# Top Incomes[*]

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## 1. Introduction

Much research into inequality is concerned with the bottom of the distribution. However, changes in top income shares may have important implications in their own right. A concentration of income at the top of the distribution may have significant consequences for economic and political power. If a small elite receives a large share of the income in a society, it may wield disproportionate influence in certain industries, and may have the ability to influence political outcomes through campaign contributions. The proliferation of 'rich lists' in business magazines over recent decades testifies to the strong interest among the general public in knowing who the richest people are, how much money they have, and how they made their money.

Frank (2007) argues that increased expenditures by top earners can affect the middle-class because it leads to an 'expenditure cascade'. He gives the example of housing, in which higher incomes cause those at the top of the distribution to build larger mansions, which in turn leads the next tier to build larger houses, which in turn means that the middle-class must spend more on housing or face the prospect of sending their children to below-average schools. Frank argues that the same cascade process operates in the cases of motor vehicles, professional wardrobes for job applicants, and gifts given to co-workers. In each instance, expenditures on positional goods

by the most affluent individuals in society changes what is considered 'adequate' by people of median income.

Beyond this, understanding the concentration of incomes at the top of the distribution can tell us something about the bottom of the distribution. As Tawney (1913) noted: 'what thoughtful rich people call the problem of poverty, thoughtful poor people call with equal justice a problem of riches'. Mechanically, of course, it must be true that if those at the top have a larger share of national income, then the rest of the population must have a smaller share. But it also turns out to be the case that income concentration at the top of the distribution is highly correlated with relative poverty.

This suggests that top income shares are not only important for understanding the rich; they may also help us better understand the poor. As we shall see, estimates of top income shares (e.g. the income share of the top 10 percent, 1 percent, 0.1 percent, etc.) are available on an annual basis for many years prior to the advent of national income surveys, during eras when little else is known about the distribution of income. In these cases, top income shares may serve as a useful proxy for inequality across the entire distribution.

The remainder of this chapter is structured as follows. In section 2, I discuss the basic methodology used for creating recent top incomes estimates, and issues that arise about comparability across countries. One of the most important of these is tax underreporting, but there are also methodological differences that exist between the studies, and it is useful to see the extent to which these are likely to affect comparability. In section 3, I present time trends for both Anglo-Saxon and non-Anglo-Saxon countries. A distinct feature of this exercise is the similarity across Anglo-Saxon countries, where top incomes have followed a U-shaped path over the course of the twentieth century.

Another set of issues concerns the degree to which top incomes can be compared with other measures of inequality. In section 4, I assess top income shares against the standard axioms of inequality, and present empirical evidence on the relationship between top income shares and other commonly used measures of inequality, such as the Gini coefficient.

Two sections of the chapter then summarize research on the causes and consequences of changing top income shares. In section 5, I consider possible drivers of top incomes, including major events (such as World Wars and Depressions), superstar labor markets, changes in taxation, and political partisanship. In section 6, I discuss research on outcomes that may be affected by top incomes, including health, economic growth, and national savings. The chapter concludes with a discussion of the many fruitful directions for research that remain in this rapidly growing field.

## 2. Methodology and Comparability

The use of tax data to estimate income inequality has a long history (e.g. Bowley 1914; Kuznets 1953). Here, I draw upon a series of recent papers that have combined tax data with external population and income control totals to estimate the changing share of income going to families and individuals above the 90th percentile of the distribution. The studies in this 'new top incomes literature' follow Piketty (2001) in using all available taxation data (rather than just selected years). In these respects, such studies provide a more complete picture of the top of the income distribution than has previously been available.[1]

Top incomes series have now been produced for at least fourteen developed countries. These include Australia (Atkinson and Leigh 2007), Canada (Saez and Veall, 2005), Finland (Riihelä, Sullström and Tuomala 2005), France (Piketty 2001, 2003, 2007; Landais 2007), Germany (Dell 2005, 2007), Ireland (Nolan 2007), Japan (Moriguchi and Saez 2008), the Netherlands (Atkinson and Salverda 2005; Salverda and Atkinson 2007), New Zealand (Atkinson and Leigh 2005), Spain (Alvaredo and Saez 2006), Sweden (Gustafsson and Jansson 2007; Roine and Waldenström 2008), Switzerland (Dell 2005, Dell, Piketty and Saez 2007), the United Kingdom (Atkinson 2005, 2007b) and the United States (Piketty and Saez 2001, 2003).[2] Although I do not

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[1] Feenberg and Poterba (1993) used taxation data to estimate the income share of the richest 0.5 per cent in the United States from 1951 onwards. Their methodology used external population controls, but not external income controls.

[2] The analysis that follows is restricted to the countries and years covered in the comparable dataset in Leigh (2007). It therefore excludes the work of Landais (2007) on French top incomes after 1998, and the work of Riihelä, Sullström and Tuomala (2005) on Finland. For Sweden, I use data from Roine and Waldenström (2008) on the basis

address them in this chapter, it is worth noting that estimates are also available for at least four developing nations, including Argentina (Alvaredo 2007), China (Piketty and Qian 2006), India (Banerjee and Piketty 2005), and Indonesia (Leigh and van der Eng 2006).[3]

In each case, the series have been produced using a similar methodology. Using published tabulations of total income into income bands, statistics on the adult population, and data on total personal income, researchers estimate the share of income held by the top $x$ percent of the population. Although it is possible to extrapolate slightly beyond the available data, it is reasonably accurate to say that estimates of the top 10 percent share are only available for periods in which 10 percent or more of the adult population file an income tax return. Thus while top incomes series for many countries start around World War I, the top 10 percent share is typically unavailable until the 1920s or 1930s, when the personal income tax is expanded to cover more than one-tenth of the population.

In what follows, I focus on three factors that affect the accuracy of any single estimate of top income shares, and six factors that affect comparability across countries. What appears here is only an overview; more detailed treatments may be found in Atkinson (2007a), Atkinson and Leigh (2007b) and Leigh (2007).[4]

1. *Tax avoidance and evasion*

   Perhaps the most troubling aspect about using taxation data to estimate inequality is that individuals have a strong incentive to underreport income to the tax authorities. If the extent of underreporting varies systematically over time or between nations, this may affect the validity of temporal or international comparisons. The underreporting of income to tax authorities is an issue that has been taken seriously by top incomes researchers. In some cases, this has involved omitting years when the data is of dubious accuracy. For example, Alvaredo and Saez (2006) only present estimates of the top 1 percent share in Spain from

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that it covers more years than the series in Gustafsson and Jansson (2007). In addition, it is worth noting that other researchers are presently preparing series on Denmark and Norway.

[3] The series for China are based exclusively on survey estimates, and do not make use of taxation statistics.

[4] Regarding United States top income shares, Reynolds (2006) has argued that Piketty and Saez's estimates are biased upwards by tax evasion, and do not accord with Census Bureau estimates on the share of the richest 5 percent. See Piketty and Saez (2006c) for a detailed response to this critique.

1981 onwards. In other cases, it has involved testing the hypothesis that the rich are keeping their money in 'safe haven' countries. In their paper on top income shares in Switzerland, Dell, Piketty and Saez (2007) show that attributing all foreign income in Switzerland to French taxpayers would have only a small effect on French top income shares.

Although data on tax underreporting is limited, it is nonetheless possible to say something about the plausible magnitude of these factors. Among the best data on underreporting comes from random audits in the United States, conducted under the Taxpayer Compliance Measurement Program (TCMP), and its successor, the National Research Program (NRP). One way that these data can be used is to compare changes in underreporting in the United States over time. Estimates from the Internal Revenue Service (1996, 2006) put the gross underreporting gap on individual income taxes (i.e. the share of income not reported) at 17-18 percent in 1985, 1988 and 1992, and 16 percent in 2001. Although Slemrod (2007) points out that these estimates are inexact, they do not point to any significant changes in underreporting. Similarly, in their study of top incomes in Sweden, Roine and Waldenström (2008) discuss four studies on the size of the tax gap, and conclude that the gap has not changed significantly from the 1930s to the 1990s (they speculate that while the incentives to underreport may have grown over time, the administrative machinery for monitoring compliance may have also improved).

Across countries, comparisons are also inexact, yet the evidence that exists does not point to major differences in underreporting. Results from random audit studies in Sweden (Swedish Tax Agency 2004) and the United Kingdom (O'Donnell, 2004) have found that the tax gap in those countries is of a similar magnitude to the United States tax gap. Another approach (suggested by Slemrod 2007) is to compare attitudes to compliance. In the 1999-2001 World Values Survey, respondents are asked whether cheating on taxes is ever justifiable. On a scale where 'never justifiable' is 1, and 'always justifiable' is 10, there is surprisingly little cross-national variation. In the 13 developed countries discussed below, the mean is between 2.1 and 2.7 for all except two nations (Japan is 1.5, France is 3.1).[5] The close similarity in

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[5] The precise question is 'Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between… Cheating on taxes if you have a chance'. The means for each

attitudes suggests that – given the same taxation regime – underreporting is likely to be similar across developed nations.

Finally, results from random audit studies can be used to look at how underreporting varies across income groups and income types. Using data from the United States TCMP, Christian (1994) finds that taxpayers with (auditor adjusted) earnings above $100,000 reported 97 percent of their true incomes to the IRS, compared with an 86 percent reporting rate for those with incomes under $25,000. Slemrod and Yitzhaki (2002) also suggest that non-compliance is much lower for wage incomes, as there is a greater chance that understatement of wage incomes will be detected. In most countries, the wage share in top incomes has risen since World War II: if overall underreporting has remained constant, one might therefore expect this to have had a small positive effect on top income shares.

*2. Tabulated income distributions*

The raw data used to produce top incomes series are typically drawn from tabulations of income in income ranges that are published annually in hard copy by taxation authorities. Estimating top income shares from these data therefore involves making some assumptions about the distribution of income within bands. The standard approach to this problem is to assume that the data follow a Pareto distribution. The different methods by which this can be done are discussed in some detail by Atkinson (2005, 2007a). For present purposes, it is sufficient to note that in instances where researchers have estimated upper and lower bounds for the interpolation, or compared results using microdata with those derived from grouped data, the results have been very similar. In principle, it should be possible to estimate standard errors to take account of the problems that arise from using grouped data, though I am not aware of any researchers having done so.

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country are Australia 2.2, Canada 2.1, France 3.1, Germany 2.4, Ireland 2.3, Japan 1.5, Netherlands 2.7, New Zealand 2.3, Spain 2.3, Sweden 2.4, Switzerland 2.6, United Kingdom 2.4, United States 2.3.

*3. Part-year incomes*

There are various ways in which part-year units can arise. Emigrants may choose to file a return when they leave the country. Individuals who die partway through the year may nonetheless have a return filed on their behalf. Immigrants or young persons entering the labor market may file a return based only on a few months' earnings. In countries where married couples file jointly, a person who divorces midway through the year may file both as a couple and an individual. Although these are all theoretical problems in estimating the distribution of top incomes, their practical importance seems to be minimal. For example, the United Kingdom Royal Commission on the Distribution of Income and Wealth (1979, cited in Atkinson 2005), found that excluding part-year units would only reduce the share of the top 1 percent by 0.1 percentage point[6].

Issues affecting comparability include the following.

*4. The tax year*

In Canada, France, Japan, the Netherlands, Spain, Sweden, Switzerland and the United States, the tax year and calendar year are one and the same. However, this is not true of all countries. The tax year commences on July 1 in Australia, April 1 in New Zealand, and April 6 in Ireland and the United Kingdom. Since many other data sources are collected on a calendar year basis, Leigh (2007) averages across tax years for these four countries, creating a comparable calendar year top incomes dataset. While this dataset allows a more direct comparison with countries where the tax and calendar year are the same, the price of the exercise is that it tends to over-smooth the top incomes series for Australia, Ireland, New Zealand and the United Kingdom.

*5. The appropriate age cut-off for the adult population*

The estimates for Australia, the Netherlands, New Zealand, and the United Kingdom use persons aged 15 and over, the estimates for Sweden use persons aged 16 and over, the estimates for Ireland use persons aged 18 and over, while those for Canada, France, Japan,

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[6] The population restriction affects numbers, and therefore incomes, more strongly for the top 1 percent.

Spain, Switzerland and the United States use persons aged 20 and over.[7] To give some sense of the magnitude of the effect, Atkinson and Leigh (2005, 2007a) find for Australia and New Zealand that shifting from a population control total of 15 and over to one of persons aged 20 and over reduces the top 1 percent share by approximately 0.5 percentage points, and the top 10 percent share by approximately 2 percentage points.[8] They do not discern any substantial change in this effect over time (see also Roine and Waldenström 2008, who show a similar robustness check for Sweden).

## 6. *The income unit*

In Australia, Canada and Spain, the tax unit is the individual. In France, Ireland, the Netherlands, Switzerland and the United States, the tax unit is a married couple or single individuals, and the population control total is therefore the adult population minus the number of married females. Germany has a hybrid system, with most taxpayers filing as tax units, and the very rich filing as individuals.

In 1948, the United States changed the incentives for married women to file separately, so Piketty and Saez adjust the estimated income shares for the period 1913-1947 (Piketty and Saez, 2001). A more significant shift occurred in Japan (1950), New Zealand (1953), Sweden (1971) and the United Kingdom (1990), when the tax unit switched from the household to the individual. In the case of Japan, Moriguchi and Saez (2008) are able to subtract dependent income from head-of-household income for earlier years. For Sweden, Roine and Waldenström (2008) find little impact of this shift, so do not adjust their series. Atkinson and Leigh (2005) adjust the New Zealand series, assuming that the whole of the increase in the top shares from 1952 to 1953 represented the effect of the move from a tax unit to an individual basis, and apply this constant adjustment to 1952 and all previous years. Leigh (2007) suggests a similar correction to the United Kingdom change in 1990, noting that since United Kingdom top income shares were steadily rising in the 1980s and 1990s, attributing

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[7] Two changes over time have affected the appropriate age cut-off (in opposite directions): a fall in the average age at which individuals form independent income units, and a rise in the average age at which individuals enter the labor market.

[8] See footnote 6.

all of the change from 1989 to 1990 to the shift in the tax unit probably underestimates the true increase in top income shares.

This issue is also relevant to the comparability of top income shares with other measures of inequality. Top income shares from countries with individual filing are conceptually more comparable with measures of earnings inequality across individuals; while top income shares from countries with joint filing are conceptually more comparable with measures of household income inequality. In principle, one could use taxation statistics on singles and couples to derive more comparable measures, but I am not aware of this having yet been done.

7. *The personal income total*

The appropriate income control total used to derive the top income shares in each country is the sum that would have been reported if all adults filed an income tax return.[9] This figure is typically derived by starting with the national accounts and subtracting the income of the government sector, corporate sector, and non-profit sector, as well as making other adjustments to account for the differences in tax reporting regimes.[10] While the accuracy of the personal income control total will doubtless vary from country to country (depending largely on the quality of the national accounts), there do not appear to be systematic differences between nations. On average, the personal income control total is about two-thirds of GDP, and this ratio appears quite similar across countries, and shows no systematic trends, either upwards or downwards.

8. *Income definition – taxable and total income*

In the earlier years, taxation statistics for several countries were tabulated by assessable income (income less deductions). In later years, this shifted to total income. In the case of Australia, New Zealand and the United Kingdom, this change has been accounted for in the

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[9] As Atkinson (2007a) points out, this does not necessarily correspond to the definition of income put forward by the Canberra Group established by the UN Statistical Commission (Expert Group on Household Income Statistics, 2001), nor to the Haig-Simons comprehensive definition of income. Atkinson gives the example of social security benefits, whose tax treatment differs across countries, and even within the same country over time.

[10] Personal income in the national accounts is typically constructed from a variety of sources, including surveys and data on wage bills. However, as Nolan (2007) points out, in some instances total taxable income may itself be used in the construction of the national accounts personal income figure.

production of the top incomes series. Another issue is that certain types of income are not included in taxation statistics. In the case of the United States, Piketty and Saez (2001) note that non-taxable (and partially taxable) social security benefits grew as a share of personal income during the post-war decades, but find that these changes had only a trivial impact on top income shares. However, differences in the definition of taxable income may have a greater impact when comparing top income shares across countries.

9. *Income definition – treatment of capital gains*

Published series differ on their treatment of realized capital gains. For Canada, Germany, Spain, Sweden, Switzerland, and the United States, researchers have compiled separate top incomes series including capital gains and excluding capital gains. For France, Japan, the Netherlands, and the United Kingdom, researchers have excluded capital gains. The top incomes estimates for Australia, Ireland and New Zealand include realized capital gains, to the extent that such gains were taxable.

Leigh (2007) makes some adjustments to top incomes series for thirteen developed countries (Australia, Canada, France, Germany, Japan, the Netherlands, New Zealand, Spain, Sweden, Switzerland, the United Kingdom and the United States) in order to make them more comparable. The main adjustments are: (a) using series that exclude capital gains where possible (b) taking account of the shift from joint to individual filing in New Zealand and the United Kingdom; (c) linearly interpolating missing years in cases where the gap is four years or less; and (d) shifting to a calendar year basis for those countries where the tax year and calendar year differ.[11]

This adjusted series covers just thirteen countries, with a comparatively large number of country×year observations. There are a total of 761 observations for the share of the top 10 percent, and 937 observations for the share of the top 1 percent. This is more than five times as many observations as in the LIS, and exceeds the number of high-quality country-year

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[11] In Leigh (2007), the interpolation is carried out as follows. Where the gap is four years or less, the missing years are linearly interpolated. In the case of Switzerland, taxpayers are only required to file returns every two years, so the same figure is assigned to both years. During the period 1887-1898, Japanese tax returns were for overlapping three years periods, so the top income estimate is assigned to the middle year. For France, top income shares for 1900-1910 are based on average data for the period, so this estimate is assigned to 1905.

observations in both the Deininger and Squire database and the WIID.[12] These data are used in the analysis that follows.

In sum, while top income series have their imperfections, these are by no means insurmountable.[13] Nor are they necessarily more problematic than the comparability problems that afflict other cross-national inequality datasets (with the possible exception of the Luxembourg Income Study). Given the extensive coverage of top income series, these data compare well with other sources for studying trends, determinants and effects of inequality across countries and over time.

## 3. Trends in Top Incomes

Figures 1 and 2 depict the top 10 percent share for Anglo-Saxon and non Anglo-Saxon countries; while figures 3 and 4 show the top 1 percent share for these two sets of countries (note that the top 10 percent share is unavailable for Japan).[14] In all countries except Switzerland, top income shares tended to fall from the 1920s to the 1970s (data for Spain are unavailable over this period). Since the 1970s, top income shares in the Anglo-Saxon countries (Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States) have risen sharply, while shares in Japan and in the continental European countries (France, the Netherlands, Spain, Sweden and Switzerland) remained relatively stable.

When did top incomes peak? For almost all countries in the sample, top income shares were at their highest at some point between the start of World War I and the end of World War II. For example, the highest level of the top 1 percent was reached in Canada in 1938, France in 1916,

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[12] Deininger and Squire identify 693 observations that they label 'accept'. Version 2a of the WIID contains 1223 observations classified as Quality=1, but many of these are repeated observations for the same country-year, so there are only 540 high-quality country-year observations in the WIID.

[13] One way of circumventing the problem of measurement error in population and income control totals is to focus on shares-within-shares (eg. the share of the top 1 percent within the top 10 percent), which are not affected by control totals. Empirically, the concentration of income within the top 10 percent is positively related to the share of the top 10 percent (where S1 and S10 are the shares of the top 1 percent and top 10 percent respectively, the mean within-country correlation between [S1/S10] and S10 is 0.6).

[14] As can readily be observed from the charts, the top 1 percent and top 10 percent series track one another quite closely. For the countries and years shown in Figures 1–4, the mean within-country correlation between these two measures is 0.8.

Germany in 1938, Ireland in 1939, Japan in 1938, the Netherlands in 1916, New Zealand in 1928, Sweden in 1916, Switzerland in 1939-40, and the United Kingdom in 1919. For Ireland and the United Kingdom, the peak year is also the first year in the series. The only exceptions to the rule that top incomes tended to peak in the inter-war era are Australia (where the 1950 wool boom caused the top 1 percent share to peak in that year), and Spain (for which top incomes data are only available since 1981).

A similar pattern emerges when looking at the year when top incomes were at their lowest level. The income share of the top 1 percent bottomed out during the 1970s in four countries (Canada 1978, Ireland 1977, United Kingdom 1978, United States 1973), in the 1980s in four countries (Australia 1982, France 1983, New Zealand 1986, Sweden 1988), and in the 1990s in four countries (Germany 1995, Netherlands 1993, Switzerland 1995-96). The only exception to this pattern is Japan, where the top 1 percent share was at its lowest level in 1945. (Again, I do not take Spain into account for the purposes of this analysis.)

A more formal way of analyzing the time series path of top income shares is to use time series econometric techniques to test for regime switches. With this approach, Roine, Vlachos and Waldenström (2007b) identify three 'formative periods' in the past century: World War II, the mid-1970s and the mid-/late-1980s. The authors also note that the regime switches found for the top 1 percent (P99-100) are often different from those found for the next 9 percent (P90–99); suggesting some heterogeneity in the experiences of top income groups.

Across countries, the differential impact of world wars can be observed. The highest concentration of top income shares in the sample may be observed in 1916, when the top 1 percent in Sweden held 28 percent of the national income, and the top 10 percent in the Netherlands held 53 percent of national income. But in all European countries, a large drop in top income shares can be observed during both World War I and World War II. Below, I discuss some of the channels through which wars affected top incomes.

# Fig 1: Income Share of Richest 10% in Anglo-Saxon Countries



Australia    Canada
Ireland    New Zealand
UK    US
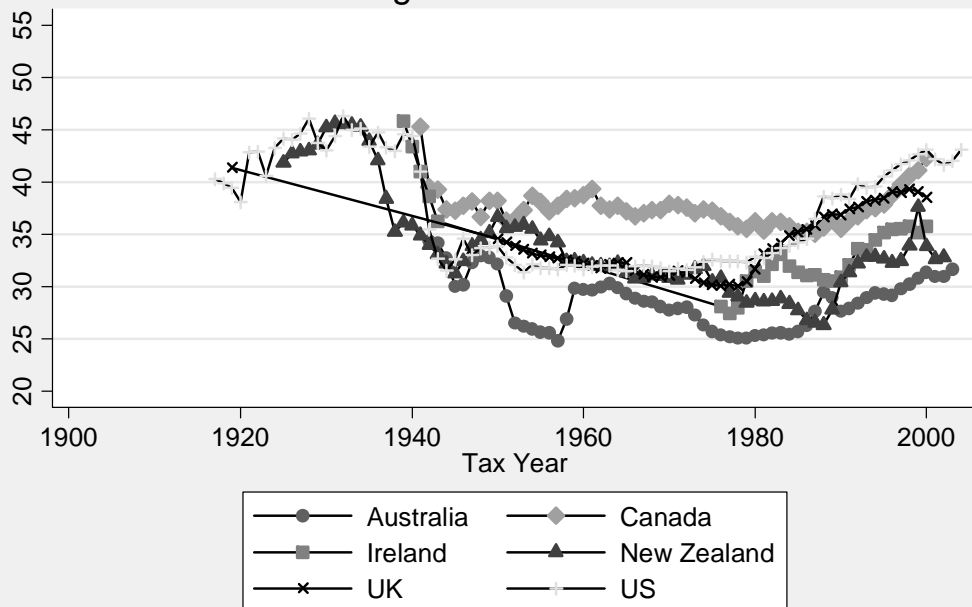
# Fig 2: Income Share of Richest 10% in Non Anglo-Saxon Countries



France    Germany
Netherlands    Spain
Sweden    Switzerland
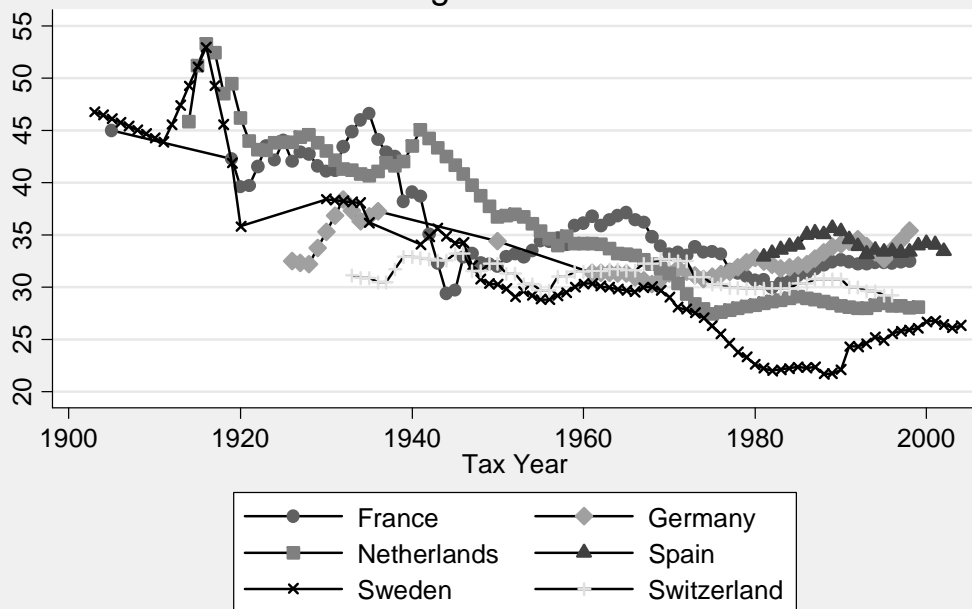
Fig 3: Income Share of Richest 1%
in Anglo-Saxon Countries

| | Australia | | Canada |
| --- | --- | --- | --- |
| | Ireland | | New Zealand |
| | UK | | US |
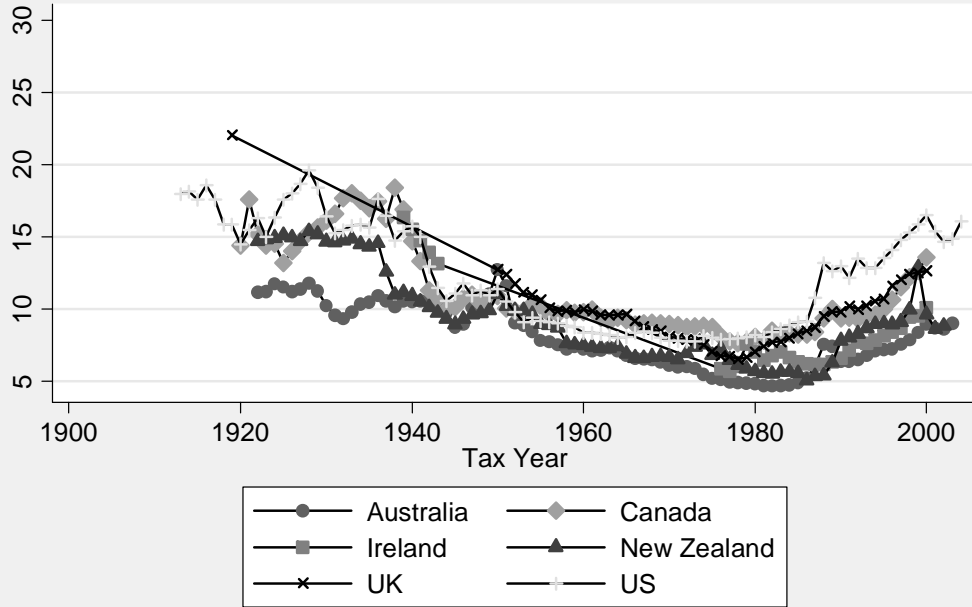


Fig 4: Income Share of Richest 1%
in Non Anglo-Saxon Countries

| | France | | Germany |
| --- | --- | --- | --- |
| | Japan | | Netherlands |
| | Spain | | Sweden |
| | Switzerland | | |
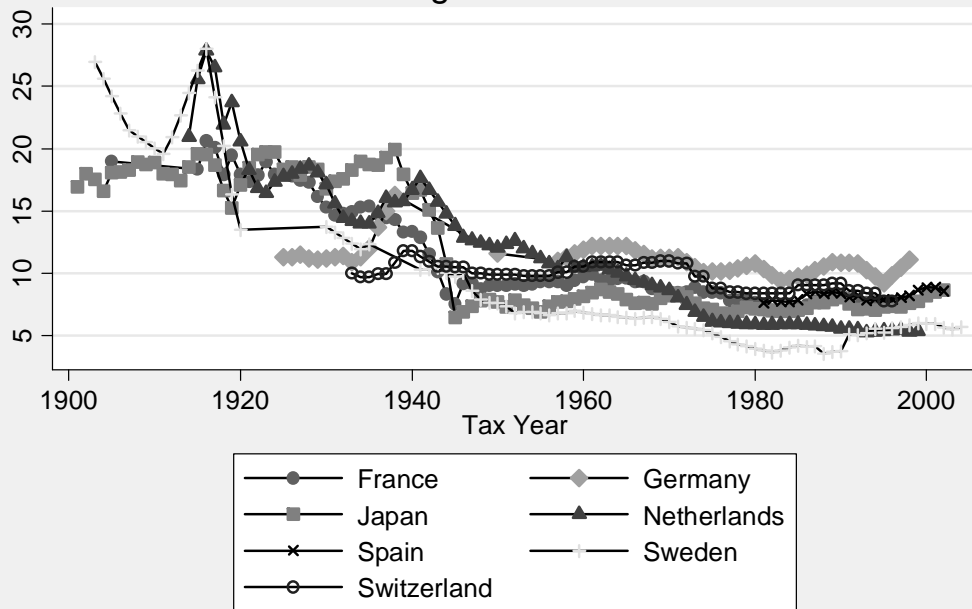
Another important trend has been the rising share of wage incomes in many countries over time. For example, Atkinson and Leigh (2007b) discuss the share of top 1 percent income that comes from wages in Australia, Canada, the United Kingdom and the United States. In each of these countries, the series start with the top percentile group drawing a minority of their income from wages, and end around 2000 with the top percentile group in all four countries drawing a majority of their income from wages. In Chapter 5, Andrew Glyn points out that in the United States, the rising share of wage income among the top 1 percent has coincided with a steady decline in labor's share of national income.

## 4. Comparison With Other Inequality Measures

Are top incomes a useful measure of inequality? As the introduction to this chapter noted, there may be instances in which researchers are particularly concerned with the top of the distribution. For this purpose, series derived from taxation data are most likely preferable to survey data, since surveys are known to under-sample high earners (Moore, Stinson and Welniak 2000), and because taxation data allow one to study the income share of very small groups (e.g. the top $1/10,000^{th}$ of the distribution) which would be represented by only a handful of individuals in a typical survey.

However, for many purposes, researchers may use top income shares as a *proxy* for inequality across the distribution, providing insights into the distribution of income for countries and years about which we do not have reliable data on the distribution of incomes. One way to judge how well top incomes shares can serve this purpose is to turn to theory, and see how well top incomes measures satisfy the standard axioms of inequality. Another approach is to answer the question empirically, by observing how closely top income shares track other measures of inequality.

Cowell (1995) sets out five desirable properties ('axioms') of inequality measures. Income scale independence requires that the inequality measure be unaffected by proportional changes in income (e.g. expressing income in pence rather than pounds should not change inequality). The principle of population requires that the inequality measure be unaffected by replications of the population (e.g. merging two identical distributions should not change inequality). Anonymity

requires that the inequality measure be unaffected by characteristics apart from income. The Pigou-Dalton transfer principle requires that an income transfer from a richer person to a poorer person should decrease (or at least not increase) inequality. And decomposability requires that a rise in inequality among some sub-group of the population should increase overall inequality.

Top income shares satisfy the first three of these axioms: income scale independence, principle of population, and anonymity. However, top income shares only weakly satisfy the Pigou-Dalton transfer principle: a transfer from rich to poor will never increase the top income shares, but if the transfer is between two individuals who are both within the top group or both outside the top group, then the share measure will remain unchanged. Top income shares are also not decomposable into within-group inequality and between-group inequality.

Another theoretical issue is that top income shares are based on pre-tax incomes, and are not adjusted for household size. To the extent that household size or the redistributive effect of taxation differs across countries and over time, top income shares may be a poor proxy for the differences in true economic resources across a given society.

Since theory is somewhat ambiguous on the usefulness of top income shares, it is therefore useful to see the empirical correlation between top incomes and other measures of inequality, over a period where both are available. Using data from the World Income Inequality Database (WIID) and the Luxembourg Income Study (LIS), Leigh (2007) shows that top income shares are strongly correlated with estimates of the Gini coefficient, in both pooled OLS specifications, and with country and year fixed effects.[15] Using various inequality measures available in the LIS (all of which are based on post-tax, size-equivalized household incomes), the gini, Atkinson index, and the 90/50 ratio are each positively and significantly associated with the share of the top 10 percent. This remains true when country and year fixed effects are included in the regression.
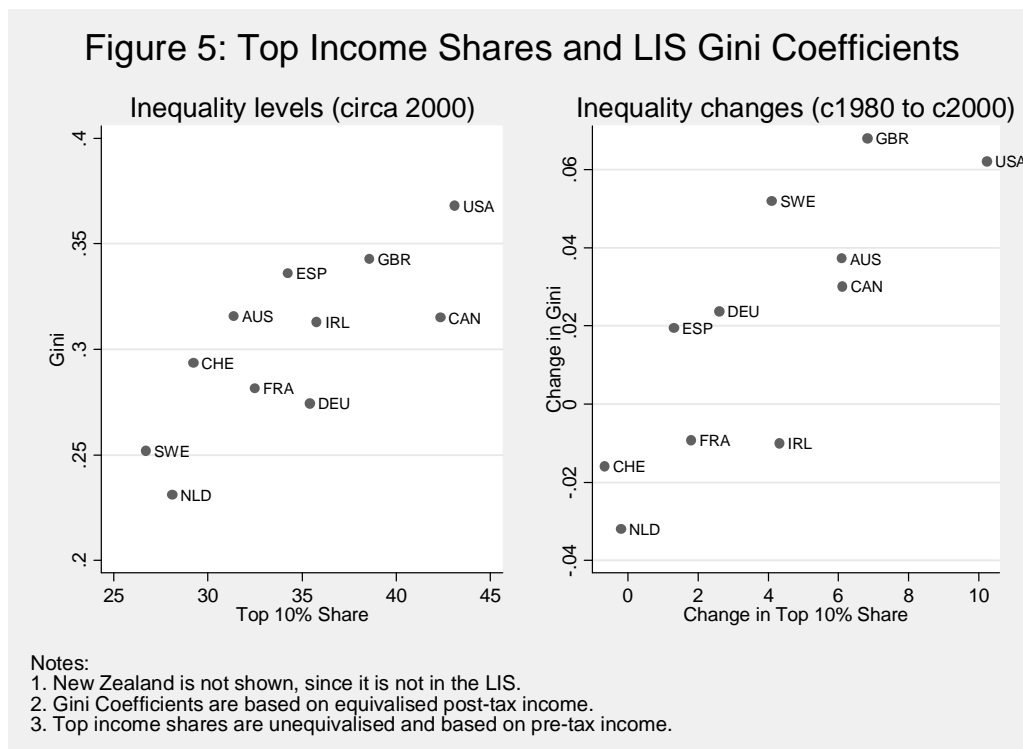
To see this pattern visually, Figure 5 plots the relationship between a country's LIS Gini coefficient and the income share of the top 10 percent (at around 2000); and the relationship

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[15] On the limitations of the Deininger and Squire database and the WIID, see Atkinson and Brandolini (2001).

between the *change* in the Gini and the *change* in the top 10 percent share (from about 1980 to about 2000). Both levels and changes are strongly correlated with one another, suggesting that the same factors which affect inequality at the top of the distribution also affect the Gini coefficient.[16]

## Figure 5: Top Income Shares and LIS Gini Coefficients



Notes:
1. New Zealand is not shown, since it is not in the LIS.
2. Gini Coefficients are based on equivalised post-tax income.
3. Top income shares are unequivalised and based on pre-tax income.

This close correspondence between top incomes and relative poverty reflects the fact that, from a theoretical standpoint, many of the hypotheses about inequality have the same predictions for inequality at the top of the distribution as for inequality at the bottom of the distribution. Theories about causes of inequality that have similar predictions for both ends of the distribution include trade, immigration, union membership, skill-biased technological change, and assortative mating. Similarly, theories about effects of inequality that have similar predictions for both ends of the distribution include growth, saving, and public expenditure. This suggests that for periods where other inequality measures are unavailable, top income shares may help fill in the gaps.

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[16] Indeed, one can see the same pattern even within the LIS. The correlation between the 90/50 ratio and the 50/10 ratio is 0.9, indicating that when the 90th percentile is further above the median, the 10th percentile also tends to be further below the median.

**5. Factors Affecting Top Income Shares**

What have been the chief drivers of changes in top income shares? In their discussion of United States top income shares, Piketty and Saez (2003) argue that top capital incomes were reduced by several major events, including the Depression, the two World Wars, and periods of high inflation. In the case of top labor incomes, they argue that social norms mattered, via their effect on executive compensation, which rose rapidly during the 1980s and 1990s. For both capital and labor incomes, Piketty and Saez argue that top tax rates played an important role, with high taxes on capital lowering the rate of capital accumulation, and high taxes on labor income reducing work incentives.

One possible explanation for the fact that top incomes in Anglo-Saxon countries rose more rapidly in the 1980s and 1990s than in Continental Europe and Japan is that the international market for English-speaking 'superstars' grew more globalised during this period. For example, in the 1970s, a top Australian CEO might have benchmarked his wage against other Australian CEOs. By the early-2000s, such a CEO would have more likely asked his remuneration committee to benchmark his salary against CEOs in Canada, the United Kingdom and the United States.

One piece of evidence in favor of this theory is presented by Saez and Veall (2005), who separate top wage shares for the Canadian province of Quebec into English-speakers and French-speakers. Over the period 1982-2000, they find that those in the top 1 percent who spoke English doubled their income share from 7 to 14 percent; while the income share of the French-speaking rich rose from 4.5 to 6.5 percent. This is consistent with the English-speaking rich in Canada having a more powerful 'brain drain threat' than their French-speaking countryfolk.

Another strategy is that pursued by Kaplan and Rauh (2007), who match the tax-derived estimates of Piketty and Saez (2003) on the share of the top 0.1 percent with publicly available information on the earnings of financial and non-financial executives, lawyers, professional athletes, and celebrities. They observe a larger rise in the incomes of financial executives than

non-financial executives. Kaplan and Rauh conclude that this evidence is most consistent with theories of superstars, skill biased technological change, and greater scale (though since the publicly available data only allows them to account for between one-sixth and one-quarter of the individuals in the top 0.1 percent, these conclusions must be regarded as merely suggestive).

Several studies have estimated the relationship between marginal tax rates and top income shares. These include Saez (2004) for the United States; Saez and Veall (2005) for Canada; Moriguchi and Saez (2007) for Japan; Roine and Waldenström (2008) for Sweden; and Atkinson and Leigh (2007b) for five Anglo-Saxon countries (Australia, Canada, New Zealand, the United Kingdom and the United States). Not surprisingly, the methodology used in these studies differs somewhat, but three general conclusions can be drawn about the relationship between marginal tax rates and pre-tax top income shares. First, tax rates seem to be an important determinant of top income shares across a range of developed countries. In Anglo-Saxon countries, Atkinson and Leigh (2007b) conclude that cuts in top tax rates can explain one-third to one-half of the rise in top income shares since 1970. Second, taxes appear to affect top income shares through two channels: an immediate work disincentive effect, and a lagged effect via capital accumulation. Third, the further one goes up the distribution, the more responsive top income groups appear to be to tax rates. For example, top tax rates are a more powerful explanator of the top 1 percent share than the next 9 percent share.

While models that take account only of personal income taxes have the advantage of parsimony, they may not fully capture the changing tax burden on high-income individuals. For example, Piketty and Saez (2007) show that in the United States in 2004, the average total federal tax rate for taxpayers in the top 1 percent was around 32 percent. Yet only two-thirds of this was individual income taxes, with the rest being payroll taxes, corporate taxes, estate, gift and wealth taxes. Another problem is the fact that income taxes as a share of the tax burden has not held steady over time, nor is it constant across countries. For example, individual income taxes constituted half of all federal taxes for the top 1 percent of United States taxpayers in 1960. In the most recent year, individual income taxes comprised only about one third of total taxes for the top 1 percent of French taxpayers; but three-quarters of the total tax burden for the United

Kingdom top 1 percent. Developing more precise estimates of the taxes faced by the very rich should facilitate better modeling of the effect of taxes on their behavior.

Interestingly, while taxes appear to have a large effect on top income shares, there is much less evidence that some of the other political explanations for changes in inequality can successfully explain variation in top incomes (for a more detailed discussion of politics and inequality, see Chapter 26). Scheve and Stasavage (2007) combine data on top income shares for 13 advanced democracies with measures of government partisanship (an indicator variable denoting whether the country had a Prime Minister and/or President from a left party in a given year), centralized wage bargaining (i.e. at the national level), decentralized wage bargaining (i.e. at the firm level), and union density. They find no evidence that partisanship or centralized wage bargaining are significant drivers of top income shares; a surprising finding in the case of centralized wage bargaining, given that a large political science literature has argued that it is a significant driver of earnings inequality. Scheve and Stasavage also find that decentralized wage bargaining and higher union density both affect top income shares in the expected direction, but the magnitude of the effects suggest that these factors can explain only a small share of the variation in top income shares over the twentieth century.

To illustrate this, Table 1 shows changes in top income shares under left-wing and right-wing governments in 13 countries. Since top incomes in the first half of the twentieth century were largely driven by the world wars, I focus on the period from 1960 onwards. Across these countries, no systematic pattern emerges. In the nine countries that had both left-wing and right-wing governments over this period, the increase in the top 10 percent share was larger under left-wing governments in five countries, and larger under right-wing governments in four countries. Similarly, the increase in the top 1 percent share was larger under left-wing governments in four countries, and larger under right-wing governments in five countries. For Ireland, New Zealand, the United Kingdom and the United States, the partisan difference is in the expected direction for both inequality measures, but even in these cases it is not statistically significant.

| Country | ΔTop 10% Share | | | | ΔTop 1% Share | | | | Total years | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Right-wing govt | Left-wing govt | Diff (R-L) | P-value on diff | Right-wing govt | Left-wing govt | Diff (R-L) | P-value on diff | Right-wing govt | Left-wing govt |
| Australia | 0.70 | 1.26 | -0.56 | 0.88 | 0.00 | 1.74 | -1.74 | 0.97 | 27 | 16 |
| Canada | -1.02 | 4.58 | -5.60 | 0.53 | -0.44 | 4.23 | -4.67 | 0.43 | 29 | 11 |
| France | -3.83 | 0.22 | -4.05 | 0.46 | -1.38 | -0.61 | -0.77 | 0.31 | 24 | 14 |
| Germany | | 4.00 | | | | -1.10 | | | 0 | 37 |
| Ireland | 4.95 | 3.38 | 1.57 | 0.66 | 2.48 | 1.92 | 0.55 | 0.51 | 21 | 19 |
| Japan | | | | | 0.48 | | | | 42 | 0 |
| Netherlands | -3.28 | -2.80 | -0.48 | - | -1.78 | -3.32 | 1.54 | - | 5 | 34 |
| New Zealand | 3.91 | -3.35 | 7.26 | 0.88 | 3.32 | -1.97 | 5.29 | 0.94 | 30 | 12 |
| Spain | | 0.52 | | | | 0.98 | | | 0 | 21 |
| Sweden | -2.58 | -1.43 | -1.15 | 0.53 | -0.81 | -0.30 | -0.51 | 0.75 | 9 | 35 |
| Switzerland | | -2.25 | | | | -2.78 | | | 0 | 36 |
| United Kingdom | 7.95 | -1.60 | 9.56 | 0.88 | 4.46 | -1.78 | 6.23 | 0.81 | 26 | 14 |
| United States | 7.39 | 4.06 | 3.33 | 0.68 | 4.43 | 3.29 | 1.14 | 0.79 | 24 | 20 |
| **Mean** | **1.58** | **0.55** | **1.06** | **0.45** | **1.08** | **0.03** | **0.81** | **0.79** | **18.23** | **20.69** |

**Table 1: Top Income Shares and Partisanship Since 1960**

Note: Top income shares from Leigh (2007) and partisan coding from Armingeon (2006). The party coding refers to whether right-wing or left-wing parties hold the largest share of cabinet posts. For simplicity, we include centre parties with left-wing parties. The mean difference refers to the mean of the column (i.e. the mean difference for countries that have data on changes in top income shares under both right-wing and left-wing parties). The p-value is from a t-test of equality between right-wing and left-wing governments, with each run of right-wing or left-wing governments treated as a separate observation (e.g. in the United Kingdom case, the period of Conservative rule from 1979-1997 would be treated as a single observation for the purpose of this t-test). For the Netherlands, there is only one run of right-wing governments during this period, so the p-value cannot be estimated. In the last row, the p-value is from a t-test that combines data from all countries.

In a wide-ranging analysis of factors correlated with top income shares in 16 developed and developing countries, Roine, Vlachos and Waldenström (2007a) analyze relationship between top income shares and financial market capitalization, stock market capitalization, trade openness, government expenditure, growth, population and income taxes. To account for the possibility that the control totals may differ systematically across countries, they focus primarily on the share of the top 1 percent within the top 10 percent, a figure that is unaffected by each country's population and personal income control totals. They find that higher growth, lower income taxes, financial development, and international trade (for the Anglo-Saxon countries only) are associated with higher top income shares. As they point out, since their analysis is based on contemporaneous changes, it is difficult in some cases to know whether their macroeconomic variables are causes or consequences of changes in top income shares.

## 6. Effects of Changing Top Income Shares

Until now, this chapter has focused on explaining changes in top income shares. But might fluctuations in the income share of the super-rich itself affect other outcomes? And given that top income shares track other inequality measures (such as the Gini coefficient), might it be possible to use top incomes series to look at some of the 'inequality and' questions?

Using top income shares from a panel of developed countries, in a specification with country-specific and time-specific fixed effects, three studies address different possible consequences of inequality. I briefly outline each in turn.

Testing the hypothesis of a negative relationship between inequality and health, Leigh and Jencks (2007) regress four different mortality measures – life expectancy, infant mortality, homicide and suicide – on the income share of the top 10 percent. In each case, they find no evidence of a significant negative relationship between health and inequality, with standard errors sufficiently tight as to rule out economically large negative effects.

This finding is consistent with much of the empirical literature in this field (see Chapter 16).

Estimating the relationship between inequality and savings, Leigh and Posso (2007) find no consistent evidence that lagged top income shares (measured as either the top 10 percent share or the top 1 percent share) have any significant impact on future savings rates. This remains true even holding constant per-capita incomes and interest rates.

As Piketty and Saez (2006a) note, top incomes data provide an opportunity to 'renew the analysis of the interplay between inequality and growth' (this issue is discussed in more detail in Chapter 22). In a panel of 12 developed countries, Andrews, Jencks and Leigh (2007) find no systematic relationship over the period 1920-1999. However, in the years 1960-1999, they find that top income inequality appears to be positively correlated with faster economic growth, a relationship that is robust to the inclusion of country and period fixed effects, and controls for educational attainment, investment, and even tax rates. The effect of top income shares on growth is quite large: a 10 point increase in the top 10 per cent share (equivalent to the increase in inequality the United States between 1980 and 2000) is associated with a 1 percentage point increase in the annual rate of per-capita economic growth.

Naturally, the issue of reverse causality looms large in such analyses. In the case of top incomes and health, the authors address the issue by saying that since they do not find any negative relationship between within-country changes in inequality and within-country changes in health, they do not pursue further the direction of causality. In the case of top incomes and savings, and top incomes and growth, the authors use lagged specifications, regressing current macroeconomic variables on past top income shares. An alternative would be to use two-stage least squares, instrumenting changes in top income shares with some exogenous variable. However, for most outcomes, it is difficult to imagine an instrument that would satisfy the exclusion restriction.

## 7. Conclusions and Future Directions

The careful creation of top incomes series over recent years provides a window into the long-run distribution of incomes in an (increasing) number of nations. But using these data as a long panel requires careful attention to the various differences between them. This paper discusses those various differences, and considers what adjustments might be made to account for them. For recent decades, the adjusted series show a strong correlation with other measures of inequality, such as the Gini coefficient. This remains true even if one looks at within-country changes in inequality. This suggests that where other data sources on inequality are limited, they may help to fill in some of the gaps.

Future research in this area will doubtless involve estimating top income shares for other countries. The path to creating top incomes series is now becoming well-worn, and the methodological differences catalogued above should help researchers decide whether they wish to – for example – use a population control total of 15+ or 20+; include and exclude capital gains; and so on. While the current series have focused on advanced democracies, there are several Southern European nations for which top income shares have yet to be estimated. In addition, it is natural to ask whether the taxation data for any Eastern European countries are appropriate for estimating top income shares. In the case of developing countries, the estimates may involve combining three sources: taxation data for the colonial eras, colonial data for the modern eras, and survey data.

In the countries for which we already have top incomes estimates, a variety of intriguing questions remain. The age and gender composition of top incomes has been analysed for the United States (Kopczuk, Saez and Song 2007) and Canada (Finnie and Irvine 2006)– but not, so far as I am aware – for other nations. The results of Kaplan and Rauh (2007) also suggest that occupational breakdowns may provide insights.[17] And understanding the

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[17] A closely related literature looks at the composition of national 'rich lists', and specifically at the question of whether the super-rich tended to have made their fortunes in industries that were uncompetitive at the time. See Siegfried and Roberts (1991); Blitz and Siegfried (1992); Siegfried and Round (1994); Hazledine and Siegfried (1997).

returns to education at the very top of the distribution would also be potentially instructive.

Another question is whether changes in top incomes represent differences in transitory or permanent income. With few exceptions (e.g. Switzerland, nineteenth century Japan), tax authorities require taxpayers to file returns on an annual basis, so most of the data presented in this chapter is based on the distribution of single-year incomes. One way to test the sensitivity of the results to this approach is to use panel data, which allow the researcher to estimate top income shares based on incomes averaged over a number of years (see e.g. Saez and Veall 2005; Kopczuk, Saez and Song 2007). Another is to estimate top wealth shares, as has been done for several countries (e.g. Kopczuk and Saez 2004 for the United States; Alvaredo and Saez 2006 for Spain; Roine and Waldenström 2007 for Sweden; Dell, Piketty and Saez 2007 for Switzerland). A more detailed discussion of the literature on top wealth shares can be found in Chapter 6. Important work remains to be done on explaining the relationship between top income shares and top wealth shares. Lastly, an interesting line of research concerns intergenerational patterns. Using Canadian data, Finnie and Irvine (2006) find that a majority of individuals in the top 0.1 percent grew up in a top 10 percent household. It would be fascinating to know whether similar patterns hold in other countries.

Another possibility is that top incomes series may be created using sub-national data. In a few specific cases, this has already been done. In the case of Canada, Saez and Veall (2005) estimate top income shares for the province of Quebec in order to see whether speaking English had an impact on top income shares. In their study of Australia, Atkinson and Leigh (2007) estimate top income shares for the state of Victoria for a period before taxation data were tabulated at a federal level. Unlike survey analysis, which is often imprecise at a state level, top incomes data are based on the universe of taxpayers, and should therefore be accurate even in small states or regions.

Datasets of sub-national top income shares may help answer many of the questions that have interested researchers. For example, comparing across states in the United States, it

might be reasonable to think that more of the unobservables were held constant than when comparing across countries. There are drawbacks in such an approach (interstate migration is more common than international migration), but better data on sub-national top incomes would be valuable nonetheless.

Finally, we may hope to see more work on the causes and consequences of changes in top income shares. Among the plausible drivers of inequality, it would be interesting to see whether variables such as immigration, inflation, product market competition, social norms, or the demographic structure of the labor force have significant effects on top income shares. As to the consequences of inequality, top incomes data are particularly well-suited to analyzing elite-driven outcomes, such as campaign contributions or industrial innovation. However, it may also be worth considering how top incomes affect factors such as trust, happiness, average working hours, residential segregation, and political polarization.

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