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The median versus inequality-adjusted GDP as core indicator of 'ordinary' household living standards in rich countries

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The Median Versus Inequality-Adjusted GDP as Core Indicator of 'Ordinary' Household Living Standards in Rich Countries

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Abstract

This paper first highlights the extent to which GDP per head will be unreliable as an indicator of household income change over time around the middle for rich countries, in the short or long run, and will mislead as to the relative performance of countries in achieving broadly-based improvements in prosperity. It then demonstrates that 'inequality-adjusting' GDP will not suffice to bridge the gap. The divergence between the trajectory of median household income and GDP/GNI per capita is due to a variety of factors that themselves vary in significance across countries and over time, with the distribution of the gains from growth being only one. Median income thus needs to be accorded a central role alongside GDP per capita in both official monitoring of living standards and research on inclusive growth. Growth in median incomes will not be a reliable measure of what is happening to the incomes of the poor, though, so low incomes and poverty certainly need to be separately monitored and

analysed: one cannot assume that growth that transmits to the middle is also going towards the bottom.

The Median as Core Indicator of Household Living Standards Across Rich Countries

1. Introduction

The contrast between reasonably strong levels of aggregate economic growth over recent decades and stagnation in household incomes across much of the distribution in some rich countries, most notably the USA, has reinforced concerns about relying on growth in GDP per capita as the core indication of economic performance and broadly-based prosperity. Reliance on GDP growth also raises much broader issues, of course, in particular relating to the treatment of environmental 'bads' and failure to encompass sustainability. That features significantly in for example the report of the Stiglitz-Sen-Fitoussi commission (2009) and more recently from the OECD-hosted High Level Expert Group on the Measurement of Economic Performance and Social Progress (OECD 2018a, b). Here, though, our focus is on the limitations of GDP in capturing household living standards and how they are improving over time, also treated at length in those reports. That is also of central importance, particularly in light of current debates about the 'squeezed middle', the 'left-behinds', and the perception that economic malaise for 'ordinary' households has been central to recent political developments in rich countries such as the rise of populism, the election of Donald Trump, and the UK vote to leave the European Union.

The most obvious way in which a marked divergence could arise between the evolution of GDP per head and the incomes of households across much of the distribution would be due to rising inequality. If most of the benefits of economic growth accrue to the top of the distribution, then that would explain the co-occurrence of rising GDP per head and stagnating incomes and living standards for 'ordinary' or 'typical' households. That is indeed what has

been happening in the USA since the early 1980s, as is now well known and documented in for example Economic Report of the President (2015), Kenworthy (2018). Increasing income inequality has also been seen across a majority of rich countries, though to a widely varying degree and with differences in timing (OECD, 2015; Forster and Nolan, 2018; Nolan and Thewissen, 2018a). In that light, 'adjusting' GDP levels and growth rates for income inequality, along the lines put forward as long ago as Sen (1976) and taken up in a variety of academic and official contexts since then, would appear to offer a solution. The UNDP's HDI used this procedure to adjust GDP per capita as far back as 1993, subsequently extending that logic to encompass the other variables in the HDI using discount factors based on the degrees of inequality in their specific distributions. The European Commission's Annual Report on the Social Situation in Europe has presented trends in inequality-adjusted GDP per capita since 2013 (EU Commission, 2013). At the same time, Atkinson (2013) and Atkinson, Marlier and Guio, (2016) advocate assigning a central role to how the median of the household income distribution is evolving and seeing that as a core social indicator (also reflected in the LSE Growth Commission's report, Aghion et al, 2013). This begs the question to be addressed in this paper: do inequality-adjusted GDP and median household income tell the same story about how household incomes and living standards evolve over time, at least in rich countries? Are they substitutes for one another as indicators, and if not, which is likely to come closer to reflecting what is happening to the real incomes of 'ordinary' or 'typical' households?

To frame and contextualise this question, we first bring out the extent of the divergence between growth in GDP per capita and in median household income across the rich countries, having described the comparative data to be employed and the patterns of real income growth they show across the OECD since the 1980s. We then show that inequality-adjusted GDP growth would still rank countries rather differently to the median in terms of real income growth. We discuss why this is the case, noting the range of other factors that 'come between'

GDP and household incomes. We demonstrate that income growth in the lower reaches of the distribution also need to be tracked alongside the median, and conclude by summarising the implications for monitoring broadly-based prosperity.

2. Measuring Median Income Growth Across Rich Countries in Recent Decades

While living standards and prosperity broadly conceived are the underlying concern, here we focus on household income as the best available proxy to capture variation across the rich countries over recent decades. Income has well-documented limitations as a measure of living standards, but crucially for comparative purposes it is available on a consistent basis across rich countries for recent decades. We take growth in real disposable income at the median as key reference point or benchmark for the evolution of "middle" living standards. With much of the generalized concern focused on the situation of "ordinary working people", particular emphasis is placed on how working age households, as distinct from older people, have fared.

The measure of household disposable income from household surveys available over this span does not capture capital gains (or losses) on assets, or impute an income for the use value that home-owners obtain from owner-occupation. It also does not include the value of the services made available free or in subsidised form by the state, notably in education and health care, which are crucial to household living standards and quality of life, affecting how changes in household incomes are felt. While estimates of the value of these services to households at different points in the distribution have been made for some countries and time-points (see for example Marical et al., 2006; Smeeding et al., 2008; Paulus et al., 2010, Verbist et al., 2012; Aaberge et al*.,* 2013), this has not been done on a consistent basis across the rich countries over time, so this key aspect of living standards is not incorporated into our analysis.

The income concept employed is total income of the household from all sources, including wages, self-employment income, income from capital, pensions, and social transfers, net of

direct tax and employee social insurance contributions. In using household income as an indicator of trends in living standards, adjustment has to be made for differences in household size and composition, and for that purpose we employ the commonly-used square root of household size equivalence scale; while the choice of scale is somewhat arbitrary, it does not generally affect measured patterns of overall income growth over time. To capture changes in the purchasing power of nominal incomes over time, these are deflated using consumer price indices to produce changes in 'real' incomes. In using income to compare (absolute) living standards across countries, the Purchasing Power Parity (PPP) conversion factors produced by the International Comparison Program for 2011 are employed; while such estimates are subject to considerable debate, here the primary interest is in comparing real income growth across countries over time rather than levels at a point in time.

The nature of the data available for this analysis has major implications for the form it takes. The two core sources are the Luxembourg Income Study (LIS) and the OECD Income Distribution Database (Atkinson *et al*., 1995; OECD, 2008; 2011; 2012; 2015; Gornick and Jannti, 2013; Ravallion, 2015; Gasparini and Tornarolli, 2015). Both provide data on household incomes standardised, insofar as possible, across countries and over time, which is critical for this comparative analysis. The LIS database brings together micro-datasets from surveys for each country, whereas the OECD database comprises various measures related to incomes, inequality and poverty drawn from such surveys. LIS mostly has data in 'waves', for years around 1975, 1980, 1985 etc.; the OECD database also has figures at intervals for around 1980, 1985, etc, but has more annual data, especially from the mid-2000s. Most of the OECD countries are covered in both sources, but LIS allows one to go back as far as 1980 for more countries. Whereas most comparative studies on household incomes, inequality etc. rely entirely on one or the other of these data sources, here we draw on both to cover the longest period, and come up as far as possible, for each country. This means we mostly employ data

from LIS, but use data from the OECD database for six out of the twenty-six countries we include.[1] For most of the countries covered we go back at least as far as the mid/late-1980s, but for a few the earliest year available is in the 1990s. This varying coverage in terms of time-period maximises the span of countries included in the analysis but must be kept in mind in interpreting the differing growth rates then observed across countries. We exclude countries that are in the LIS database but are not OECD members, countries that are OECD members but generally categorised as middle-income (Chile, Mexico, and Turkey), and OECD countries for which the data required is only available from 2000 or later (Estonia, Iceland, Portugal, South Korea and Switzerland)[2].

3. What Has Happened to Median Incomes in Rich Countries Over Recent Decades?

On the basis of these data, what has happened to real incomes around the middle of the distribution in recent decades? Table 1 shows for each country the years covered by the data we are employing, the overall increase in the median in real terms over the period covered, and the (compound) annual average growth rate over that period. The most striking feature is the very wide range of variation across countries in real income growth at the median. The average annual growth observed over those decades ranges from as high as 3% down to a modest decline. The average growth rate across all the countries/time-periods covered is about 1%. The USA is the point of departure for much of the current commentary and debate about

[1] These are New Zealand, which is not included in LIS; Japan, for which LIS only has data for 1 year; Sweden, for which LIS has data only up to 2005; the Netherlands, for which the early waves in LIS are drawn from a different source, giving rise to what looks like a major break in the time-series; Greece, where LIS only starts in 1995 whereas OECD data goes back to 1986; and Canada, for which LIS only goes up to 2010. For Belgium, LIS runs only up to 2000 and OECD from 2004-2013, so we link those two series to provides estimates.

[2] Median income growth for those countries over the shorter period their data cover is reported in Nolan and Thewissen (2018b).

stagnation and the 'squeezed middle' but is seen to be anything but typical in terms of this key indicator. To highlight just one contrast, the UK is often categorised alongside the USA as 'liberal/Anglo-Saxon' economy, but the US median was only 12% higher in real terms in 2013 than it had been in 1979, whereas the UK median went up by almost 70% over the same period.

Table 1: Growth in Median Equivalised Household Income in Real Terms by Country, Longest Period Covered from About 1980

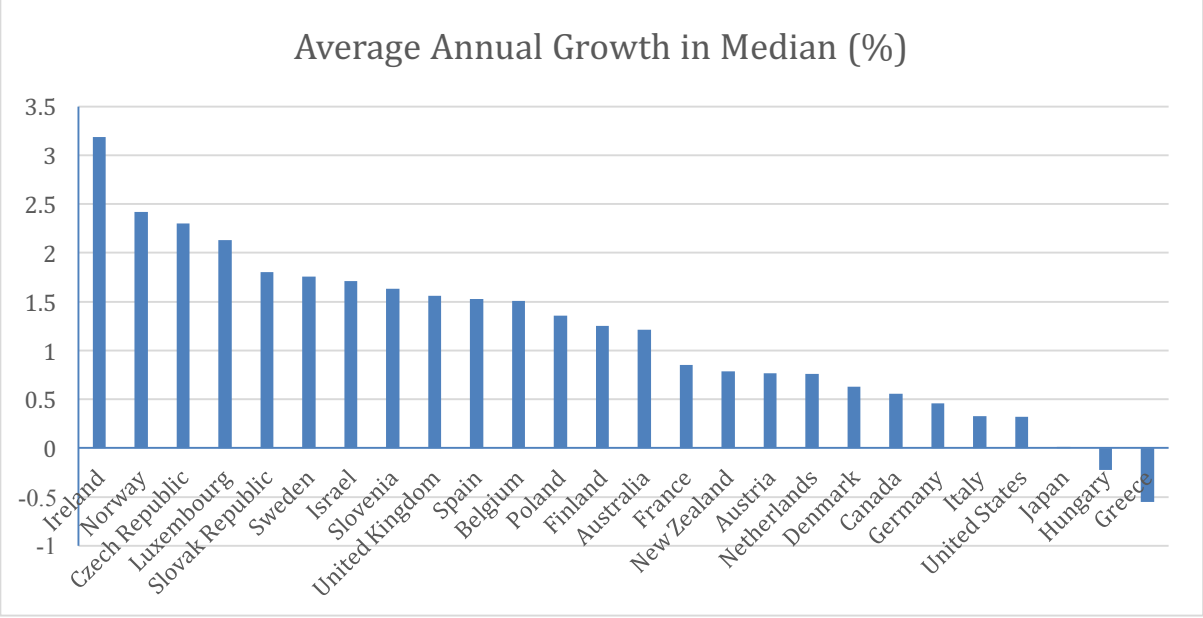
Country	Initial Year	End Year	Overall increase %	Annual average growth rate %
Australia	1981	2010	41.93	1.21
Austria	1994	2013	15.58	0.77
Belgium	1985	2013	52.34	1.51
Canada	1980	2013	20.22	0.56
Czech Republic	1992	2013	61.12	2.30
Denmark	1987	2013	17.84	0.63
Finland	1987	2013	38.01	1.25
France	1978	2010	31.27	0.85
Germany	1984	2013	14.11	0.46
Greece	1986	2013	-13.90	-0.55
Hungary	1991	2012	-4.44	-0.22
Ireland	1987	2010	105.76	3.19
Israel	1986	2012	55.27	1.71
Italy	1986	2014	9.53	0.33
Japan	1985	2012	0.31	0.01
Luxembourg	1985	2013	80.34	2.13
Netherlands	1977	2014	32.17	0.76
New Zealand	1985	2012	23.78	0.79
Norway	1979	2013	125.24	2.42
Poland	1992	2013	32.91	1.36
Slovak Republic	1992	2013	45.36	1.80
Slovenia	1997	2012	27.36	1.63
Spain	1980	2013	64.99	1.53
Sweden	1983	2013	69.01	1.76
United Kingdom	1979	2013	69.47	1.56
United States	1979	2013	11.66	0.32
Average				1.22

Source: LIS except OECD for Belgium (from 2004), Canada, Greece, Japan, Netherlands, New Zealand, Portugal, South Korea, and Sweden

Figure 1 illustrates how countries rank in terms of performance in achieving real income growth for 'ordinary' households as measured by the (compound) annual average growth rate

in the median. The strikingly poor performance of the USA, which ranks 23rd. out of the 26 countries, is evident. The only countries doing worse were Japan, where effectively no growth in the median was seen, and the two countries where an actual decline in the value of the median was observed, namely Greece and Hungary. Italy performed as poorly as the USA, while Germany, Canada and Denmark are also to be seen in the bottom one-third. Austria, the Netherlands and New Zealand performed a little better than them, and France slightly better again but still in the bottom half. The strongest growth over a long period has been seen in Ireland, Norway, the Czech Republic and Luxembourg. The Slovak Republic, Sweden, Israel, Belgium and Slovenia are also in the top one-third, with Spain and the UK close behind, and Poland, Spain, Finland and Australia make up the rest of the top half.

Figure 1: Annual Average Growth Rate of Median Equivalised Household Income in Real Terms by Country, Longest Period Covered from About 1980



4. GDP and Median Incomes

Growth in national output/income per head as measured in the national accounts, while subject to a variety of critiques, is still the most frequently-used benchmark for assessing macroeconomic performance. How misleading is it as an indicator of how real incomes and

living standards evolve for ordinary working families? We assess this by comparing it with growth in median incomes over the same period for the 26 OECD countries we are covering. Table 2 brings together the average annual growth rates for median household income from Table 1, with countries listed in order of their rank by that indicator, with the average annual growth in Gross National Income (GNI) per head by country calculated over the years covered by our survey data for each country, together with each country's ranking on that measure. We focus on GNI rather than GDP since the latter includes income flows to non-residents, which would not feature in the incomes of households in the country in question.

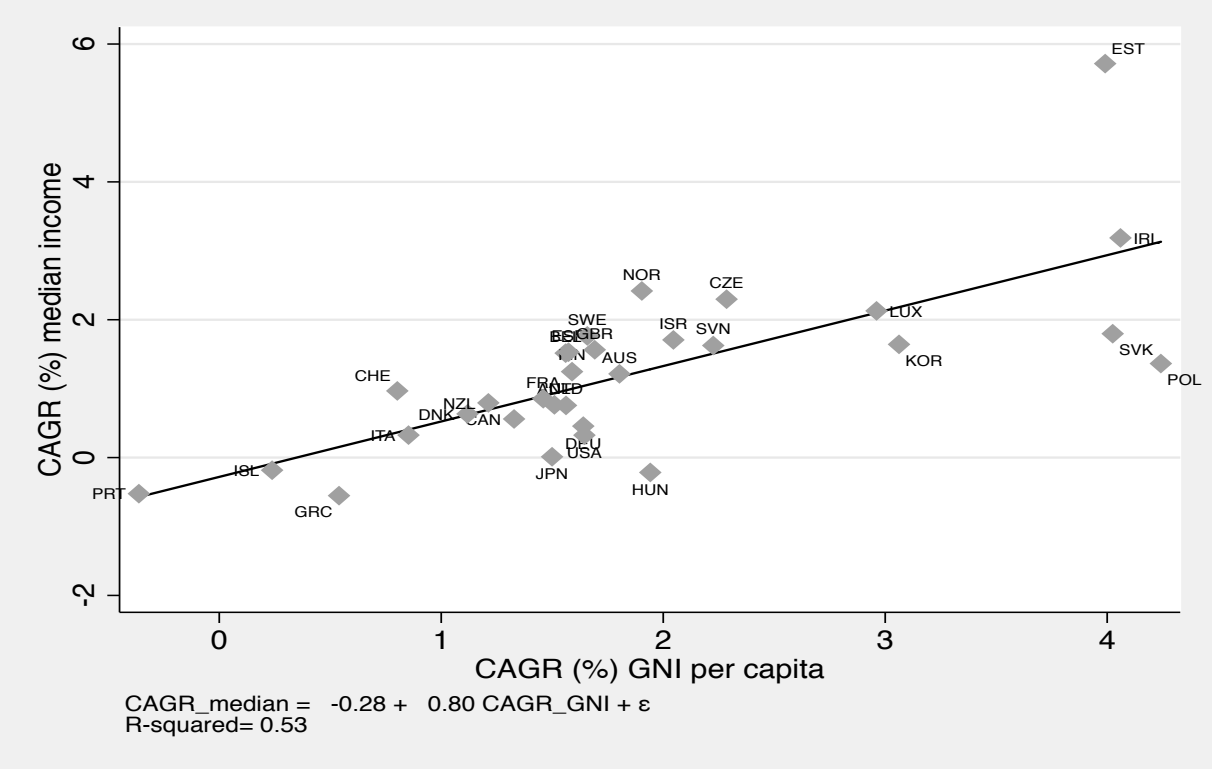
Table 2: Average Annual Growth in Real Median Equivalised Household Income and GNI per capita by Country, Longest Period Covered from About 1980

	Average Annual Growth in Median (%)	Rank by Growth in Median	Average Annual Growth in GNI (%)	Rank by Growth in GNI
Ireland	3.19	1	3.53	3
Norway	2.42	2	2.04	6
Czech Republic	2.30	3	2.01	7
Luxembourg	2.13	4	1.50	21
Slovak Republic	1.80	5	3.94	2
Sweden	1.76	6	1.78	9
Israel	1.71	7	2.21	4
Slovenia	1.63	8	2.14	5
United Kingdom	1.56	9	1.52	18
Spain	1.53	10	1.59	15
Belgium	1.51	11	1.62	14
Poland	1.36	12	4.40	1
Finland	1.25	13	1.62	13
Australia	1.21	14	1.72	11
France	0.85	15	1.51	20
New Zealand	0.79	16	1.28	24
Austria	0.77	17	1.52	19
Netherlands	0.76	18	1.53	17
Denmark	0.63	19	1.32	23
Canada	0.56	20	1.36	22
Germany	0.46	21	1.67	12
Italy	0.33	22	0.87	25
United States	0.32	23	1.73	10
Japan	0.01	24	1.58	26

Hungary	-0.22	25	1.82	8
Greece	-0.55	26	0.52	26

The results in Table 2, and the graphical comparison of the two indicators in Figure 2, bring out first that growth in the median lagged considerably behind growth in real GNI per head in most countries, though there are exceptions such as Norway and Luxembourg. On average, if we simply fit a regression line as shown in Figure 2, only four-fifths of the increase in GNI is reflected in median income growth on average. Secondly, however, the gap between the two indicators is not consistent, so they give a rather different impression of how countries compare. The USA in particular would rank 10th. out of these 26 countries in terms of average GNI growth, compared with 23rd. by median income growth. Germany, Japan, Hungary and Poland also rank considerably higher by average GNI growth per head than by median income. It is worth also noting that this divergence is even more pronounced if one looks at the relationship within sub-periods rather than across the period as a whole, where the ability of GNI growth to 'predict' growth in the median is considerably weaker.

Figure 2: Annual Average Growth in the Median vs GNI, Longest Period Covered for Each Country



5. Inequality-Adjusted Growth vs Median Incomes

One reason why growth in the median could lag behind national income per capita would be if the benefits are concentrated towards the top rather than the middle of the distribution: increasing inequality could be the key factor. If that was the case, then as outlined in the introduction 'inequality-adjusting' GDP would be expected to bridge the gap, inequality-adjusted GDP (or better GNI) would show a similar picture to median income growth, and would serve as a robust and reliable indicator of the extent of broadly-based income growth for households. But does this in fact prove to be the case?

The notion of incorporating inequality directly into the assessment of national income goes back to the seminal papers by Atkinson (1970) and Sen (1976, 1979). Atkinson's approach allows the degree of inequality aversion to be a choice parameter, while Sen's index of 'real

national income' employs the most widely-used summary measure of overall income inequality, the Gini coefficient. The Gini ranges between 0 (no inequality) and 1 (maximum inequality), and the 'inequality adjustment' involves simply multiplying the level of GNI in the country and year in question by (1-Gini). The higher the level of inequality indicated by the Gini, the greater the reduction will be in the level of GNI. As far as change over time is concerned, which is what we are focusing on here, it will be the evolution of inequality over the period that matters: if inequality remains unchanged, then it does not matter whether it is high or low, the growth rate for inequality-adjusted GNI per head will be the same as for unadjusted GNI. Where inequality increases, though, the inequality adjustment will man that inequality-adjusted GNI will be seen to grow more slowly, some of the growth in GNI per capita is discounted. While various more sophisticated procedures have been developed and applied,[3] this rather straightforward inequality adjustment suffices for current purposes, namely to see the extent to which it accounts for the divergence between the trajectory of GDP per capita versus median household income.

Table 3 adds the average annual growth in inequality-adjusted GNI) per head produced in this way, and each country's ranking on that measure, to the corresponding figures for growth in the median and in unadjusted GNI per head from Table 2. This shows that the inequality adjustment to GNI produces a degree of convergence with the ranking by median household income growth for some countries, but not for others, and there remain marked divergences between the two indicators in those terms. Most notably, the UK is ranked 9th. by median income growth versus 22nd. by adjusted GNI, Poland is ranked only 12th. by median income growth versus first by adjusted GNI, for Finland these rankings are 13th. vs 20th., for France

[3] See for example discussions in Klasen, 1994; Jenkins; 2013. Shaikh and Ragab (2008) has an illuminating examination of the empirical behaviour and interpretation of GDP per capita adjusted by the factor (1-Gini).

15th. vs 9th., for New Zealand 16th. vs 24th., for Austri 17th. vs 11th., for Germany 21st. vs 10th., for Japan 24th. vs 16th., for and Hungary 25th. vs 6th. Sweden is ranked 6th. The USA is ranked 23rd. in terms of median income growth vs 18th. by inequality-adjusted GNI, not the largest gap but still substantial.

Table 3: Average Annual Growth in Real Median Equivalised Household Income, GNI per capita, and Inequality-adjusted GNI per capita by Country, Longest Period Covered from About 1980

	Average Annual Growth in Median (%)	Rank by Growth in Median	Average Annual Growth in GNI (%)	Rank by Growth in GNI	Average Annual Growth in Adjusted GNI (%)	Rank by Growth in Adjusted GNI
Ireland	3.19	1	3.53	3	3.75	2
Norway	2.42	2	2.04	6	1.93	4
Czech Republic	2.30	3	2.01	7	1.68	8
Luxembourg	2.13	4	1.50	21	1.27	21
Slovak Republic	1.80	5	3.94	2	3.42	3
Sweden	1.76	6	1.78	9	1.41	17
Israel	1.71	7	2.21	4	1.83	5
Slovenia	1.63	8	2.14	5	1.76	7
United Kingdom	1.56	9	1.52	18	1.24	22
Spain	1.53	10	1.59	15	1.48	12
Belgium	1.51	11	1.62	14	1.46	14
Poland	1.36	12	4.40	1	3.98	1
Finland	1.25	13	1.62	13	1.34	20
Australia	1.21	14	1.72	11	1.46	13
France	0.85	15	1.51	20	1.63	9
New Zealand	0.79	16	1.28	24	0.94	24
Austria	0.77	17	1.52	19	1.53	11
Netherlands	0.76	18	1.53	17	1.45	15
Denmark	0.63	19	1.32	23	1.35	19
Canada	0.56	20	1.36	22	1.21	23
Germany	0.46	21	1.67	12	1.53	10
Italy	0.33	22	0.87	25	0.75	25
United States	0.32	23	1.73	10	1.40	18
Japan	0.01	24	1.58	26	1.43	16
Hungary	-0.22	25	1.82	8	1.79	6
Greece	-0.55	26	0.52	26	0.47	26

This degree of divergence arises from a complex set of factors that we will briefly summarise, but the central implication is that inequality-adjusted GDP/GNI does not offer a reliable way

to capture the evolution of real incomes and living standards for 'ordinary' households even over a lengthy period. As we noted for unadjusted GNI, this divergence is even more pronounced if one looks at the relationship within sub-periods of about 5 years in length, which can be distinguished in the household survey data we are employing. Annual data on median incomes for more recent years is available for a substantial sub-set of the countries, and analysing these reveals that the divergence is even greater with respect to growth from one year to the next. This means that if one is seeking an indicator of what is happening to ordinary incomes and living standards, tracking inequality-adjusted GNI does not offer a satisfactory alternative, either in the long or shorter-term, to monitoring median household income directly.

This reflects the fact that how growth is distributed is only one of a range of factors, in terms of both underlying dynamics and measurement-related issues, that contribute to the divergence between the evolution of national income per head as measured in the national accounts and median income as captured in household surveys. Atkinson (2013) notes for example that there can be changes in the share of household income in total national income, what he terms 'spendable income' may have moved differently from total household income, changes in National Accounts procedures may have no counterpart in household surveys, and changes in household composition can affect the equivalised income of households. (See also Fixler and Johnson, 2014, and Jorgensen and Slesnick, 2014 for US-focused discussion.) Nolan, Roser and Thewissen (2018) investigate the complexities of this relationship, seeking to assess the quantitative importance of such distinct contributory factors. Increasing income inequality was found to play a substantial role in the case of the US, as well as Canada, but even there was by no means the main factor at work. The fact that nominal growth in national income is generally deflated by the change in producer prices whereas household incomes are deflated by the change in consumer prices was seen to be important in the case of the US but was not as important in most other countries. The distinction between Gross Domestic Product and Gross

National Income was important for only a few countries with exceptionally large net factor outflow, such as Ireland and Luxembourg. The most important factor on average across countries and the most consistent contributor to the divergence has received very little attention in this context, or indeed in thinking about the evolution of household living standards more generally, namely declining household size. With average household size falling over time in most countries, in effect fewer of the potential economies of scale from living together are being exploited.

Among the other factors at work, GNI refers to the entire economy, with a significant proportion of national income flowing to the corporate rather than the household sector. Honing in on the household sector in the national accounts (which is only possible for many countries on a hamonised countries since the mid-1990s), certain income sources such as imputed rent, retained profits, or in-kind benefits are taken into account in the national accounts but are (often) not reported in household surveys. Finally, surveys may not reliably capture the income from different sources that they aim to cover, while national accounts aggregates are also measured imperfectly. Nolan, Roser and Thewissen (2018) found that these factors also contributed to the observed GDP-median gap for some countries, but mostly less than other factors. The scale of the divergence to the USA and the factors contributing to it, including the impact of rising inequality, were seen to be distinctive, serving again to underline how cautious one must be about generalising from the experience of a single country, no matter how important.

6. Median Income As Indicator

Having made our core point about the median versus inequality-adjusted GNI, it is worth also highlighting some important features about how the median behaves as revealed by our data, and the implications for its use as a key socio-economic indicator. The first point to make is that the extent of median income growth varied widely over the period covered for most

countries. This is brought out in Table 4, which shows the average annual growth rates for sub-periods that can be distinguished in the data. These each cover approximately 5-year periods up to 2000, and then the pre-Crisis period up 2007, the onset of the Crisis from 2007 to 2010, and the aftermath from 2010 to 2013.

Table 4: Growth in Median Equivalised Disposable Household Income in Real Terms by Country and Sub-Period

	Average annual growth in median						
	1980-1985	1985-1990	1990-1995	1995-2000	2000-2007	2007-2010	2010-2013
Australia	-0.08	0.23	-1.41	1.97	4.67	-0.32	
Austria				0.50	1.25	1.80	-0.85
Belgium		1.45	4.68	1.04	1.39	1.15	0.02
Canada	-1.09	0.46	-1.33	1.86	1.83	1.25	0.91
Czech Republic			3.95	0.97	5.35	1.07	-0.96
Denmark		-0.62	2.28	1.13	1.33	0.41	-1.11
Finland		2.31	-2.73	2.18	3.07	0.80	-0.07
France	-0.72	0.97	1.97	0.13	0.85	2.42	
Germany		2.39	-0.95	1.24	-0.36	0.49	-0.07
Greece			0.19	2.75	2.65	-4.11	-12.01
Hungary			-7.02	-0.23	2.86	-2.37	0.22
Ireland			4.09	6.97	3.28	-5.26	
Israel		2.72	0.24	2.68	1.06	1.33	2.94
Italy		4.26	-2.68	1.21	0.86	-1.59	-2.61
Japan			1.59	-1.19	-0.72	-1.34	-0.38
Luxembourg		6.27	2.27	1.00	1.87	-0.38	-0.67
Netherlands	-0.84	3.45	0.32	2.32	0.60	-0.15	0.22
New Zealand		-1.33	-0.94	2.52	2.64	-0.62	1.29
Norway	4.12	0.69	-0.17	3.24	3.18	1.39	2.76
Poland			-8.20	5.32	2.08	5.54	0.25
Slovak Republic			2.06	0.76	9.40	2.62	-0.76
Slovenia				0.36	2.37	1.93	-0.51
Spain	-0.97	5.19	2.06	4.86	1.20	-3.63	-0.54
Sweden		2.32	-1.83	2.58	2.65	1.68	1.50
United Kingdom	0.06	3.16	0.37	3.71	3.51	-1.55	-0.72
United States	0.16	0.05	-0.18	2.04	0.32	-1.06	-0.32
Average	0.08	2.00	-0.06	2.00	2.64	-0.24	-0.24

Note: From/to nearest year available in the data for the country in question (for example, Japan 1990-1995 is for the period 1985-1995, Ireland 1990-1995 is for 1987-1994, Slovak Republic 1995-2000 is for 1996-2004).

This shows for example that there were certain periods of reasonably healthy growth even for the poorest performers overall. The USA had the 'Clinton boom' in the 1990s, Japan some growth in the early 1990s, and Italy and Germany saw growth in the 1980s before the 'shocks' of the early 1990s currency crisis and the incorporation of the former German Democratic Republic respectively. For the better performers, we see that growth was also often concentrated in specific sub-periods, interspersed with stagnation or decline. For Australia, most of the growth over the period as a whole was from the mid-1990s, and especially from 2000 to 2007 at the height of its minerals boom. Finland, Norway and Sweden saw sharp declines from 1990 to 1995, when they were hit by financial crises and recession. The UK had sharply contrasting experiences of stagnation in the early 1980s and early 1990s versus strong growth from 1985-1990 and 1995-2007, followed by a decline from 2007 on as the Economic Crisis struck. The Crisis and Great Recession was a profound macroeconomic shock for the rich countries as a whole, but its effects on household incomes varied widely across countries. The median fell between 2007 to 2010 in about half the countries covered, but the scale of the decline and subsequent trajectory of the median differed between them. Ireland and Spain had experienced very rapid growth in the years up to the Crisis, so even with the sharp falls it produced they still registered a substantial increase in the median over the whole period. For Greece, by contrast, the scale of the declines both in the initial stages of the Crisis and especially from 2010 onwards were more than enough to offset the substantial growth also seen there from the mid-1990s; this decline was on a much larger scale than any other OECD country.

The extent of this variation over time means that the ranking of countries in terms of median income growth is quite sensitive to the period examined. To illustrate the point, Australia and Canada would have been regarded as very poor performers indeed, as bad or worse than the USA, if one was looking back from 1995 at the preceding 15 years. For the UK, even having

the starting-point in the late 1970s versus mid-1980s would make a considerable difference. It is not possible to have a common starting-point across countries for the analysis here due to data availability, but even if one could that would not address the underlying issue that countries do not share a common pattern of variation over time, and any starting point may be a low point for one country and a peak for another. This also applies to comparisons focused simply on economic growth and macroeconomic performance. However, with much longer runs of macroeconomic data available on an annual basis, various smoothing methods can be applied to ameliorate if not eliminate this problem. The occasional nature of the observations available on incomes across the distribution going back in time do not allow this to be done here, though annual data are much more widely available over the last decade or so, not least due to the introduction and roll-out of the EU-SILC.

It is also worth noting of course that the varying growth in median incomes over the period from the early/mid-1980s observed across these countries related to very different starting-points in terms of initial levels of income and living standards. This is brought out in Table 5, which shows median income levels expressed in Purchasing Power Parity terms in the first year observed and how that then changed over time. In the early/mid-1980s the US had the highest level of median income by a considerable margin, with Canada, Germany and Japan also at comparatively high levels. The subsequent increase in the median in $PPP terms was particularly high in some countries that had relatively low levels at the outset, such as Ireland and Spain, but also in Luxembourg and Norway that started with intermediate levels. The average annual increase in the median in the USA was among the lowest seen (though not as low as Japan). This meant that by 2010 or 2013 Luxembourg and Norway had higher levels for the median than the USA, and Australia, Canada, Denmark, Finland, Iceland and the Netherlands were much closer to it. The UK, despite achieving relatively strong increases and narrowing the gap, remained further behind the US and below the levels reached in Germany

or France. So in monitoring how the median evolves over time and making comparisons between countries in those terms, the underlying levels of income and living standards – as imperfectly captured by income in PPP terms – must also be kept in mind in assessing the implications.

Table 5: Median Equivalised Disposable Household Income in Real Terms, $PPPs, by Country Over Longest Period Covered

Country	Initial level	Most recent Level	Overall Growth	Annual Average Growth
			$ 2011 PPPs	
Australia	19,639	27,874	8,234	284
Austria	24,035	27,780	3,745	197
Belgium	16,456	25,070	8,614	308
Canada	23,688	28,477	4,790	145
Czech Republic	10,039	16,176	6,136	292
Denmark	22,975	27,074	4,099	158
Finland	18,229	25,158	6,929	266
France	18,665	24,502	5,837	182
Germany	22,354	25,507	3,153	109
Greece	13,201	11,366	-1,835	-68
Hungary	11,460	10,952	-509	-24
Ireland	11,351	23,356	12,005	522
Israel	11,942	18,543	6,601	254
Italy	15,452	16,924	1,472	53
Japan	22,385	22,454	69	3
Luxembourg	18,955	34,183	15,229	544
Netherlands	19,406	25,649	6,244	169
New Zealand	19,234	23,808	4,574	169
Norway	15,436	34,769	19,333	569
Poland	9,312	12,376	3,064	146
Slovak Republic	10,099	14,680	4,581	218
Slovenia	15,280	19,460	4,181	279
Spain	11,293	18,633	7,340	222
Sweden	15,345	25,935	10,590	353
United Kingdom	13,198	22,367	9,169	270
United States	26,674	29,784	3,109	91

Source: LIS except OECD for Belgium (from 2004), Canada, Greece, Japan, Netherlands, New Zealand, and Sweden

The median must also be interpreted with care in other respects. Trends in the median of the distribution for all households will not necessarily capture what is happening to those of working-age, who are the primary focus of current debates about the 'squeezed middle'; the

living standards of the elderly are determined by a distinctive set of factors,, and their income trajectory may deviate markedly – in either direction - from that of working-age households. Table 6 compares the average annual growth in the median for all households with that for working-age households only. The two are mostly very similar, which is unsurprising given that working-age households comprise a very substantial proportion of all households. The difference between the two growth rates is in favour of older households in seventeen of the thirty countries, lending some support to the general view that older households have done relatively well, though some of these gaps are marginal. There are only a few instances where a noticeable gap is to be seen, large enough to significantly affect how the country would rank. However, over shorter periods the divergence between the median for working-age versus all households is much greater, distinguishing the same sub-periods employed earlier. This reveals a gap of at least 0.2% in almost half the total number of country/sub-period observations we have, and many of these gaps are twice that size. These gaps are often in different directions across the sub-periods for a given country, and thus offset each other when the sub-periods are combined in looking over the whole period for which we have data. The implication from a shorter-term monitoring perspective is that the median for all households may not provide a good guide to what has been happening to working-age households over say 3-5 years. This will be even more pronounced when looking from one year to the next.

Table 6: Growth in Median Equivalised Household Income for Entire Sample versus Working-Age Households Only, Longest Period Covered from about 1980

Country	Average Annual Growth All	Average Annual Growth Working Age	Difference
	%	%	
Australia	1.21	1.26	0.05
Austria	0.77	0.77	0.00
Belgium	1.51	1.70	0.18
Canada	0.56	0.50	-0.06
Czech Rep	2.30	2.39	0.10
Denmark	0.63	0.64	0.00
Finland	1.25	1.35	0.10
France	0.85	0.81	-0.04
Germany	0.46	0.53	0.07
Greece	-0.55	-0.64	-0.09
Hungary	-0.22	-0.38	-0.17
Ireland	3.19	3.23	0.05
Israel	1.71	1.64	-0.07
Italy	0.33	0.23	-0.09
Japan	0.01	0.22	0.21
Luxembourg	2.13	2.00	-0.13
Netherlands	0.76	0.73	-0.03
New Zealand	0.79	0.77	-0.02
Norway	2.42	2.38	-0.04
Poland	1.36	1.34	-0.02
Slovak Rep	1.80	1.86	0.06
Slovenia	1.63	1.76	0.13
Spain	1.53	1.43	-0.10
Sweden	1.76	1.75	-0.02
UK	1.56	1.49	-0.08
USA	0.32	0.27	-0.05

Source: LIS except OECD for Belgium (from 2004), Canada, Greece, Japan, Netherlands, New Zealand, and Sweden

The final point to be made about the median as indicator is that it can be expected to capture what is happening to real incomes across the middle, but not for those towards the bottom of the distribution. This can be seen from Table 7 which compares real income growth for the median over the period available for each country with the corresponding growth rates at the income cut-offs for the bottom ten and thirty percent of the distribution, P_{10} and P_{30}. (To bring home the point we continue to focus on working-age households only in this comparison, leaving out older households; when these are included the divergence is even greater.)

Comparing the average growth rates for the median and P_{30} across all the countries, the latter grew by 0.2% less on average, and this differential was also almost always to the disadvantage of the lower percentile. However, for most countries the growth in the median, down-scaled by about 20%, would be a reasonably good predictor of growth in P_{30}.

Table 7: Real Growth in Median Equivalised Household Income versus P_{10} and P_{30} for Working Age Households by Country, Longest Period Covered from about 1980

	Median	P_{30}	P_{10}
	%	%	%
Australia	1.26	1.14	1.06
Austria	0.77	0.71	0.84
Belgium	1.70	1.68	0.94
Canada	0.50	0.38	0.37
Czech Rep	2.39	2.16	1.41
Denmark	0.64	0.53	0.61
Finland	1.35	1.17	0.77
France	0.81	0.84	0.59
Germany	0.53	0.36	0.11
Greece	-0.64	-0.81	-1.32
Hungary	-0.38	-0.62	-1.06
Ireland	3.23	3.33	3.34
Israel	1.64	1.28	0.45
Italy	0.23	0.01	-0.84
Japan	0.22	-0.07	-0.69
Luxembourg	2.00	1.80	1.45
Netherlands	0.73	0.61	0.12
New Zealand	0.77	0.54	0.27
Norway	2.38	2.28	1.93
Poland	1.34	1.05	0.38
Slovak Rep	1.86	1.46	0.39
Slovenia	1.76	1.34	0.63
Spain	1.43	1.14	0.49
Sweden	1.75	1.39	0.67
UK	1.49	1.27	1.22
USA	0.27	0.01	-0.08
Average	1.20	1.01	0.59

Source: LIS except OECD for Belgium (2001-2013), Canada, Greece, Japan, Netherlands, New Zealand, and Sweden.

However, the divergence between the median and P_{10} is considerably larger, at 0.6% on average; the average annual growth at this percentile across all the countries/periods covered was only half that of the median. Strikingly, in a substantial minority of countries P_{10} grew by

as much as a full percentage point per year less than the median on average. The trajectory of the median versus lower percentiles varies across the sub-periods we can distinguish, with wider or narrower gaps between them being seen. The implication is that the median cannot be relied on to capture or reflect real income trends towards the bottom/for the poor: it is to be seen as a complement rather than substitute for indicators focused on low incomes and poverty.

8. The Implications for Monitoring and Promoting Progress

The analysis and findings presented here first of all serve to reinforce existing concerns about relying on growth in GDP per head to capture trends in general living standards and how incomes for most households are faring. GDP per head will not be a reliable indicator of household income change around the middle, in the short or long run, and will mislead as to the relative performance of countries in achieving broadly-based improvements in prosperity.

They then demonstrate that 'inequality-adjusting' GDP or GNI does not suffice to bridge the gap. The divergence between the trajectory of median household income and GDP/GNI per capita is due to a variety of factors that themselves vary in significance across countries and over time, with the distribution of the gains from growth being only one of the drivers. This means that inequality-adjusted GNI cannot serve as a substitute for direct monitoring of the evolution of median household income.

Median income thus needs to be accorded a central role alongside GDP per capita in both official monitoring of living standards and how they are changing over time, as some have advocated (for example, Atkinson et al., 2015), and in research on inclusive growth.

Growth in median incomes will not be a reliable measure of what is happening to the incomes of the poor, though, and thus of inclusive growth more broadly conceived. That does not take away from the value of the median in capturing what is happening to incomes around the middle of the distribution and the extent to which economic growth has fed through to those

incomes, but it does mean that low incomes and poverty certainly need to be separately monitored and analysed: one cannot assume that growth that transmits to the middle is also going towards the bottom. The 'dashboard' of indicators employed to assess progress and inform policy needs to incorporate measures focused directly both on the middle and towards the bottom, since each is of central societal concern.

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