reduces poverty ratios
- Country ranking unchanged, but higher wealth holdings of Italians produce biggest reduction
- Smaller effect if we annuitize financial assets rather than net worth

Income-net worth (2)

% share of income-poor and income-net worth-poor households
**Households with head 55+ (head life expectancy, 2% rate, zero bequest)**

Country	National lines			US-PSID line		
	Income-net worth poor	Income poor	Difference	Income-net worth poor	Income poor	Difference
Finland (1998)	6.7	13.3	-6.6	26.9	52.8	-25.9
Germany (2002)	7.8	11.4	-3.6	22.5	33.3	-10.8
Italy (2002)	5.2	11.9	-6.7	22.1	47.2	-25.1
US-PSID (2001)	8.9	18.0	-9.1	8.9	18.0	-9.1
US-SCF (2001)	13.5	21.9	-8.4	18.3	29.5	-11.2

Source: elaborations on LWS data

- Income poverty higher for this subgroup than for whole population in Finland and US, lower in Italy and Germany
- Much larger impact from the adoption of income-net worth indicator
- Lower impact in Germany related to lower home-ownership
- Pronounced narrowing of differences between US and Europe

Income-net worth (3)

% share of poor households
(head life expectancy, 2% rate, zero bequest, only heads 55+)
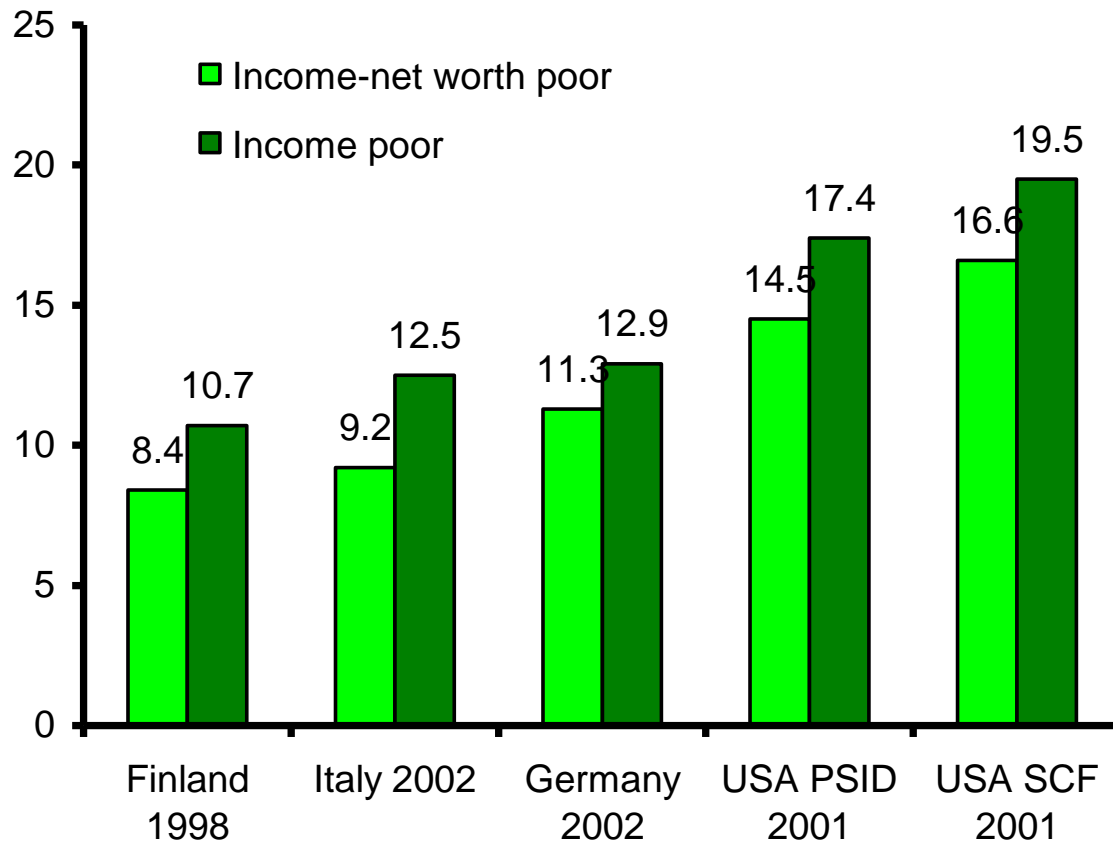
- Lower poverty ratios
- Country ranking unchanged, but biggest reduction in Italy
- Smaller effect if financial assets annuitized

Asset-poverty (1)

Country	Income poor	Net worth poor	Income and net worth poor	Liquid asset poor	Income and liquid asset poor
Austria (2004)	–	–	–	13.8	–
Canada (1999)	16.5	33.8	11.3	56.5	13.4
Finland (1998)	10.6	28.3	5.7	49.0	7.7
Germany (2002)	12.9	38.0	8.4	52.3	10.4
Italy (2002)	12.5	14.3	4.4	31.7	9.2
Norway (2002)	12.0	–	–	36.1	6.8
Sweden (2002)	10.2	–	–	42.8	6.0
UK (2000)	14.6	24.7	5.4	46.0	9.7
US-PSID (2001)	17.4	33.2	11.0	52.6	14.7
US-SCF (2001)	19.5	31.7	11.2	44.6	15.1

Source: elaborations on LWS data

- National lines – Asset poverty line at ¼ of income poverty line
- Net worth poverty 2 to 3 times income poverty in most nations
- Income and liquid asset poor not terribly different from income poor

Asset-poverty (2)

% share of poor households
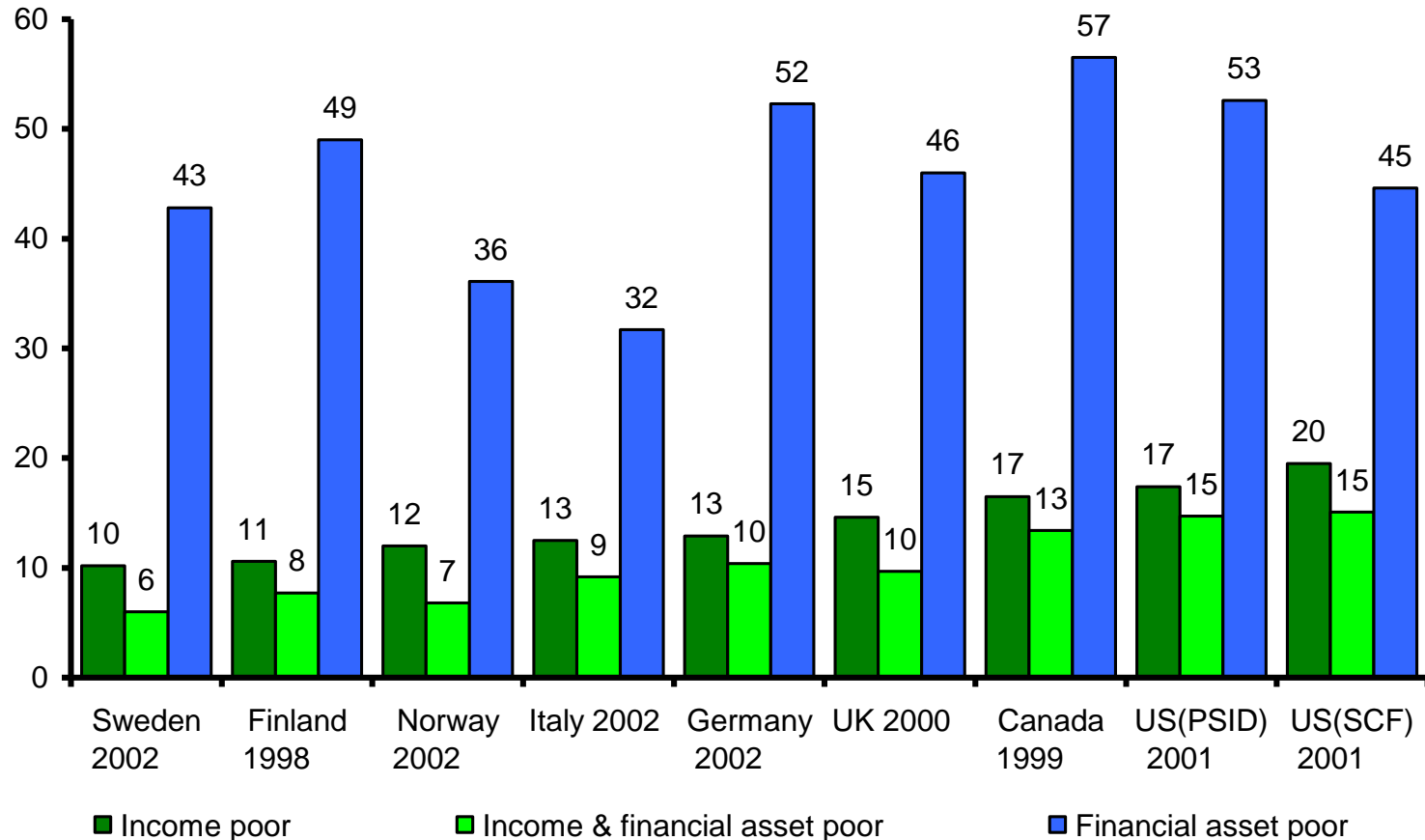
- Income & financial asset poor not terribly different from income poor
- Many households have little financial assets

Conclusions

- Need to integrate wealth into the analysis of poverty and inequality

- Asset-related measures of poverty have distinctive informative value with respect to income-based statistics
  - Pools of asset-poor and income-poor do not coincide

- Empirical problem:
  - income & wealth together
  - better wealth data
  - need ex ante standardization of methods and definitions
  - SHARE (55+, Europe+) and HFCS (euro area)

- Analytical challenge
  - Better understand properties of alternative indicators

MANY THANKS FOR YOUR ATTENTION