

Decomposing income inequality into factor income components: A comparison of different methods

Uma Rani & Marianne Furrer

Research Department, ILO, Geneva

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Research questions:

- To examine what sources of income influence inequality
- To analyse the factor contribution of each component of income to total inequality in disposable income
 - Assess the extent to which the contribution of each factor has changed over time
- To evaluate whether different approaches yield different results, which is crucial for policy making

Empirical Literature

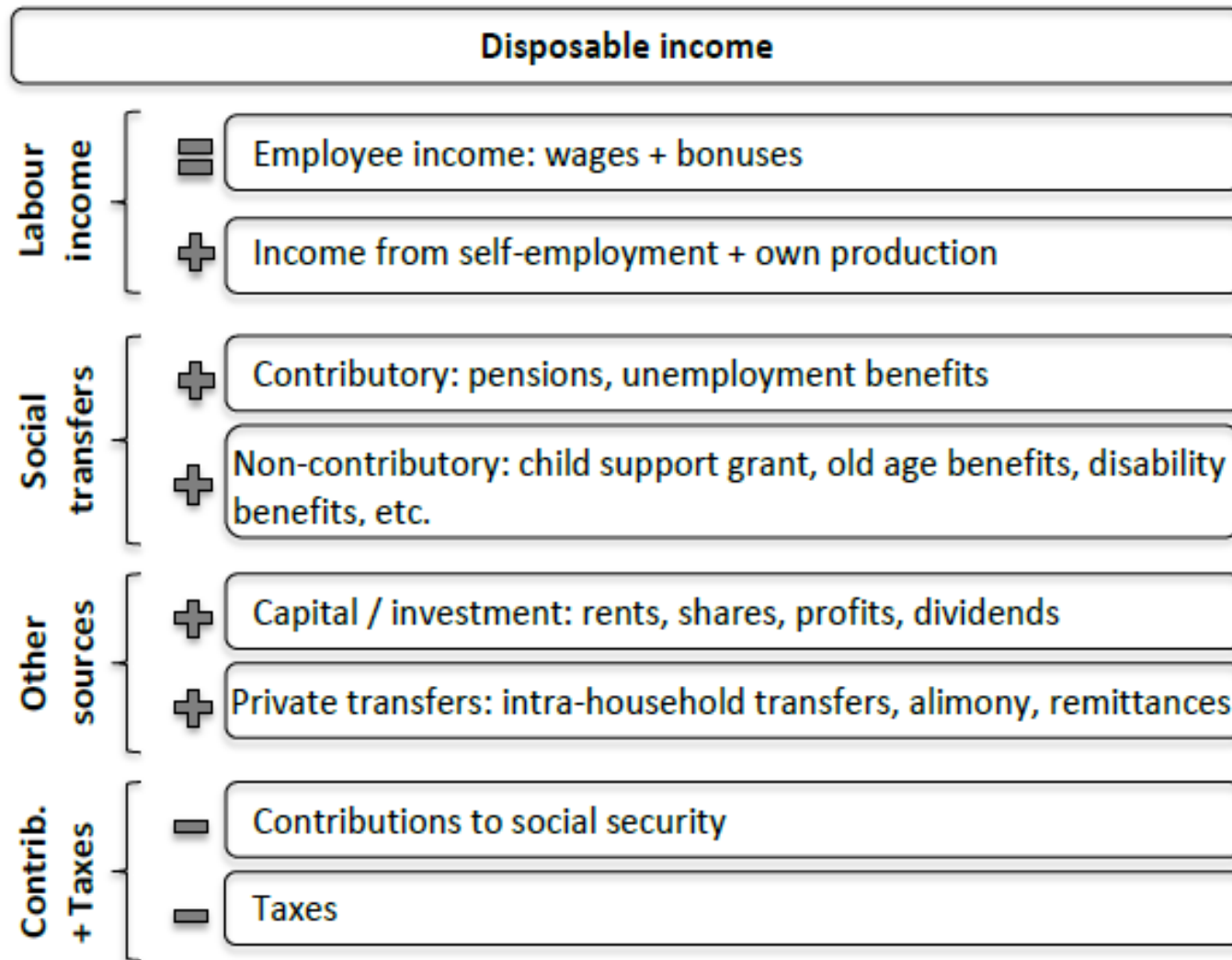
- Decomposing inequality according to factor components (labour, capital, land) (Fei, Ranis and Kuo, 1978 for Taiwan; Fields, 1979 for Colombia)
- Examining the drivers of income inequality for Canada, Germany, Netherlands, Norway and Sweden (Jäntti, 1997; Garcia-Penalosa and Orgiazzi, 2012)
- How tax and transfer (benefit) systems alter the distribution of household incomes (Wang and Caminada, 2011; Forster and Whiteford, 2009; Fuest et al., 2009; Immervoll et al., 2005)
- Factors underlying the increase or decline in inequality in emerging economies (Morduch and Sicular, 2002; Wan and Zhou, 2005 for China; Barros et al., 2010 for Brazil).

Methodology

Different methods utilised to address income inequality depending upon the question:

- Additive decomposition method (Rao, 1969; Fei, Ranis, Kuo, 1978 for Taiwan; Fields, 1979 for Colombia)
- Accounting framework (Smeeding et al., 1990; Mitchell, 1991; Whiteford, 2008; Fuest et al., 2009)
- Proportionate contribution of each factor of income to income inequality (Shorrocks, 1982, 1983; Jenkins, 1995; Fuest et al., 2009)
- Decomposing the Gini by source of income (Lerman and Yitzhaki, 1985)
- Decomposing inequality according to linear income-generating functions, using regression decomposition (Morduch and Sicular, 2002; Fields', 2003; Bigotta, Krishnakumar and Rani, 2014, among others)

Methodology 1: Accounting Framework



Methodology 2: Factor decomposition of CV

Assume that total income Y consists of $f = 1, \dots, K$ different income sources y_f , such that $Y = \sum_{f=1}^K y_f$

Inequality in total income, $I_2(Y)$, can be expressed as the sum of the factor income contributions (Shorrocks, 1982, 1983):

$$I_2(Y) = \sum_{f=1}^K S_f = \sum_{f=1}^K S_f I_2 = \sum_{f=1}^K \rho_f \mu_f \sqrt{I_2 I_2^f}$$

Where...

I_2^f : inequality for income source f

S_f : the (absolute) contribution of factor f to total inequality

ρ_f : correlation between Y and y_f

$\mu_f = \bar{y}_f / \bar{Y}$ factor f 's share in total income.

Thus, the **relative contribution of factor f to inequality** is $S_f = S_f / I$

Methodology 3: Factor decomposition of the Gini

Assume that total income Y consists of $k = 1, \dots, K$ different income sources y_k , such that $Y = \sum_{k=1}^K y_k$

Lerman and Yitzhaki (1985) show that the Gini coefficient for total income inequality, G , can be expressed as:

$$G = \sum_{k=1}^K S_k G_k R_k$$

Where...

S_k : share of component k in total income

G_k : Gini coefficient of income source k

R_k : Gini correlation of income source k with the distribution of total income

Data:

- Surveys:
 - » Household/Family Income and expenditure surveys
 - » EU-Statistics on Income and Living Conditions
 - » Consumer expenditure survey
- Countries:
 - » G20 countries covered: Argentina, Brazil, China, France, Italy, Republic of Korea, South Africa, Spain, Turkey, UK, USA

- Time period:

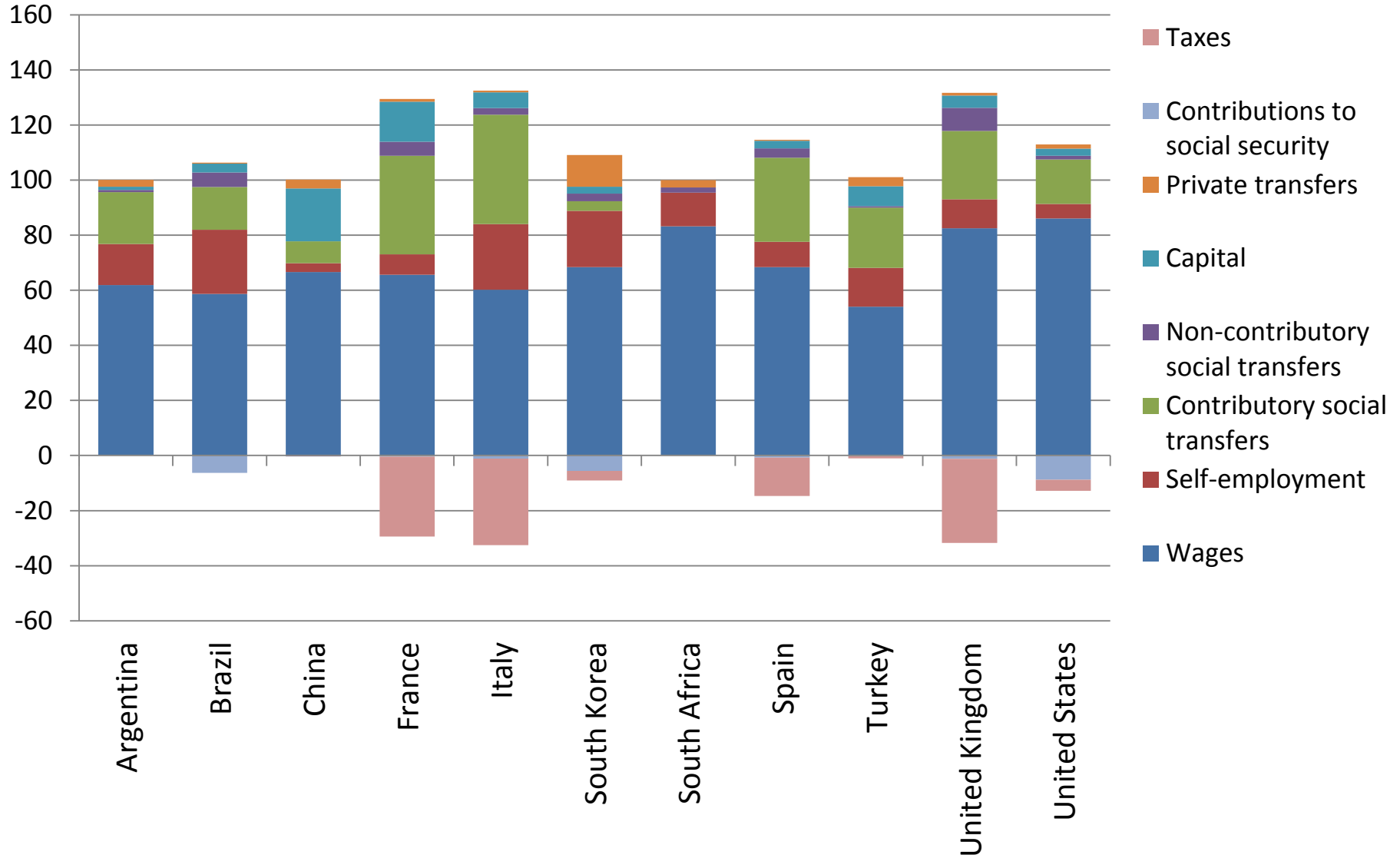
	Mid-2000's	Most recent
Argentina	2005	2013
France, Italy, Spain	2006	2011
Turkey, UK	2005	2011
Brazil, USA	2005	2012
Rep. of South Korea	2006	2012
South Africa	2007	2012
China	2005	2010

Methodological issues

- Comparability issues
 - Across countries
 - Across time period
- Standardisation methods
- Income categories
 - Capital income
 - Social transfers
 - Disposable income
- Defining “household head”

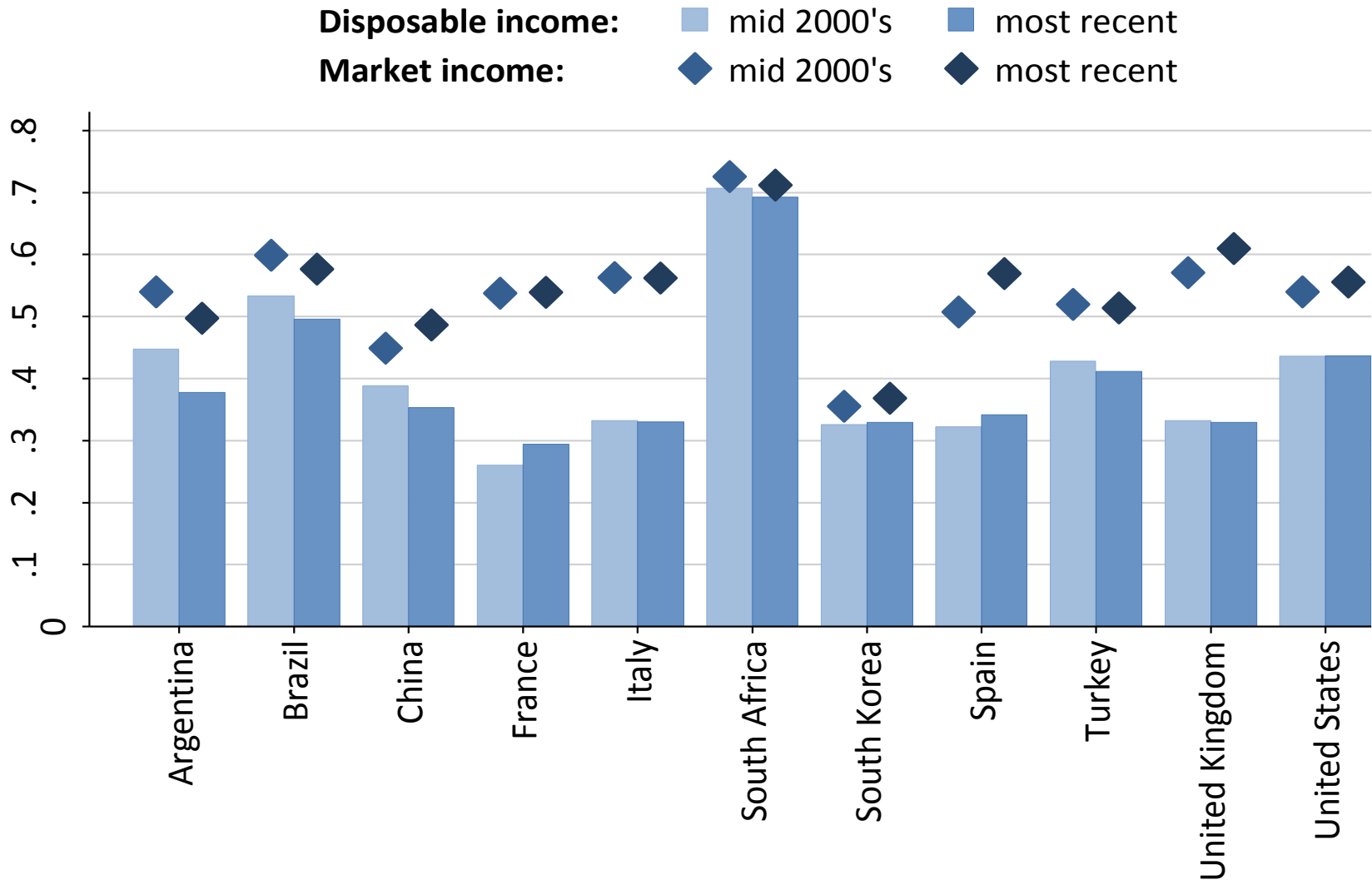
1. Empirical findings

Share of different income components in disposable income: Labour income the most dominant source, wage and self-employed income



2. Empirical findings

Evidence is mixed: emerging economies declined; increased in some European countries and stable in others



3. Empirical findings: comparison of approaches

Argentina		2005			2013		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	56.7	87.2	86.8	52.1	89.5	89.6	
...Wages	.	59.7	63.8	.	70.1	73.6	
...Self-employment	.	27.5	23.0	.	19.4	16	
Contr. transfers	-9.5	8.2	9.7	-12.1	8.6	9.3	
Non-contr. transfers	-0.6	0.1	-0.4	-0.7	-0.5	-0.8	
Capital	-0.1	2.9	2.5	0.0	2.4	1.9	
Private transfers	-1.8	1.5	1.4	-1.6	-0.1	0.0	
Contributions to SS	.	.	.	.	.	.
Taxes	.	.	.	.	.	.
Brazil		2005			2012		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	61.3	80.0	81.0	59.3	84.8	86.0	
...Wages	.	42.2	51.8	.	43.2	57.2	
...Self-employment	.	37.8	29.2	.	41.6	28.8	
Contr. transfers	-4.7	14.6	15.7	-6.4	11.8	14.4	
Non-contr. transfers	-2.2	3.7	5.1	-2.0	2.5	4.0	
Capital	-0.4	5.7	3.6	-1.1	4.5	1.7	
Private transfers	-0.4	0.3	0.5	-0.2	0.0	0.1	
Contributions to SS	-0.3	-4.2	-6.0	0.0	-3.7	-6.1	
Taxes	.	.	.	.	.	.

Note: Acc.Fr: accounting framework; CV and Gini: relative contributions of each factor to total inequality using the factor decomposition of the CV and the Gini

3. Empirical findings: comparison of approaches

France	2006			2011		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini
Labour income	56.4	106.1	111.8	58.0	72.6	89.4
...Wages	.	83.4	97.4	.	55.1	77.0
...Self-employment	.	22.7	14.4	.	17.5	12.4
Contr. transfers	-22.4	28.7	30.3	-24.0	16.9	23.6
Non-contr. transfers	-3.7	-3.3	-5.6	-2.9	-1.9	-4.0
Capital	0.4	11.5	9.6	2.4	56.5	32.6
Private transfers	-0.5	-0.4	-0.6	-0.5	-0.2	-0.6
Contributions to SS	-0.1	0.0	-0.1	-0.1	-0.6	-0.6
Taxes	-4.1	-42.7	-45.4	-3.7	-43.2	-40.4
Italy	2006			2011		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini
Labour income	57.9	124.7	117.9	58.1	111.8	108.0
...Wages	.	58.8	78.4	.	56.0	73.1
...Self-employment	.	66.0	39.5	.	55.8	34.9
Contr. transfers	-19.3	16.6	19.3	-20.4	25.7	26.3
Non-contr. transfers	-0.9	0.0	0.1	-1.0	0.1	0.2
Capital	0.1	8.0	6.1	0.3	10.8	9.1
Private transfers	-0.5	0.3	0.2	-0.2	0.5	0.4
Contributions to SS	0.0	-0.7	-0.7	0.0	0.2	0.4
Taxes	-4.1	-49.0	-42.9	-3.9	-49.0	-44.4

Note: Acc.Fr: accounting framework; CV and Gini: relative contributions of each factor to total inequality using the factor decomposition of the CV and the Gini

3. Empirical findings: comparison of approaches

South Africa		2007			2012		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	73.1	100.4	100.5	73.1	100.4	100.0	
...Wages	.	85.6	89.3	.	82.6	86.4	
...Self-employment	.	14.8	11.2	.	17.8	13.6	
Contr. transfers	.	.	.	.	.	.
Non-contr. transfers	-1.9	-0.4	-0.5	-1.9	-0.4	-0.7	
Capital	.	.	.	.	.	.
Private transfers	-0.4	-0.1	0.0	-2.0	0.0	0.8	
Contributions to SS	.	.	.	.	.	.
Taxes	.	.	.	.	.	.
Spain		2006			2011		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	51.8	113.3	116.1	58.3	105.3	104.9	
...Wages	.	97.5	108.3	.	77.1	89.4	
...Self-employment	.	15.8	7.8	.	28.2	15.6	
Contr. transfers	-16.2	1.2	0.8	-20.3	7.1	9.5	
Non-contr. transfers	-1.0	0.4	0.6	-1.8	0.6	0.4	
Capital	0.3	9.9	5.7	0.3	6.1	4.8	
Private transfers	-0.2	0.2	0.2	-0.2	0.0	-0.1	
Contributions to SS	-0.1	-2.1	-1.4	-0.1	-0.8	-0.8	
Taxes	-2.4	-22.9	-22.0	-2.0	-18.3	-18.8	

Note: Acc.Fr: accounting framework; CV and Gini: relative contributions of each factor to total inequality using the factor decomposition of the CV and the Gini

3. Empirical findings: comparison of approaches

United Kingdom		2005			2011		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	58.4	129.6	149.3	63.1	172.9	152.1	
...Wages	.	109.0	132.9	.	142.1	133.0	
...Self-employment	.	20.6	16.4	.	30.8	19.0	
Contr. transfers	-14.7	14.0	1.2	-16.6	1.9	6.0	
Non-contr. transfers	-5.5	-4.0	-6.2	-6.3	-3.6	-7.4	
Capital	-0.1	10.4	7.2	-0.3	5.9	6.9	
Private transfers	-0.2	0.1	0.1	-0.4	0.4	0.5	
Contributions to SS	-0.2	-1.5	-1.6	-0.2	-1.5	-1.9	
Taxes	-4.9	-48.5	-50.0	-6.7	-75.9	-56.1	
United States		2005			2012		
	Acc.Fr.	CV	Gini	Acc.Fr.	CV	Gini	
Labour income	55.4	102.9	105.7	56.8	100.6	102.2	
...Wages	.	86.0	94.3	.	87.0	94.1	
...Self-employment	.	16.9	11.4	.	13.6	8.1	
Contr. transfers	-9.7	1.3	3.3	-10.7	3.7	6.0	
Non-contr. transfers	-0.9	-0.4	-0.7	-1.1	-0.5	-0.9	
Capital	0.0	4.8	4.0	0.1	5.6	4.1	
Private transfers	-0.4	1.0	1.1	-0.4	1.4	1.3	
Contributions to SS	-0.3	-7.0	-9.2	-0.4	-7.3	-8.9	
Taxes	-0.4	-2.6	-4.2	-0.6	-3.4	-3.8	

Note: Acc.Fr: accounting framework; CV and Gini: relative contributions of each factor to total inequality using the factor decomposition of the CV and the Gini

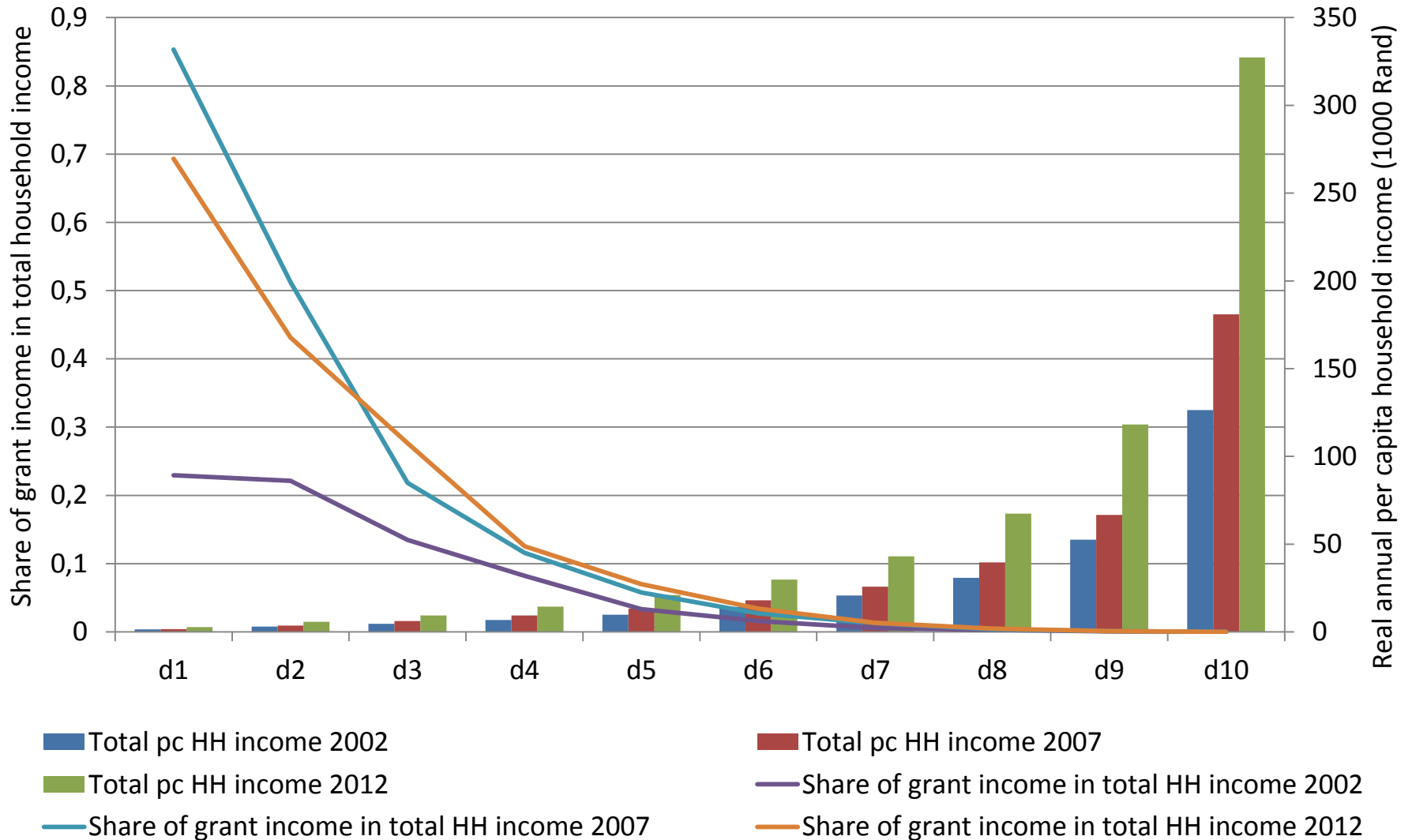
Some Conclusions

- Labour income most dominant factor contributing to inequality
 - Employment status
 - Type of contract
 - Polarisation
- State intervention, esp. non-contributory transfers has played an imp. role in reducing inequality (accounting approach)
- Redistribution through tax quite effective especially in European countries (factor decomposition – CV, Gini)
- Magnitude of the effects vary between the two factor decomposition methods

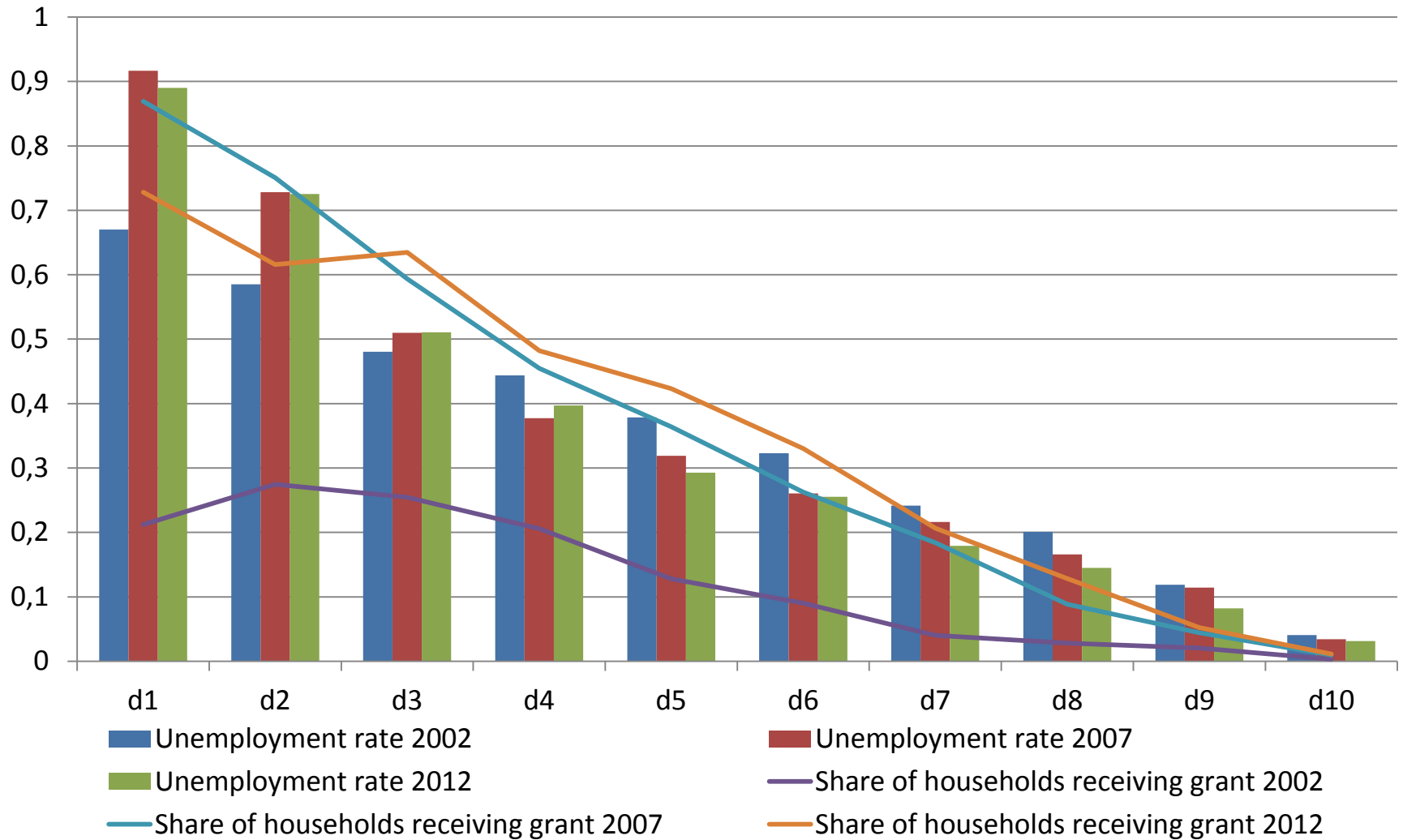
Policy challenges

- South Africa, a developing country, where inequality is quite high (0.70)
- Unemployment is huge (24.3 per cent)
- Social assistance often seen as a remedy

Total household income and per capita income grants as proportion of total household income, South Africa 2002-2012



Household access to social grants and unemployment rates by income decile, South Africa 2002-2012



Challenges to be addressed

- Polarisation in the labour market
 - Institutional mechanisms could play a role
- How to generate employment for the unemployed?
 - Public works programmes
 - Structural transformation / Industrial policies
- Community and state transfers playing an important role in some of the developing countries, how far are such models sustainable?