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# Rising Income Inequality and Living Standards in OECD Countries: How Does the Middle Fare?\*

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## *Abstract*

This paper uses data from the key comparative sources available for the rich countries to examine how both real median incomes and income inequality have evolved from around 1980 through the Great Recession. There are striking differences across OECD countries in average real median income growth. Some increase in overall inequality has been common, but with wide variation in extent and timing. Top (pretax) income shares have generally been rising, but not always consistently with overall inequality from household surveys. A significant negative association between changes in Gini and median income is found across countries over time, and a significant negative relationship with changes in top shares only when controlling for economic growth. Economic growth and inequality trends together leave much of the variation in median incomes unaccounted for, so direct measures of how these incomes are evolving need to be central to monitoring progress towards inclusive growth. (*JEL D31*)

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## 1. Introduction

Concern about increasing income inequality in rich countries has become a common theme among commentators, politicians and international organisations, often focusing on the rising share going to the very top versus the “squeezed middle”. Polarisation of the wage distribution from hollowing out of the occupational structure has received a great deal of attention. Polarisation in the broader income distribution in terms of a shrinking share of households “in the middle” has also been studied, as has the extent to which the share of total income going to households around the middle has been falling (Wolfson, 1997; Deutsch and Silber, 2010). Polarisation or declining income shares for the middle could go together with rising living standards, but increasing inequality is seen by some to be a key cause of stagnating real incomes and living standards for the middle and lower parts of the distribution (Mishel *et al.*, 2012; Stiglitz, 2012; Chakravarty and D'Ambrosio, 2010). This linkage is at the core of the recent focus on “inclusive growth” and “shared prosperity”, which has become a rallying-cry and central focus for the OECD and other multilateral organisations (Saunders, 2001; de Mello and Dutz, 2012; OECD, 2015).

This paper uses data from the key comparative distributional data sources available for the rich countries from around 1980 through the Great Recession to investigate the extent to which increasing income inequality has in fact been associated with stagnating real incomes for the middle. Drawing on data across 29 rich countries from the Luxembourg Income Study, the OECD Income Distribution Database and the World Top Income Database, we examine how income inequality and real incomes around the middle have evolved over time, and the extent to which rising inequality appears to be associated with changes in real incomes. The experience of the United States over the past 30 years – rapid rise in income inequality together with slow growth of middle incomes – has played a major role in influencing research and commentary on inequality, living standards and the “squeezed middle”. Here we are able to put that experience in comparative context. The paper also brings out some important lessons about using the available data to analyse the relationship between inequality and living standards and how best to track and monitor “inclusive growth”.

The paper is structured along the following lines. We begin with a discussion on inequality and the squeezed middle and the channels by which inequality might impact on middle incomes. Section 3 describes the data on which we rely, covering most of the countries of the OECD. In Section 4 we look at how real incomes at the middle evolved over time for these countries, and whether this simply reflects differences in overall economic growth. We then examine trends in income inequality in Section 5, as measured by the Gini index and the share going to the very top of the income distribution. In Section 6 we investigate the extent to which stagnating real incomes and increasing inequality appear to be going together, and the role of economic growth. Section 7 presents the key findings and priorities for further analysis.

## **2. Inequality and the “squeezed middle”**

While the notion that the middle has been squeezed as a result of increasing inequality is widespread, it is open to a variety of interpretations, depending on what one sees as “the middle” and what constitutes being “squeezed”. Economists investigating the squeezed middle have usually focused on those in the middle of the income distribution (Gornick and Jäntti, 2013), rather than those in the middle class in sociological terms (although a good deal of the popular discussion refers to the “middle class” in the latter sense, who would generally be higher up the income distribution). Being “squeezed” could refer to a shrinking proportion being located around the middle, which is what polarisation is usually taken to mean, or to those around the middle losing out in terms of their share in total income, each the focus of recent research (Alderson *et al.*, 2005; Goos and Manning, 2007; Goos *et al.*, 2009; Foster and Wolfson, 2010; D’Ambrosio, 2001; Bigot *et al.*, 2011; Alderson and Doran, 2013; Atkinson and Brandolini, 2013; Autor and Dorn, 2013). In popular and political debate, however, the dominant concern has been that the middle has seen little or no improvement in living standards and overall prosperity over time. This concern goes beyond current real incomes, to include greater insecurity and vulnerability for the middle as well as poorer opportunities and prospects for their children (Nichols and Rehm, 2014; Hacker *et al.*, 2013). But stagnating real incomes is central to the debate, particularly in the USA.

Why would increasing income inequality give rise to such a “squeeze” on middle incomes? If the very top receives an ever-increasing share of total income then there must be a compensating decline in shares elsewhere. Nevertheless, an increase in top shares (in relative terms) could go together with rapidly rising real incomes throughout the distribution (in absolute terms).

Indeed, the argument that higher inequality provides the incentives required to drive economic growth, from which the middle and lower parts of the income distribution benefit through greater increases over time in their real incomes, has been prominent in economic and political debate for many years. More recently, though, it is argued that increasing inequality may instead now be damaging to growth and middle incomes, through a complex variety of channels. These include fuelling household debt and real estate bubbles; reducing aggregate demand; undermining capital investment; reducing the capacity of middle and lower income households to invest in education and skills; reinforcing barriers to socio-economic mobility so more fail to reach their full productive potential; entrenching the power of existing elites to protect their economic interests including rent-seeking, increasing barriers to entry and stifling innovation; fuelling household debt and real estate bubbles; exacerbating pressures for protectionism and restriction of immigration; and undermining the political and legal institutions and social trust that are now recognised as key to growth. Such potentially important channels have featured in Stiglitz’s highly influential contributions (2012; 2015), in recent studies by the IMF and the OECD (Ostry *et al.*, 2014; Cingano, 2014; OECD, 2015), and in financial sector commentary (Morgan Stanley, 2015; Standard and Poor’s, 2014).

Seeking to identify whether such specific channels of influence have operated or been central to recent experience is extremely complex, not least due to the very different time periods over which they might operate, and is well beyond the scope of this paper. Rather, we are contributing the empirical basis on which this research can be carried out, our aim is to describe and assess overall trends and patterns in real incomes and income inequality over time across OECD countries and probe the extent to which they appear to be related. While this can only be suggestive as to underlying causal mechanisms and relationships, such an analysis does allow us to consider which of the competing

grand narratives that are central in current debates – that inequality contributes to rising prosperity for "ordinary" middle-income households or prevents it – is more consistent with the evidence from varying country experiences.

### 3. The data

#### 3.1 Underlying micro datasets

Our analysis of the evolution of incomes and their distribution is based primarily on the two sources that provide data on income in a standardised way across countries and time and that have featured prominently in seminal studies on inequality and poverty – namely, the Luxembourg Income Study (LIS) database (used for instance in Atkinson *et al.*, 1995; Gornick and Jannti, 2013), and the OECD Income Distribution and Poverty database (used in OECD, 2008; 2011; 2015). We briefly describe these datasets here; detailed information is provided on the relevant websites, and the LIS and OECD datasets have also been the subject of recent in-depth reviews by Ravallion (2015) and Gasparini and Tornarolli (2015) respectively.

The LIS database allows the micro data to be accessed (remotely to safeguard confidentiality), so that inequality and poverty measures and income levels at different points in the distribution can be derived directly and consistently from the underlying data at the individual and household level. The OECD database, on the other hand, comprises a substantial set of such variables collected using a standardised questionnaire sent to member countries and filled out by them from national surveys.<sup>1</sup> LIS has assembled data for most of the countries it covers in “waves” for occasional years around 1975, 1980, 1985 and so on, at approximately 5-year intervals. The OECD database also presents 5-year interval data for the earlier period but contains a good deal of annual data for recent years. LIS allows one to go back as far as around 1980 for rather more countries than the OECD database, but the latter has information on New Zealand and Portugal which are not in LIS, as well as Japan for which LIS has data for only one year.

As the LIS and OECD databases are each widely used in comparative research, we draw on both here to see whether they show similar patterns and

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<sup>1</sup> The material on the OECD website also includes a valuable quality review; see OECD (2012).

support the same conclusions. For presentational purposes the paper concentrates on figures from LIS, but we note where the OECD data would lead to markedly different conclusions for a particular country or more broadly. We start our analysis around 1980 where possible, since neither source has many observations before that, but for many countries we have to start later – around the mid-1980s, 1990, or even later.<sup>2</sup> We do not include middle-income countries that are in the LIS database but are not OECD members, and likewise we exclude countries that are OECD members but generally categorised as middle-income (Chile, Mexico, and Turkey).

### ***3.2 Measuring living standards***

Our central measure for living standards is equivalised disposable household income. The concept of disposable household income employed in the LIS and OECD databases is in principle the same, as are the components in terms of earnings, self-employment, capital income, and taxes and transfers, though there may be subtle differences in operationalization across countries or over time.<sup>3</sup> We divide income by the square root of household size to take differences in household size and composition into account (Buhmann *et al.*, 1988).

To capture trends in real incomes over time for the middle compared to other parts of the distribution a number of approaches can be adopted. Here we focus on how the median – the income level separating the top and bottom halves of the distribution – has evolved over time. (An alternative is to look at average income of those in the middle quintile of the distribution, which gives similar results). We use national consumer price indices (CPI) to deflate household income, and we convert all income to 2010 US dollars by applying

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<sup>2</sup> We have dropped a small number of observations in LIS where breaks in series have given rise to substantial changes in definitions or coverage, based on information provided about the underlying data sources and patterns in the data, namely Austria 1987 and 1995, Germany 1981, 1983, Netherlands 1983, 1987, 1990 and Switzerland 1982, 1992. We also do not use Israel 1979 or Poland 1986 because comparable PPP information is not available.

<sup>3</sup> In using data from LIS we set negative disposable household incomes to zero but retain all households with zero disposable income, rather than dropping negatives or zero incomes as is sometimes the practice, and we do not apply top and bottom coding. For the OECD database it is not always clear whether top and bottom coding has been applied or how negative incomes have been treated, as noted in the OECD's quality review on the database.

purchasing power parities (PPP) for actual individual consumption to household incomes, both sourced from OECD National Accounts.<sup>4</sup>

### *3.3 Measuring income inequality*

To capture trends in income inequality, we focus first on the most widely used summary indicator, the Gini coefficient. The Gini is particularly sensitive to changes in the middle of the income distribution, which fits with our interest in the income of the middle. The Gini can be calculated from the micro-data in LIS and is among the measures included in the OECD Income Distribution Database.<sup>5</sup>

The household surveys on which both the LIS and OECD databases rely have difficulty capturing what is happening at the very top of the income distribution. To be able to incorporate this into the analysis we draw on the World Top Income Database, which has estimates for a range of countries of the income share going to the top 1%, based on data from the administration of income taxes together with the national accounts (see <http://topincomes.parisschoolofeconomics.eu>). These have made possible the in-depth analysis of trends in top incomes over the last century or more (see e.g. Atkinson and Piketty, 2007; 2010; Atkinson *et al.*, 2011; Alvaredo *et al.*, 2013; Piketty, 2014). Data are only available for some OECD countries, and refer to the share of the top in taxable (before income tax and social insurance contributions) rather than disposable income and the tax unit rather than the household.<sup>6</sup> While these are important limitations for our purposes, it is essential to capture what has been happening at the very top of the distribution in some form.

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<sup>4</sup> Households at different income levels may not be affected by price changes in the same way, as shown for example by Flower and Wales (2014) for the UK, but the absence of comparable data means we cannot take this into account.

<sup>5</sup> Among alternative summary inequality measures, the  $P_{90}/P_{10}$  ratio is also available in the OECD database, so we derived it from LIS micro data as well, and it shows similar patterns to those we describe.

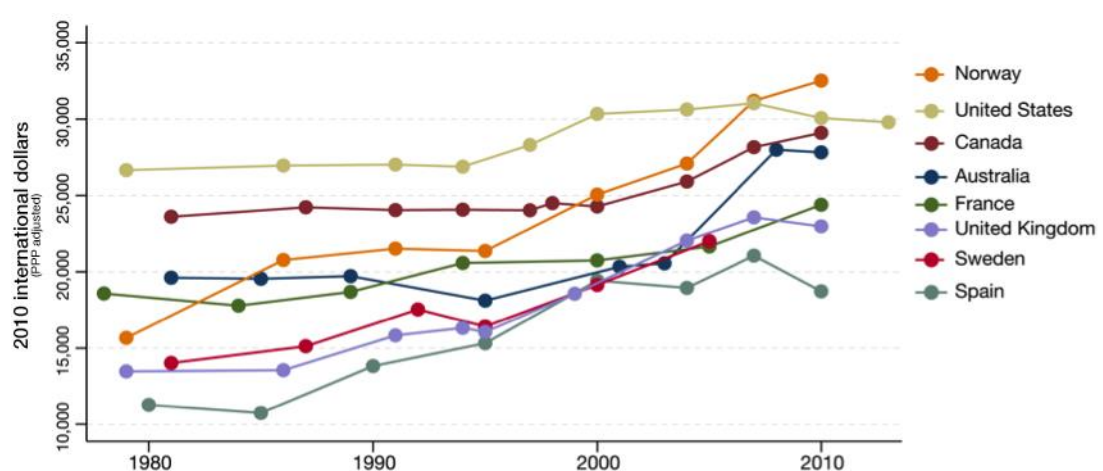
<sup>6</sup> Estimates on a post-tax basis have been produced in separate studies for a few countries.



#### 4. The evolution of living standards at the middle

We begin our examination of trends in real incomes at the middle by showing in Figure 1 the evolution of the median over time for the countries where we have data from LIS going back as far as about 1980. We see that there is very wide variation. For Norway real income growth was spectacular in international comparison, while at the other extreme the USA saw only a very modest increase, with the result that Norway's median had risen above the US figure by 2010. In between those extremes, Spain, Sweden and the UK saw median income rise by about two-thirds, though with a sharp decline in Spain toward the end of the period. Canada and France saw much more modest growth, and Australia saw limited growth up to the early 2000s but then a very substantial pick-up.

**Figure 1: Evolution of living standards of the middle: Real median household income from around 1980 (in 2010 PPP adjusted international dollars)**



For the countries where our earliest observation in LIS is about 1985 (not shown), there is also high variation in how living standards of the middle evolved: Ireland and Luxembourg achieved a doubling of median incomes over the course of 25 years, Italy and Denmark in contrast had aggregate rises of about 20%, and Finland doing considerably better but Germany doing worse. The four countries for which our first observation in LIS is about 1990 – all experiencing the upheaval of the post-communist transition – also display

striking differences: Hungary had a sharp initial decline in median income and a subsequent recovery sufficient only to bring the median back to about where it was in 1990 more than 2 decades later. Poland also saw a sharp initial decline, but the subsequent growth, notably from the mid-2000s, was strong enough to produce a substantial increase over the whole period.

It is helpful in framing our discussion to categorise countries, using a set of (necessarily arbitrary) cut-offs, in terms of their average annual growth rate in median income, calculated over the longest period covered by the LIS data for the country in question. The length of time to which this average applies varies across countries, but it can be meaningfully related to the trend in inequality measured over the same period, to which we will come shortly. This produces the groupings shown in Table 1, from countries achieving average annual growth in median income of 2% or more down to those that saw little or no growth on average. The USA is in that bottom category, with median income growth averaging under 0.5%.

**Table 1: Average annual growth in median household income by country over the longest period covered in LIS back to 1980**

Average growth per year	Country
<i>Very strong growth</i> (2% or more)	Czech Rep, Estonia, Greece, Ireland, Luxembourg, Norway, Slovak Rep
<i>Strong growth</i> (1.6% < 2%)	Belgium, Israel, Poland, Slovenia, Spain, Sweden, UK
<i>Some growth</i> (1%-1.5%)	Australia, Finland, Netherlands
<i>Modest growth</i> (0.5% < 1%)	Austria, Canada, Denmark, France, Germany, Italy, New Zealand, Switzerland
<i>Little or no growth</i> (< 0.5%)	Hungary, Iceland, USA, Japan

Note: Japan and New Zealand based on OECD data.

Does the OECD database present a similar picture of country rankings and groupings, on the basis of their average growth rates in the median for the longest period covered in the OECD database back to 1980? About half the countries covered in both sources fall into the same category, and some of the

others would move up or down only one category. For Ireland, Poland, and Spain, the OECD data shows much lower growth but covers only from 2004 onward and includes 2011 and thus more of the impact of the Great Recession. For Luxembourg, the average growth rate in the OECD database is lower than in LIS despite covering much the same period, though it remains a good performer. For Greece the average growth rate in the OECD data is very much lower, but the OECD data covers from 1986 whereas LIS is from 1995. The OECD database also provides trend data for Japan and New Zealand, not included in LIS; they are in the bottom and second category respectively.

In most countries median household income growth also varied substantially from one sub-period to another. This is clear from Figure 1 for the countries with the longest data coverage in LIS, and is also true of the other countries. This provides another source of variation in assessing how trends in real income for the middle may be related to those in income inequality, though the time-lags one might expect to operate are far from clear, as noted earlier.

Countries also varied greatly in their median income at the beginning of the observation period. Some had already achieved high levels of income, while others started from low levels and had ample scope to catch up. As well as percentage growth rates, one may therefore want to also focus on the absolute increase in median income over time, which can be read off Figure 1. This does affect to some extent one's perspective on how well or badly specific countries have done, but it is clear from Figure 1 that the USA's performance is particularly poor by either standard.

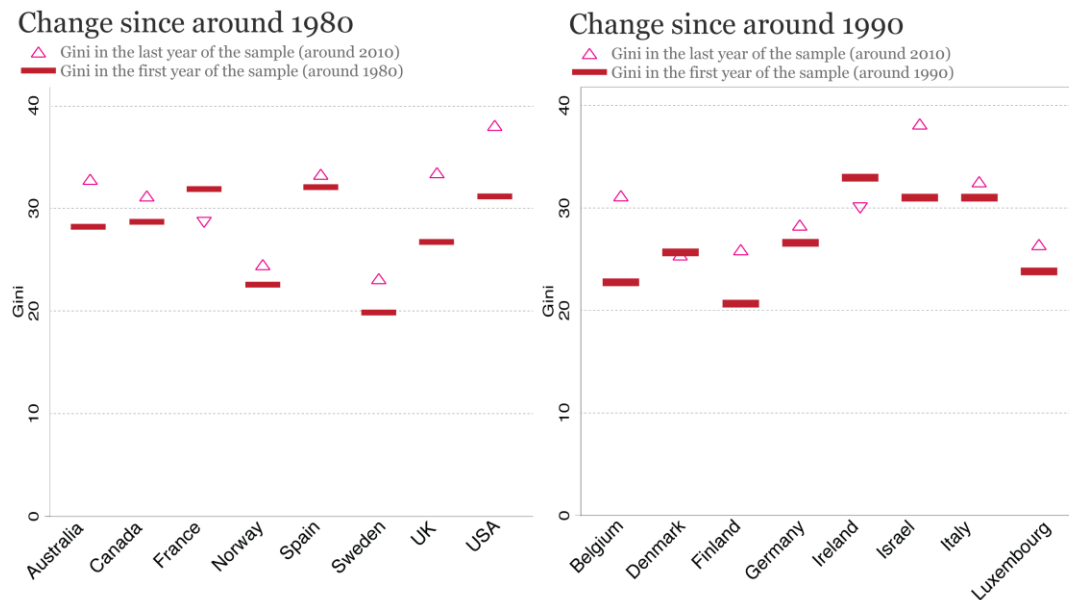
## **5. Trends in income inequality**

### **5.1 Overall inequality**

Turning to the distribution of incomes, we look first in Figure 2 at what happened to the Gini coefficient over time for the countries for which we have data in LIS beginning in about 1980 (left hand side) or 1990 (right hand side). The figure shows the initial level of the Gini, in the first year for which we have data, as well as the level in the latest observation in LIS. We see also see here that there is a wide variation in how the Gini changed over the past decades – inequality has risen a good deal in some countries, but has not risen much, or

indeed has fallen, in some. So while inequality has increased in a clear majority, there is no uniform trend: country experiences vary widely.

**Figure 2: Long-term trends in the Gini coefficient**



Once again, it is helpful to categorise countries by the pace and nature of the change observed in the Gini coefficient in LIS, both to see whether the OECD data show a similar picture and then as a point of reference when considering how trends in real incomes may be related to those in inequality. For this purpose we use the following cut-offs for the annual average change in the Gini: more than 0.2 as representing a pronounced increase, between 0.1 and 0.2 as a substantial increase, between 0.05 and 0.1 as some increase, between -0.05 and 0.05 as representing little or no change, and below -0.05 as a clear fall. Over a twenty-year period these annual averages would mean an increase of above 4 points in the Gini, between 2 and 4, between 1 and 2, between -1 to +1, and below -1. On this basis LIS data leads to countries being grouped as shown in Table 2. We see countries with a pronounced increase in inequality including the USA and the UK, about which there has been much research and commentary, but also traditionally low-inequality Nordic country Finland (and Sweden is in the next grouping) as well as formerly state socialist and low-inequality countries like the Czech Republic, Poland, and the Slovak Republic. At the other end of the spectrum, seven countries register a decline, three more little change, and a further four only a modest increase. What we can learn from this cross-

country perspective is that the widely-used broad summary that inequality has been increasing across most of the rich countries risks obscuring major differences in country experiences.

**Table 2: Trend in the Gini index by country over the longest period covered in LIS back to 1980**

Change in Gini	Country
<i>Pronounced increase</i> (0.2 points or more per year)	Belgium, Czech Rep, Israel, Finland, New Zealand, Poland, Slovak Rep, UK, USA
<i>Substantial increase</i> (0.1 to 0.2 points per year)	Australia, Canada, Japan, Luxembourg, Slovenia, Sweden
<i>Some increase</i> (0.05 to 0.1 points per year)	Italy, Germany, Norway, Spain,
<i>No change</i> (-0.05 to 0.05 points per year)	Denmark, Hungary, Netherlands
<i>Fall</i> (-0.05 points or below per year)	Austria, Estonia, France, Greece, Iceland, Ireland, Switzerland

Note: Japan and New Zealand based on OECD data

The OECD data again allow us to add Japan and New Zealand, both shown as experiencing marked increases in the Gini. However, comparing the two databases for the countries that are included in both reveals rather different patterns of change in the Gini coefficient over time for quite a few countries. Sometimes different periods are covered in the two sources – at the extreme for Belgium, for example, LIS data shows a very marked increase in the Gini but only covers 1985-2000, whereas the OECD data show a decline but relate to 2004-2010. For some other countries – including Austria, the Netherlands, Poland, Slovak Republic and Slovenia – the two datasets overlap in the period covered but differ in their start or end-point and the categorisation in Table 2 would be affected. This reflects the important reality that, as Tóth (2014) emphasises, inequality may often rise (or fall) in discrete “episodes” rather than consistently over a lengthy period, most dramatically in the case of the countries experiencing transition from state socialism in the 1990s but also to a significant degree in other OECD countries (see also Atkinson and Brandolini, 2001). This

becomes clear when one moves from examination of the change in inequality over the entire period covered by LIS (or OECD) data to focus on sub-periods from one wave to the next, of (approximately) 5 years in length. For most countries, there is very substantial variation across these sub-periods in movements in the Gini; to give just a few examples, inequality grew rapidly in the UK in the 1980s but was stable from about 1995 and also increased much more rapidly in the USA before that date than after it, while Sweden saw some periods when inequality rose very rapidly and others where it fell. This means that the categorisation of countries in terms of changes in inequality will depend on the particular period examined, and the period that happens to be covered by the available data will influence perceptions and research findings.

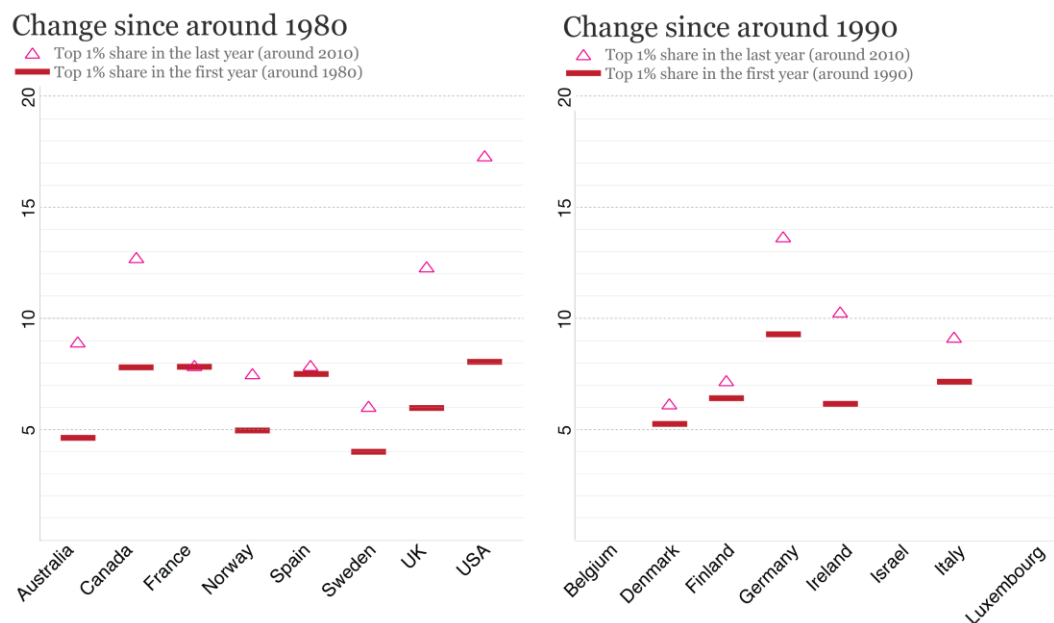
Even more problematically, though, there are a number of countries for which the OECD data cover the same period as LIS but show a different picture. For the Czech Republic LIS has a much greater increase in the Gini than the OECD database, whereas for Germany and Hungary the opposite is the case. For Denmark the Gini declines marginally in LIS whereas the OECD database shows a considerable increase, and for France LIS shows inequality declining substantially whereas the OECD suggests some increase. The factors underlying these divergences between the two datasets require and merit in-depth investigation. For present purposes, the central message is that available data sources capture changes in income inequality imperfectly, so the ranking of countries in terms of those trends has to be regarded as an approximation subject to error, with a particular question mark over the countries where the divergence is greatest.

## ***5.2 Top incomes***

For a subset of the OECD countries we are able to study trends in income shares at the very top of the income distribution. These data are available in the World Top Income Database. Figure 3 shows the share of total (gross) income going to the top 1% around 1980 and 2010. We see that the share going to the top has generally gone up over this period, but by a great deal more in some countries than in others. Atkinson and Piketty (2007) highlighted the fact that the English-speaking countries saw much larger increases than the continental

European countries for which estimates were available. Indeed, Australia, Canada, Ireland, the UK, and the USA all saw this share increase by 5 percentage points or more, and were the only OECD countries to do so (though New Zealand is the exception, with only a modest increase). Italy, Norway, and Portugal saw a lower but still substantial increase of 3 percentage points or more, while the share of the top 1% did not increase by that much in Finland, France, Germany, Japan, Netherlands, New Zealand, Spain, Sweden, and Switzerland.

**Figure 3: Long-term trends in top income shares**



Most of the English-speaking countries where top income shares rose particularly rapidly (namely Australia, Canada, the UK and the USA) also saw overall inequality rise markedly as can be seen from Table 2, but Ireland is a striking exception, where the share of the top 1% increased sharply but overall inequality actually declined. The opposite contrast can be seen in the case of Finland, Japan, New Zealand and Sweden, where top income shares did not rise sharply but overall inequality did. Italy and Norway saw substantial increases in both top income shares and overall inequality. France saw little increase in either, while the Netherlands and Spain saw little increase in top income share and some increase in overall inequality. So there is some consistency in terms of trends between the two indicators of inequality, but also some substantial

divergence: the two measures are positively but only weakly associated, with a correlation coefficient of 0.21. This may arise for a variety of reasons: changes at the top may be missed in household surveys to a varying extent across countries and the Gini measure is in any case more sensitive to changes occurring around the middle than at either extreme of the distribution, so the Gini may mostly reflect inequality within the “bottom 99%”. Further, the differences in income concept and recipient unit already noted may also be important and merit investigation. For our current purposes, though each indicator contains valuable information about what has been happening to inequality.

## **6. The evolution of living standards and inequality**

Having examined how median household incomes and income inequality have evolved over time across the OECD countries, we now bring these together to see how they are aligned. Has rapidly rising inequality been associated with stagnating real incomes around the middle? A comparison of the way countries are grouped in Table 1 versus Table 2 shows some such cases: Japan and the USA have had big increases in income inequality and slow median income growth, and rapid median income growth has accompanied little or no increase in overall inequality in Ireland and Greece. However, there are also counterexamples, including for example Belgium, the Czech Republic, and the UK, which (in LIS data) saw both median income and inequality rising rapidly, and Austria, Denmark and France which saw only modest real income growth with inequality stable or declining. Focusing on top incomes rather than the Gini would change the story for specific countries, but it would not change the overall conclusion. This can be assessed in more depth from Table 3, which ranks countries by their average annual median growth and brings that together with the annual average change in the Gini and in the top 1% share, each calculated over the longest period available in LIS. We see that the countries where median growth was the strongest include ones where the Gini and/or top income shares rose rapidly, but also ones where this was not the case, and vice versa. More broadly, the rankings by inequality change do not align closely with that by median income growth (see also Kenworthy 2013).



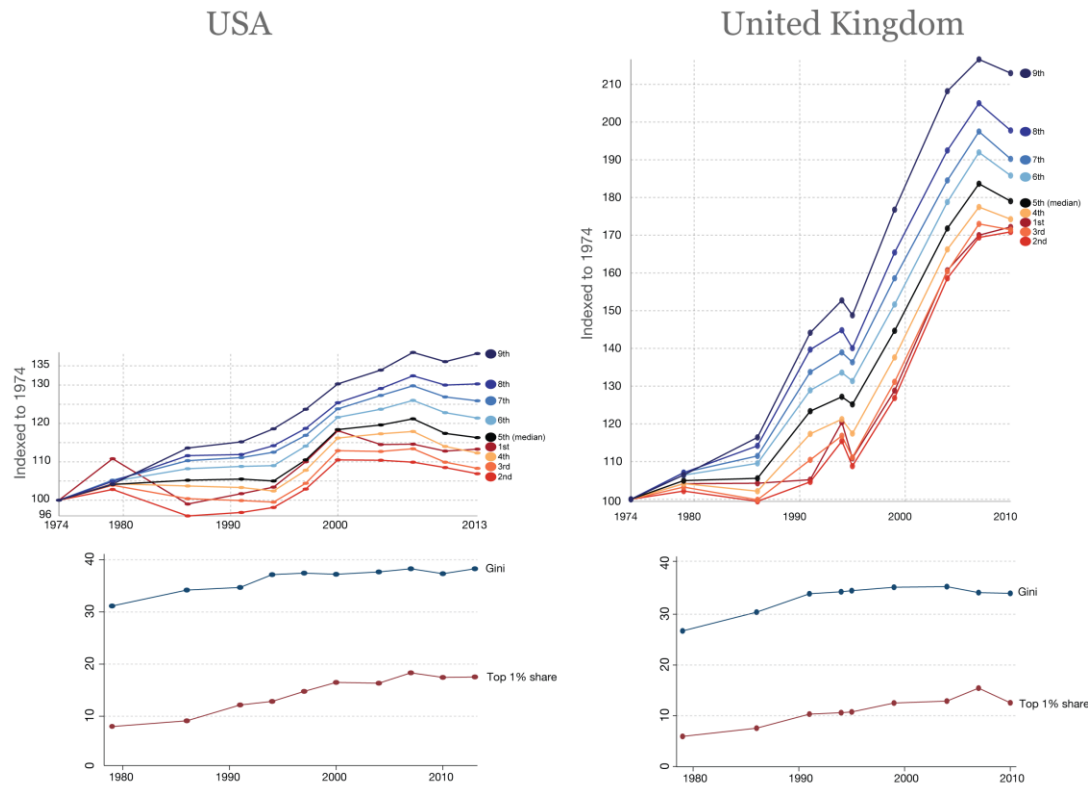
**Table 3: Evolution of ordinary living standards and inequality over the longest period covered in LIS back to 1980**

Country	Years	Average % growth in median	Average Gini change	Average top 1% share change
Ireland	1987-2010	3.188	-0.146	0.190
Norway	1979-2010	2.383	0.081	0.091
Sweden	1981-2005	1.897	0.167	0.096
United Kingdom	1979-2010	1.738	0.239	0.214
Spain	1980-2010	1.707	0.063	0.021
Finland	1987-2010	1.421	0.246	0.047
Netherlands	1993-2010	1.340	-0.026	0.071
Australia	1981-2010	1.212	0.179	0.157
Denmark	1987-2010	0.862	-0.012	0.051
France	1978-2010	0.854	-0.084	0.010
Italy	1986-2010	0.829	0.089	0.094
Canada	1981-2010	0.723	0.111	0.178
Switzerland	2000-2004	0.582	-0.442	-0.195
Germany	1984-2010	0.547	0.088	0.178
United States	1979-2013	0.327	0.210	0.280
Estonia	2000-2010	6.148	-0.384	
Czech Republic	1992-2010	2.843	0.281	
Luxembourg	1985-2010	2.809	0.123	
Slovak Republic	1992-2010	2.232	0.420	
Greece	1995-2010	2.000	-0.117	
Slovenia	1997-2010	1.957	0.179	
Belgium	1985-2000	1.955	0.599	
Israel	1986-2010	1.595	0.320	
Poland	1992-2010	1.551	0.287	
Austria	1994-2004	0.923	-0.133	
New Zealand	1985-2011	0.778	0.200	
Japan	1985-2009	0.060	0.130	
Iceland	2004-2010	-0.184	-0.186	
Hungary	1991-2012	-0.232	0.019	

Note: Japan and New Zealand based on OECD data

The UK and the USA provide a striking illustration of how countries that look similar in one of these dimensions performed very differently in the other. As the bottom part of Figure 4 shows, from around 1980 to 2010 the Gini increased by a comparable amount in the two countries, and both saw a rapid increase in the top 1% income share. By contrast, the top part of the Figure shows that growth in the median (and below the median) was much more substantial in the UK.

**Figure 4: Growth of real disposable household income by decile and trends in inequality in the US and the UK**



In addition to overall changes over the entire period covered for each country, we can look at the relationship between median income growth and inequality employing all the available observations for intervening years. (In LIS most often these are at approximately 5-year intervals; for the small number of countries where some annual data are available, we only use selected years for consistency.) We then find that median income growth across the entire sample of countries and observations from LIS is negatively correlated with change in the Gini (-0.25) but actually has a (low) positive correlation with growth in top income shares (+0.12). To assess more fully whether the evolution in median household income is statistically associated with changes in income inequality, we estimate a simple OLS regression with standard errors clustered at the country level, with growth in the median as dependent variable and change in the Gini and the top 1% share entered separately and then together as

independent variables.<sup>7</sup> As we have the top 1% variable only for a subset, we present the results for the Gini estimated with the full sample and that subset.

**Table 4: OLS regressions with median household income as the dependent variable**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta$ Gini	-1.184*	-0.700**		-0.831**	-1.210*	-0.717**		-0.841**
	(0.074)	(0.027)		(0.027)	(0.076)	(0.039)		(0.037)
$\Delta$ Top 1%			0.813	1.134			0.815	1.123
			(0.457)	(0.297)			(0.443)	(0.291)
P50 (level)					-0.000	-0.000	0.000	-0.000
					(0.576)	(0.740)	(0.977)	(0.830)
Constant	1.637***	1.341***	1.179***	1.213***	2.156*	1.713	1.146	1.461
	(0.000)	(0.000)	(0.000)	(0.000)	(0.055)	(0.163)	(0.278)	(0.195)
N	153	99	99	99	153	99	99	99
Adjusted R <sup>2</sup>	0.059	0.025	0.004	0.041	0.055	0.016	-0.007	0.032

Note Dependent variable: average annual percentage growth rate of median equivalised disposable household income. OLS with clustered standard errors. Columns 1 and 3 are based on the full sample; 2 and 4 on the sample for which we have top income information.

The results are in Table 4 consistently suggest a statistically significant negative association between median income growth and an increase in the Gini in the same period. This holds across the entire sample (column 1) and the subset for which the top 1% share is available (col. 2), and for the latter when the change in that share is included (col. 4). The change in top income share in the same period is itself not significant when entered alone (col. 3) or with the Gini (col. 4). The adjusted R<sup>2</sup> for the equations is low, consistent with the low correlation between median growth and the change in inequality.

An underlying tendency toward convergence in average or median incomes, whereby countries with initially lower incomes tend to grow relatively quickly and catch up, might complicate the relationship between change in the median and in inequality. To test and control for this, we add the level of the median at the beginning of the period as a right-hand-side variable. The results in columns 5-8 of Table 4 show that this variable is not significant and does not alter the other results.

<sup>7</sup> Alternative estimation approaches such as system-GMM are problematic given the limited number of time periods per country.

So far we have sought to relate the change in median incomes to the change in inequality in the same period, but one could also argue that the initial level of inequality might also matter. Much of the discussion on the competing “grand narratives” mentioned earlier is unclear whether the postulated positive or negative effects of inequality relate more to it being at a high level or increasing rapidly. To examine this we generate an error correction model in Table 5, where we include the lagged level of both the dependent variable and the inequality indicators. The results do not change, and the lagged levels are not significant.

**Table 5: An error correction model for median household income**

	(1)	(2)	(3)	(4)
$\Delta$ Gini	-1.206*	-0.725*		-0.916**
	(0.084)	(0.053)		(0.049)
Gini (level)	-0.004	0.006		0.080
	(0.922)	(0.902)		(0.352)
$\Delta$ Top 1%			1.066	1.515
			(0.330)	(0.208)
Top 1% (level)			-0.086	-0.192
			(0.146)	(0.138)
P50 (level)	-0.000	-0.000	0.000	0.000
	(0.572)	(0.744)	(0.462)	(0.182)
Constant	2.289	1.531	1.264	-0.632
	(0.166)	(0.315)	(0.213)	(0.752)
N	153	99	99	99
Adjusted R <sup>2</sup>	0.049	0.006	-0.008	0.030

As highlighted earlier, in debating the potential association between the evolution of median income and of inequality, the time lags that might be involved are also unclear. Is it the contemporaneous increase in inequality, or an increase in the previous period, or indeed further back, that we might expect to be associated with lower median income growth? In testing alternative lag structures we are severely limited by the number of time periods covered in the data, but Table 6 seeks to relate change in the median in each period to that in inequality in the previous period. No significant association is seen. Including both current and previous period change in the inequality measures leads to results similar to Table 4.

**Table 6: Lagged growth**

	(1)	(2)	(3)	(4)
Lagged $\Delta$ Gini	0.411 (0.157)	0.407 (0.161)		0.465 (0.118)
Lagged $\Delta$ Top 1%			0.992 (0.142)	0.765 (0.273)
Constant	1.467*** (0.000)	1.480*** (0.000)	1.049*** (0.001)	1.040*** (0.001)
N	126	125	84	84
Adjusted R <sup>2</sup>	0.001	0.001	0.005	0.009

## 7. Bringing in economic growth

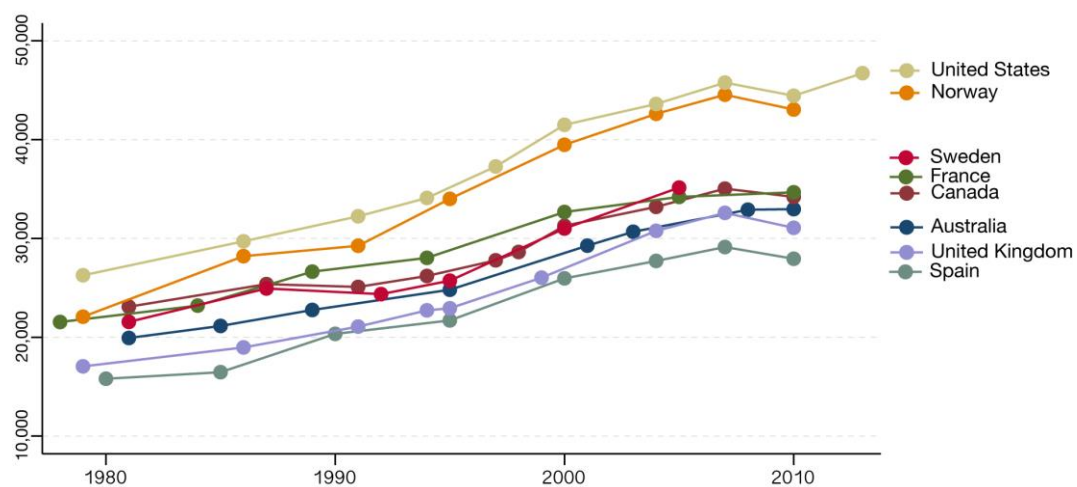
Our analysis so far has focused directly on the relationship between median household income and income inequality, without taking into account a key determinant of median income growth – growth in national output. Moreover, some of the causal stories embedded in the competing narratives whereby inequality may help or hinder median income growth operate significantly through their postulated effects on national income, while also relating to its distribution. In addition to looking directly at whether trends in median incomes are associated with those in inequality, it is therefore also important to bring growth in national income into our analysis. We do not seek to directly probe the impact of inequality on economic growth (Barro, 2000; Voitchovsky, 2005). Instead, we look at what happens when we add measures of the pattern of change in national income per person to our estimated models.

For this purpose we employ per capita gross national income (GNI). Unlike GDP, this excludes primary incomes payable to non-resident units but includes primary incomes receivable by residents from non-residents, which is more aligned to the sample coverage of household surveys. Data are from the OECD National Accounts, expressed in per capita terms using OECD population data and correcting for changes in price levels over time by applying the GDP deflator and by employing PPP adjustment for cross-country price differences in 2010, so GNI per capita is expressed in 2010 international dollars.<sup>8</sup> As context, Figure 5 shows the evolution of GNI per capita for the countries and years for which we have LIS median income data from around 1980 onward. Compared to

<sup>8</sup> For US 2013 GNI per capita is not available. We use the trend in GDP per capita from 2012-2013 to extrapolate it.

the trends in median real income, there is less variation across countries and over time, as can be seen by comparison with Figure 1 earlier. Furthermore, in terms of GNI per capita we see that the USA stands out as the richest country of the sample, which – as we saw earlier – is no longer the case for income at the median.

**Figure 5: Trends in GNI per capita in real terms (measured in 2010 international dollars)**



Average annual percentage growth in GNI per capita in the countries and periods we are discussing is indeed correlated with annual percentage growth in median household income, but the correlation is only around 0.6. There is essentially no correlation between growth in GNI per capita and the evolution of overall inequality as captured by the Gini, though the correlation with contemporaneous growth in the top 1% share is 0.5 (see also Thewissen, 2014). When we add growth in GNI per capita as an explanatory variable to our initial regression model with the same-period changes in inequality as independent variables, we see first in Table 7 that economic growth is positively associated with median income growth in all model specifications, and its inclusion improves the explanatory power of the model substantially. With an estimated coefficient of about 0.7-0.8, increases in GNI per capita are substantially but not fully transmitted to middle-income households on average. A contemporaneous increase in overall inequality has a negative impact on median income growth

controlling for GNI change. In addition, the change in the top 1% income share also becomes negative and significant; so for a given change in per capita GNI, an increase in the share going to the top is associated with slower income growth at the middle (see also Kenworthy 2013).

**Table 7: OLS regressions with growth in median as the dependent variable, accounting for growth in GNI per capita**

	(1)	(2)	(3)	(4)	(5)	(6)
% Growth GNI per capita	0.714*** (0.000)	0.684*** (0.000)	0.708*** (0.000)	0.676*** (0.000)	0.838*** (0.000)	0.812*** (0.000)
$\Delta$ Gini			-1.121* (0.053)	-0.603*** (0.006)		-0.404** (0.031)
$\Delta$ Top 1%					-1.793** (0.020)	-1.557** (0.037)
Constant	0.069 (0.788)	0.056 (0.812)	0.213 (0.415)	0.124 (0.575)	0.000 (0.998)	0.053 (0.754)
N	153	99	153	99	99	99
Adjusted R2	0.367	0.351	0.422	0.371	0.395	0.400

Note Dependent variable: average annual percentage growth rate of median equivalised disposable household income. OLS with clustered standard errors. Columns 1, 3, and 5 are based on the full sample; 2, 4, and 6 on the sample for which we have top income information available.

As before, we also estimated an error correction model specification where the levels of the dependent and independent variables at the start of the period are included, and this does not improve model fit or affect the significance of the coefficients. We also investigated whether the change in the independent variables in the previous period was important, and the lagged change in per capita GNI but not in the inequality measures was then significant. Among other sensitivity tests, using the percentage (rather than “absolute”) change in the inequality measures produced similar results, as did weighting the observations by the inverse Gini bootstrapped standard error. Separating out periods of positive from negative economic growth did affect the results: although we have only a small proportion of cases of the latter, when they are dropped the change in Gini is no longer statistically significant although the top 1% share remains so.

Estimating the same models with data on the median and Gini from the OECD database rather than LIS is another important test of their robustness, from which the results are more mixed. For this purpose, to have the most

comparable results, we include the same set of countries and the time span for which we have LIS data. We again find that the change in GNI per capita is significant, though the coefficient is a good deal lower (at around 0.4). The change in the Gini is negative and significant (at the 10% significance level) when the top 1% share is included, while the top 1% itself is not significant. The fact that the two datasets show somewhat different relationships reinforces the point we emphasised earlier about the data on inequality trends and the care required in using them.

It is also worth highlighting that even when economic growth is included in the estimated model, a significant part of the variation in median household income growth over time and across countries is left unexplained. Apart from the fact that rising national income going to households may benefit those at the top rather than in the middle, as evidenced by the growth of the capital income share in most rich countries, not all such income goes to households in the first place (Piketty and Zucman, 2014). Some of the economic growth measured through the national accounts accrues to other sectors, and even the proportion going to the household sector in national accounts terms will not be fully reflected in the incomes of households as captured in household surveys. The differences arise for both conceptual and measurement reasons: who and what is included differs in important respects, and some components of income are known to be underreported in household income surveys (Tormalehto, 2011). Making the analytical links in the chain going from overall economic growth to growth benefitting households is thus an important complement to understanding how the income that does reach households is distributed among them. It is encouraging that the OECD recently launched a project to produce data on incomes reaching the household sector compatible with the framework of the national accounts (Fesseau *et al.*, 2013). Another difference is that economic growth is measured on a per capita basis, whereas our real income levels are calculated at the household level and equivalised to account for economies of scale within households.



## 8. Conclusions

The evolution of living standards of ordinary households has become a central concern as rich countries strive for inclusive growth and shared prosperity. By analysing the most satisfactory comparative data, this paper has brought out the widely varying experiences of OECD countries with respect to real income growth around the middle over the last two or three decades. Median income growth has been very much stronger in some countries than others, with some seeing average annual growth rates of 2% or more while others, including the United States, had the median grow by less than 0.5% per year. Over a twenty- to thirty-year period this yields very striking differences in how middle-income households have fared. The data also show that for most countries median income growth also varied a good deal from one sub-period to another.

As far as income inequality is concerned, we find that while some increase in overall inequality – as reflected in the Gini coefficient – has been the most common experience among the OECD countries over the same decades, there has been very wide variation in the extent and timing of that increase, and some countries have seen little or none while others have seen rapid increases. Among the subset of OECD countries for which estimates of top income shares are available, most have seen increasing concentration of (pretax) income at the top, but the scale of that increase varies widely and is not always consistent with measured trends in overall inequality. So here too it is important not to lose sight of difference in the search for a common, consistent pattern and overarching story. Furthermore, available estimates of changes in inequality are subject to error and we saw that different sources and indicators do not always tell the same story, so caution is required in using these data, not least in studying their relationship with household income growth.

The comparative time-series data employed here do not allow for an investigation of the complex channels and processes through which inequality levels and changes might influence middle income growth, but they do show that there have once again been widely varying experiences in how median incomes and inequality have evolved together. There are countries and sub-periods where the median stagnated and inequality rose rapidly, but also ones where

increasing inequality accompanied rapid growth in the median and others where the median rose only modestly while inequality was stable. The US case, where stagnating middle incomes accompanied rapidly rising inequality for much of the period covered by the data, is not representative of the experience of the rich countries over recent decades. A negative and statistically significant association between the change in the Gini coefficient and median income growth was found when we pooled the data from LIS across countries and sub-periods, but this accounted for only a very small proportion of the variation in median income growth. A significant negative relationship with changes in the top income share was found only when controlling for the change in gross national income per person: for a given level of overall growth, increasing shares at the very top went together with lower growth at the middle. Even including overall economic growth and inequality trends in the statistical model, a substantial part of the variation in income change for the middle remains unaccounted for.

These findings have important implications for how one measures and monitors progress toward improving living standards for ordinary, middle-income households. Promoting and tracking economic growth will clearly not suffice, as is now widely recognised, but the evidence presented here shows that monitoring the evolution of growth and inequality together will also fall short. Instead, if incomes around the middle (or toward the bottom) of the distribution are of central interest, these must be measured directly and integrated into headline indicators and policy impact tracking processes.

From a substantive rather than measurement and monitoring perspective, our findings can only be suggestive, but they do suggest that neither of the polar “grand narratives” featuring so strongly in current debates – that high or rising inequality consistently boosts or reduces real income growth for the middle – is true to the variety of experiences actually observed across the rich countries in recent decades.

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