

# THE LEGACY OF TONY ATKINSON IN INEQUALITY ANALYSIS

Tony Atkinson is considered as a true European and internationalist dedicated to reducing poverty everywhere:

«To make progress happen, you have to believe, optimistically, that progress is possible».

*2nd LIS/LWS Users  
Conference*





*Luxembourg, Tony's last Executive Committee meeting with us - July 2016. From left to right: Serge Allegrezza, Reeve Vanneman, Janet Gornick, Tony Atkinson, Paul van der Laan, Thierry Kruten and Daniele Checchi.*



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## Tony Atkinson and the Luxembourg Income Study–LIS

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Arguably, Tony Atkinson laid the foundation of the modern measurement and analysis of inequality. First and foremost, he did so in theory, with innumerable papers since his path-breaking article in the *Journal of Economic Theory* (Atkinson, 1970). But he constantly sought to apply his conceptual insights to empirical research, with a relentless attention to the characteristics, fitness-for-purpose and limitations of the data used.

It is then no surprise that Tony was long acquainted with LIS. In 1985, he attended the first LIS conference, making the LIS founders nervous about his reaction to the debut of the project. A few years later, in the introduction to the first LIS book which came from this conference, he stated his enthusiasm and pledged his support for the endeavour (Atkinson, 1990). In 1993, he joined Lee Rainwater and one of us (TMS) in writing a report for the Organisation for Economic Co-operation and Development (OECD) on income distribution in rich countries using the LIS data, which was the founding document of OECD's work on income inequality (Atkinson, Rainwater and Smeeding, 1995). For that volume, he wrote the chapter illustrating, with his usual clarity, the linkage between household income micro-data and national accounts – anticipating the now fashionable topic of micro-macro linkages.

It was only natural to invite Tony to deliver the keynote address at the LIS 20th Anniversary Conference in July 2003. He right away asserted that “it is the historic achievement of LIS to have elevated to a new level our capacity for comparative analysis in the field of income distribution” (Atkinson, 2004, 166), but he did not confine himself to celebration. In his typically plain style, he started with a discussion of “the archetypal intellectual problems with which LIS is concerned” – cross-country comparability – to assess LIS' contribution; he then moved on to the future challenges in a changing environment. Of course, he

expected LIS to carry on what it did, but he also called for LIS to confront new demands. He pointed to “his” own priorities, acknowledging that others could undoubtedly have different ones: making available long time series with annual observations, and strengthening the connection with policy modelling. The first priority motivated LIS to shorten the interval between waves from five years, to four, then to three – a process that came to be known at LIS as moving, incrementally toward Tony’s wish that “LIS goes annual”. In discussing this point, Tony explicitly drew a link with the top incomes literature that Thomas Piketty had just started developing and to which Tony substantially contributed in subsequent years (Atkinson and Piketty, eds., 2007, 2010). This link is currently on the agenda of future LIS developments. As to the second priority, LIS kept refining the tax and transfer variables and made available an institutional database with policy rules, although never engaged in policy microsimulation exercises.

The closing words of Tony’s keynote address, however, were not about strategic developments of LIS. Rather, they were concerned with LIS as an institution. On the one side, Tony stressed that data quality cannot be achieved without substantial expense; on the other, he observed approvingly that the administration of LIS is totally independent of national governments and of international organisations. “The key to continued progress – he concluded – is to find a method by which the substantial investment can be maintained without infringing the independence of LIS” (Atkinson, 2004, 187).

These ideas were not bound to remain untested. In January 2012, Tony assumed an active role in LIS by serving as its second President, succeeding Robert Erikson. He was a deeply involved President, a position that he held throughout illness until his death. He provided continuous and invaluable advice on all LIS matters, from overall strategic decisions to measurement concerns and micro-data dissemination, from fundraising and budgeting to personnel decisions and European data politics. He carried out his Presidential role with grace and elegance, and with his quiet wry wit. And he resolutely urged LIS to pursue funding that protected LIS’ independence.

Tony died prematurely on 1st January 2017 from multiple myeloma, an incurable disease diagnosed three years earlier. The LIS leadership decided to honour Tony by dedicating the 2nd LIS/LWS Users Conference to him. The conference was held in the Belval Campus of the University of Luxembourg on 3-4 May 2018, and was made possible by the effort of the LIS staff: Paul Alkemade, Andrej Cupak, Thierry Kruten, Heba Omar, Teresa Munzi, Jörg Neugschwender, Piotr Paradowski and Carmen Petrovici.

Some of the sixteen papers selected for the conference are going to be published in the *Italian Economic Journal*. These proceedings – which were thoroughly edited by Erica Chirulli and Alessandro Vinci at the Bank of Italy – contain brief articles summarising the main results of thirteen papers presented at the conference.

These articles cover a wide range of topics, many using the LIS Database. Several papers exploit its cross-national richness to carry out comparative analyses on diverse questions: the relative importance of market incomes and social transfers on child poverty (Bradbury, Jäntti, Lindahl); the extent to which female employment growth has affected poverty rates (Cantillon, Collado, Nieuwenhuis, Van Lancker); the impact of taxes-and-benefits vis-à-vis work-family policies on single-parent incomes (Maldonado); the effect of assortative mating and intra-couple sharing on income inequality (Aaberge, Lind, Moene). One paper uses the LIS data to investigate extreme child poverty in both middle-income and high-income countries (Cai, Smeeding), a topic closely related to Tony's final posthumous book (Atkinson 2019). Some papers study top incomes focusing on their factor income composition in the United States (Lakner) and on their gender composition in Switzerland (Martínez) and Sweden (Boschini, Gunnarsson, Roine). Other papers investigate methods to assess the growth responsiveness of poverty when both absolutist and relativist views are taken into account (Decerf, Ferrando), to measure the degree of income and wealth inequality net of life-cycle effects (Harvey, Mierau, Rockey), to estimate absolute intergenerational mobility in the absence of longitudinal data (Berman), to integrate survey and tax data to improve cross-country inequality comparisons (Bartels, Metzging) and to adjust survey data for the missing wealthy (Waltl).

One way or the other, all papers refer to Tony's contribution. The variety of themes discussed at the conference and their policy relevance are telling evidence of Tony's enduring legacy to the analysis of poverty and inequality.

June 2019

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## Labour Income, Social Transfers and Child Poverty

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Since its creation, the LIS database has played a central role in documenting the living standards and “income packages” of disadvantaged families. This paper continues this tradition, examining the living standards of the poorest children in rich (and some middle-income) nations. Our focus is on the relative importance of social transfers (net of taxes) and market incomes and the extent to which low market incomes are due to either low wages or to low parental employment.

The key dependent variable is the average disposable (after-tax) family income of the poorest fifth of children, relative to the median income in their country. All incomes are adjusted for household size. Across countries, the average income of the bottom fifth is strongly correlated with rates of relative income poverty, but has the analytical advantage of providing a simple decomposition by income source. When looking at trends over time, we also examine real (PPP adjusted) incomes.

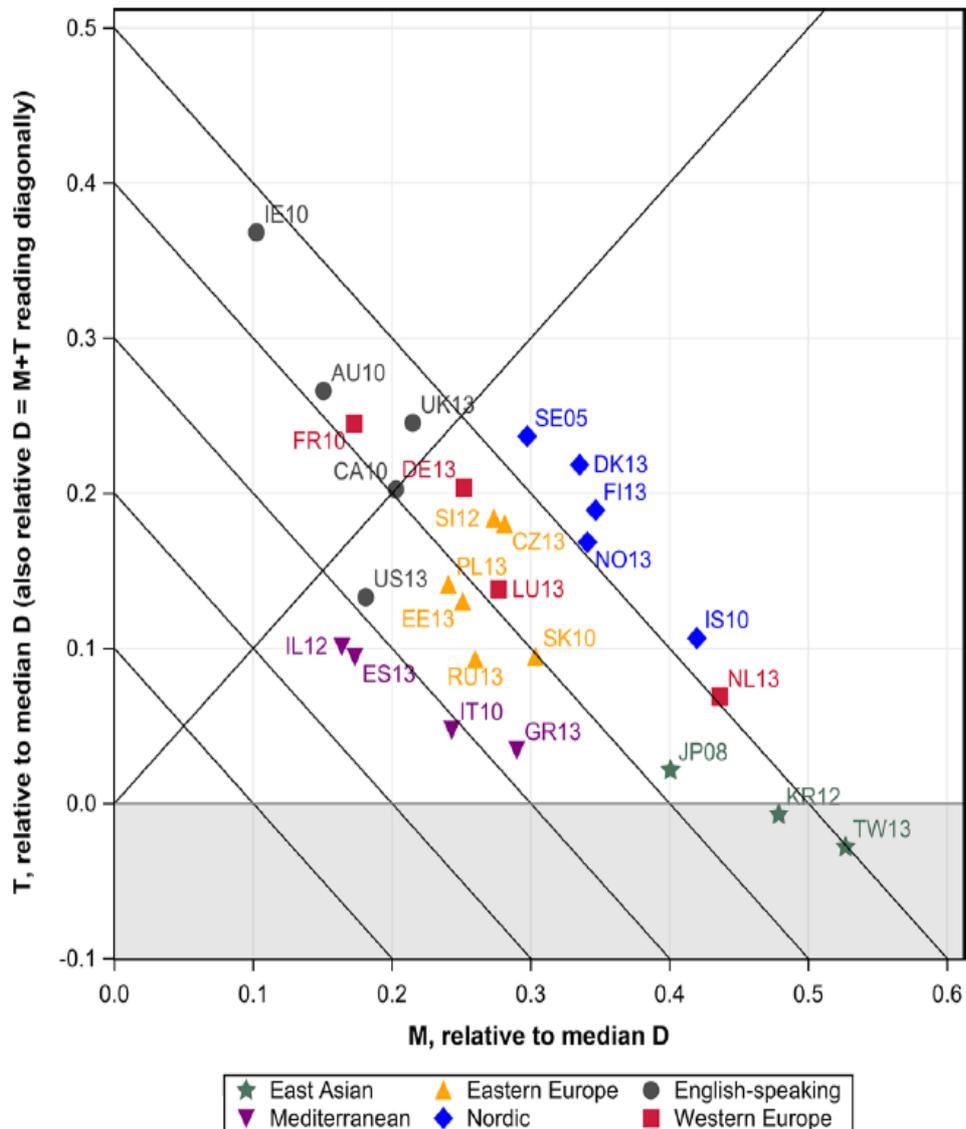
### **Cross-national variation**

Figure 1 presents a decomposition of bottom-fifth household income into that derived from the market (M) (mainly wages) and from net social transfers (T) (cash or near-cash transfers from government to households minus income tax and social insurance contributions). The figure plots average M and T among the one-fifth of children living in the poorest families. In this figure, these averages are presented relative to the overall median disposable income (D) in their country.

The horizontal axis shows the average bottom-fifth market income in each country, relative to the median disposable income. In Korea and Taiwan, the average market income is around half the median disposable income. Disadvantaged children in the English-speaking countries, on the other hand, all

have relatively low levels of market income (around 10-20% of median income). Using a synthetic wage/hours decomposition, we estimate that this reflects low employment hours in Australia, the UK and Ireland, while in the US and Canada low hours and low wage rates contribute equally (see Bradbury, Jantti and Lindahl, 2018, for more discussion).

**Figure 1: Children in the bottom-fifth of disposable income: average market income (M), Net social transfers (T) and disposable income (D = M + T) – all relative to median income.**



These income patterns are also linked to family structure, with children in the East Asian countries living in larger households – e.g. with grandparents. This is partly a response to the low levels of social transfers provided in these countries to families with children – indicated by the vertical axis of the figure<sup>1</sup>.

Since disposable income equals the sum of market and net transfer incomes, countries which lie further to the top-right of the figure have higher total incomes (the diagonal lines represent contours of disposable income with values read off their intersection with the vertical axis). As found in other studies of income poverty, the Nordic countries stand out – with average disposable incomes for the bottom fifth all lying above half median income.

Though the English-speaking countries all have low market incomes, within this group of countries the level of transfer generosity varies significantly – with the US a notable outlier with low transfers, and Ireland an outlier with relatively generous payments to families with children. The net impact is that disposable incomes of bottom-fifth children in the US are around 1/3 of the median, while the other English-speaking countries lie between 40 and 50%. The US relative disposable income level thus puts it on a par with the high-poverty Southern European countries. (Though as we show below, real incomes are currently lower in Southern Europe).

The most notable feature of Figure 1, however, is simply the wide variety of income packages received by disadvantaged families in countries at similar levels of economic development. Both variations in market and in transfer incomes are important, and they contribute roughly equally to the overall variation.

These two components are also negatively correlated, with high social transfers associated with low market income. Several causal mechanisms might explain this. One is labour supply (or demographic) responses to high or low benefits. If benefits are very low, parents will be forced to take up employment or move in with other adults (e.g. the East Asian model). Similarly, the high benefit, low earnings model in Ireland (reinforced by few activity tests) might fit this model.

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<sup>1</sup> The negative T values for Korea and Taiwan indicate that taxes and social insurance contributions are higher than average cash transfers.

On the other hand, within country groups such as the English-speaking countries, benefits vary widely but market income is uniformly low. Other explanations include causal links in the opposite direction, with benefits compensating for low market income (e.g. in recessions) or some countries directing more resources to employment support (e.g. training and child care) rather than income transfers.

The successful outcomes for disadvantaged children in the Nordic countries represent a clear break from this negative association between transfers and market income. In these countries, reasonably high transfers, combined with employment support services, produce the highest incomes for children in the bottom fifth.

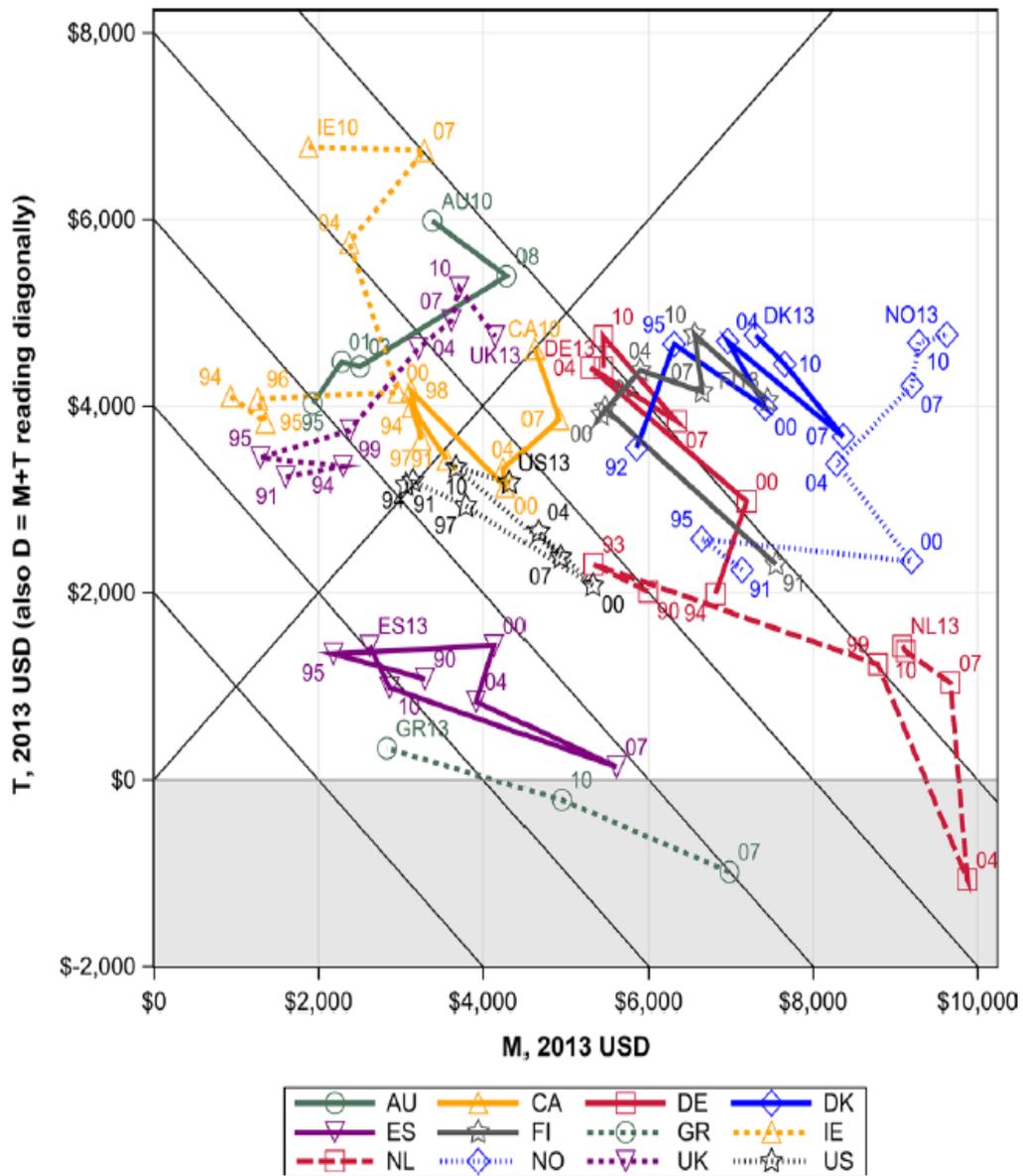
### **Trends**

In Figure 2, we look at trends in real (PPP adjusted) incomes for some selected countries since the early 1990s. For most countries, the general story is one of increasing real incomes for the bottom-fifth – with average incomes moving steadily away from the origin of the figure.

Notable exceptions are Greece and Spain, where average disposable incomes in 2013 were back to the level of two decades earlier (pre-2007 Greek data not shown in this figure). Ireland also suffered a substantial income drop after the financial crisis of 2007-08. For most other countries, however, the lines in the figures move to the top-left after 2007, illustrating the role of the “automatic stabilisers” – as market incomes fell, social transfers increased.

The other exception to the long-term growth in real incomes of the bottom fifth is the US, where income growth over the two decades has been remarkably small. In the early 1990s, the real income of the bottom fifth in the US was similar to (or higher than) that in all the other English-speaking countries. By 2013, American bottom-fifth children clearly had the lowest incomes.

**Figure 2: Children in the bottom-fifth of disposable income: Trends in average market income (M), net social transfers (T) and disposable income (D = M + T), 2013 USD**



*Reference*

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## Women's Employment Growth Associated with Only Modest Poverty Reductions in 15 OECD Countries, 1971-2013

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Employment growth is considered one of the most important ways to reduce poverty. In the European Union this is reflected in the “Social Investment” perspective and explicit in the EU 2020 Growth Strategy, which is the new steering wheel for European social and economic integration for the period 2010-2020. In this growth strategy, EU countries are supposed to raise employment rates from 69% to 75% and to reduce poverty by 25% (Cantillon and Vandenbroucke, 2014).

In our contribution (Cantillon, Collado, Nieuwenhuis and Van Lancker, 2018), we examine the potential of employment growth to reduce trends in poverty. We did so by looking specifically at trends in women's employment. There are three reasons for our focus on women's employment. First, most of the growth in employment in these countries has been among women, with men's employment rates being relatively stable. Second, women's rising earnings are known to have reduced inequality among households (Need, Nieuwenhuis and Van Der Kolk, 2018). Finally, it has often been overlooked that although women's employment rates have shown marked rises, these trends have levelled off in various OECD countries.

It is, of course, well-known that households with higher work intensity have a lower risk of being in poverty. This also holds for women's employment. Yet, there are three reasons why this does not automatically mean that the rise in women's employment over the last decades led to a reduction in (trends in) household poverty. First, it could be that growth of women's employment was

among women who live in households that were not poor. Second, the growth of women's employment could have been among women who lived in poor households, but that the earnings from their employment are insufficient to elevate their household above the poverty threshold. Work is not always a guarantee for a poverty-free existence (Lohmann and Marx, 2018), certainly not among, for instance, single parents (Maldonado and Nieuwenhuis, 2018). Third, other factors could have been driving up poverty despite women's rising employment putting a brake on these upward trends in poverty.

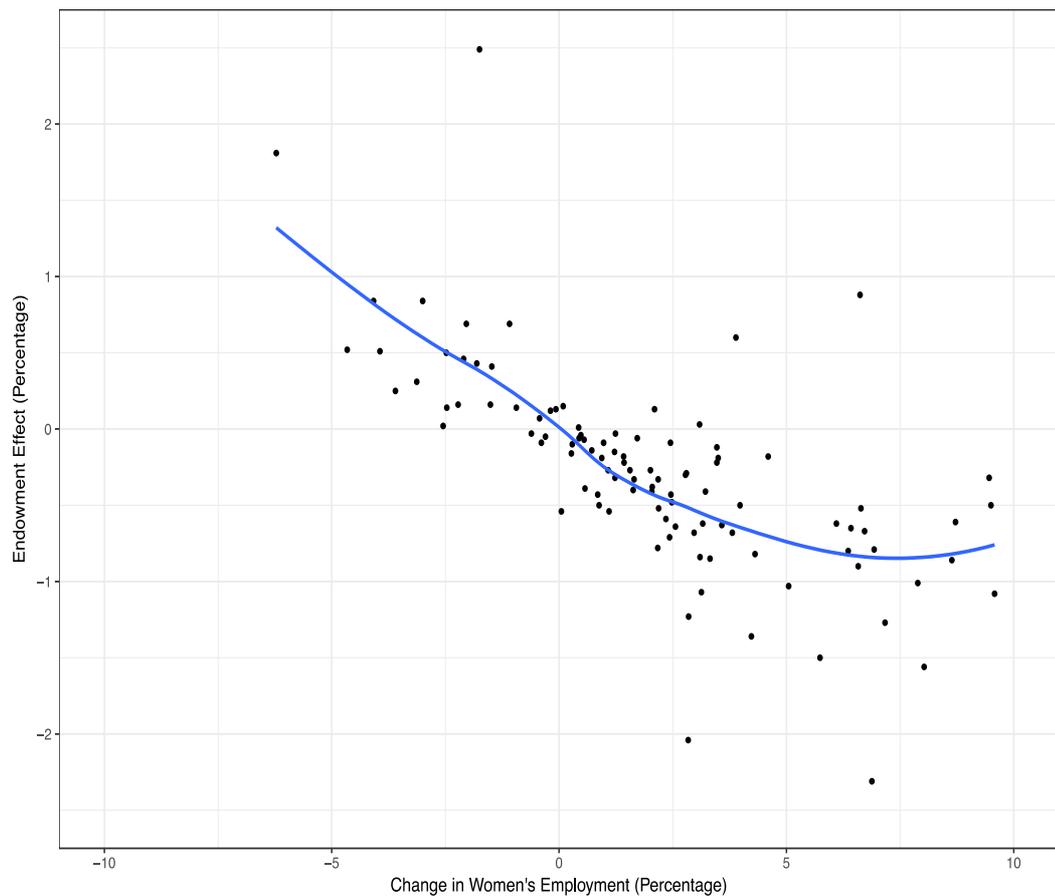
We have used data from the Luxembourg Income Study Database, that harmonizes existing survey data to a common template to ensure cross-national and over-time comparability. We were able to select 15 OECD countries that were covered in the LIS Database for several decades. In total, we analysed data from 129 datasets, covering the period from 1971 to 2013, and over 2 million household-level observations. The data were analysed using a Blinder-Oaxaca decomposition (Oaxaca, 1973). With respect to women's employment and poverty, the Blinder-Oaxaca technique can be used to decompose a change in poverty into (1) changes in women's employment rates and (2) changes in the degree to which individual women's employment protects a household against poverty.

Our results demonstrate that women's rising employment reduced poverty defined as living with an income below 60% of equivalised median income. Naturally, the results presented here cannot be interpreted as causal inferences. Yet, making the distinction between how the rising number of employed women is related to trends in poverty, and how well their employment protects against poverty, proved highly insightful.

The key finding is illustrated in Figure 1, showing the association between changes in women's employment rates and the effect of these changes on poverty (in the Blinder-Oaxaca decomposition this is called the endowment effect) are plotted. The data-points of the different countries in our analyses were combined here. As would be expected, the line crosses the origin of the graph, representing that no change in women's employment aligns with no endowment effect on

poverty. Increases in women's employment were associated with a reduction in poverty, although at each level of increase in women's employment a substantial amount of variability in this effect was observed. Declining women's employment rates were associated with an increase in poverty. Overall, these results suggest that poverty reduction of one percentage point requires women's employment rates to rise with about ten percentage points.

**Figure 1: General Association Between Change in Women's Employment and Poverty**



In some countries, the process of women's increasing employment seems to stagnate; upward trends were found to plateau in the US, the Netherlands and Germany. The Nordic countries showed very high levels of female employment, but with no further increase. Sweden and Finland even showed a small decline, as did the US in recent years. There is no reason to believe that stagnation of trends in women's employment rates needs to continue. But, to the extent they do, this poses a serious challenge for social policies that seek to reduce poverty by

stimulating women's employment (Cantillon, 2011). Even though rising women's employment rates have had a substantial impact on reducing poverty in various countries, it took place over the course of several decades. Moreover, these reductions in poverty required an increase in women's employment that was so substantial that such an increase cannot be repeated given the limit that women's employment rates seem to have reached in most countries. Regardless of what caused women's employment rates to rise, be it due to social policies, demographic shifts, or both (Need, Nieuwenhuis and Van Der Kolk, 2012), our findings suggest that the potential for further compensating poverty by increasing the number of employed women, to a large extent, been depleted. The implication of this is that to further reduce poverty, effort could be made to further reduce gender pay gaps, occupational segregation, and gender differences in part-time employment.

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## Doing Better for Single-Parent Families, Redistribution and Work-Family Policy in 45 Countries

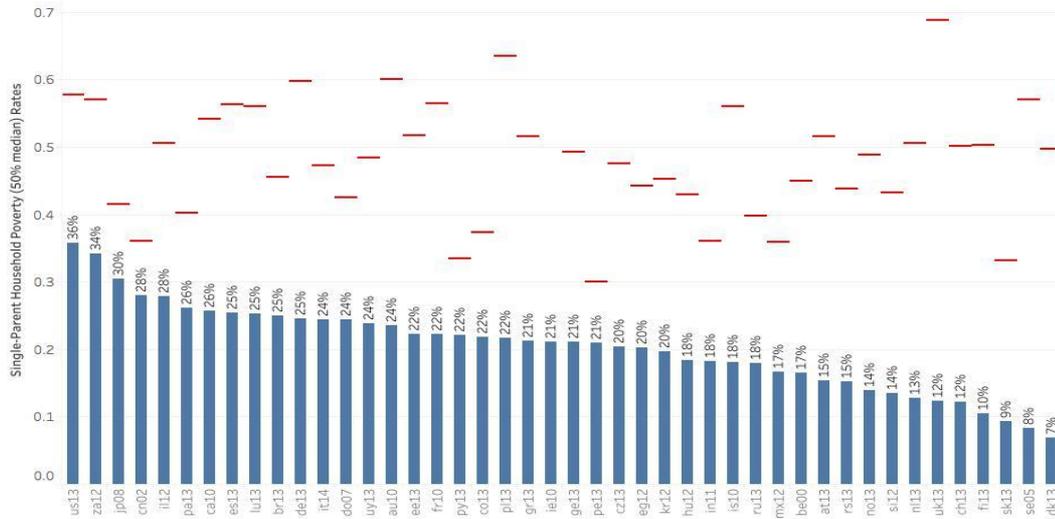
**Laurie C. Maldonado** (The Stone Center on Socio-Economic Inequality at the Graduate Center, City, University of New York, US)

Inequality and poverty are on the rise in many countries. Single-parent families, and other households at the bottom of the income distribution, are often left behind. Not only are single parents likely to be poor, but – with increased competition with dual earners – there is risk of greater inequality between single-parent and coupled-parent families. This study examined the role of policy to reduce poverty among single-parent and coupled-parent families across countries. Anthony Atkinson (2015) argued that cross-national variation in poverty is not only based on the effectiveness of redistribution but also on market inequalities. Therefore, this study examined not only redistribution but also work-family policies that perhaps render the work place more equal for families with children. This study examined 373,032 households with children in 45 countries, using household-level data from the Luxembourg Income Study database and country-level policy indicators from The World Policy Analysis Center.

### **Descriptive results**

Across countries, single-parent households have higher poverty rates than coupled-parent families (Figure 1). On one extreme, the US has much wider gap between single and coupled parent poverty. The US has the highest single parent poverty rates of about 35% and much lower coupled parent poverty rates of 11%. Similarly, more inequality between family types in Luxembourg, Canada, Germany, Czech Republic, France, Iceland, Ireland, Japan, South Africa, and South Korea. Denmark, on the other hand, has low poverty rates in general and a small poverty gap between families. Denmark has 7% of single-parent families and 2% of coupled-parent families in poverty. Sweden, Switzerland, and Finland have similar low poverty gaps. Interesting are some of the other countries with perhaps medium to high poverty, but with lower gap between single and coupled parent poverty: Mexico, Colombia, India, Egypt, China, Guatemala, Georgia,

**Figure 1. Single-parent households poverty rates across countries**

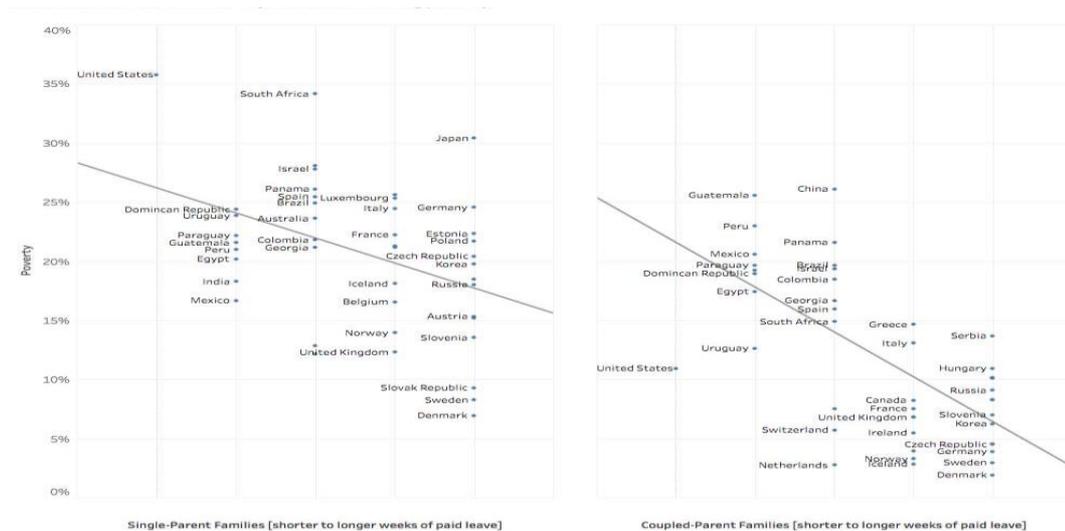


Panama, Peru, Paraguay, Slovak Republic, and Serbia. Surprisingly, in Guatemala and India the single parent poverty rates are slightly lower than the coupled parent poverty rates. In the UK, there is a major decline in both single parent poverty and the single and coupled parent poverty gap.

**Poverty and policy associations**

Higher amount of parental leave is associated with lower poverty rates for single- and coupled-parent households.

**Figure 2. Association between maternity and reducing poverty**

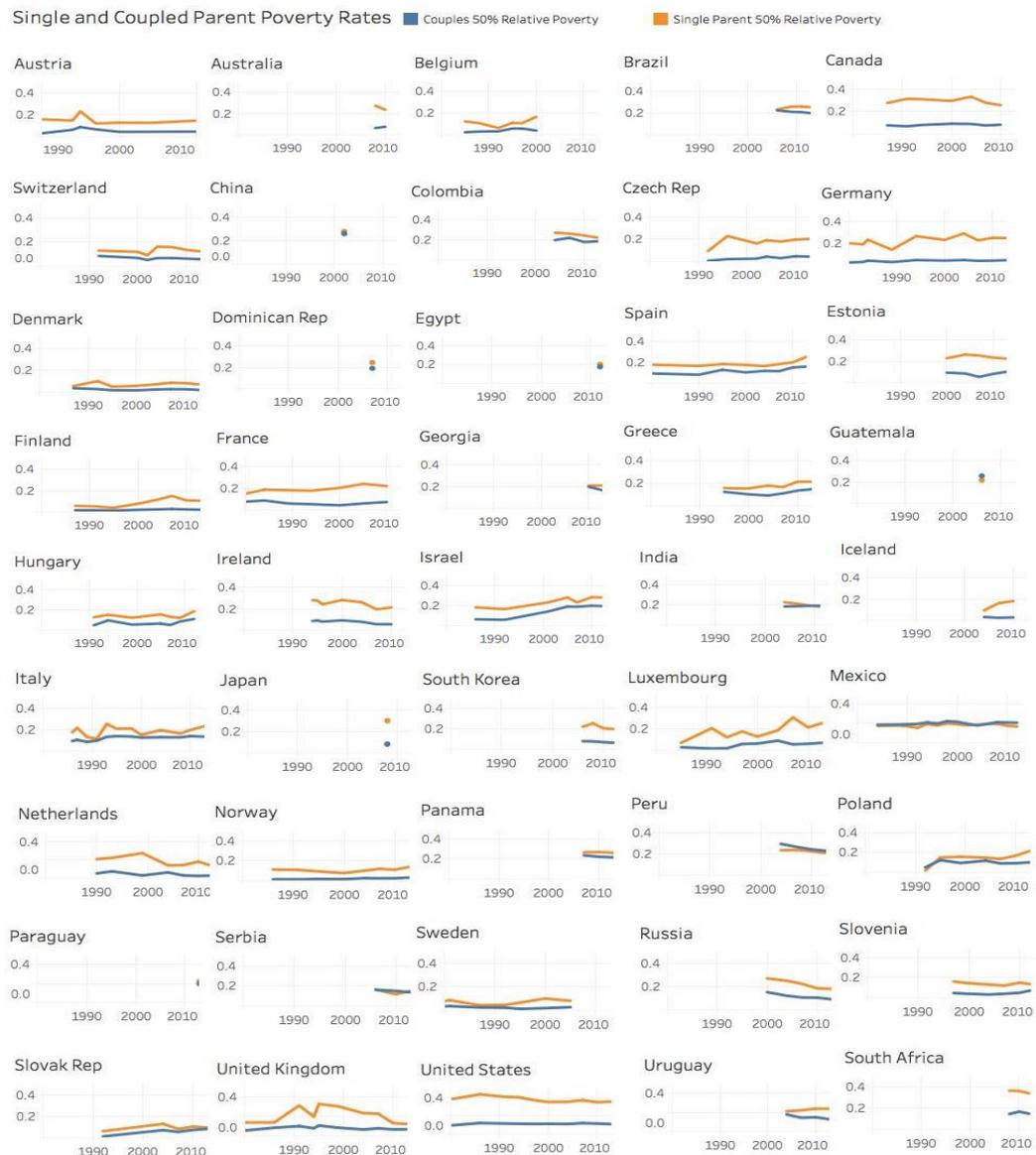


In addition, higher amounts of working time regulations are associated with lower likelihood of poverty, but perhaps less so than leave for parents to care for their children.

### Pre-and Post-taxes and transfers

Redistribution through taxes and transfers is very effective in reducing poverty for both single- and coupled-parent families for all countries.

**Figure 3. Redistribution of taxes and transfers reducing poverty rates for single-parent families.**  
**Red lines are poverty rates before taxes and transfers, blue bars are poverty rates post taxes and transfers.**



Most countries redistribute income to cut their poverty rates by half or more. Not only is redistribution effective, family transfers are particularly important for single-parent families. Ireland and the UK have high amounts of family transfers. Some countries have lower poverty rates to begin with, but still effectively use family transfers to reduce poverty by more than half.

### **Conclusion**

Countries balance both redistribution and family policy to reduce poverty for vulnerable populations. Redistribution – especially family transfers – is effective in reducing poverty for all families. Single-parent families do well in countries that have both moderate levels of redistribution and moderate levels of family policy.

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## The Inequality of Equal Mating

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It is widely recognized that equal mating boosts inequality across households since the rich marry other rich, and the poor marry other poor. This flocking effect – the isolated effect of assortative mating – may have led observers to overlook that household formation also can reduce the inequality in the distribution of individual incomes as marriages pool incomes. Although it might still be true that the marriage is «uniting goods rather than persons» – as de Tocqueville famously said – the question is whether it does so on terms that are redistributive, or not?

In our paper, we demonstrate how inequality in the distribution of income of couples can be seen as the result of two counteracting effects – a sharing effect, capturing the pooling of two non-negative individual incomes, and a flocking effect, capturing the tendency that people marry within their own income group. We explore the race between sharing and flocking. The impact of sharing and flocking is not the same along the income distribution of couples. Neither is the pattern the same in all countries. Both within and across countries we emphasize a process of what we denote an unequal income levelling of the formation of couples.

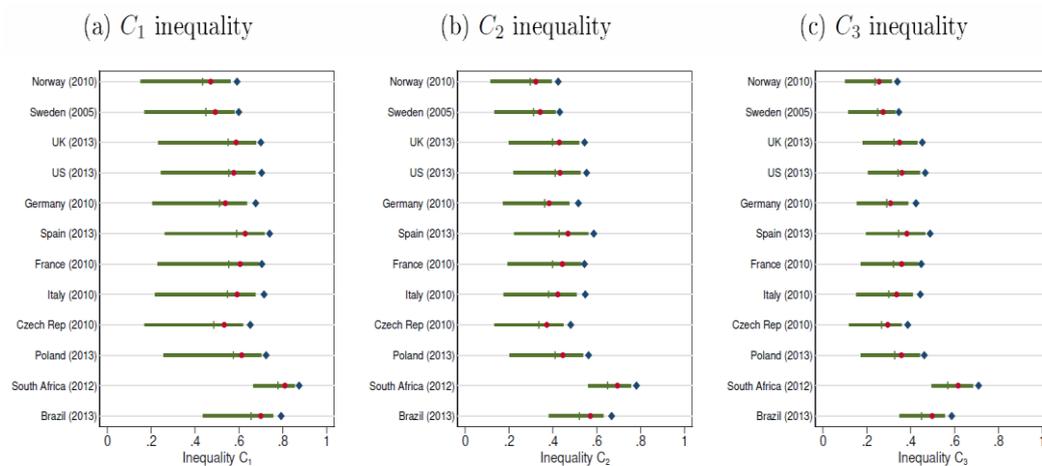
We use income data for individuals and couples from the Luxembourg Income Study (LIS), covering 46 countries over the period 1969-2013. To illustrate some aspects we at places focus on twelve countries (the focus countries) Brazil, Czech Republic, Germany, Spain, France, UK, Italy, Norway, Poland, Sweden, US, and South Africa.

To capture how systematic matching varies across the income distribution of couples we develop measures of flocking and sharing that provide detailed information as we move across the income distribution. For instance, to investigate whether equal mating is most prevalent among the rich or the poor, we need flocking and sharing measures that are more disaggregated than conventional

measures of inequality. Our measures visualize which quantiles in the income distribution lose and which quantiles gain from the mating game and can be considered as parallels to the Lorenz curve.

To compare the pattern of unequal levelling across countries we aggregate the measures by varying the weights on observations at different parts of the distribution, distinguishing, for instance, between upper tail sensitive measures and lower tail sensitive measures. Specifically, we use Gini's nuclear family of inequality measures (Aaberge, 2007),  $C_1$ ,  $C_2$ , and  $C_3$ , where  $C_2$  corresponds to the Gini coefficient,  $C_1$  is particular sensitive to changes in the lower tail and  $C_3$  to changes in the upper tail of the income distribution. These measures have been estimated on the basis of observed incomes for individuals living as couples, and for outcomes from random matching, as well as perfect positive and negative assortative matching. The results are displayed in Figure 1.

**Figure 1. Inequality measures in several countries between 2005 and 2013**



This approach enables us to classify countries where there have been more flocking and less sharing in either the upper or the lower tail of the distribution. We can also characterize the size of “the neutral middle”, where matches are close to what would result if they were random, and hence, the sharing effect is maximal.

Using the entire data set, we offer three basic general results.

**Pooling:** the process of unequal levelling is inequality reducing. There is a clear net levelling effect in the formation of couples as the sharing effect dominates the

flocking effect. We demonstrate the claim theoretically and quantify the dominating effect empirically. We show that in all cases where the distributions of income of females and males are not identical, the sharing effect is stronger than the flocking effect, no matter how couples are formed, and stronger in some countries than in others. Accordingly, the formation of households lowers income inequality across individuals. In fact, the inequality across couples tends to be lower than the inequality in the marginal distribution of income for females and males – and obviously also the inequality of the joint distribution of individual incomes. Although a tendency of equal mating reduces the impact of sharing, flocking does not eliminate it.

**Polarization:** the overall levelling effect hides a little noticed flocking in the tails of the distribution. In many countries, high-income flocking and low-income flocking increase the difference between rich and poor households at the same time as each of the two groups become more homogeneous. The tendency of polarization in the couple distribution might lead to misallocation of resources and influence. Flocking in the tails contrasts couple formation in the middle where matches emerge as random. We show how flocking in the tails is associated with differences across countries in the distribution of couples' income. High-income flocking is typical for countries with high inequality, such as Latin-American countries in addition to the US, Spain, and Italy, while low-income flocking is typical in countries with less extreme inequality, such as the North-European countries.

**Gender:** differences in the joint income distribution of men and women magnify the unequal levelling, but not in a symmetric manner. Individual inequality among men is associated with higher flocking and lower sharing, while inequality among women is associated with lower flocking and higher sharing. The case of flocking can be explained by a simple non-monotonicity: the impact of inequality in the individual income distributions is hump-shaped – first increasing and then decreasing. The top of the hump is at a lower threshold level of inequality for women than for men. The gender difference in the impact of inequality can then arise as long as the variation in the level of inequality, that we observe, basically is between these two thresholds.

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## Extreme Child Poverty in Rich and Poor Nations: Lessons from Atkinson for the Fight against Child Poverty

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**Tim Smeeding** (University of Wisconsin-Madison, US)

Children living in conditions of severe deprivation are drawing increased attention from social scientists and policymakers in the United States and beyond. There has been an outpouring of literature documenting the negative consequences of extreme poverty on children in most societies (Almond, Currie and Duque, 2018; Magnuson and Votruba-Drzal, 2008; Rainwater and Smeeding, 2003; Smeeding and Thévenot, 2016). However, little is known about the role of the labour market, state transfers and private transfers in lifting otherwise deprived families out of poverty. In some rapidly growing middle-income countries (MICs), extreme child poverty is still a major issue. Deep and extreme poverty issues have recently surfaced in the United States (Alston, 2018; Deaton, 2018) as well. As several larger growing economies have recently become upper-middle-income nations, poverty reduction has become a main policy goal and reductions in extreme poverty have been noted by many. This has led to the need to revisit issues regarding comparability in measurements of child poverty in countries with large differences in terms of living standards and welfare regimes and to assess progress to reduce deep and extreme poverty in those nations.

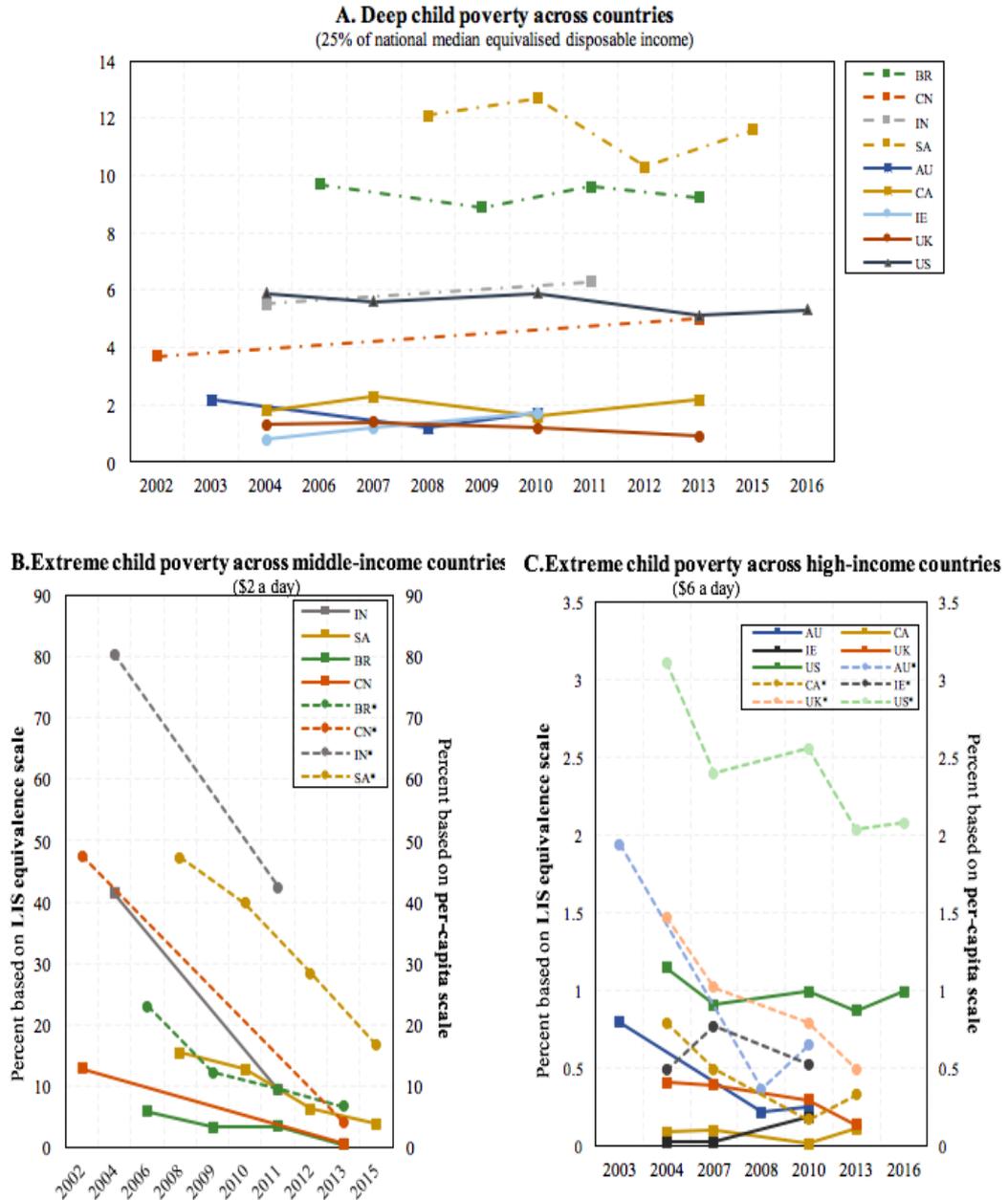
In a recent paper, we attempt to fill the gap by estimating child poverty levels and trends using both relative (“deep”) and absolute (“extreme”) measures from 2002 to the most current year available in the LIS Database in two clusters: in Anglo-Saxon high-income countries (Australia, Canada, Ireland, UK and US) and in upper-middle-income countries (Brazil, China, India and South Africa). We also investigate the influence of different components of household income resources on deep child poverty rates in order to examine the role of the market and redistributive effects, which materialize through transfers and child benefits, on poverty reduction. Our paper is very much in line with Tony Atkinson’s concerns for poor children as expressed in his recent research on global poverty with the

World Bank (World Bank, 2017), in his work with rich countries and in his prescriptions for ending poverty among children in all nations (Atkinson, 2015).

We refer to children living in families with incomes below a fixed dollar line (\$2 per person per day in MICs and \$6 per person per day in the rich nations) as being in “extreme” poverty, while children living in families with incomes below half of the “half median” international poverty line (25% of median equivalised income) as being in “deep” poverty. The roles of the labour market, private transfers and public benefits are recognized, especially because of their differences across nations. We employ two equivalence scales to capture the absolute extreme poverty level and adjust the fixed poverty lines over time for inflation using the national CPI throughout the period examined to estimate the different level poverty rates across these countries, through which we aim to offer new insights into the efforts of poverty measures via a more consistent channel.

In Figure 1, we show that the relative/deep poverty rates (panel A) among children across all countries of interest tend to remain flat across the whole period. Although some fluctuations are observable in Brazil and South Africa, deep child poverty rates tend to be higher in India and China in the latest year relative to earlier points in time. This increase in relative rates over the period examined may be due to growing inequality – real economic growth at the bottom of the distribution is lower in these MIC nations compared to the median-income families (Alvaredo, Chancel, Piketty, Saez and Zucman, 2017). Focusing on the most recent year (of available data) for each nation, China can be distinguished by having the lowest relative proportion (5%) of children living in households with incomes lower than 25% of the median regional disposable income; on China’s heels are India (6.3%), Brazil (9.2%), and South Africa (11.6%). Turning to relative trends of the five developed nations (panel A), Ireland and UK appear to have relatively lower proportions of children living in households subsisting on less than 25% of median regional equivalised income, while Australia’s relative line fluctuates, before it reaches 1.7% in 2010. However, the US is the only developed nation we studied that struggles with relatively severe deep child poverty rates – approximately 5.5% nationwide, between 2004 and 2016 – using very comparable LIS data.

**Figure 1. Deep and extreme child poverty across countries**



Note: In panels B and C, solid line is based on LIS square root; dashed line displays the trend based on the per-capita scale (2011 PPP \$). Each set of colored lines represents poverty rates among children for each nation.  
Source: Authors' calculation from LIS Database

The overall picture in extreme child poverty rates (panels B and C) is very different when we deploy absolute measures. In addition to calculating the rates based on per-capita scale (2011 PPP adjusted), we also estimate percentage of children living in absolute extreme poverty using LIS equivalence scale to reflect economies of household size. Panel B in Figure 1 reports estimates of the proportions of children in four MICs who live on incomes of less than \$2 per day,

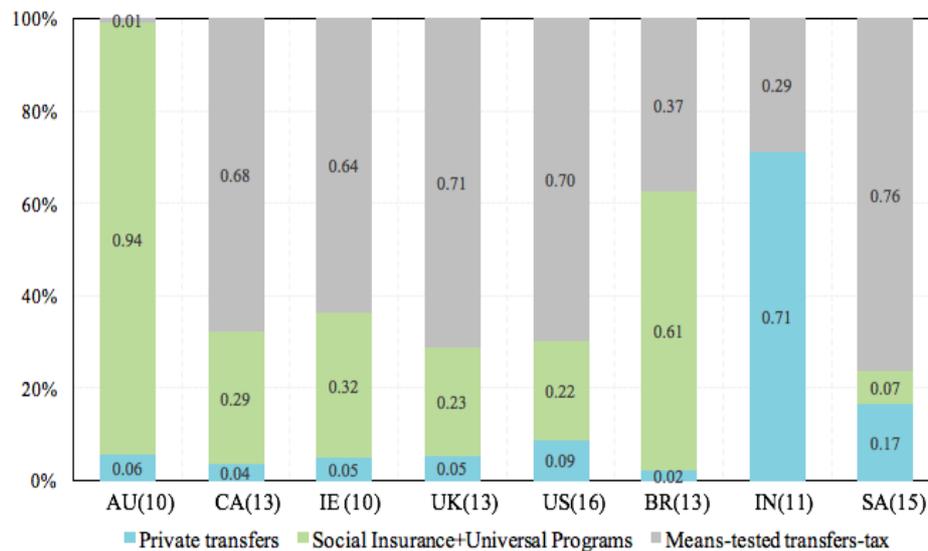
based on two different equivalence scales (LIS square root and per-capita scale). Each set of coloured lines represents \$2-per-day poverty rates among children for each nation. The solid line is based on the LIS square root, while the dashed line represents the trend based on the per-capita scale. Two sets of lines within each country are virtually parallel, while tending to converge for the most recent years, except in India. All the lines trend downward in all countries, regardless of the different definitions of equivalence scales; this reflects widespread economic growth across all four of these nations. As we expected, given that the per-capita scale fails to account for the concept of resource-sharing within households, the lines based on per-capita measures for each nation are always higher than those lines representing extreme poverty rates that take economies of household size into account. Overall, starting from 2003, all five developed nations (panel C) appear to have achieved a largely constant reduction in their absolute rates of extreme child poverty, while, notably, Australia and the United States have unfavourably increased their proportions of children living on materially less than \$6 per day in the most recent year we examined.

Furthermore, we examine the marginal effects of each component of a given household's income package, incrementally and cumulatively, on changes in deep child poverty rates. We begin by estimating market-income poverty rates based on private earnings and other own sources, and then integrate private transfers into household income packages. We examine two further sets of deep poverty rates based on (1) the addition of social insurance and universal programs as sources of income, and (2) means-tested benefits net of tax and social security contributions (graphs available from the authors upon request).

In order to illustrate how the weights of different income components account for the total reduction in deep child poverty rates for each nation and to shed light on which interventions may merit further attention, we calculate the extent to which private transfers, social insurance, universal benefits, and net means-tested transfers contribute to the overall reduction in deep child poverty rates within each respective country in Figure 2. With the exception of Australia, where the reduction of deep child poverty is disproportionately due to social insurance and universal programs, across all of the other countries, net means-tested benefits

play a substantial role in reducing deep child poverty; the most significant illustration of this (76%) can be observed in South Africa, but reduction rates range from 71% to 29% in the other nations. Social insurance and universal programs in the US tend to be meagre compared to those in other high-income countries, and the overall portion that the US contributes to reducing its deep child poverty is far lower than the portion Brazil contributes.

**Figure 2. Percentage of deep child poverty reduction that each income component accounts for**



Note: Deep child poverty rates are defined as those living in households whose income is below 25% of national median equivalised disposable income. Data from China regarding distinction of universal benefits, assistance benefits and private transfers is unavailable; information on social insurance and universal benefits in India is unavailable.  
Source: Authors' calculation from LIS Database

The preliminary results show that nations with universal benefits do better in lifting children out of deep or extreme poverty than those with targeted programs alone in rich nations. In contrast, private transfers and remittances from relatives abroad as well as conditional cash transfers benefit the poorest children in the middle-income countries (Cai and Evans, 2018). We conclude that some type of a universal child benefit – complementing basic public health care and education – is needed to eradicate long-term child poverty in all types of nations.

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## Capital and Labour: The Factor Income Composition of Top Incomes in the United States, 1962-2006

**Christoph Lakner** (World Bank)<sup>1</sup>

The increasing inequality at the top of the distribution has been well-documented (e.g. Atkinson and Piketty, 2007, 2010). For example, Piketty and Saez (2003) show that the income share of the top 1% in the United States doubled between the mid-1980s and the mid-2000s, reaching levels similar to the early part of the 20th century. While the top 1% income share was increasing, the composition of that income was changing: Capital incomes became less prominent, while salaries and self-employment incomes became more important. The literature has focused on the distribution of total income, as well as the distributions of capital and labour income separately, but the association between the two income sources has received little attention. In Atkinson and Lakner (2017), we attempt to fill this gap by studying the association between capital and labour incomes at the top of the US income distribution.

Using data based on US tax returns, we investigate this association in two ways. We begin by decomposing the inequality in total income by factor incomes, as is frequently done with other inequality measures (e.g. Shorrocks, 1982; Lerman and Yitzhaki, 1985). This is the first empirical application of such a decomposition to inequality measured by top income shares. In Figure 1, the top 1% share in total income (panel A) is decomposed into three components as follows. The first component is the share of labour in total income (panel B), which fluctuated between 87% and 90%, with no clear trend. The second component is the share in total labour (capital) income of the top 1% of the labour (capital) income

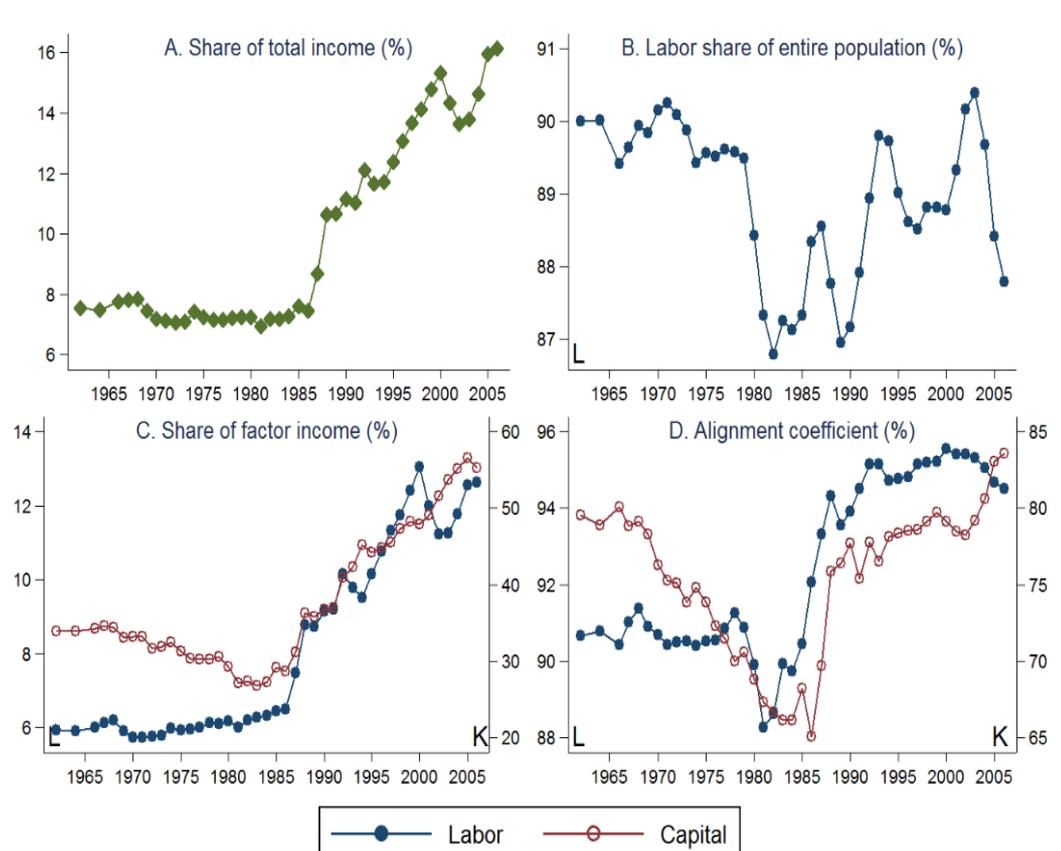
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<sup>1</sup> This is my own summary of the paper which I wrote with Tony Atkinson, developed from a chapter of my DPhil thesis, and which appeared as World Bank Policy Research Working Paper No. 8268 in 2017. Tony sadly passed away in January 2017, before the final version of our paper was completed. I have been very fortunate to have Tony supervise my DPhil thesis and to work with him on this paper, and I wish we could have collaborated for a longer time. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

distribution (panel C), which captures the inequality within the distribution of capital and labour incomes. The top 1% of earners approximately doubled their share of labour income from 6% in the 1960s to 12% in the 2000s, which mimics the estimates by Piketty and Saez (2007). The inequality in the distribution of capital incomes is much greater, and also increased.

The third component of the decomposition is the alignment coefficient (panel D), which is a measure of the association between capital and labour income with total income. In recent years, the capital alignment coefficient is around 83%, which means that 83% of the capital income that the top 1% of *capitalists* receive goes to tax units, who are also in the top 1% according to *total* income. For labour income, the corresponding estimate is 95%, so the association of labour income with total income is even stronger. Both alignment coefficients increased since the mid-1980s, showing the increasing association between factor incomes and total income.

**Figure 1. Decomposition by factor income of the top 1% income share**

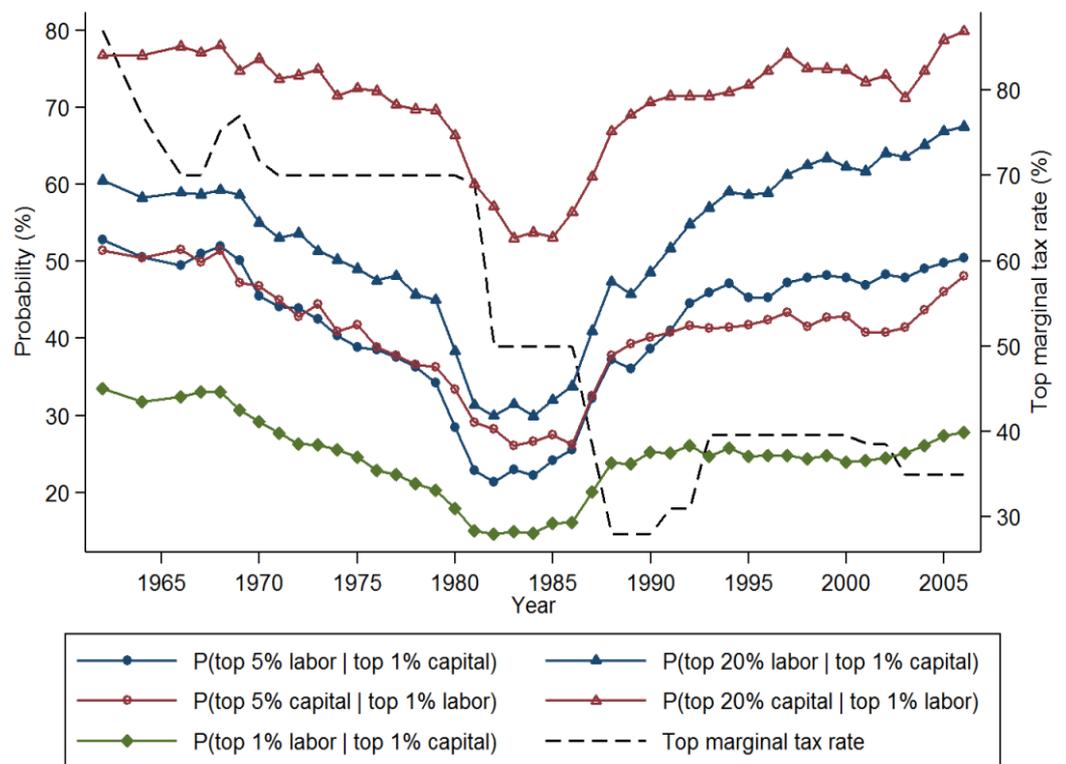


Separate axes: labor (L) on left, capital (K) on right. Excluding capital gains and negative observations. Capital includes S-corporation profits. Self-employment income split between labor (2/3) and capital (1/3).

In the second part of the paper, we use the association matrix between capital and labour to test for changes in the association. The association matrix of capital and labour incomes has the ranks in the two marginal distributions on the two axes. It is equivalent to transition matrices used to study mobility and it is a discrete approximation to the copula density. By being a rank-based measure of the association, it is invariant to monotone transformations in the marginal distributions, and therefore offers a more general test of increasing association.

The long-run evolution of some statistics from the association matrix shows a clear U-shape over this period (Figure 2).

**Figure 2. Long-run changes in the distribution conditional on top 1%**



Excluding capital gains and negative observations. Capital includes S-corporation profits. Self-employment income split between labor (2/3) and capital (1/3). Source of top marginal tax rates: Piketty et al. (2014).

In the 1960s, 80% of tax units that were among the top 1% of earners were also in the top quintile of capital incomes. This share fell below 60% in the 1980s, and approached 80% again by the end of the period. Hence, there is some evidence that the association between labour and capital incomes weakened during the first

20 years, before strengthening again. There is some evidence of an asymmetric association, which was also shown by the alignment coefficient above: the top 1% earners are very likely to also receive high capital incomes (80% are in the top quintile of capital incomes), while only two-thirds of the top 1% capitalists are in the top quintile of earnings.

By comparing *survival* association matrices (the association matrix cumulated from above), we can test formally whether the association between capital and labour incomes has become stronger. The association between capital and labour incomes has increased when the difference between two survival association matrices is everywhere positive. This first-order dominance test was introduced by Atkinson (1981), who examined transition matrices to study mobility.<sup>2</sup> Between 1985 and 2006, we find evidence of increasing association. Put differently, at the same time as the top 1% income share doubled, the positions in terms of earnings and capital income became more similar. These results are robust to alternative income definitions, such as the treatment of negatives, capital gains and the income from self-employment and closely-held corporations. It is important to test for alternative income definitions (as well as to focus on long-run changes), since the turning point in the 1980s coincides with sweeping reforms of the US federal income tax.

In summary, our paper shows that capital and labour incomes became more strongly associated between the mid-1980s and the mid-2000s, contributing to the well-known rise in the income share of the top 1%, and compounding the impact of increasing inequality within the distributions of capital and labour incomes. We find some evidence of a U-shape, with the turning point coinciding with the strong decline in the top marginal income tax rate in the US (dotted line in Figure 2). With lower tax rates, tax units are able to save a higher proportion of their wages, thus accumulating future capital incomes. Although we do not test this hypothesis in the paper, the fall in the US top marginal tax rate may thus be a possible explanation for the increasing association that we document.

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<sup>2</sup> Aaberge et al. (2018), which has been developed in parallel to our paper, apply this test to study the association between capital and labour incomes in Norway.

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## Income Mobility and Gender Composition of Top Earners in Switzerland

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Top income shares, a popular measure of inequality at the top, are cross-sectional snapshots of inequality and say little about the persistence of earners at the top or changes in life-time inequality. If at the same time that we observe rising cross-sectional inequality also income mobility over the life-cycle has increased, life-time income inequality may not have changed after all. Yet so far, still little is known about the prevalence of top earners at the top.

I address this question in the case of Switzerland. Previous research by Föllmi and Martínez (2017) has found that top income shares in Switzerland have been rising since the mid-1990s, while at the same time becoming more volatile. Using social security data, I document labour income mobility patterns within the top decile and the rest of the distribution over the period 1981-2010. In addition, I shed light on gender inequality at the top as well as the share of foreign-born and self-employed among top earners in Switzerland. These aspects, rarely discussed in earlier research on top earners, display how well different subgroups are represented at the top of the labour income distribution and hence characterize the labour market itself and show important changes over time.

### **Rising inequality despite higher top income mobility**

I find that mobility has increased over the period 1981–2010, yet the increase took place during the 1980s, *before* the observed surge in inequality. After three years, about 40% of those formerly in the top 1% are not in this group anymore, after ten years about 60% of top earners have left the top. These figures were about ten percentage points higher for those top earners starting out in 1981. Mobility has increased over the whole income distribution and especially in the middle.

This increase in mobility was nevertheless not enough to counteract the increase in inequality. Both the Gini index and top percentile-to-median ratios of permanent income averaged over five years have been increasing since the mid-

1990s. Also top income shares based on 5-year average income show the upward trend in top incomes. The share going to the top 1% rose from below 6% in 1983 (i.e., based on individual's incomes averaged over the period 1981-1985) to 8% in 2009. The strong fluctuations over the business cycle observed with annual data are reduced substantially when measuring top income shares with 5-year average income. I conclude that approximately 5-15% of the top one percent's share in total labour income is transitory incomes. This amounts to 0.5-1% of total labour income. Interestingly, the transitory incomes peak with the business cycle, right before entering a recession. In a recession, transitory incomes fall, but they remain positive. This pattern is stable over the whole period considered. It suggests that high earners are able to reap large gains in economic booms, but are not faced with according income cuts during downturns. This finding is consistent with earlier research on CEO pay (e.g., Bertrand and Mullainathan, 2001; Shaw and Zhang, 2008).

### **Only few women rise to the top in Switzerland**

When it comes to the composition of top earners in Switzerland, women are highly underrepresented. Their share among the top 1% was 8% in 2010 – 5.6 times lower than in the total labour force. This is extremely low in comparison with other countries. In the UK, 18% of the top 1% were female in 2013, in Canada the share was 22% (both found in Atkinson et al., 2016), and in France (2012) it was 16% (Garbinti et al., 2017). In the US, the share of women among the top 0.1% was 11% in 2012 (Güvenen et al., 2014), while in Switzerland their share was merely 5%. Not only are women underrepresented among top earners, they also exhibit higher mobility rates, implying that women are less likely than men to remain at the top. Likely reasons for the higher female mobility are the prevalence of interrupted female career paths, the difficulty to manage a career and family duties, and opposition or outright discrimination faced by successful professional women (Bohnet, 2016). The higher mobility of women slows down their catch-up process at the top. Assuming a linear trend, it would take another 200 years for women to represent 50% of top earners. For comparison: Garbinti et al. (2017) estimate that in France the top 1% will be half female by 2102, 120 years earlier. Also has the gender gap in earnings (at face value, without

controlling for education and experience in a Mincer-type earnings regression) narrowed more slowly in Switzerland than in France. The gap used to grow over the life-time almost until retirement. In 2010 the gap was increasing until the age of 45 and then stayed flat, therefore putting a halt on growing gender disparities in income over the life cycle.

### **The rise and fall of foreigners and self-employed**

Since the 2000s, the share of foreign-born among top earners has been increasing, especially at the very top. In 2010, 40% of those in the top 0.1% of the labour income distribution were foreign-born, compared to 27% in the total labour force. The timing of the increase coincides with the introduction of the agreement on free movement of persons between Switzerland and the European Union, suggesting that the policy change increased the share of well-paid, highly mobile international professionals in the Swiss labour market.

On the other side of the spectrum, the share of self-employed among top earners has been decreasing since the mid-1990s, especially among the top 1% and top 0.1%. Self-employed are still overrepresented at the top, and more so further up. This suggests that successful business owners are still very successful on average. However, there are now many more employees who make it to the very top. Besides high-paid professionals these are most likely managers of large, often international companies with headquarters in Switzerland, which offers attractive taxes for both, multinational corporations and high-income individuals.

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## Women in Top Incomes

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**Jesper Roine** (SITE, Stockholm School of Economics, Sweden)

Much attention has been given to the growing share of incomes going to people at the top of the income distribution.<sup>1</sup> Much less has been said about the gender composition of these high income earners. The overarching aim of our ongoing research project is to further our understanding of gender dimensions of top incomes.

Though clearly related, this is not the same as studying women in the top of the labour earnings distribution or the gender wage gap. An important finding in the so called top income literature has been the importance of capital incomes, especially in the very top of the distribution, something that has been absent in most of the work focusing on labour market outcomes. Furthermore, the standard “glass-ceiling results” compare women in the top of the female distribution to men in the top of the male distribution, also typically restricting the population to those in working age (e.g., Albrecht, Björklund and Vroman, 2003; Arulamplam, Booth and Bryan, 2006; Albrecht, Skogman Thoursie and Vroman, 2015; see Bertrand, 2017, for an overview). In contrast, the top income literature is concerned with the top of the whole adult population and individual incomes (before taxes and transfers) from all sources.

Our aim is to follow the top income literature as closely as possible in terms of definitions of total income and top groups, but adding novel insights to previous results by asking questions such as: What share of different top groups consists of women and how has this changed over time? Are there gender differences in income compositions and have these changed over time? Are top income women different from top income men in terms of observable characteristics? Are there

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<sup>1</sup> Leigh (2007), Atkinson, Piketty and Saez (2011), Alvaredo, Atkinson, Piketty and Saez (2013), and Roine and Waldenström (2015) provide overviews of this literature.

differences in mobility for top income women and men? Are they different in terms of family characteristics?<sup>2</sup>

### **Top income women in Sweden 1974-2013**

In a first part of our project we study these questions using detailed register data for the top of the Swedish income distribution between 1974 and 2013. The underlying income data is from Swedish tax registers and the income sources used correspond to those used in the studies of Swedish top income shares (Roine and Waldenström, 2008, 2010, 2012). In addition we have information on individual characteristics (age, education, family status, including information about family members). We also have information on individual wealth (taxable wealth at the individual level). The data is longitudinal so we can also study mobility and calculate average incomes over several years (thereby addressing potential problems with changing role of transitory incomes, thereby approximating long run income).

Our first basic result is that we find that the share of women has significantly increased, which has risen from around 6% to around 18% in the top percentile (the top one percent of income earners); in the top decile (the top ten percent of the income distribution) it has risen from around 12% to 28% since the mid-1970s.

Furthermore we find that the income composition of top women is different to that of men. In particular, in the top percentile group women rely more on capital incomes, and realised capital gains are also relatively more important for women. Over time, however, the gender differences in this respect have decreased due to two developments. First, and most importantly, the number of working rich women has increased, and second capital incomes have grown in importance for top income men, while staying about the same for women, in terms of the relative importance of capital as an income source. Women in the top one group receive on average about 30% of their income from capital and this share does not exhibit

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<sup>2</sup> Closest to our work is Atkinson, Casarico, and Votchovsky (2018). Guvenen, Kaplan and Song (2014) also pose similar questions but, like most of the labour economics literature, focus on top earnings.

any clear trend over time. For men in the top one group the corresponding share has increased from being around 5% in the 1970s to being close to that of women, around 30%, today. When defining top earners based on their dominant source of income, the number of working-rich women per working-rich man has increased, while the number of capital-rich women per capital-rich man has decreased.

When studying differences in mobility, we find that women are more likely to exit the top group from one year to the next. This is mainly related to a very different impact of realised capital gains between men and women. Roine and Waldenström (2012) show the importance of realised capital gains for top income earners in Sweden and, also, that this importance persists even if the top is ranked excluding capital gains as well as when the top is defined based on incomes over multiple years. The interpretation is that realised capital gains to a large extent top-up incomes for individuals with already high incomes. We find that there is a strong gender component to this. While realised capital gains top-up already high incomes for men (and hence for most individuals in the top one group) women in the top without capital gains are not much affected by adding them. Most of the realised capital gains earned by top income women go to women who do not qualify in the top group without them. Also, the share of women in the top of long run incomes is considerably lower than that in repeated cross sections when capital gains are included (but not when excluding capital gains).

The importance of capital incomes for women is mirrored by the finding that top income women on average have more (taxable) wealth than top income men. The difference in magnitude has changed substantially over time, though (also in line with the converging role of capital income between top income men and women). Starting in the late 1970s the ratio of women's to men's wealth grew, reaching levels of women in the top one group having around four times as much in average wealth as men in that group in the late 1980s. In the early 1990s this drops sharply, to a level where women have around 1.5-2 times as much as men in taxable wealth. This pattern is consistent with tax- planning being important in the 1980s prior to the 1991 tax reform, but the ratio is also driven by a gradually changing composition of women in the top group.

Finally, we find that women in the top are not very different to men in terms of individual characteristics such as age and education. Family situations, on the other hand, are different, and in some dimensions strikingly so. Only about half of women in the top one group are married while the other half is roughly split between non-married, divorced and widows respectively. These shares have been relatively stable over time (though the prevalence of married has increased and that of widows has decreased). For men in the top one group the share of married clearly dominates but it has gone down since 1970s (mainly because the share of non-married and divorced have increased). We also find a stark difference in terms of couple composition for top income men and women. About three out of four top one men have a wife outside the top ten (and mostly in the bottom 60%). For women, the opposite is true; about three in four top one women have a husband in the top ten (and one in four has a husband who is also in the top one). This asymmetry in top income couples – where most high income women also have high income partners, while many high income men have partners with low income – is in line with recent work by Bertrand, Kamenica, and Pan (2015), suggesting that there are strong norms against wives earning more than husbands. It is also suggestive of very different possibilities of sharing non-market work within the couple (on average to the disadvantage of top income women).

### **Using LIS data to study top income women**

Based on our work on Swedish top income women we have also started a project exploring the possibilities of using LIS data to study top income women. By constructing top groups of the distribution of total income (factor income when capital incomes are available otherwise labour income) we explore the development of the share of women in this group over time, and also (when data permits) study how different the picture is when including capital incomes as compared to labour income only. Our preliminary results suggest similar trends in that women increase their presence in the top of the distribution almost everywhere.

In light of the striking differences in partner income for top income men and women respectively found in Sweden, we also use LIS data to study this for a

larger set of countries. Our preliminary results suggest a similar pattern in many countries; top income women are much more likely to have a partner who is also a high income earner, while top income men are much more likely to have a low income partner.

Overall, our results suggest both that many of the findings in the top income literature have a clear gender component and that understanding gender equality in the top of the distribution requires studying not only earnings and labour market outcomes, but also other sources of income as well as other aspects (such as family relations) of top income men and women.

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## Evolution of Income Poverty under Unequal Growth: Settling the Dispute between Absolutists and Relativists

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**Mery Ferrando** (Tilburg University, Netherlands)

There exist two central approaches for measuring income poverty: absolute poverty and relative poverty. These two approaches aim at capturing different kinds of deprivations, but they only differ in the type of poverty line used.

On one hand, absolute poverty refers to the idea of *subsistence*. An individual is absolutely poor if her income is not sufficient to satisfy several of her basic needs, such as being sufficiently nourished, owning some clothes or having access to a dwelling. In a first approximation, the real cost of subsistence does not depend on standards of living. Therefore, the income threshold of an absolute line is independent of standards of living. This is for instance the approach underlying the extreme poverty line of the World Bank, recently updated to \$1.9 per person per day, and the official poverty measure in the United States.

On the other hand, relative poverty refers to the idea of *social inclusion*. An individual is relatively poor if her income is not sufficient to engage in the everyday life of her society. The real cost of not being excluded from social participation depends on standards of living. A relative line usually evolves as a constant fraction of mean or median income. This is for instance the approach underlying the poverty line used in the European Union, where the poverty threshold is set at 60% of median income.

Poverty comparisons obtained using the absolute approach are sometimes in conflict with those obtained using the relative approach. In particular, such a conflict arises when evaluating the poverty consequences of *unequal growth processes*. Consider for instance an unequal growth process such that the incomes of all members of a society increase but the incomes of the middle class and the rich increase faster than the incomes of the poor. Whether such unequal growth is deemed poverty reducing or poverty enhancing depends on the normative view held by the observer. For a purely absolutist observer, only the level of income

matters. Therefore, she concludes that income poverty falls whenever the income of the poor increases, irrespectively of the evolution of inequality. In contrast, for a purely relativist observer, only the income inequality experienced by the poor matters. Therefore, she concludes that income poverty increases when the incomes of the poor increase at a lower rate than the incomes of the middle class and the rich.

If both subsistence and social inclusion are deemed relevant, then one must evaluate poverty using an hybrid measure, which weighs the absolute and relative aspects of income poverty. The weight that an hybrid measure gives to the absolute over the relative aspect captures the precedence that this measure gives to subsistence over social inclusion. The larger this weight, the more importance is given to subsistence and the less importance is given to social inclusion. In our terminology, an “absolutist” observer evaluates poverty using an hybrid measure characterized by a large weight and a “relativist” observer evaluates poverty using an hybrid measure characterized by a small weight.

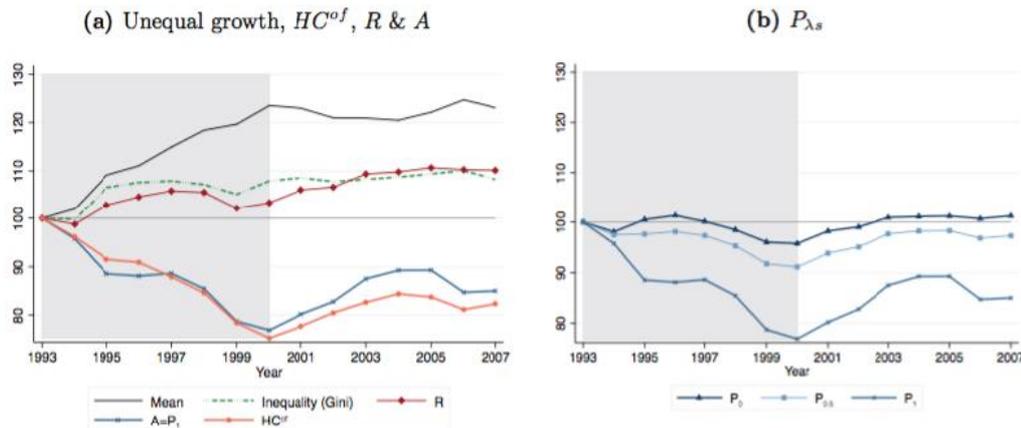
The question we address in our article is the following: can we sometimes say that an unequal growth process *unambiguously* reduces income poverty? Poverty reduction is unambiguous if all moral observers agree that poverty has been reduced, independently of the degree to which these observers are absolutist or relativist.

Our article shows that, if a minimal priority is given to subsistence over social inclusion, then there exist unequal growth processes that unambiguously reduce poverty. The minimal priority necessary for this result to hold is that all moral observers agree that having an income level below the subsistence threshold is worse than having an income level above the subsistence threshold but below the social inclusion threshold. Assuming this form of priority, we derive the conditions under which an unequal growth process unambiguously reduces poverty.

We then use our theoretical results in order to evaluate the poverty impact of the unequal growth that took place in the US over the period 1993-2007. This process is illustrated in panel (a) of Figure 1. Over the period, mean income (plain black

line) increased by more than 20%, while inequality, as measured by the Gini coefficient (dashed green line) increased by almost 10%. A purely absolutist observer deems that poverty has been reduced (plain blue line with crosses - P1), while a purely relativist observer reaches the opposite conclusion (plain red line with diamonds -R).

**Figure 1: Evolution of poverty measures, mean income and inequality. 1993-2007.**



It is important to observe that a purely relativist observer does not grant a minimal priority to subsistence over social inclusion. In panel (b) of Figure 1, we plot the evolution of poverty according to all observers that grant this minimal priority. As in panel (a), the purely absolutist observer deems that poverty has been reduced (plain blue line with crosses - P1). Over the period 1993-2000, the most relativist observer also deems that poverty has been reduced (plain dark blue line with triangles - P0). Hence, there is a consensus among all observers who grant a minimal priority to subsistence. Therefore, we can unambiguously conclude that the unequal growth process over the period 1993-2000 has reduced poverty. Observe that we cannot obtain such unambiguous conclusion over the period 1993-2007. While the most absolutist observer deems that poverty has been reduced, the most relativist deems that poverty has been (very slightly) increased.

In our article, we quantify how often we can obtain an unambiguous conclusion when a purely absolutist observer disagrees with a purely relativist observer. It turns out that, in our sample, this happens for about one-third of such disagreements. For these cases, using an absolute poverty measure – like the US official poverty measure – leads to the same conclusion as the one obtained with a

hybrid measure. When the conclusion is ambiguous, we can quantify the degree of relativism necessary to reverse the conclusion obtained by an absolute measure.

Overall, when assessing the poverty impact of an unequal growth process, the normative tools proposed in this research allow the practitioner to go beyond a disappointing absence of conclusion.

## Inequality in an Equal Society

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Even a society in which everybody is the same at the same stage of the lifecycle will exhibit a substantial degree of income and wealth inequality. In this paper, we take this notion to the data in order to quantify the share of observed income and wealth inequality that is attributable to lifecycle profiles of income and wealth.

An early version of this argument was made by Atkinson (1971), who suggested that the distribution of wealth should be expected to be unequal solely due to differences in accumulated savings over the lifecycle. In a related contribution, Paglin (1975) uses an argument similar to Atkinson to suggest that popular measures of inequality such as the Gini coefficient should be corrected for the age structure inherent in income and wealth profiles. While Paglin's suggestion for a correction was not uncontroversial, the core of his argument that inequality measures should be adjusted for the underlying lifecycle structure still holds. A powerful new body of evidence (particularly: Piketty (2003), Piketty and Saez (2003) and most recently, Atkinson et al. (2011), Piketty and Saez (2014) and Saez and Zucman (2016)) has transformed our understanding, and highlighted the societal implications, of long-term trends in inequality. However, following Atkinson (1971) and Paglin (1975) it is important to understand the extent to which these trends reflect changes in natural inequality due to changes in nations demographics, versus changes in the technology of production and the distribution of rents.

The data reveals that natural inequality, the inequality solely due to lifecycle effects, is a substantial component of actual inequality. Treating the natural rate as the benchmark, analysing excess or adjusted inequality suggests that recent increases in income inequality in the US are both larger than the actual rate would suggest, and represent a distinct change from the period 1960-1980. It is also clear that natural inequality is of first-order importance in understanding variation in other developed countries and the variation between them. A similar analysis for

wealth inequality suggests that natural inequality is a less important determinant than it is for income, and a much smaller component of actual wealth inequality. It similarly explains less of the cross country variation.

**Figure 1. Cross-country variation in inequality (Wave IX, circa 2013)**

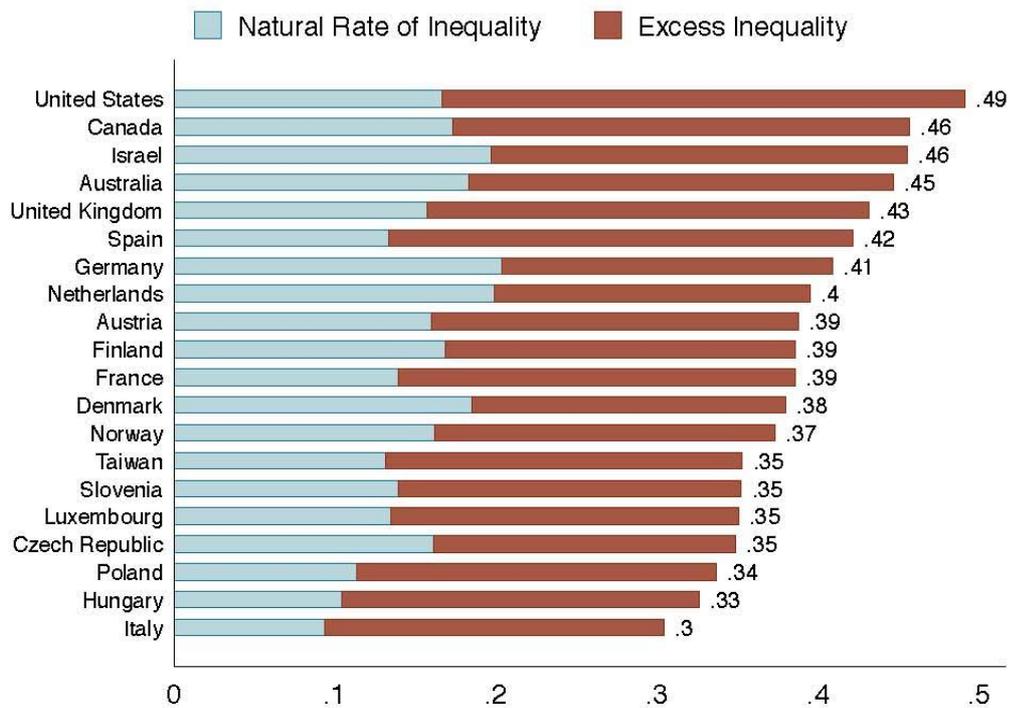


Figure 1 summarizes the cross country variation in the final wave of the LIS for all of the countries we consider. Natural inequality is blue, and excess inequality is red. The sum of these gives actual inequality in labour income, reported to the right of each bar. The most obvious feature of the data is the substantial variation in actual inequality, between 0.49 for the US or Canada and 0.3 for Hungary or Italy. This variation is continuous, meaning that there are no obvious groups in the data. Secondly, we note that there is similarly large variation in excess inequality. For example, actual inequality in Spain or Germany is similar, but excess inequality is much higher in Spain. Alternatively, if Spain had the same demographics as the US, it would be nearly as unequal. Conversely, while natural inequality in Slovenia is similar to that in Spain, excess inequality is around seven percentage points lower. Thus, cross-country comparisons of actual inequality may be misleading. France and Finland have the same actual Gini, but excess

inequality in France is higher, and thus perhaps more amenable to policy. This emphasizes that as well as being important in understanding variation over time, separating natural and excess inequality is crucial to a nuanced understanding of cross-country variation in income inequality.

We extend this analysis to consider cross country time series results. Considering labour income again, we find that the actual Gini coefficient in the US is high compared to the other countries we consider, particularly at the beginning of our sample period. However, the gap has narrowed and all countries have experienced rising inequality. The biggest changes have been in Spain, the Netherlands, and Germany. In comparison, the US and Taiwan seem to have experienced relatively stable levels of inequality in labour income. This finding is cast in new light when we consider the natural rates of inequality. While natural inequality is stable on average, this masks comparatively notable increases for Spain, Germany and the Netherlands. This suggests that the similar trends in inequality have different sources in the US than elsewhere.

This difference is clearer when we consider adjusted inequality. Now we can see that the US has seen a substantial increase in adjusted inequality, both starting and finishing the period at a higher level of adjusted inequality than elsewhere. Taiwan is notable in that adjusted inequality has remained relatively stable over the sample period. Other countries, such as the UK and Canada, have seen rapid growth rates of adjusted inequality similar to those in the US, albeit from lower initial levels. In general, the rate of increase was relatively slow everywhere until the mid-1980s after which it accelerated. The similarities in these trends, allowing for different starting points, suggest that rises in excess inequality may be driven by technological and policy changes common across the developed nations.

We explore the effect of demographics on inequality by investigating the distortion in the demographic pyramid created by the Baby Boom generation. We find that as cohort shares transition back into their long run equilibrium levels, natural rate inequality of income will fluctuate and reach a new higher steady state level. In this regard, we show that an additional factor contributing to any future rise in income and wealth inequality is that comparatively high levels of natural

inequality are forecast to remain, and indeed increase, from their historically high level. Given the current rapid increases in excess inequality in the US and elsewhere this suggests that, other things equal, actual inequality should be expected to rise substantially over the next 20 years.

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## The Evolution of Global Absolute Intergenerational Mobility

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The question whether next generations will be better off than previous ones has been dominating much of the public economic and political debate in the past few decades across the globe. The «growing public perception that intergenerational income mobility [...] is declining in the United States» (Chetty et al., 2014b) and the argument that «people’s frustrations [...] are] rooted in the fear that their kids won’t be better off than they were» (Obama, 2013) led scholars to quantify absolute intergenerational mobility – «the likelihood a child will be financially better off than their parent at around the same age» (Halikias and Reeves, 2016).

Intergenerational mobility is typically divided into two classes: relative and absolute. Relative measures gauge children’s propensity to occupy a different position in the income distribution than their parents. Absolute measures gauge their propensity to have higher incomes than their parents in real terms. These two classes of mobility also «capture different normative concepts» (Chetty et al., 2014a), and «attaching a precise normative significance to “income mobility” is difficult because of the multidimensionality of this concept» (Fields and Ok, 1999). This may create different and possibly contradictory pictures of ostensibly the same phenomenon.

While relative intergenerational income mobility has been studied for decades, investigations of absolute intergenerational income mobility remain «scarce, mainly because of the lack of large, high-quality panel data sets linking children to their parents» (Chetty et al., 2017). Chetty et al. (2014a) introduced a measure of absolute mobility: the fraction of children with higher inflation-adjusted incomes than their parents at the same age, capturing the chances of children to have a higher standard of living than their parents. Chetty et al. (2017) studied the historical evolution of absolute mobility in the United States, finding that it has

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fallen from around 90% for children born in 1940 to 50% for children born in the 1980s.

This paper extends the estimation of absolute mobility trends to several developed and developing countries and to the global level. Following Chetty et al. (2017), our approach combines the marginal income distributions for parents and children and their copula, i.e. the joint distribution of parent and child income ranks. We first show that the estimates of absolute mobility depend mainly on the marginal income distributions, while the copula plays only a minor role in determining absolute mobility, within plausible limits. Notably, we find that the long run evolution of absolute mobility cannot be explained by plausible changes in the copula, but only in the marginal distributions.

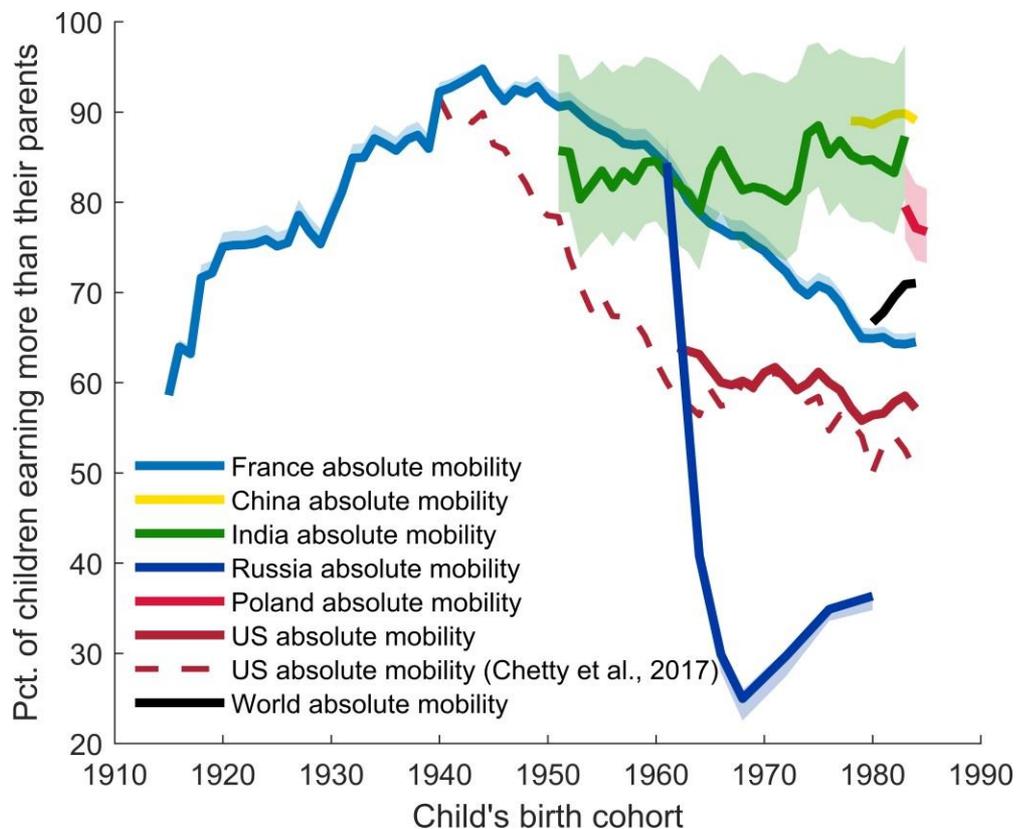
These observations make the estimation of absolute mobility possible even for countries in which panel data are very scarce. We then combine the available data on intergenerational copulas and historical income distributions from The World Inequality Database (2017) and provide absolute mobility estimates for several developed and developing countries. The main results are presented in Figure 1.

We find a decrease in the probability of children to earn more than their parents in France and in the United States for post-war birth cohorts. Unlike the findings on the United States (Chetty et al., 2017), we find that the slow economic growth of the past several decades is the key factor for the decrease in absolute mobility in France, rather than increasing income inequality. We also find that despite higher growth rates in recent decades and regardless of “the American Dream” ethos, the absolute intergenerational mobility in the United States for late 1970s and early 1980s birth cohorts is among the lowest within the group of countries we consider. In China, India and Poland we find very high absolute mobility rates, which reflect the high growth rates characterizing these economies in the recent decades. Despite the high income inequality in China and India, the levels of absolute mobility remain very high.

We also provide a reduced form model, which enables the derivation of closed-form expressions for absolute mobility as a function of income growth, income inequality and relative intergenerational mobility. We demonstrate that this

simplified model describes well the long run evolution of absolute mobility, unlocking powerful theoretical and empirical techniques. Notably, we find that the co-movement of absolute and relative mobility should not, in general, be expected and that these two types of mobility are inversely related. We also use the model to provide estimates of absolute mobility in additional countries, for which less data on marginal distributions are available.

**Figure 1: Evolution of absolute mobility in France, China, India, Russia, Poland, United States and globally.**  
**The shaded areas take into account the lower and upper limits of the rank correlation, which in some countries has a negligible effect.**



The main contribution of this paper is by demonstrating that data on marginal income distributions, which are widely available, can be used to estimate absolute intergenerational mobility without the need for high-quality panel data sets, which remain unavailable for most countries and for most birth cohorts. We also offer a theoretical study of the relationship between the canonical measures of intergenerational income mobility and show empirically that a simple model of a

bivariate log-normal income distribution can describe adequately the long run dynamics of absolute mobility and provide a good understanding of the inter-relationship between income growth, income inequality, relative mobility and absolute mobility.

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## An integrated approach for a top-corrected income distribution

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**Maria Metzger** (DIW Berlin, Germany)

Has inequality of living standards in European countries increased in recent years? The answer is far from conclusive, varying as we look at different inequality measures and different data sources. A well-known and intensively discussed reason for diverging trends is the inequality measure's sensitivity to changes in the top, middle or bottom of the income distribution. Another reason for diverging trends is much less investigated: the different nature of the data employed to estimate inequality measures. Whereas the top income share literature based on tax data produces wide evidence of rising inequality in recent decades, survey-data-based inequality studies find less clear trends.

Tax and survey data substantially differ in their definition of income and unit of observation. Household surveys usually apply a comprehensive income concept, while tax data contain income subject to taxation. While incomes in survey data are aggregated at the household level, the income-receiving unit in tax data is the tax unit. If household members pool their income, the narrower sharing unit of a tax unit usually produces higher inequality. Furthermore, survey and tax data are affected differently by time-variant factors such as survey response and reporting behaviour, tax filing behaviour as well as economic, demographic and legislative changes. Undercoverage and underreporting of top incomes may produce a downward bias for survey-based inequality measures. Tax filing behaviour is sensitive to changes in the income tax law creating downward or upward bias before or during reform years. Top income earners tend to benefit disproportionately from economic growth (Roine et al., 2009), which in turn produces higher inequality estimates in tax data than in survey data where top income earners are underrepresented. Changes in the number of unmarried couples affects tax-based inequality measures in countries with joint taxation where the direction of the effect depends on the degree of assortative mating.

For the United States and the United Kingdom, a growing number of studies investigates these differences by reconciling estimates from administrative and survey data (Burkhauser et al., 2012; Armour et al., 2013; Bricker et al., 2016; Burkhauser et al., 2016; Jenkins, 2017) or adjusting survey-based Gini coefficients with tax data-based top income shares (Atkinson et al., 2011; Alvaredo, 2011). However, these contributions draw on access to tax record microdata which require substantial knowledge of the country's tax rules to harmonize income concepts and are notoriously difficult to access. This makes cross-country comparisons rather difficult. Furthermore, most of these studies document inequality trends of tax income over tax units that do not necessarily reflect how inequality of living standards evolved for the entire population.

In Bartels and Metzger (2019), we develop a new method to obtain top-corrected income distributions by combining easily available information from tax and survey data. We replace the top 1% of the survey income distribution with Pareto-imputed incomes using information on the top incomes' distribution from the World Inequality Database (WID). Our approach is easily applicable by relying on information publicly available from the WID for the upper tail of the distribution and easily accessible survey data, such as the German SOEP or EU-SILC, for the middle and bottom of the distribution. Neither access to tax record microdata nor record linkage is needed. In contrast to the decomposition approach for top-corrected Gini coefficients (Atkinson, 2007; Alvaredo, 2011), which exclusively relies on tax incomes of tax units, our integrated approach allows for producing inequality measures for inequality of living standards in the entire population of a country also considering differences in households' needs. Of course, the applicability of the approach is restricted by the number of countries and years for which top income shares are available in the WID. However, we expect the WID to grow in the years to come such that our approach becomes usable for many additional countries and years.

Our integrated approach represents a useful tool to improve cross-country comparisons of inequality. If there exist legal barriers to link administrative to survey data in some countries (like Germany) but not in others, quality and coverage of income components across the distribution are likely to deviate. We

find that a significant share of inequality differences across countries stems from data source differences. E.g., investment and property income is often understated in survey data as compared to administrative data (Jäntti et al., 2013). Consistently aligning the top of the distribution with WID-series based on administrative data in all countries improves the comparability of top incomes across countries. In contrast to the Atkinson-Alvaredo approach, our integrated approach allows to address various additional research questions, e.g., decomposing inequality by groups other than income, applying resampling frameworks like bootstrap and jack-knife and using the top-corrected income distribution for regression analysis.

Another potential application of our approach is to check the coverage of top incomes in other household surveys than EU-SILC and SOEP. Examples are the Household Finance and Consumption Survey (HFCS) conducted by national central banks and national statistical institutes in 18 Euro area countries, the Luxembourg Income Study (LIS) and surveys in developing countries where WID-series increasingly become available.

In our paper, we first reconcile German survey and tax data and examine the extent to which differences in top income share estimates from household surveys and tax returns arise from differences in income concepts, observation units or from the ability to capture top incomes. We find that the top 1% is underrepresented in German SOEP data compared to tax data, but the lower percentiles of the top decile match very well. We find that different definitions of income and observation unit yield substantially different inequality levels in Germany: the Gini of tax income by tax unit is about 10%-points higher than the Gini of equivalent gross household income by household unit. The selected income concept is responsible for the largest part of this gap, whereas the observation unit changes inequality only slightly as most German households form a single tax unit anyway.

We apply our integrated approach to German SOEP data and European EU-SILC data. Our top-corrected Gini's based on German SOEP data 2001-2012 are about 5% higher than unadjusted Gini's. Our top-correction method indicates similar

trends and slightly lower inequality levels than the decomposition approach (Atkinson, 2007; Alvaredo, 2011). We estimate top-corrected Gini coefficients for European countries where the WID provides information on the shape of the income distribution's top. The gap between unadjusted and top-corrected Gini's is highest in countries that rely (Germany, UK) or have relied (Spain) on interviews for the provision of EU-SILC data. Top-corrected Gini's are 5% to 9% higher in Germany and 2% to 5% in the United Kingdom. This means that German SOEP data provide a comparably better picture of top incomes than German EU-SILC data, since inequality levels change less using our integrated approach. For most countries using administrative data, the gap between top-corrected and unadjusted Gini's is negligible since top incomes are already well-represented.

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## Distributional National Accounts for Wealth: Measurement Issues and First Results for Austria, Germany, France and Spain

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Analysing, assessing and comparing economies is usually done by means of macroeconomic aggregates or indicators derived therefrom, such as total income, total consumption, or total wealth. Although these indicators provide useful information about the economy *as a whole*, they can say nothing about the *distribution* of income, consumption and wealth among the population. However, whether, for instance, the total wealth of a nation is owned by a few extremely wealthy households, or whether it is held by many households each contributing a similar share of the total, makes a big difference.

Distributional information is needed to assess, understand and compare economies in a comprehensive way. It is an important source of information for the public, and essential to foster a discussion within society about inequality and (re-)distribution. For researchers, such information is valuable to better understand economic dynamics including the impact of macroeconomic shocks on different parts of the population and feedback effects. Distributional data can thus potentially lead to better models and predictions. It will also enable a better understanding of where economic growth originates and thus improve the identification of winners and losers. Finally, distributional information will help policymakers to tailor policies more effectively and to better monitor their impact.

The need for distributional information for the household sector was also pointed out by the Stiglitz-Sen-Fitoussi commission, which examined how to measure the wealth and social progress of a nation in a more adequate way. The commission emphasized that the availability of more comprehensive economic indicators is crucial because what is measured ultimately affects actions. Likewise, the G20 Data Gaps Initiative – a list of recommendations on how to improve economic

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<sup>1</sup> A summary, discussion and extension based on Chakraborty and Waihl (2018).

and financial statistics created as a response to black spots identified in the course of the global financial crisis – recommends providing distributional alongside aggregate information.

The joint OECD-Eurostat Expert Group on Measuring Disparities in a National Accounts Framework focuses on distributional indicators for income and consumption. The ECB Expert Group on Linking Macro and Micro Data for the Household Sector (EG-LMM) works on linking micro data obtained from the Household Finance and Consumption Survey (HFCS), a harmonised wealth survey carried out in a large number of EU countries (see HFCN 2016), with macroeconomic data reported in the National Accounts to derive distributional indicators for wealth.

When focusing on wealth, the ultimate goal is to break down *all* components of wealth (real estate assets, business wealth, deposits, liabilities, etc.) by homogenous household groups, such as groups constituted by similarities in income, age, household composition, or wealth itself.

The resulting Distributional National Accounts (DINA) should ideally be compiled in a standardised and harmonised way enabling comparability across countries and time. As the name suggests, distributional figures should be integrated within the national accounts framework whenever possible, which means that eventually distributional split-ups should sum up to national accounts aggregates. This integration is important to establish a link to GDP, avoid confusion amongst users and enable a consistent and comprehensive discussion about wealth inequality. Having aggregate and distributional figures next to each other stands a good chance of increasing the utilisation of distributional statistics as users will be “nudged” towards taking them into consideration.

To link micro (HFCS) and macro (national/financial accounts) data, the variables and their definitions need to be aligned as far as possible. The definitions of liabilities/loans, deposits, bonds/debt securities and investment funds are highly comparable between the two sources as assessed by the EG-LMM (2017).

The definitions of a substantial component of wealth – namely equity/business wealth – are at the moment conceptually not readily comparable as the HFCS and

the financial accounts use different split-ups of non-listed businesses according to legal forms. Both data sources are currently not granular enough to create sufficiently similar categories. Only the sub-component listed shares is highly comparable between the two sources. Overall, the EG-LMM assesses equity/business wealth as of medium comparability. Equity/business wealth is particularly important for the wealthiest of the wealthy.

Real estate constitute the most important asset type for the (upper) middle class due to the common ownership of the household main residence. A direct comparison across the two data sources is not yet possible due to data gaps in the national accounts and differences in concepts. The national accounts differentiate real estate into the value of the structure and the value of the underlying land. As land prices are rarely observed (particularly in densely populated urban areas), this separation relies heavily on imputations. In the national accounts, the land underlying structures generally cannot be separated from undeveloped or other types of land, and land or structures owned by households cannot be separated from the same assets owned by non-profit institutions serving households, e.g., land and structures owned by churches or sports clubs. The HFCS follows a more natural concept of housing wealth by pooling the value of the structure and the underlying land, and in general does not include non-household owners.

Whereas the survey asks for other valuables, such as cars, yachts, planes or jewellery, the national accounts do not include any of those. There needs to be further discussion as to whether such assets should still be part of DINA. Another issue emerges from measuring and comparing pension wealth and insurance claims – two components hard to measure for macro- and micro-statisticians alike.

When, as a first step, only focusing on highly comparable components, the totals reported by the national accounts and the totals computed from the survey do not match, there is usually under-coverage in the survey, i.e., the totals derived from the survey data are lower than the totals in the national accounts. The case is different for equity/business wealth: usually, the HFCS reports larger amounts than the financial accounts, which is an empirical hint of problems in definitions.

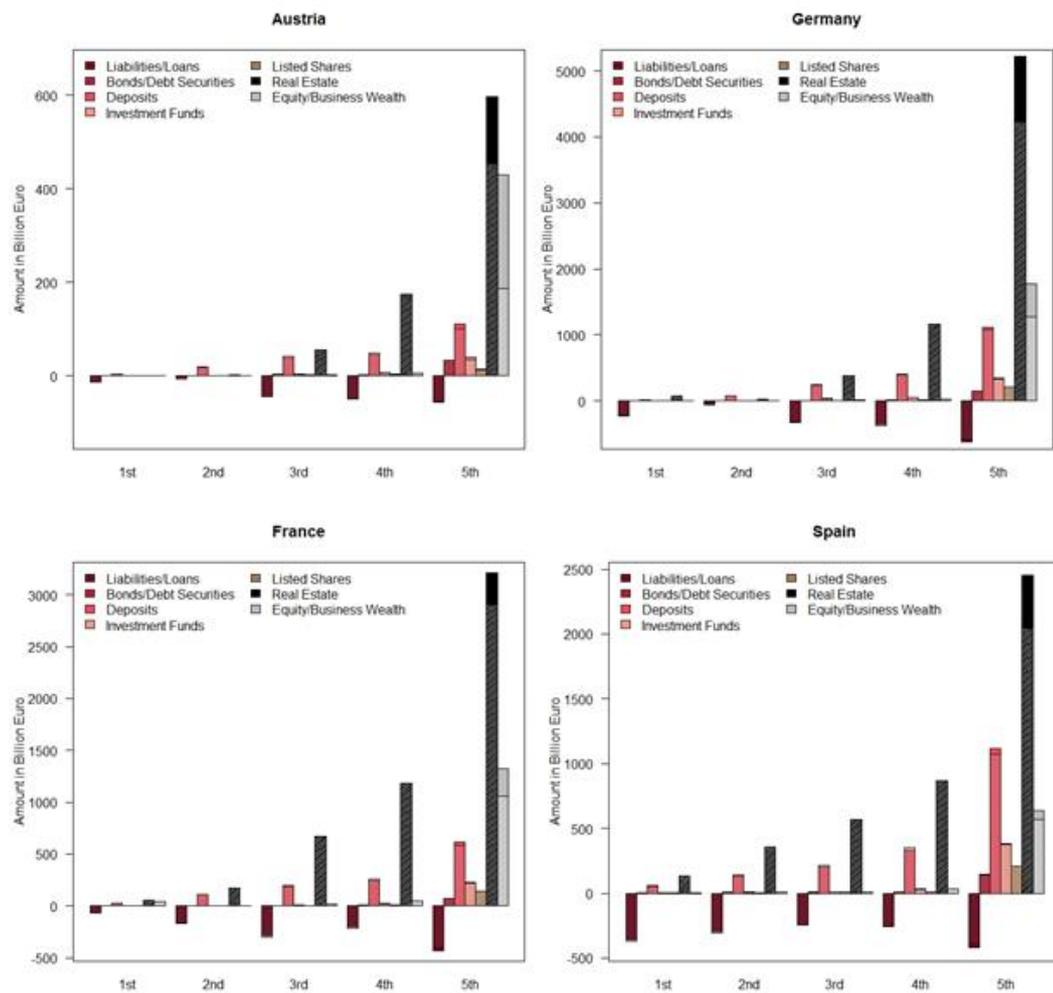
There are several possible causes for the gap besides differences in definitions: differences in valuation concepts (the HFCS relies on the competence of owners to self-evaluate their assets), differences in the exact population scope (e.g., the survey excludes persons living in retirement homes, monasteries or prisons, and homeless people, whereas the national accounts do not differentiate based on the mode of living), reporting and sampling problems in the survey, recording problems in the national accounts, and, of course, remaining discrepancies in definitions.

Moreover, it is known that voluntary surveys aiming to collect information about wealth usually suffer from inadequate representation of the wealthiest households. Wealthy households are harder to contact and participate less often in such a survey. Given that this part of the population owns large shares of total wealth, good coverage at the very top would, however, be crucial. Therefore, Chakraborty and Walzl (2018) quantify the impact of the so-called “missing wealthy” on aggregate components of wealth.

Chakraborty and Walzl (2018) take advantage of “rich lists” published by newspapers (see also Vermeulen, 2016, 2018). The most prominent of these lists is the Forbes World’s billionaires list, which aims to collect the names and net worth of US-dollar-billionaires around the world. In Chakraborty and Walzl (2018), use is made of national rich lists for Austria and Germany compiled by the magazines *Trend Magazin* and *Manager Magazin*, respectively. These lists are combined with the survey’s top observations to adjust the shape of the top tail assuming that the top of the wealth distribution follows a Pareto model. Here, I also present results for Spain and France relying on the *El Mundo* list for Spain and the *Capital* list for France. The adjusted wealth of the top tail of the distribution is divided into its components: i.e., how much of the total consists of real estate assets, business wealth, and so on, is detailed. The results of this exercise are then used to quantify the contribution of the missing wealthy to the

total micro-macro gap and to compile adjusted DINA. Figure 1 shows adjusted and unadjusted DINA for Austria, Germany, France and Spain.<sup>2</sup>

**Figure 1: Pareto-adjusted and unadjusted DINA**



Adjusted and unadjusted HFCS totals are scaled to match national account totals for conceptually highly comparable components, whereas HFCS totals are used for equity/business wealth and real estate.<sup>3</sup>

<sup>2</sup> The figures show the distribution of several wealth components and liabilities held by each net worth quintile (e.g., the first quintile refers to the poorest 20% and the fifth quintile to the wealthiest 20% of all households). Due to discrepancies in definitions, the components real estate and equity/business wealth are not scaled to match the national accounts, whereas all other components are. Note that listed shares form part of equity/business wealth. Shaded bars indicate amounts without adjustments, whereas filled bars indicate Pareto-adjusted amounts.

<sup>3</sup> Sources: (1) 2nd wave HFCS data compiled by the respective central banks/statistical institutes and harmonized by the European Central Bank; (2) Financial Accounts compiled by the respective central banks (average quarterly data matching the respective HFCS fieldwork period); (3) 2014

Measured asset-specific inequality is particularly striking for equity/business wealth: the richest 20% own almost all assets of this type. Similarly, bonds/debt securities, investment funds and listed shares are concentrated at the top although totals are much smaller. Real estate assets are spread over a larger share of the population. Austria and Germany are countries with traditionally high proportions of renters, which is reflected in the low amounts of real estate assets held by the bottom 40% of the population. In contrast, home-ownership rates are higher in France and even higher in Spain. Although inequality of real estate wealth is less pronounced than inequality of other asset types, the distribution is far from uniform in all four countries. The distribution of debts stands out for Spain, where they are large and evenly spread across the groups. One explanation is the extraordinary housing boom at the beginning of the century that motivated people to take out excessive mortgages to invest in real estate and participate in the boom. After the bust in 2008, many were left with mortgage debt far exceeding the value of their assets (see also Martínez-Toledano, 2017).

Adjusting for the missing wealthy leads to the largest relative changes in equity/business wealth. This is not surprising, as the wealthiest households tend to hold a large proportion of their wealth in the form of stocks and shares. Relative changes for other components of wealth are less pronounced. Overall, wealth inequality increases when adjusting for the missing wealthy (the Gini coefficients increase from 72% in Austria and from 76% in Germany to roughly 80% in both countries).

Improving the survey design can help to limit the impact of the missing wealthy: administrative data can, whenever available, be used to correct responses of survey participants (some countries already do this for income and, less commonly, also for other components), and results for the top tail can be enhanced by strategically including more wealthy households in the survey. Such “oversampling” is applied in most countries participating in the HFCS, but the exact strategies and the oversampling success vary largely between countries thus

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Trend list (AT), 2014 Manager Magazin list (DE), 2013 El Mundo list (ES), 2014 Capital list (FR) and authors' own calculations; (4) Rich lists are adjusted for family clans and foreign residents whenever possible. The year of each rich list is chosen to best match the respective HFCS fieldwork period.

limiting comparability: oversampling requires administrative data to identify rich households, but the availability of such data and the legal possibilities to use them differ across countries. Spain and France are able to directly oversample based on individual data on taxable/net wealth. Germany oversamples indirectly by drawing more observations from regions where average incomes are high, and Austria completely refrains from oversampling (see HFCN, 2016).

Chakraborty and Waihl (2018) find that adjusting for the missing wealthy has a much larger effect in Austria than in Germany. They also find that Austria and Germany are more similar in terms of (component-wise and total) wealth inequality *after* the adjustment. Given the structural similarities of the two countries (also pointed out by Fessler et al., 2016), this suggests that a Pareto-adjustment of the top tail potentially increases comparability across countries which otherwise suffers from differences in oversampling strategies. Performing the same exercise for Spain and France shows that the overall effect of the missing wealthy is even smaller, as these two countries follow a very advanced oversampling strategy.

Although the 'missing wealthy' notion does explain parts of the total micro-macro gap, a substantial gap still remains *after* the adjustment. Further research on where this gap comes from, as well as more work on better aligning definitions between the two data sources, is needed before distributional breakdowns can be included into the regularly produced set of official statistics.

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