An overview of polarization, pro-poor and distributional change ideas

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Motivation

- The role of the middle class in fostering economic growth, stabilizing political systems and reducing conflicts is well acknowledged in the literature.

- Yet, despite extensive literature on distributional change, mobility and pro-poor growth, the subject of **pro-middle class growth** was not thoroughly studied

- The main goals of my research is to construct a new measure for pro-middle class distributional change and to apply it to the case of Israel

Outline of the presentation:

- What is polarization and how is it different than inequality?
- Why is polarization important?
- How is polarization measured (in a nutshell ☺)
- What is distributional change?
- What are the main properties that a distributional- change measure should have?
- Pro-poor growth, different forms of convergence
- Outline of my research- how can a pro-middle-class growth be measured?
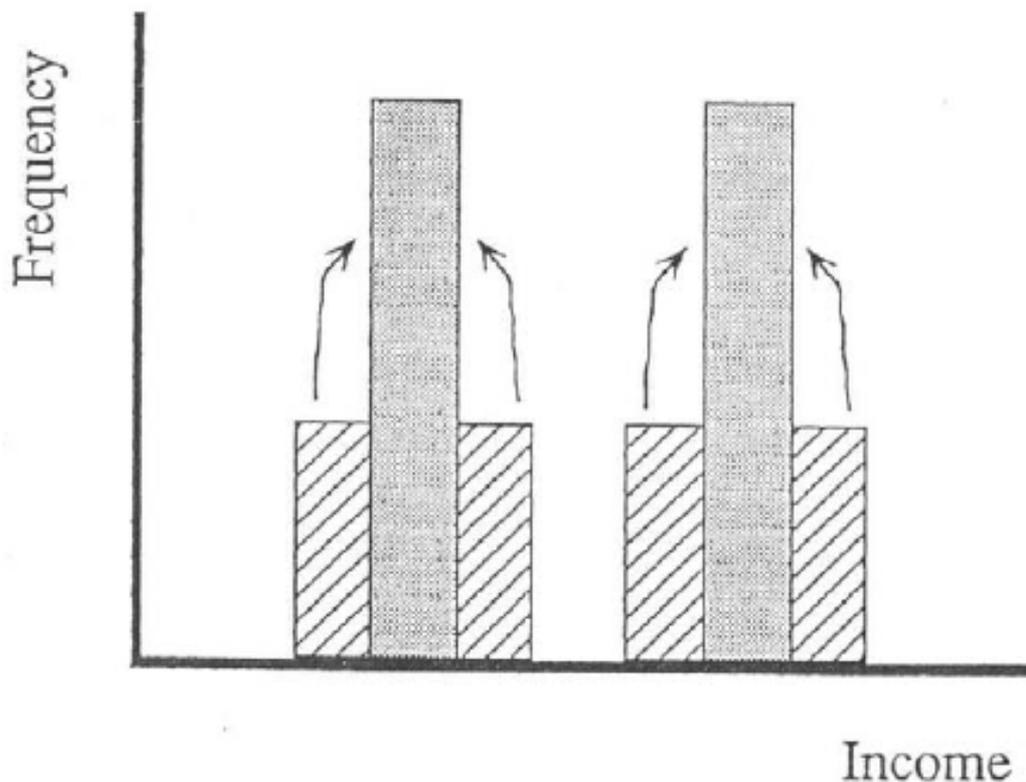
Basic concepts of polarization and Bi-polarization:

- Increased spread:

mean-preserving regressive transfer:

Source: Foster and Wolfson (2010)
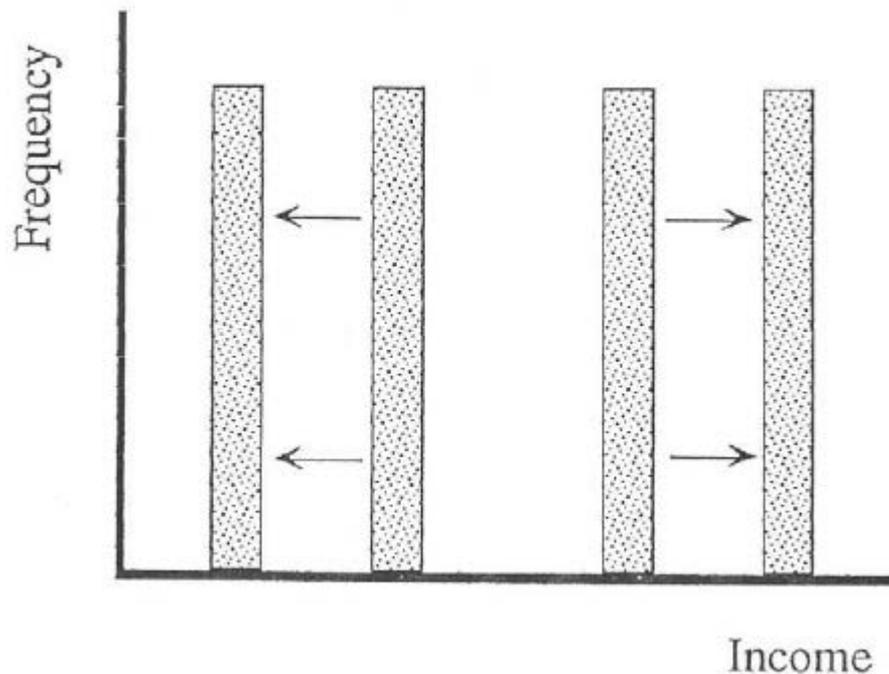
Basic concepts of polarization and Bi-polarization:

- Increased bipolarity

Source: Foster and Wolfson (2010)

Polarization vs. inequality

- Any regressive transfer (or mean preserving spread) leads to an unambiguous increase in inequality, irrespective of the location of the transfer.

 Thus,

- polarization and inequality move in the same direction when the transfer takes place across the middle: increased spread

However,

- Increased bipolarity is associated with a pair of *progressive* transfers, one on each side of the middle, which necessarily *diminish* inequality.

Identification-alienation framework: Esteban and Ray (1991, 1994), Duclos, Esteban and Ray (2004)

Why is polarization important

- It is negatively related to growth (for example: Brzeziński 2013)
- It is positively related to conflicts (thousand of papers; famous few are: Esteban and Ray (1991, 1994), Easterly and Levine (1997), Easterly (2001), Alesina et al (2003) and Birdsall et al (2000)
- The middle class plays an extremely important role as the backbone of society (vast literature in sociology, psychology and economics. For example: Barro (1999), Easterly (2000))

Measuring polarization and the size of the middle class

Four decisions that have to be taken when attempting to measure the middle class
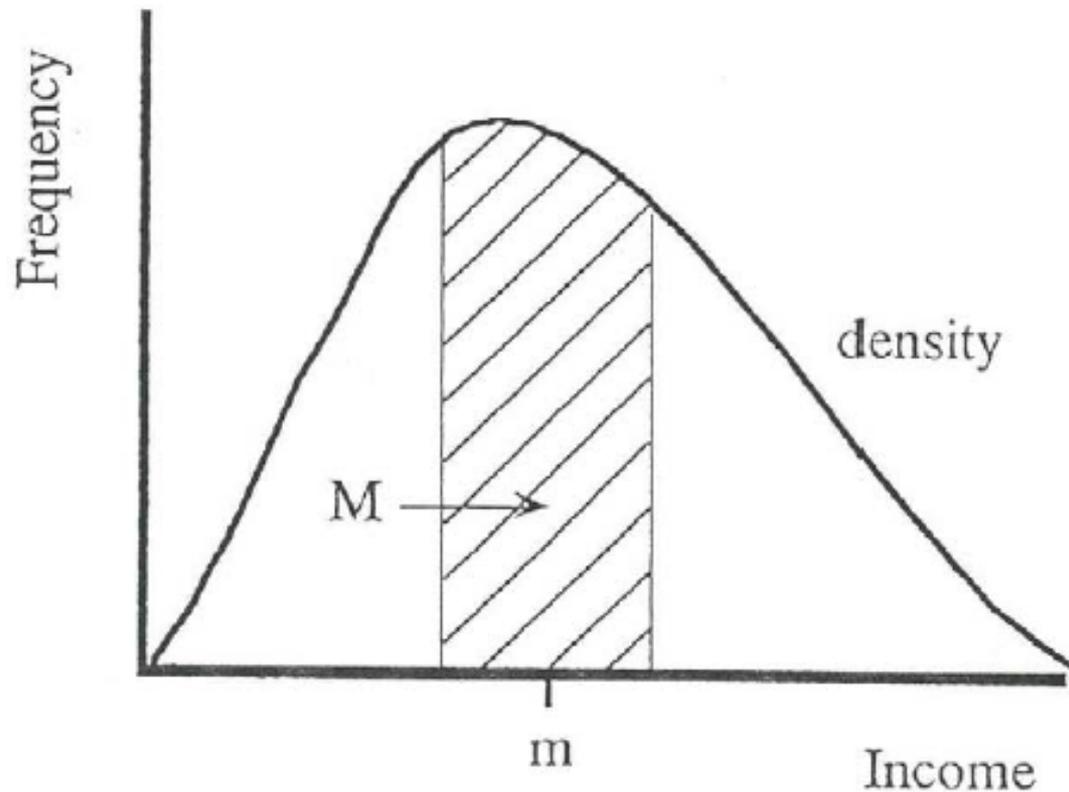
(Foster and Wolfson 2010*):

(i) Choosing the space –"income space" (most common choice) or "people space"

(ii) Defining the middle- the median (most common choice) or the mean.

(iii) Fixing the range around the selected middle to identify the middle class

(iv) Aggregating the data.

Measuring the middle class
Income space

For example: Thurow (1984), Blackburn and Bloom (1985)
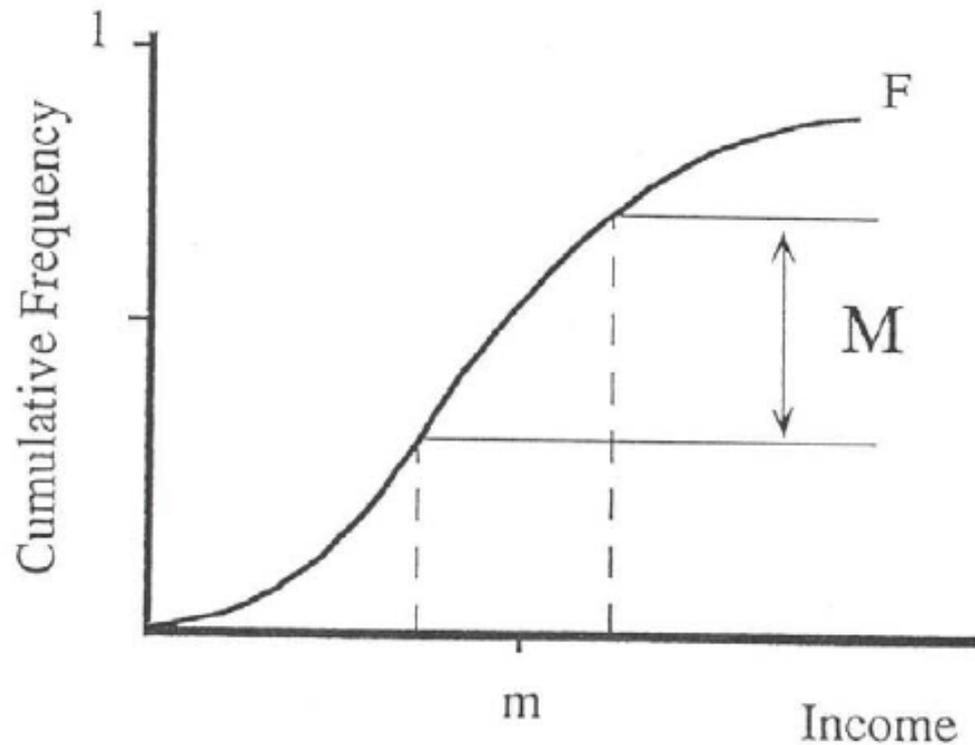
Figure C1: Finding *M* for a density

Source: Foster and Wolfson (2010)
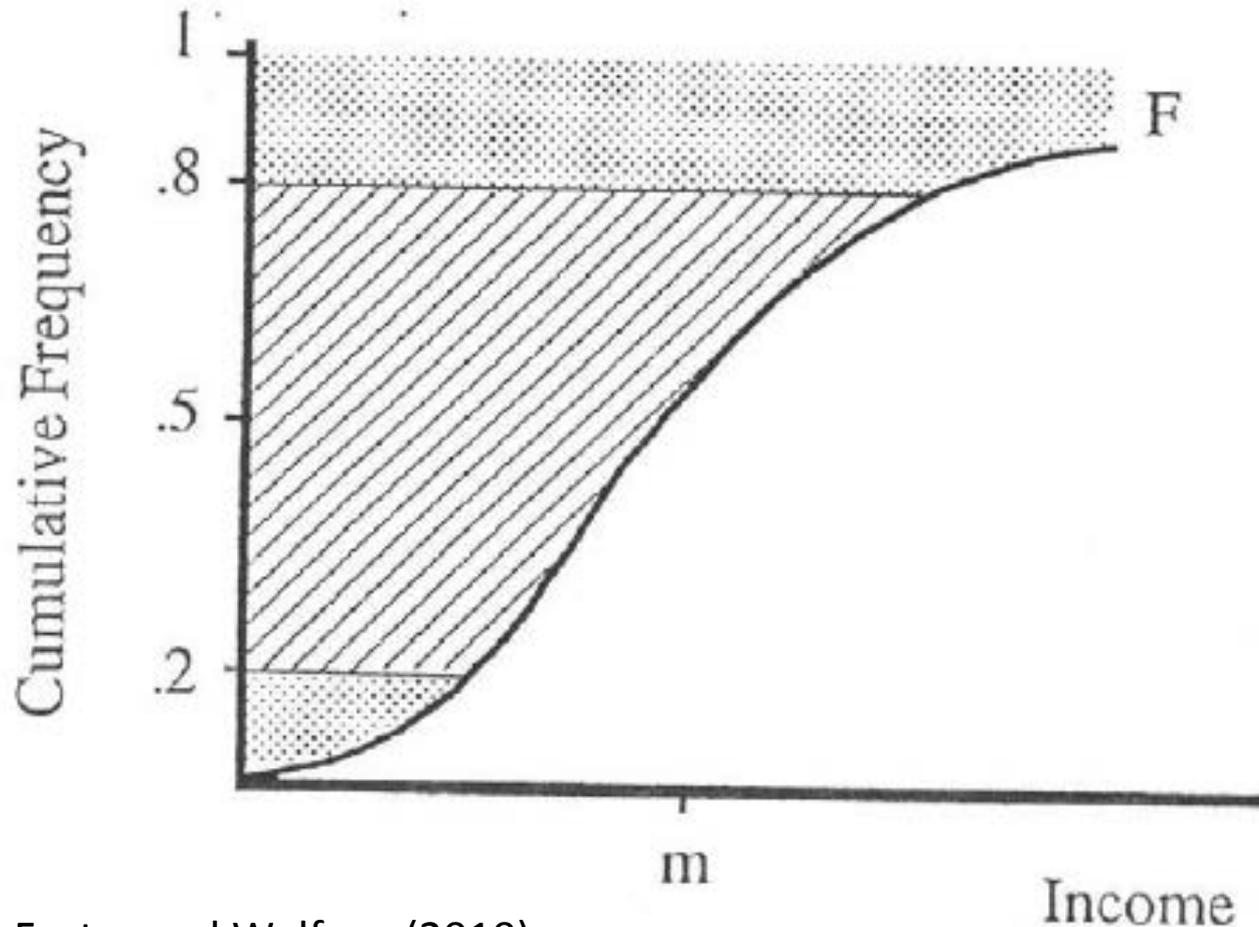
Measuring the middle class (cont.)
Income space

Figure C2: Finding *M* for a cumulative distribution function

Source: Foster and Wolfson (2010)

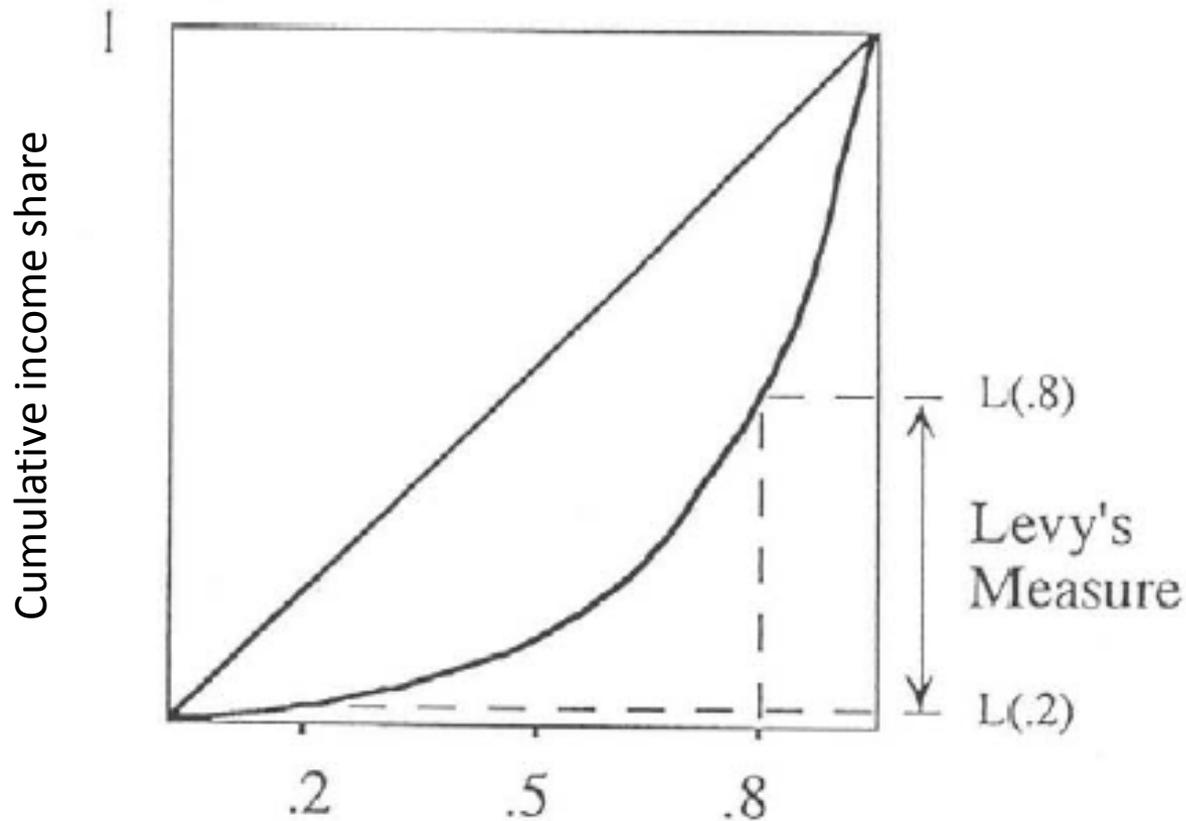# Measuring the middle class (cont.) people space

Figure C3: Levy's measure

Source: Foster and Wolfson (2010)

Measuring the middle class (cont.)
people space

Figure C4: Lorenz curve and Levy's measure
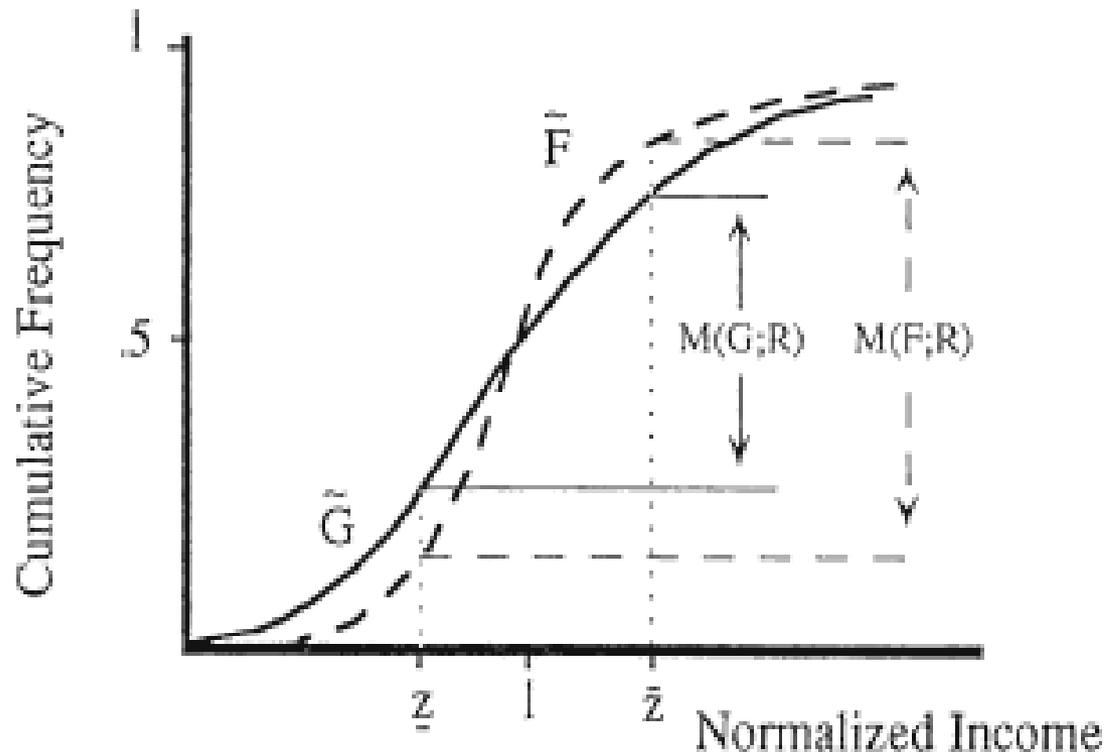
Source: Foster and Wolfson (2010)

Critique (Foster and Wolfson):

- Any symmetric distribution will have the same "size" of the middle class using Levy's approach, irrespective of whether the incomes range widely or fall within one dollar of the median income.

- Consider a simple example of a uniform distribution between $10,000 and $30,000

- Now suppose that the distribution spreads out to become uniform between $0 and $40,000, as would result if those with an income of m − ε gave a transfer of ε > 0 to those with m + ε.

- Levy's measure remain the same in both cases despite the "move from the middle"

Measuring the middle class
Partial ordering

Fig. 8 An example where F M G

Source: Foster and Wolfson (2010)

Measuring the middle class
Partial ordering

Fig. 9 M-Curves

Source: Foster and Wolfson (2010)
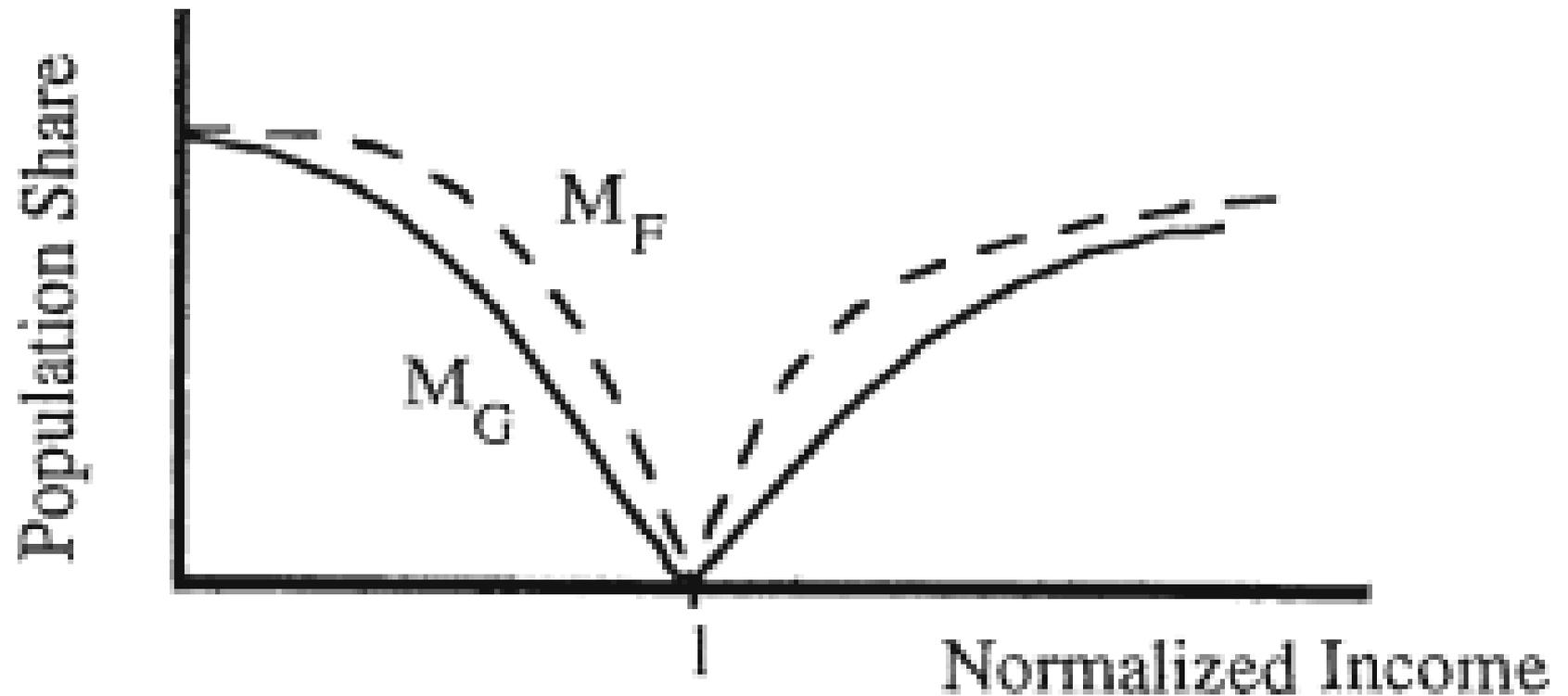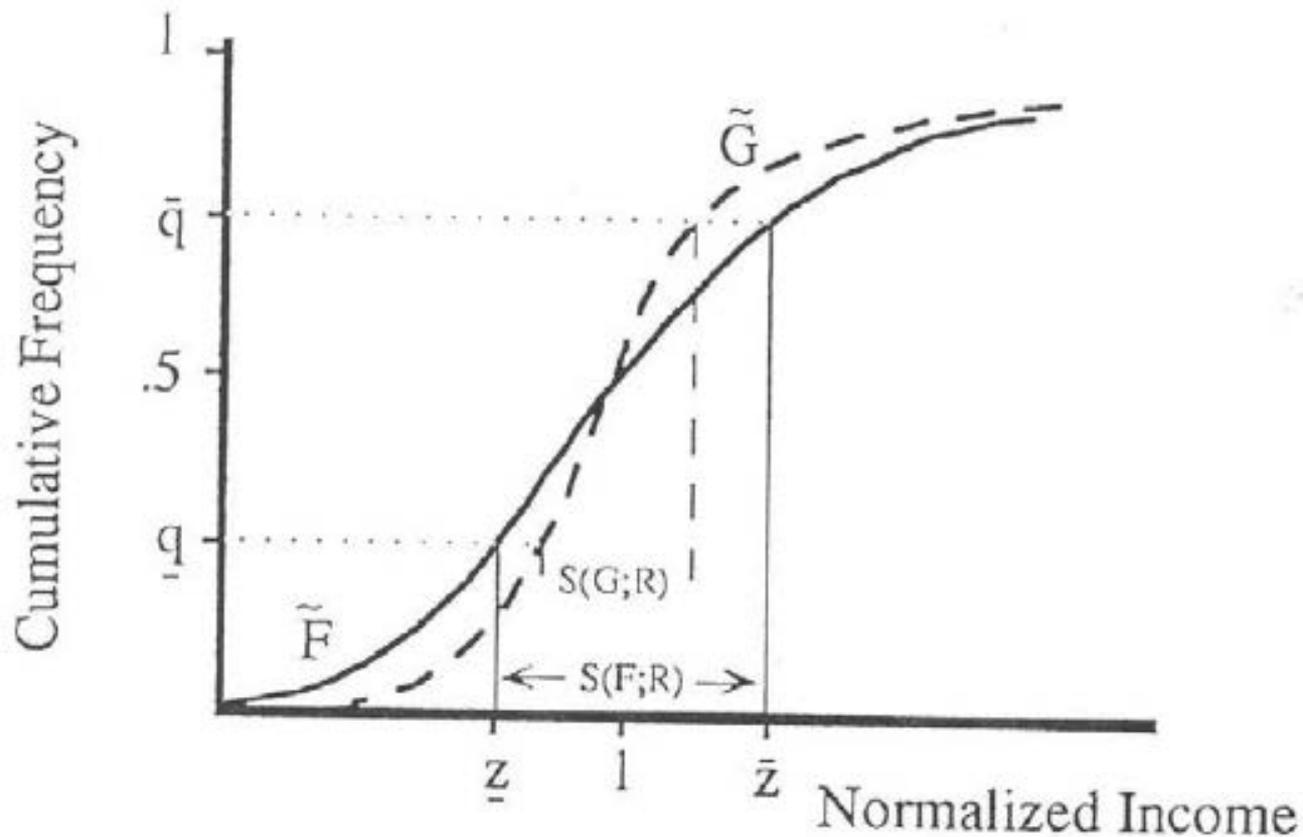
Measuring the middle class
Partial ordering in income space
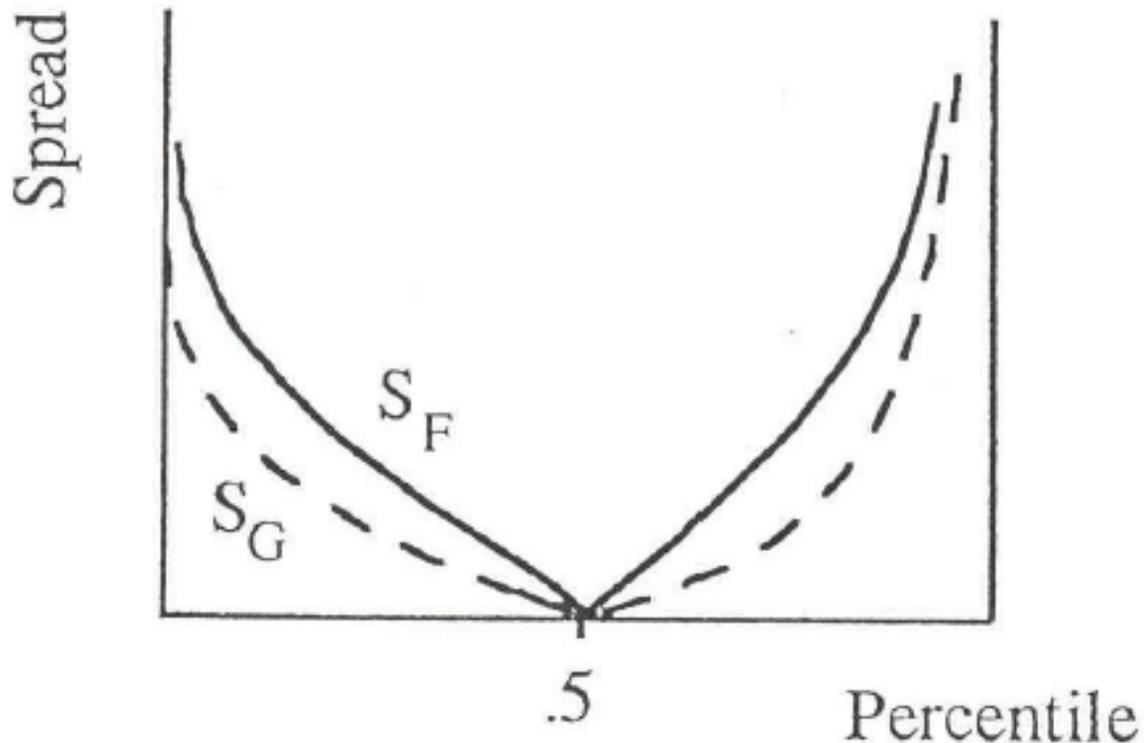

Figure D1: An example where F S G

Source: Foster and Wolfson (2010)

Measuring the middle class
First degree polarization curve

Figure D2: First degree polarization curves

Measuring the middle class
Partial ordering in income space

Figure D3: Increased bipolarity and crossing curves
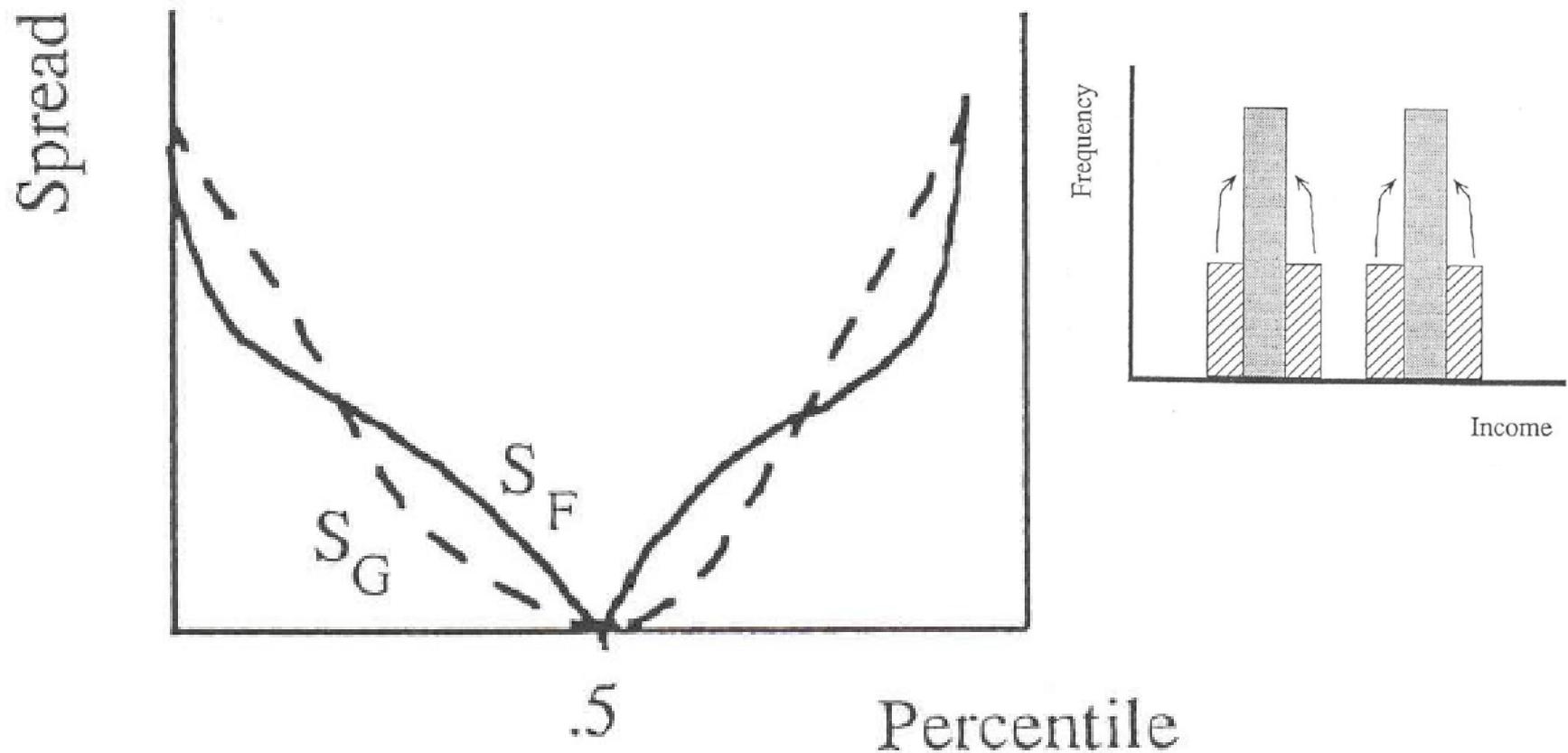
Source: Foster and Wolfson (2010)

Second degree polarization curve
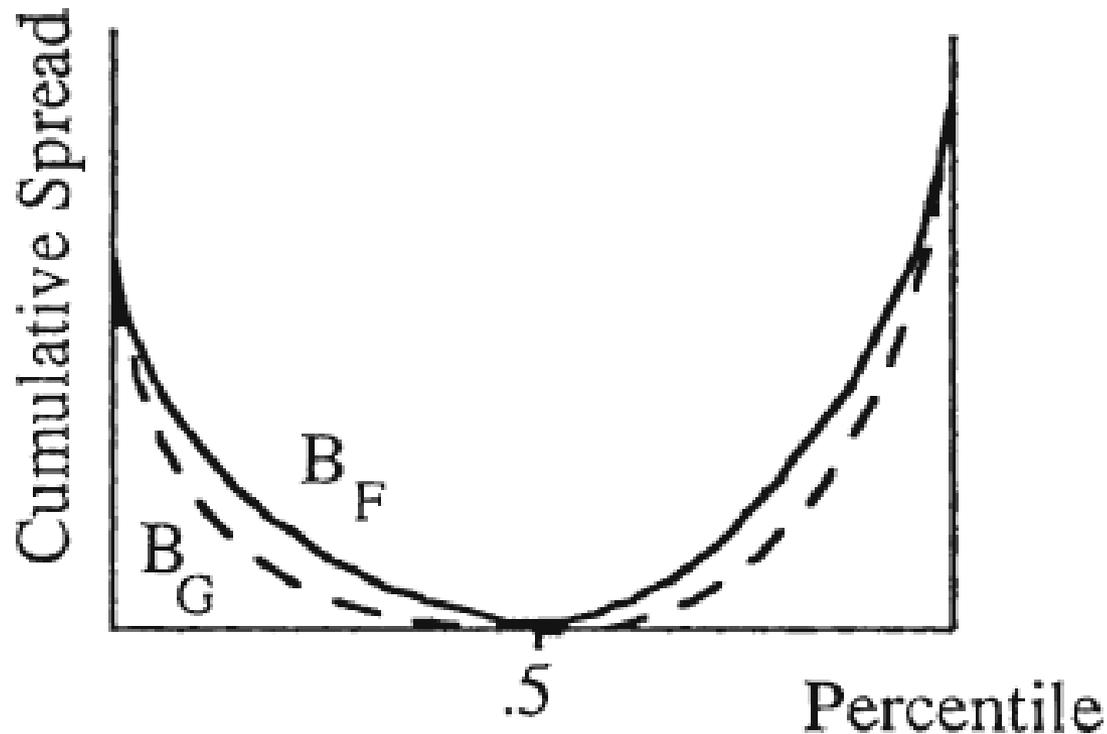
FBG is equivalent to the requirement that for any middle class population Q, the average distance of its members' incomes from the median (in terms of medians) is no lower in F than in G, and for some Q it is higher.
Source: Foster and Wolfson (2010)

Foster and Wolfson polarization index

$$P = (G^B - G^W) \frac{\mu}{m}$$

Cumulative Income

Cumulative population
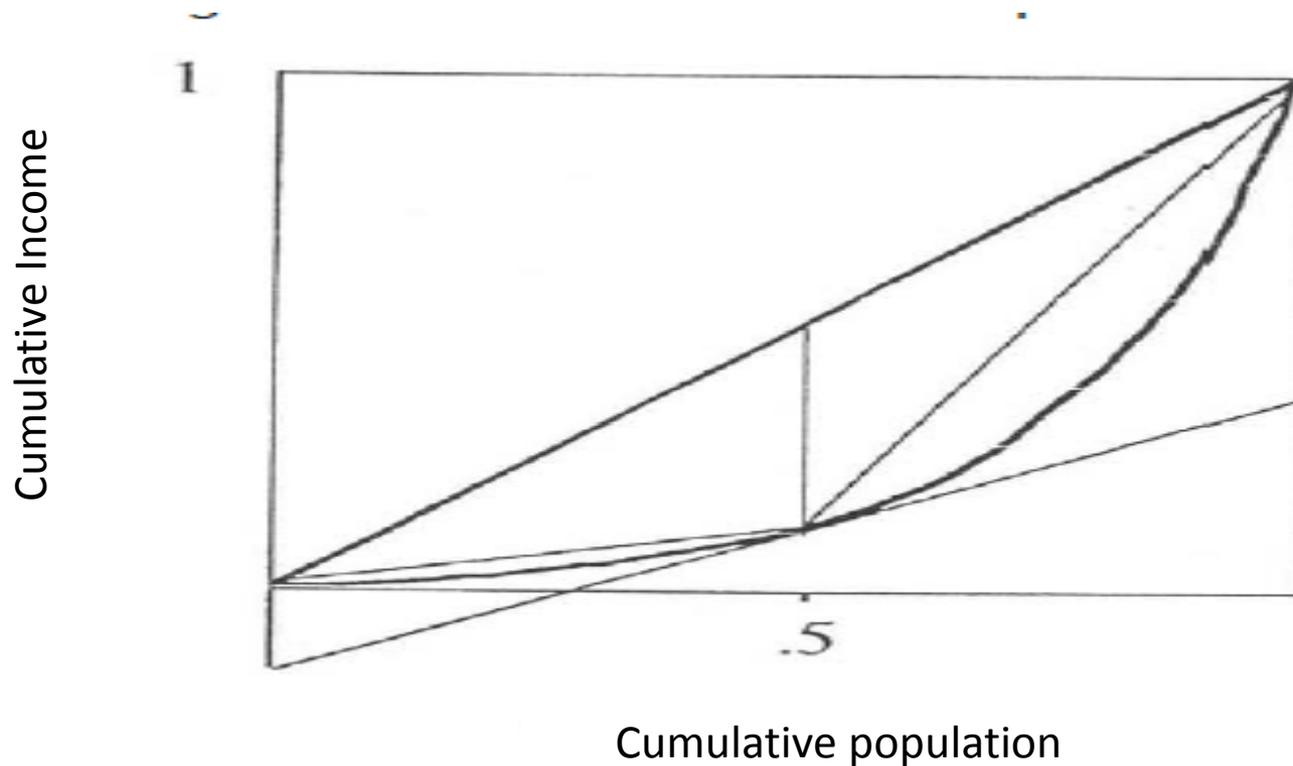
Source: Foster and Wolfson (2010)

What is distributional change?

- The goal of distributional change analysis is to compare different aspects of two or more distributions.

- In the context of income mobility: the amount of movement (over time) that is involved in going from one n-vector of individual incomes x to another n-vector y.

- In the case of horizontal inequity, one compares an "actual" distribution y to some "reference" vector x.

What is of interest when analyzing distributions?

- Inequality
- Polarization
- Comparing different aspects of different distributions (e.g which dist. has a longer tail?)
- How do different aspects of the distribution is related/ is affected by/ influence other economic issues/factors

A glimpse into the literature of distributional change

- Cowell (1985): an axiomatic framework to the analysis of distributional change [*](#)
- Cowell (1980):Specific measures of distributional change
- Silber (1989) an algorithm which define the Gini index as the product of a row vector of population shares and the so-called G-matrix
- Silber (1995): Gini-related measures of distributional change.

Axiomatic framework to the analysis of distributional change (Cowell 1985)

(i)   Axioms of purely technical convenience: differentiability ("smoothness") and continuity

(ii)   Axioms that impose some fairly specific structural restrictions on an index of distributional change: symmetry, homotheticity and decomposability

(iii)   the central principal -analogous to the Pigou Dalton transfer principle in inequality measurement- the principle of monotonicity in distance.*

=>

The principle of monotonicity in distance (Cowell 1985)

The basic idea behind this principle is as follows: Assume that going from a vector of distribution x to a vector of distribution y involves a certain amount of "change" in a specific direction.

Assume that there is another vector of distribution, y', such that the only difference between y and y' is a transfer from individual j to individual i,

>> The sign of the difference in the distributional change measure (comparing the move from x to y to the move from x to y') would be equal to the sign of the difference between the distances.

The principle of monotonicity in distance (Cowell 1985)

For example:

Consider the following distributions:

```
    a  b  c  d  e  f   g   h   i   j
X   1  3  5  1  7  8  11   5   7   4
Y   5  4  3  7  2  1   6  10   9   3
Y'  5  4  3  7  2  1   6  10  10   2
```

>> The distributional change between Y' and X
   Is bigger than the distributional change between Y and X

Mobility

Fields (2008)

Three aspects that should be addressed when analyzing mobility:

I. whether the aspect of mobility is intergenerational or intragenerational;

II. what is the indicator of social economic status (income, earnings, wealth etc.) and what is the recipient unit (individuals, households etc.);

III. whether the concept of analysis is **Macro mobility** or **Micro mobility**.

Six different concepts of mobility :

1. Time independence concept (how dependent is current income on past income?)

2. Movement concepts:

(i) positional movement (or quintile movement)

(ii) share movement

(iii) non directional income movement (flux)

(iv) directional movement

(v) mobility as an equalizer of longer term incomes.

Pro poor growth

- Absolute Vs. relative approach
  - σ-convergence and β-convergence
- The target of the pro-poor policy (only income or other dimensions?)
- Anonymous Vs. nonanonymous approach
- The measure of poverty and the poverty line.

Theoretical framework of my research:

Let $y_{i,t}$ refers to the income of individual i at time t. An income weighted index of distributional change will then compare the distributions of individual income at times t and t+1, by plotting the (cumulative) individual income shares $(y_{i,t}/\sum_i y_{it})$ at time t on the horizontal axis and the corresponding (cumulative) shares $(y_{i,t+1}/\sum_i y_{i,t+1})$ at time t+1 on the vertical axis.

# Distributional change curve in the case of pure positive growth
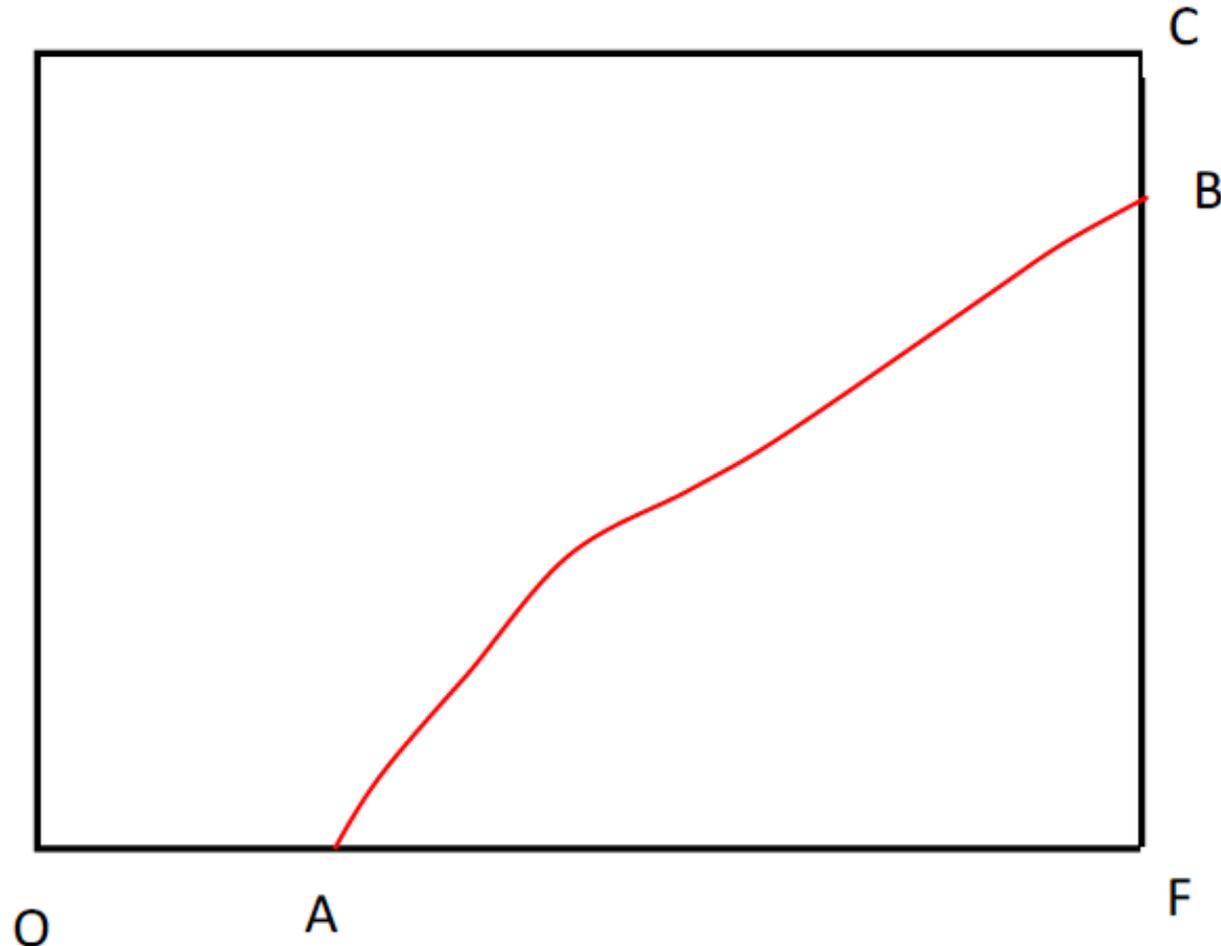
Source: Deutsch, Silber and Yalonetzky (2013)

Example 1: distributional change in favor of the rich

| cum. Income share t+1	cum. Income share t		$(y_{i,t+1}/\sum_i y_{i,t+1})$	$y_{i,t}/\sum_i y_{it}$	(t+1)/t	$y_{i,t+1}$	$y_{i,t}$	
0.000	0.005		2.27E-05	0.004762	1.00	10	10	1
0.000	0.014		0.000181	0.009524	4.00	80	20	2
0.001	0.029		0.000612	0.014286	9.00	270	30	3
0.002	0.048		0.001451	0.019048	16.00	640	40	4
0.005	0.071		0.002834	0.02381	25.00	1250	50	5
0.010	0.100		0.004898	0.028571	36.00	2160	60	6
0.018	0.133		0.007778	0.033333	49.00	3430	70	7
0.029	0.171		0.01161	0.038095	64.00	5120	80	8
0.046	0.214		0.016531	0.042857	81.00	7290	90	9
0.069	0.262		0.022676	0.047619	100.00	10000	100	10
0.099	0.314		0.030181	0.052381	121.00	13310	110	11
0.138	0.371		0.039184	0.057143	144.00	17280	120	12
0.188	0.433		0.049819	0.061905	169.00	21970	130	13
0.250	0.500		0.062222	0.066667	196.00	27440	140	14
0.327	0.571		0.076531	0.071429	225.00	33750	150	15
0.419	0.648		0.09288	0.07619	256.00	40960	160	16
0.531	0.729		0.111406	0.080952	289.00	49130	170	17
0.663	0.814		0.132245	0.085714	324.00	58320	180	18
0.819	0.905		0.155533	0.090476	361.00	68590	190	19
1.000	1.000		0.181406	0.095238	400.00	80000	200	20
			1	1		441000	2100	

Example 1: distributional change in favor of the rich
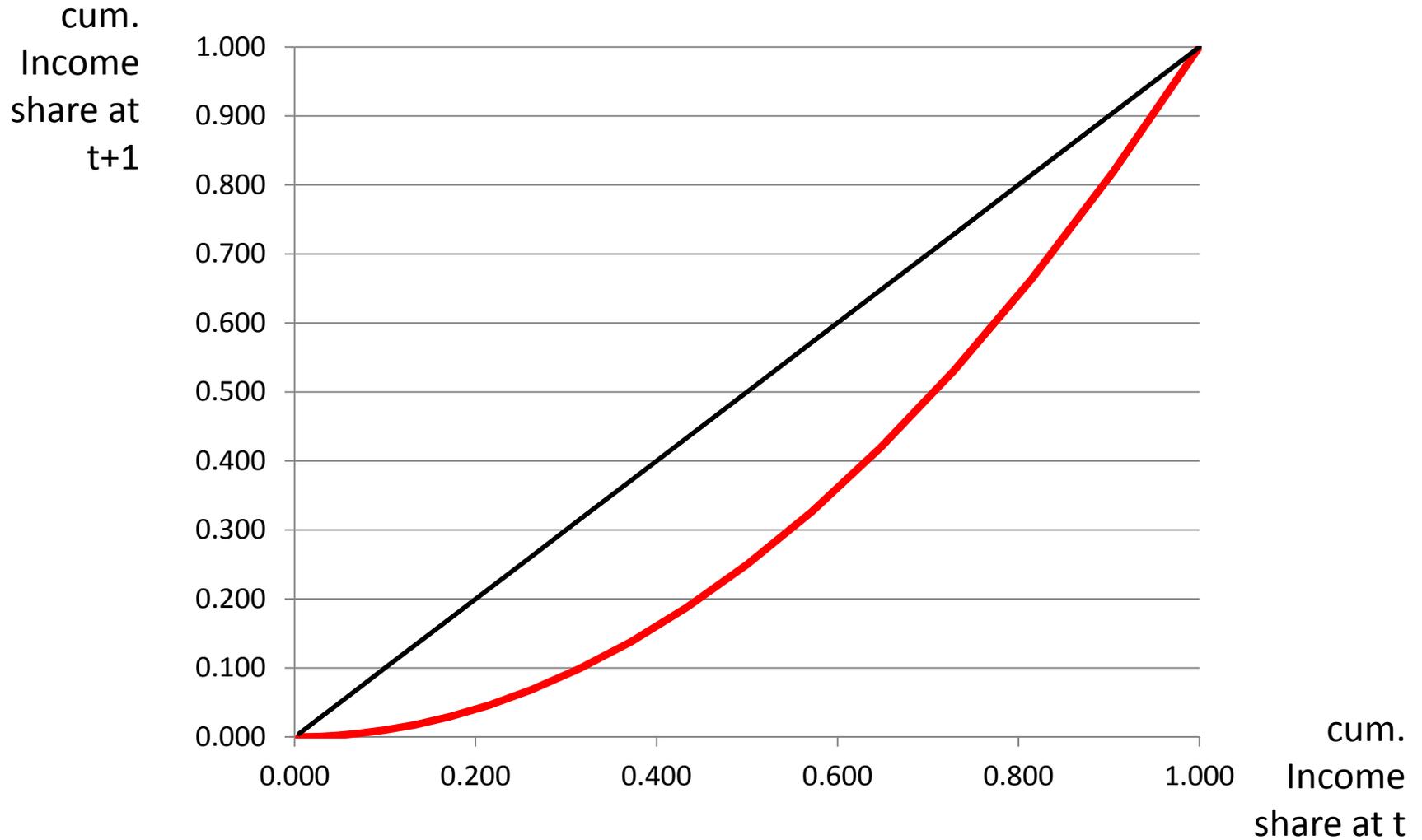
Example 2: distributional change in favor of the poor

cum. Income share t+1	cum. Income share t		$(y_{i,t+1}/\sum_i y_{i,t+1})$	$y_{i,t}/\sum_i y_{it}$	(t+1)/t	$y_{i,t+1}$	$y_{i,t}$	
0.04	0.00		0.04	0.00	501.00	5010	10	1
0.08	0.00		0.04	0.00	126.00	5040	40	2
0.12	0.00		0.04	0.00	56.56	5090	90	3
0.16	0.01		0.04	0.01	32.25	5160	160	4
0.20	0.02		0.04	0.01	21.00	5250	250	5
0.24	0.03		0.04	0.01	14.89	5360	360	6
0.28	0.05		0.04	0.02	11.20	5490	490	7
0.33	0.07		0.04	0.02	8.81	5640	640	8
0.37	0.10		0.05	0.03	7.17	5810	810	9
0.42	0.13		0.05	0.03	6.00	6000	1000	10
0.47	0.18		0.05	0.04	5.13	6210	1210	11
0.52	0.23		0.05	0.05	4.47	6440	1440	12
0.57	0.29		0.05	0.06	3.96	6690	1690	13
0.62	0.35		0.05	0.07	3.55	6960	1960	14
0.68	0.43		0.06	0.08	3.22	7250	2250	15
0.74	0.52		0.06	0.09	2.95	7560	2560	16
0.80	0.62		0.06	0.10	2.73	7890	2890	17
0.86	0.73		0.06	0.11	2.54	8240	3240	18
0.93	0.86		0.07	0.13	2.39	8610	3610	19
1.00	1.00		0.07	0.14	2.25	9000	4000	20
			1	1		128700	28700	

Example 2: distributional change in favor of the poor
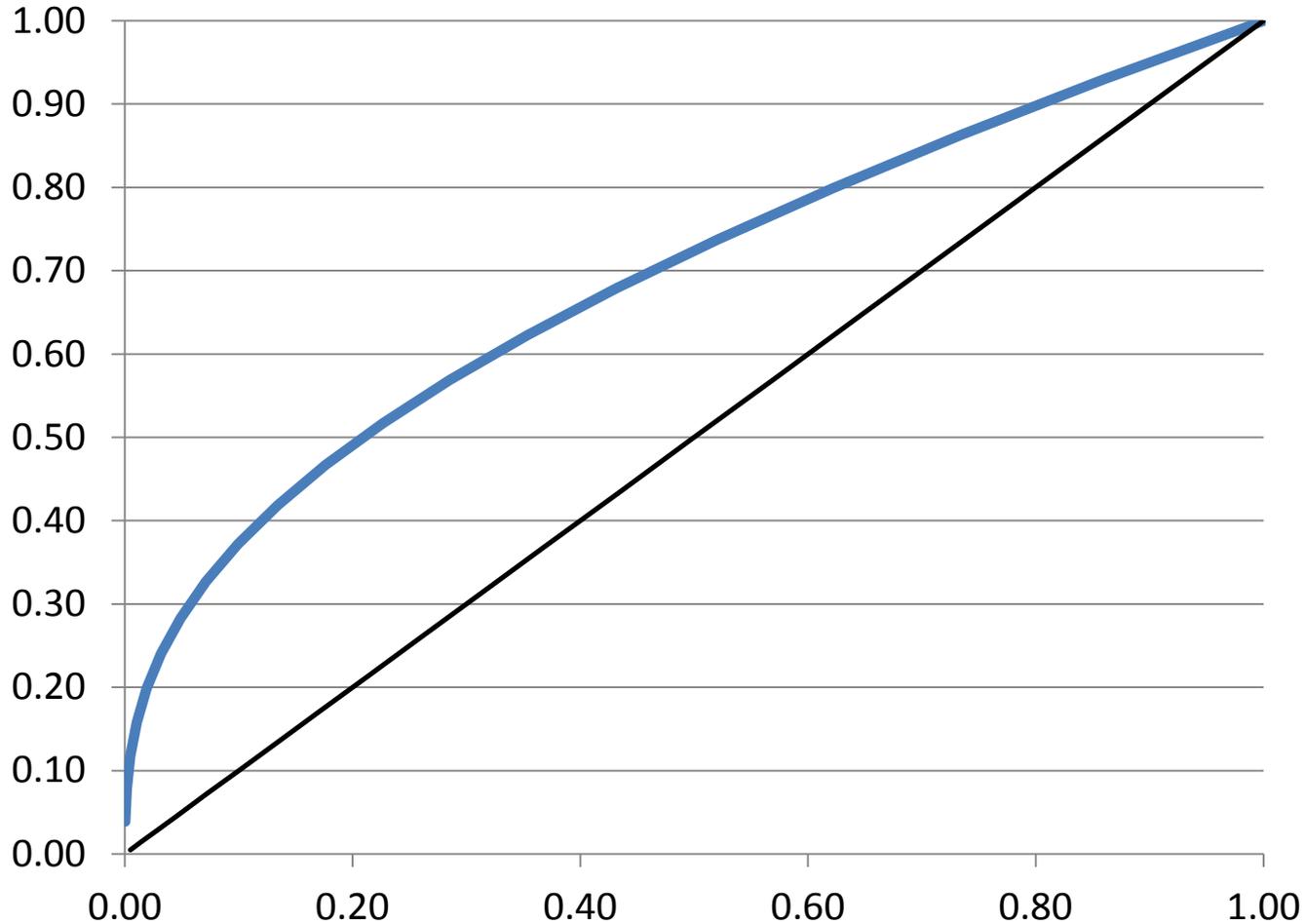
Pro-poor, median preserving change
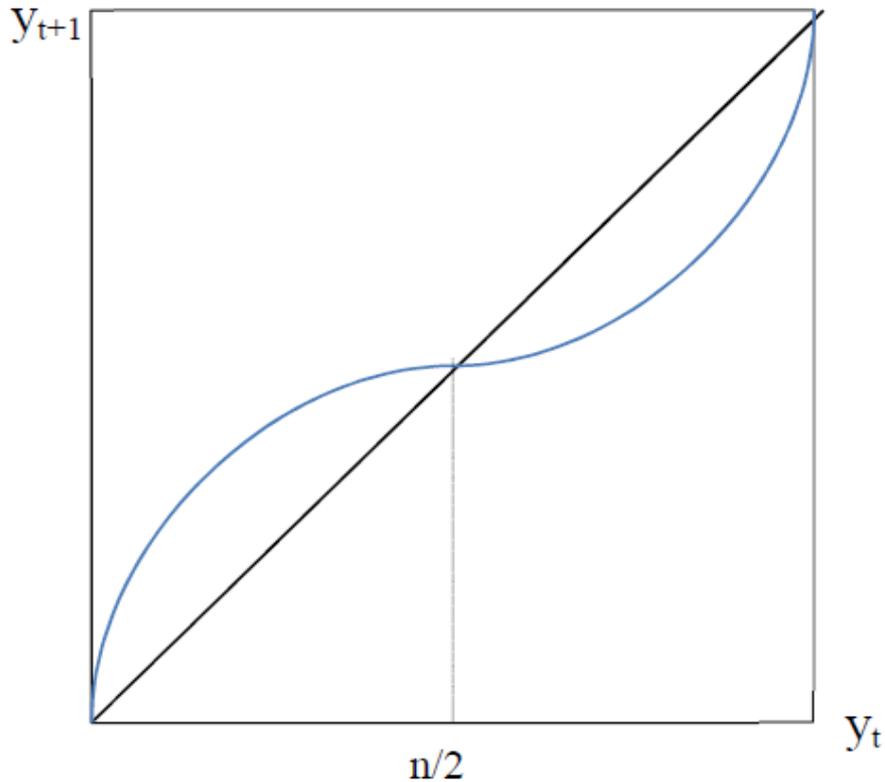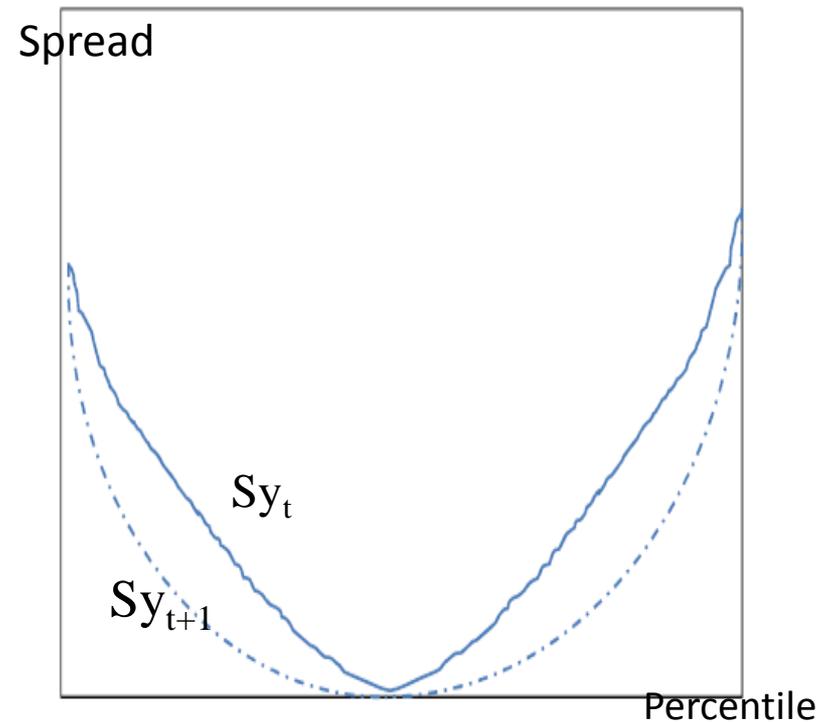
Figure 1: Distributional Change Curve

y_{t+1}

y_t

$n/2$

Figure 1a: First Degree Polarization Curves

Spread

Sy_t

Sy_{t+1}

Percentile

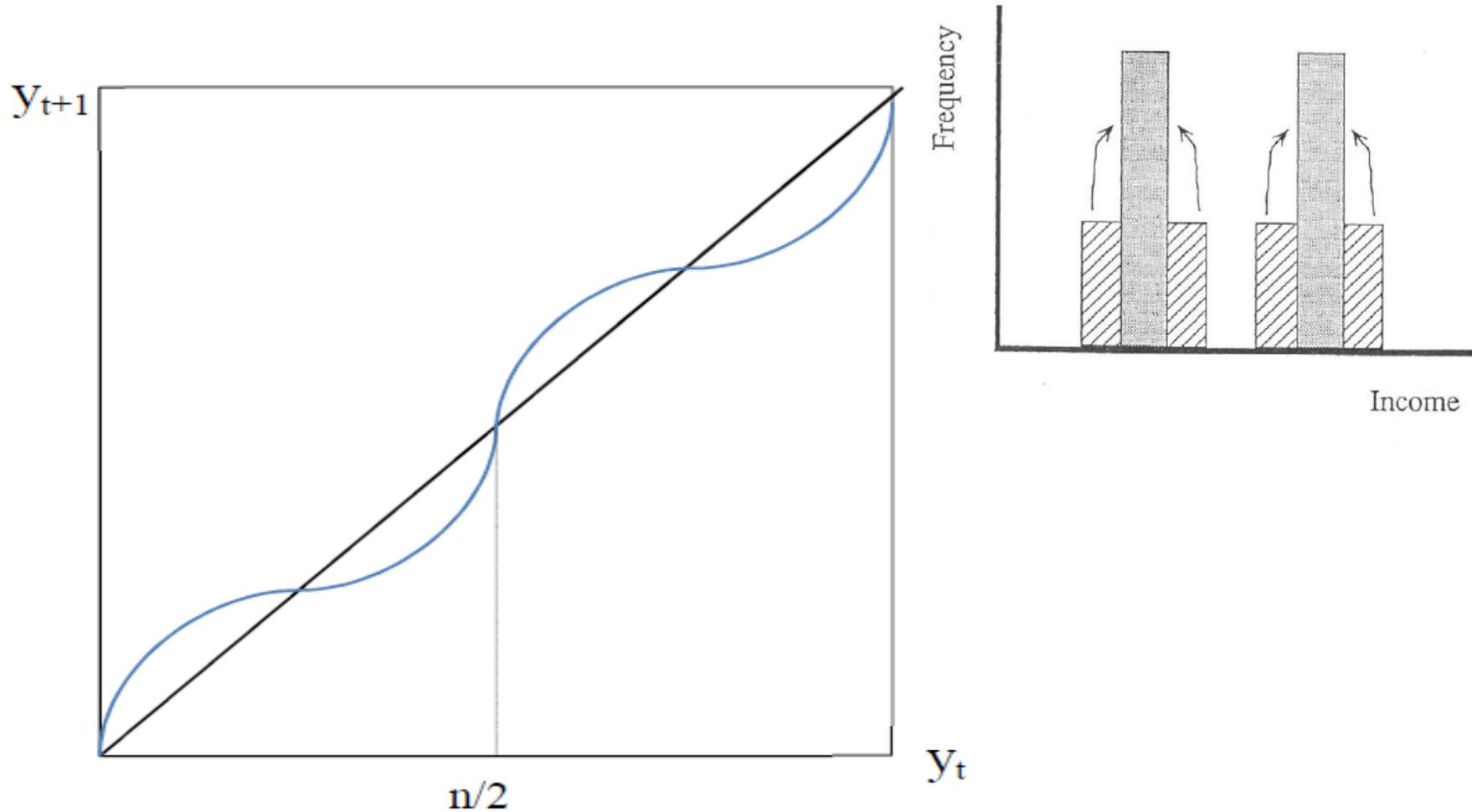# Distributional Change Curve in the case of progressive transfers on both sides of the median

Figure 2a: First Degree Polarization Curves in the case of Increased Bipolarity and Crossing Curves
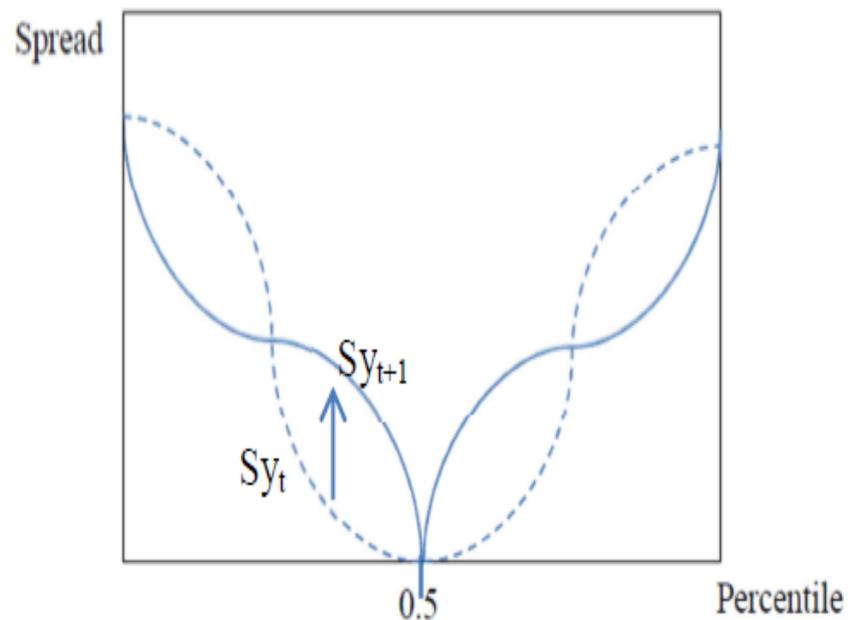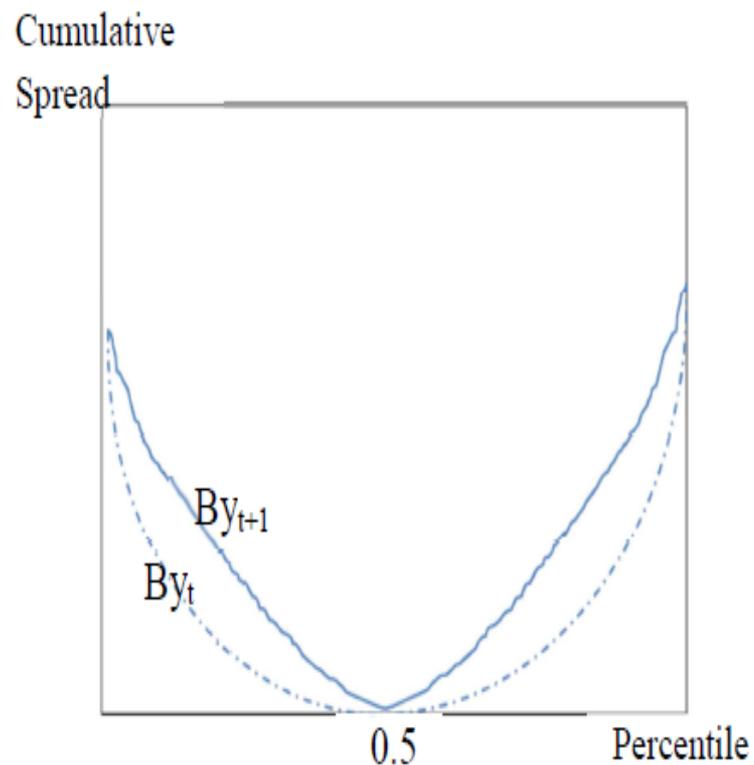
Figure 2b: Second Degree Polarization Curves in the case of Increased Bipolarity

Empirical illustrations:

- The first illustration analyses the change in polarization in Israel in 2008 versus 1995, using (a) total household income, (b) labor income and (c) wealth

- A second illustration will measure income bipolarization among different ethnic groups in Israel.

The database

- Two Israeli censuses, conducted on 1995 and 2008

- Merging the data from the two censuses creates a panel which allows us to use a non-anonymous approach to analyse the change in polarization and compare the result with these from an anonymous analysis.

The database (cont.)

- The first census included about a million individuals who answered the full questionnaire.

- The 2008 census included about 14 percent of the population

  => As a whole there are about 140,000 observations of individuals with full data.