

Measuring top incomes using tax record data: a cautionary tale from Australia

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Received: 26 November 2013 / Accepted: 9 June 2014 / Published online: 25 June 2014
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Abstract Atkinson et al. (*J. Econ. Lit.* 49(1):3–71, 2011) survey an important new literature using income-tax-based data to measure the share of income held by top income groups. But changes in tax legislation that expand the tax base to include income sources (e.g. capital gains, dividends, etc.) disproportionately held by these groups will conflate such an expansion with an increase in the share of income they hold. We provide a cautionary tale from Australia of how comprehensive tax reform legislation in 1985 substantially altered Australian top income series, especially those that do not separate taxable realized capital gains from other taxable income. Drawing on the Household, Income and Labour Dynamics in Australia (HILDA) Survey we then estimate the size and distribution (across income groups) of taxable realized capital gains in 2006 and 2009, and compare these results with those using accrued capital gains, finding substantially different distributions. More importantly, we find substantial differences across our measures in how capital gains changed between 2006 and 2009. Our results suggest that yearly taxable realized capital gains, often included in studies of top incomes, might be a poor proxy for the theoretically more appropriate yearly accrued capital gains.

Keywords Income inequality · Personal income · Tax-based data · Top incomes

JEL Classifications (2010) D3 · H2

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1 Introduction

A major new literature using personal income tax data now measures the share of income captured by the top part of the income distribution. Atkinson et al. [10] survey the methodology, main findings, and perspectives emerging from the collective research projects at its core. What makes these projects especially valuable to researchers interested in trends in the level and distribution of income of a country or in making cross-national comparisons of such outcomes is that data from all 28 country studies are updated each year and put on a Paris School of Economics website [4].

These studies are valuable in tracing the share of taxable income going to the top end of the income distribution beginning early in the 20th century. Despite their great potential, especially in capturing long trends in top income growth, these data have limitations. Atkinson et al. ([10], p. 5) warn that “Even within a country, there are breaks in comparability that arise because of changes in tax legislation affecting the definition of income... and perhaps most important, our series might be biased because of tax avoidance and tax evasion.”

That is, because top income studies only capture income in the personal income tax base (i.e. taxable income), changes in tax legislation that increase this base may lead them to conflate an increase in the sources of income captured in the tax base with an increase in all income. When these sources are disproportionately held by top income groups—e.g. dividends, capital gains, etc.—tax-based studies may overstate the rise in the share held by top income groups.¹ Here we provide a cautionary tale from Australia of how comprehensive tax reform legislation in the 1980s substantially altered Australian top income series values and their comparability with earlier years, especially in series like Atkinson and Leigh [8] that do not separate taxable realized capital gains from other taxable income.

We replicate the [8] top income series and Leigh’s updates of it. We add to their work by disentangling taxable realized capital gains from all other taxable income. We find that a substantial portion of the long-term growth in the Atkinson and Leigh series after 1989 is the result of Australia, for the first time, taxing longer-term realized capital gains (capital gains on property held for more than one year)—but only on property purchased after 19 September 1985—and hence gradually increasing the share of the capital stock subject to capital gains taxed at sale.

We also address an inconsistency in the tax tables over the period we examine relating to the treatment of dividend income, and find that a substantial portion of the major short-term spike in top incomes for tax years 1987 and 1988 is the result of a fundamental change in the treatment of company profits and dividends that more fully captures them in the personal income tax base.²

¹Symmetrically, a reduction in the tax base will have the opposite effect. For instance, Morelli et al. [20] and Roine and Waldenstrom [27] both reference the ending of taxation on certain sources of capital income in some countries as an example of this possibility. The former study also references the ending of the taxation of the imputed rental value of one’s residence in France reported by Piketty [21] as another example, although Roine and Waldenstrom [27] report counter-examples for the U.K. and Sweden.

²Our findings for Australia in this regard parallel those found in Norway by Fjærli and Aaberge [17] and Aaberge et al. [1], who argue that both the decline in inequality attributable to capital income in 1992 and 1993 and its sharp increase in 1994 are the result of major tax reforms, announced in 1992 and implemented in 1993, that lowered the tax on dividends relative to capital gains. Another example is the rarely controlled-for tax law change for those using the top income series excluding capital gains created for the U.S. by Piketty and Saez [22]. See Feenbergs and Poterba [16] and Slemrod [28] for empirical analyses of the importance of the Reagan Era Tax Reform Act of 1986, which reduced the highest marginal tax rate on personal income below the corporate tax rate and hence distorted subsequent changes in top incomes series that excluded capital gains.

We argue that our adjusted series is not only a more consistent way of measuring levels and trends in top income groups in Australia over the period of our analysis, 1970 to 2010, but is also a more appropriate series to use in cross-national comparisons of the vast majority of other country top income series that do not include capital gains in their measure of taxable income. Using this adjusted series we find that not only does the share of income of the top 1 per cent not increase as fast or fluctuate as much over time, but the timing of the increase is substantially changed, with most of it occurring between 1985 and 2000. Nonetheless, even our more consistently measured top 1 per cent series has increased substantially since 1970, with the top 0.1 per cent and the top 0.1 to 0.5 percentile groups increasing the most, but less so relative to other Anglo-Saxon country series that do not include capital gains.

Finally, we draw on the Household, Income and Labour Dynamics in Australia (HILDA) Survey to make a more general point. Measures of the level and trend in income held by top income groups based on tax record data are affected by the personal income tax base, which differs both across countries at a point in time and within countries over time. Such differences are especially evident in respect of the treatment of capital gains. For example, only five of the 22 country studies, that Atkinson et al. [10] review, provide both a series that includes and a series that excludes capital gains. Of the rest, 12 exclude capital gains in all years and the other five include capital gains in some years but not in others. These latter five countries, of which Australia is one, are potentially subject to the same problems described above.

But perhaps more importantly, all of the series including capital gains only capture taxable realized capital gains. In general, for horizontal equity reasons a tax base should capture income from all sources. But no income tax system does so. When capital gains are taxed, for practical reasons that tax is usually on realized capital gains, and not all sources of realized capital gains are taxed (e.g. owner-occupied homes). Atkinson et al. ([10], p. 34) acknowledge this dilemma for studies using tax record based data: "In all cases, the estimates follow the tax law, rather than a 'preferred' definition of income, such as the Haig-Simons comprehensive definition, which includes such items as imputed rent, fringe employment benefits, or accruing capital gains and losses." (See Roine and Waldenstrom [24] for a discussion of the classical Haig-Simon income principals in the context of the top income literature in Sweden, and Armour et al. ([5]; *in press*) in that context for the United States.) But are taxable realized capital gains a good proxy for the theoretically more appropriate yearly accrued capital gains?

Using HILDA Survey data we first estimate the size and distribution (across income groups) of taxable realized capital gains assuming that all capital gains in Australia in 2006 were on assets purchased after 19 September 1985. We compare these results with those using accrued capital gains on these types of taxable assets as our capital gains measure and then do so, but using accrued capital gains on assets that are not taxable (in particular, owner-occupied homes and superannuation funds) as our measure. We find substantially different distributions across these three measures of capital gains. We also find this pattern of differences when we look at HILDA Survey data for 2009. Most importantly, we also find substantial differences across our measures in how capital gains changed between 2006 and 2009 for top income groups. Given the divergence in levels and trends between taxable realized capital gains and accrued capital gains, it is unclear that including taxable realized capital gains in tax-based measures of top income shares as a proxy for accrued capital gains achieves this aim.

2 A summary of the 1985 tax reforms

A growing concern about the equity of the Australian tax system led to the establishment of the Taxation Review Committee in the early 1970s.³ A major recommendation of this report [7], subsequently taken up in a white paper [12], was to broaden the tax base to improve equity and efficiency. Government Treasurer Paul Keating introduced a proposal for fundamental tax reform based on this white paper on 19 September 1985. His opening statement provides a sense of its magnitude: “Today we are addressing a crisis in our national taxation system... There was a time when Australia had a reasonably sane and credible taxation system. But that time is long gone. The system has been broken and beaten by an avalanche of avoidance, evasion, and minimisation.... It is the deterioration and decay that occurred in the late 1970s and early 1980s that has now made substantial reform so essential” (Keating [19], p. 2).

We focus on the two reforms that most increased the income base on which personal income taxes were collected and hence the part of income captured by tax record data: changes to the taxation of dividends and changes to the taxation of capital gains.

2.1 Dividends

Between 1940 and 1986 Australia maintained a classical company tax system with profits taxed at the company rate and then again at the personal income tax rate when distributed.⁴ The aspects of the Keating proposal on the treatment of company profits and dividends were given Royal Assent in June 1987. As a result the company marginal tax rate increased from 46 % to 49 % for the 1987 tax year. This rate equalled the highest marginal tax rate on personal income. But under the new 100 per cent imputation tax system, these company taxes effectively became withholding taxes, since their payment could be used to offset personal income tax.⁵ Hence this was a major reduction in the effective tax rate on dividends.⁶

Holding aside whether this is good or bad tax policy, this change in tax law had a major and “artificial” impact on measured top income trends. Unless accounted for in the data series, it will result in an overstatement in the growth of top income shares. This is the case because the tax reform increased the personal income tax base—the 100 per cent of profits on which the withholding tax was now levied was larger than the after-company-tax amount of these profits that was paid out in dividends prior to reform.

³Our summary in this section is based on Keating [19], Australian Government [12], and Reinhardt and Steel [23].

⁴Australia first taxed company profits in 1922, but at the same time a non-refundable rebate system applied to all dividends effectively made this a withholding tax for individuals whose marginal tax rate was greater than the company rate. In 1940 this rebate was “temporarily” removed. (See Reinhardt and Steel [23] for additional details.)

⁵It became fully refundable in 2000. Handley and Maheswaran [18] estimate that, between 1990 and 2000, resident individuals and funds were able to utilise 67 % of their tax credits to reduce their tax liabilities. This increased to 81 % between 2001 and 2004.

⁶One reason for the passage of this legislation was to treat company profits the same as trust profits. Australian Government [12] identified shifting from companies and partnerships to public and private trusts in the 1970s and 1980s as a major threat since it was becoming a low-cost legal vehicle for successfully circumventing the classical taxation system.

Because this previously uncounted income predominately went to higher income groups, it artificially increases their share of income relative to the way it was counted prior to 1987.⁷

Conveniently, this additional income is exactly the value of the personal income tax credit, which is identifiable in the more detailed tax tables we use (compared with the tax tables used by Atkinson and Leigh [8]). We are therefore able to subtract this credit from taxable income. By doing so, we are able to generate pre-tax income values that are consistent before and after this change in tax rules.

While the government's decision to move from a classical to a 100 per cent imputation tax system was announced on 19 September 1985, the law was not adopted until June 1987 and its reduction in the marginal tax on dividends only began for dividends received on or after 1 July 1987. We will show this delay had a major short-run effect on top income measures in tax year 1987 and 1988 consistent with behavioural changes in the timing of dividend payments related to the roll-out of this tax reform.⁸

2.2 Capital gains

Prior to 1985, Australia had no general tax on capital gains. Hence, almost no capital gains were captured in tax record data. Beginning in 1972, realized capital gains on most assets were included in the tax base, but only for assets held less than one year, and excluding owner-occupied housing. A tax on "speculative" capital gains existed as far back as the 1920s, but it was not systematically enforced and it generated little revenue. (See Chapter 7 of Australian Government [12] for a fuller discussion.)

This aspect of the Keating proposal on the treatment of capital gains was given Royal Assent in June 1986. It substantially expanded the income base on which taxes were collected by including most realized capital gains, regardless of how long the asset was held. But to soften its effect, the reform applied only to assets purchased after 19 September 1985. Certain types of assets continued to be exempt, most importantly owner-occupied housing.⁹

This change in tax law had a substantial effect on the income that is captured in the personal income tax base. As was the case with dividends, unless accounted for, the pre-tax taxable income measure used in the top income literature will once again conflate an increase in the share of income that is taxable with an actual increase in income. Unlike the effect of the change in the tax law on dividends, this artificial increase in income is not primarily a short-run phenomenon. Rather, it grows over time with the stock of assets purchased after 19 September 1985 and the share of realized capital gains that enter the tax base.

⁷The increase in the tax base is larger to the degree that retained earnings prior to 1986 that were realized by stockholders via non-taxable long-term capital gains were now no longer retained and were instead realized as dividends.

⁸The Australian tax year begins in July and ends in June. We denote each tax year by the first of the two calendar years it spans.

⁹Between 1985 and 1999, an indexation system was applied so that taxes were only paid on inflation-adjusted capital gains. In 1999, the indexation system was replaced with a discount of 50 % on capital gains realized on assets acquired after 19 September 1999.

3 Data and methods

Atkinson and Leigh [8] were the first to estimate the share of income going to top income groups in Australia using tax record data. This seminal study measures levels and trends in top incomes from 1921 to 2003 based on data in the Australian Taxation Statistics component of the Annual Reports of the Commissioner of Taxation combined with Australian Bureau of Statistics (ABS) National Accounts data (as well as a splice of data from other sources prior to 1959 as their control of total income) and ABS population data [2]. Their unit of analysis is the tax unit, which in Australia is the individual. They assume that all persons aged 15 and over are potential tax units, and indeed estimates of top income shares relate only to persons aged 15 years and over. For example, the interpretation of the estimated income share of the top 1 per cent is “the proportion of total income going to the top 1 per cent of individuals aged 15 years and over.”

The key elements of Atkinson and Leigh’s method (described in more detail in the Appendix of Burkhauser et al. [14]) are as follows. The number of individuals in the top x per cent is derived from ABS estimates of the total population aged 15 years and over. The total income of the top x per cent is obtained from tax tables in the Australian Taxation Statistics. This total pre-tax taxable income value is divided by aggregate household income, obtained from National Accounts data [2]. For example, on 30 June 2011, the ABS determined that 18.111 million Australians were aged 15 and over, implying 181,110 were in the top 1 per cent income group. The total income of the top 181,110 people in the tax data in 2010-11 is calculated (\$80.2 billion) and then divided by total household income in 2010-11 obtained from the National Accounts data (\$881.8 billion) to produce the income share of the top 1 per cent (9.1 %). Importantly, capital gains are not included in the Australian National Accounts household income measure.

Here, using Atkinson and Leigh’s methods, we replicate their findings for the period from 1970 to 2003 using Australian Taxation Statistics data and the ABS 2004 National Accounts and population data. Leigh has updated the Atkinson and Leigh top income series each year since then, using various newer releases of these data. We are also able to replicate these values from 2003 to 2010. However, because the National Accounts and population data Leigh uses are preliminary data for the year they are announced, their continued use in subsequent years, without updating them based on subsequent ABS corrections, will introduce unnecessary noise. Furthermore, National Accounts and population data are subject to periodic revisions of concepts, definitions, and methods. Such revisions, when they occur, are typically applied retrospectively, so that using the most recent release for all previous years produces a more consistent total income series. We therefore use the most updated ABS series [2] in our analyses.

Atkinson and Leigh ([8], p. 250, fn. 3) recognise the value of producing a top income series without capital gains, but did not do so. Their reticence to attempt to exclude capital gains is understandable, particularly given their focus on producing a long-run series, since the available tax tables do not provide information on taxable realized capital gains until 1969. However, in the period on which we focus, the more detailed Australian Taxation Statistics tax tables include tabulations of realized capital gains, allowing us to separate taxable realized capital gains from other taxable income over the entire period. Doing so, we provide a measure of pre-tax income that is both of value in its own right and a more consistent measure of income derived from tax data. We also use the more detailed Australian Taxation Statistics tables since 1979 to adjust our series for the 1987 change in tax

laws related to dividends. We do so by subtracting the primary imputation credit going directly to individuals based on the profits associated with their dividends as well as the subsidiary imputation credit provided on the dividends going to trusts and then passed on to individuals.¹⁰

4 Results

4.1 Alternative estimates of the top 1 per cent

Figure 1 provides alternative estimates of the share of income held by the top 1 per cent of Australians for tax years 1970 to 2010.¹¹ We divide the period spanned in Fig. 1 into three parts. The first, 1970 to 1985, are years before the implementation of tax reform. The second, 1986 to 1988, are years these reforms increase the income base and top incomes in the short run. The third, 1989 to 2010, are years these reforms increase the income base and top incomes in the longer term.

Share line (1) replicates the level and trend found in Atkinson and Leigh [8] through to 2003 as well as the updated values reported each year by Leigh. Share line (1) includes taxable realized capital gains in its income base. We replicated these values based on Leigh's programs. Share line (2) is based on ABS data that are consistently updated to 2010 and uses the latest ABS standards as of 2013 for all years.

These first two share lines are somewhat different over much of the 1970 to 2003 period. However, these differences are ones of level, not direction. They primarily reflect a major revision to National Accounts concepts and definitions made by the ABS in 2004 that the ABS—and we, using their revisions—have retrospectively applied to the data for all preceding years. In contrast, Leigh, in adding years, has included this major revision from 2004, but not for earlier years. As a result, share line (1) shows a decline of 0.29 percentage points in the share of income of the top 1 per cent from 2003 to 2004 instead of the increase of 0.41 percentage points we find using our single consistent ABS series in share line (2). Thereafter, the minor differences in these two series are primarily due to our using the 2013

¹⁰The tax tables consist of a number of taxable income ranges or brackets, with the number of individuals and the total value of the relevant variable (income, capital gains or imputation credits) in each bracket. To create our series without capital gains and imputation credits, we create “synthetic” tax tables that, for each taxable income bracket, subtract total capital gains and imputation credits for that bracket from the total income of tax filers in the bracket. Top income shares are then calculated using these synthetic tax tables as per Atkinson and Leigh's [8] method. Note, however, that this method for removing capital gains and imputation credits implicitly assumes that capital gains and imputation credits within an income bracket are the same proportion of total income for all individuals within the bracket. That is, we assume no re-ranking of individuals after removal of capital gains and imputation credits. We test the sensitivity of this assumption using Australian Tax Office unit record data from their “1 per cent individual sample file” which is available for the tax years from 2003 to 2009. Doing so, we show that the effects of re-ranking are relatively small and thus our findings are robust. See Table A10 and the associated discussion in Burkhauser et al. [14], which also contains full details on the methods used to separate realized capital gains and dividend imputation credits from other income.

¹¹In this paper, we focus primarily on results for the top 1 per cent income group. In Burkhauser et al. [14], we present detailed results for other top income groups, ranging from the top 10 per cent to the top 0.01 per cent.

corrections consistently for all years, while Leigh continues to simply add the current year's base ABS numbers.¹²

Share line (2) makes a better case for the view that the share of income controlled by the top 1 per cent consistently increased from 2001 to 2006. It also suggests that the share of income held by the top 1 per cent in Australia is sensitive to international business cycles—2001 was a recession year in the United States and most other major western industrial countries and was followed by five years of economic growth until the start of the Global Financial Crisis in 2007. In all subsequent analyses we will contrast share line (2) with our other series that also use the updated ABS data.

Share line (3) reports the share of income held by the top 1 per cent adjusting for the changes with respect to dividends contained in the 1985 tax proposals. As discussed above, while the change in dividends was announced in September 1985, the movement to a 100 per cent imputed tax system and its subsequent effect on marginal tax rates was only for dividends received at the start of the 1987 tax year. There is a major spike in the top 1 per cent share of income in share lines (1) and (2) in 1987 and in 1988 that we will show is largely related to increases in dividends and in the primary and subsidiary imputation credits associated with the profits linked to them. Share line (3) subtracts the imputation credits from taxable income so that our income measure consistently excludes this component of profits. This substantially reduces the size of the spike. The share of income controlled by the top 1 per cent falls in 1989 in all three series but still is considerably above 1985 levels in each. In subsequent years, share line (3) continues to show a substantial increase in the share of pre-tax income held by the top 1 per cent, but the level is lower.

Share line (4) removes all taxable realized capital gains from the income included in share line (3). These two lines best represent the share of income with and without realized capital gains controlled by the top 1 per cent from 1970 to 2010 based on tax record data. There is almost no difference between share lines (3) and (4) prior to 1986, since realized capital gains only started to be systematically taxed in 1972, and then only on property held less than one year. The vast majority of capital gains did not enter the tax base. This began to change after the implementation of the 1985 tax reforms in 1986. But over the first few years there is little or no difference between these two series, since most realized capital gains were on assets purchased prior to 19 September 1985. But over time, the share of assets purchased after that date grew and with it the income base on which realized capital gains are taxed. Therefore, it is not obvious how much of the difference between these two series is due to increases in realized capital gains and how much is due to increases in the share of realized capital gains now taxable and included in the income base.¹³

4.2 Changes in the portfolio of income of the top 1 per cent

In Fig. 2 we provide evidence that the differences in Fig. 1 between share line (2) and share lines (3) and (4) are the result of the 1985 tax reforms. Figure 2 uses information in the

¹²As discussed in more detail in Burkhauser et al. [14], there are also slight differences between these two lines because we consistently use the more detailed tables in the Australian Tax Office tax series (Commissioner of Taxation 1973–2013 [15]) that allow us to disentangle the various sources of income that are taxed. In contrast, Atkinson and Leigh always use the tax table that has the most income brackets. In many years, these are the same tables. Our use of the more detailed tax tables only accounts for a very small part of the difference between these two lines.

¹³When we repeated our analysis as shown in Fig. 1 for subcomponents of the top 1 per cent income group, we found the same pattern of differences between each of our share lines. (See: Burkhauser et al. [14]).

more detailed tables in the Australian Taxation Statistics series (Commissioner of Taxation 1973-2013 [15]) that allow us to disentangle the various sources of income that are taxed. We do so for share line (2) to show how the types of income held by those in the top 1 per cent group change over the period from 1979 to 2010.¹⁴

As discussed above, an effective reduction in the tax on dividends was announced in 1985, but only for dividends received after the start of the 1987 tax year. Note that the share of dividends in the income portfolio of the top 1 per cent over the seven years from 1979 through 1986 rises slightly from 2.2 % to 3.1 % but then increases to 6.0 % in 1987 and 11.8 % in 1988.

But in addition to this increase in dividends, the income of the top 1 per cent now includes the primary imputation credits associated with the profits on which these dividends are based. This income share, which was zero prior to 1987, now makes up 4.5 % of their portfolio in 1987 and 10.8 % in 1988. The dividends paid to partnerships and trusts but distributed as income to individuals now come with a subsidiary imputation credit attached to them. The income the top 1 per cent receives from these credits makes up a total of 1.7 % of their portfolio in 1987 and 4.2 % in 1988.¹⁵ This addition of income from profits that was not counted as personal income prior to 1987 explains the difference between share lines (2) and (3) reported in Fig. 1, in the size of the short-run spike in top incomes in 1987 and 1988.

This pent-up short-run spike in the pay-out of profits to individuals in the form of dividends in Fig. 2 is consistent with firms deferring profits and dividends that would have been paid in tax years 1985 and 1986 after the announcement of the government's tax reform plan but before its effective date. As can also be seen in Fig. 2, in 1989 dividends fall but to a level higher than over the 1979 to 1986 period, reflecting the lower marginal tax rate on dividends. The share of income associated with primary and subsidiary imputation credits also falls from its 1988 height, both because dividends fall and because subsequent tax reforms lowered the tax rate on company profits and hence the difference between dividends and the profits associated with them. For the purposes of measuring top income shares from tax record data, if the tax on profits was zero and all profits were paid out in dividends, then there would be no difference in Fig. 1 share lines (2) and (3).

Table 1 shows the shares of dividends and the tax credits associated with them in the portfolio of the top 1 per cent for 1985 to 1989 based on income series (2)—years just before and just after the short-run spike years. It also shows those values for the subcomponents of this top 1 per cent income group. The share of dividends in the portfolio of the top 0.1 percentile (5.4 %) is higher than in the 0.1 to 0.5 percentile (2.8 %) and in the 0.5 to 1 percentile (2.0 %) in 1985, the year the tax reforms were announced.

The growth in the share of dividends over the spike years from 1986 to 1988 for the 0.1 percentile is also greater, as is the difference between 1985 and 1989. But so is the share of tax credits in their portfolio, which artificially increases the pre-tax measure of income used in the top income literature. In spike year 1988, 48.2 % of the income of the top 0.1 percentile group was in dividends and the tax credits associated with them—more than 10

¹⁴Figure 2 is limited to the period from 1979 to 2010 because specific information on income components other than salary and wages is only available beginning in 1979. Income on dividends did not begin until tax year 1982. In the prior three years we use the broader dividends and interest category and approximate the importance of dividends in those three years.

¹⁵Also included in Fig. 2 is the net income from partnerships and trusts. After declining as a share of income between 1979 and 1982 and then increasing somewhat up to 1986, there is also a spike in this income in 1987 and 1988. This spike reflects the increase in dividends of partnerships and trusts that are paid out to the top 1 per cent, which is the basis for the subsidiary imputation credits these individuals receive.

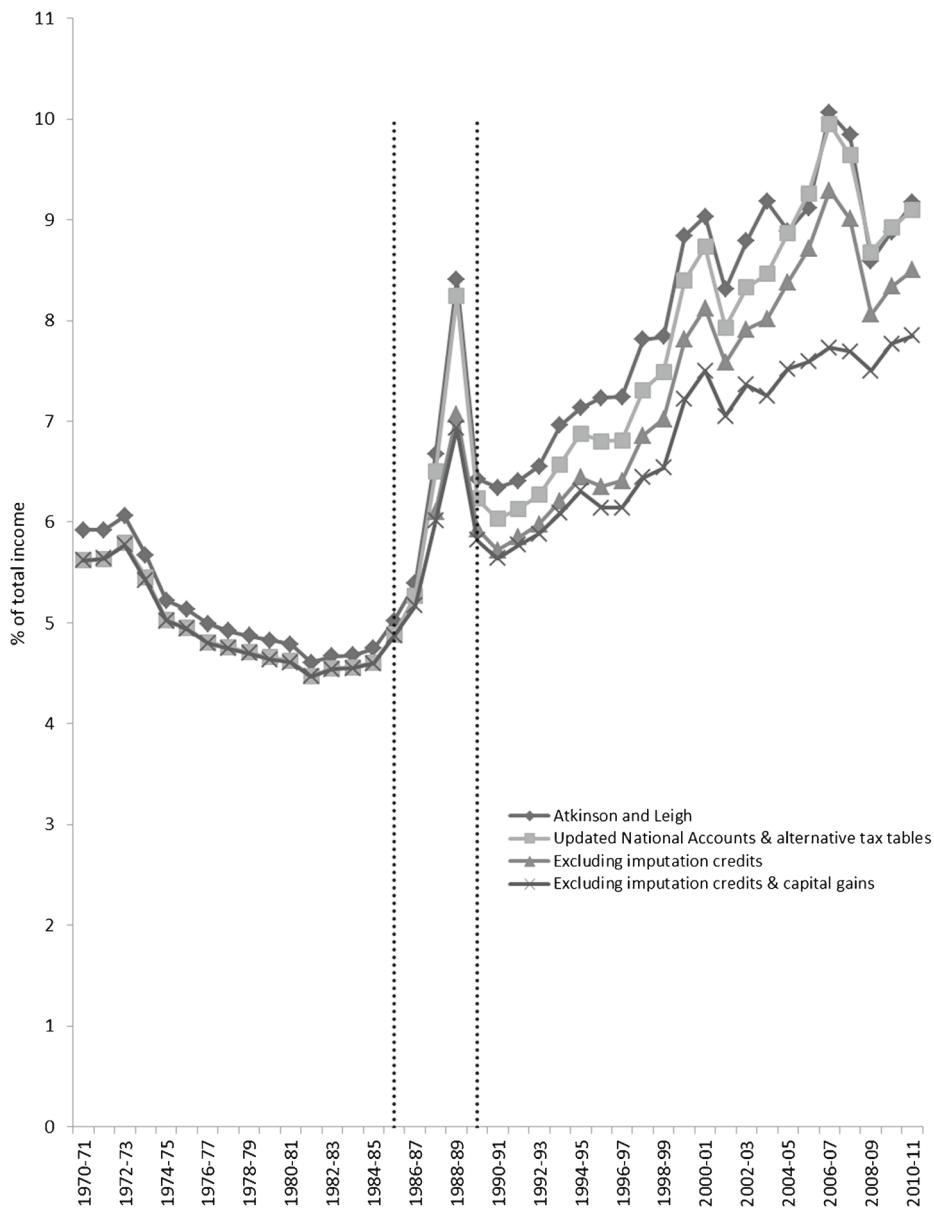


Fig. 1 Alternative estimates of the income share of the top 1 per cent. *Source:* Authors' calculations

times the share of dividends in their portfolio in 1986.¹⁶ But only 20.2 percentage points of this spike were in dividends; the other 27.9 percentage points were in tax credits.

¹⁶Part of the reason for this huge spike is that dividends fell from 5.4 % to 4.5 % of their portfolio between 1985 and 1986, the year after the announcement of the decline in marginal tax rates and the year before they were implemented.

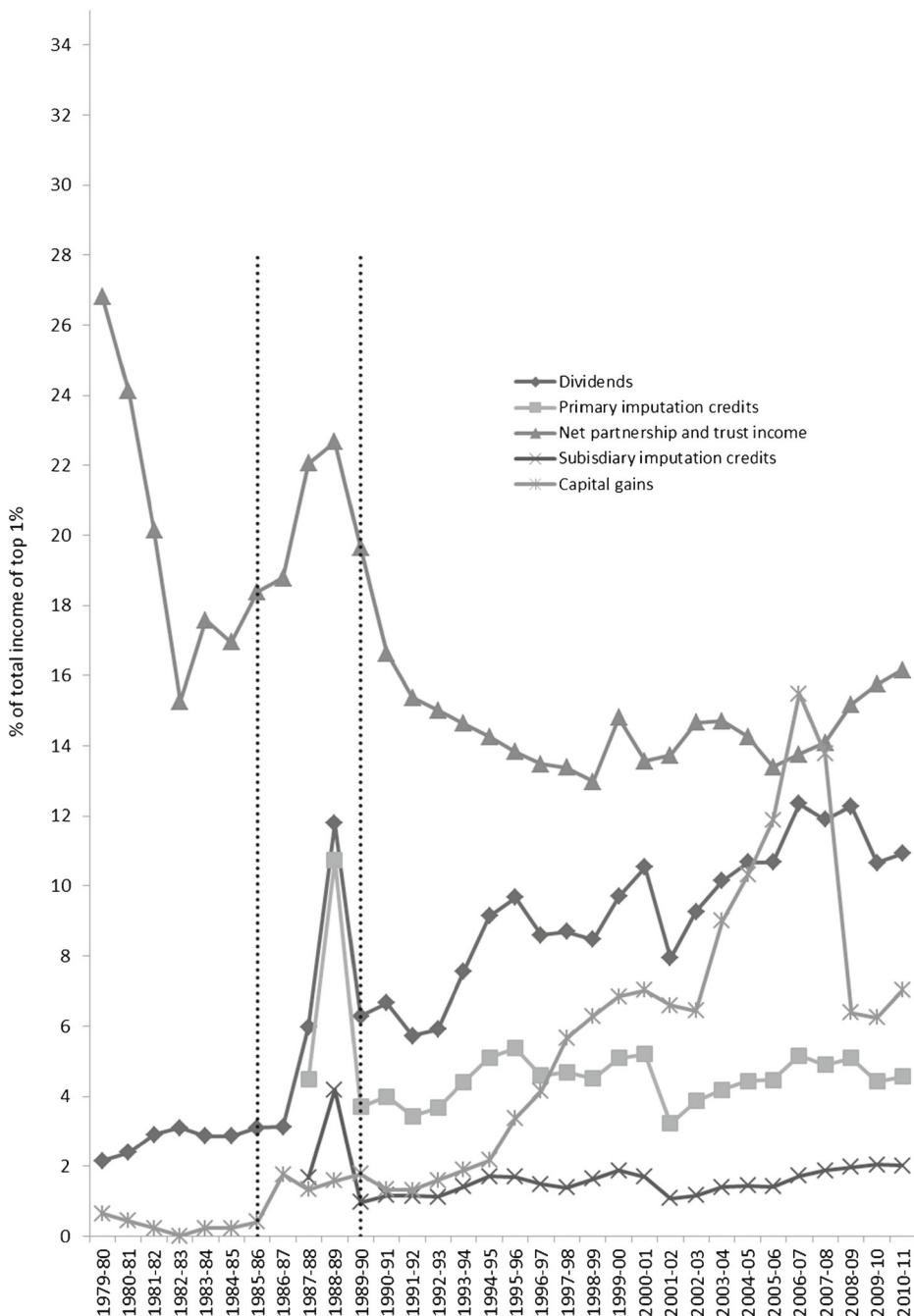


Fig. 2 Share of various sources of income in the portfolio of the top 1 per cent

Table 1 Share of dividends and tax credits in portfolios of top income groups, 1985 to 1989 (%)

	1985–86			1986–87			1987–88			1988–89			1989–90			
	Dividends	Dividends		Primary credits	Subsidiary credits		Total credits	Dividends	Subsidiary credits		Primary credits	Total credits	Dividends	Subsidiary credits		Total credits
		Dividends	Dividends	Primary credits	Subsidiary credits	Total credits			Subsidiary credits	Total credits				Dividends	Subsidiary credits	Total credits
Top 0.1 %	5.4	4.5	10.6	4.9	7.0	22.5	20.2	18.3	9.6	48.2	10.4	6.1	1.7	1.7	1.7	18.3
Top 0.1 %–0.5 %	2.8	3.1	6.0	6.0	0.0	12.1	11.2	10.1	2.5	23.8	6.7	4.0	1.0	1.0	1.0	11.7
Top 0.5 %–1 %	2.0	2.4	2.6	2.0	0.0	4.6	3.3	2.8	0.6	6.7	3.4	1.9	0.5	0.5	0.5	5.8
Top 1 %	3.1	3.1	6.0	4.5	1.7	12.2	11.8	10.8	4.2	26.8	6.3	3.7	1.0	1.0	1.0	11.0

Source: Authors' calculations

Figure 2 also traces the share of taxable realized capital gains in the portfolio of the top 1 per cent. As can be seen, taxable realized capital gains made up a trivial share of the taxable income of this group between 1983 and 1985 (between 0.2 % and 0.4 %) since only capital gains on assets held less than one year entered the taxable income base. This changed in 1986, since assets purchased after 19 September 1985 were taxed in 1986 even if held for more than one year. So unlike dividends that did not increase as a share of the income of the top 1 per cent until 1987, and in the case of the top 0.1 per cent actually fell in 1986, the share of capital gains in the portfolio of the top 1 per cent as measured in the tax base did increase in 1986. But since these potentially taxable assets only made up a small part of the stock of assets and the share of realized capital gains taxed in 1986, the increase was only to 1.8 %. While some of this increase is the result of market forces, it is also because a larger share of their total capital gains were now subject to tax and hence now artificially included in the share series (2) and (3) in Fig. 1.

Figure 2 also shows that the increase in the share of realized capital gains in the portfolio of the top 1 per cent only increased gradually over the next few years. Hence, unlike dividends, it played no role in the spike in the share of income controlled by the top 1 per cent in 1987 or 1988. The reason there is no difference between share lines (3) and (4) in Fig. 1 for those years is that the share of capital gains included in the tax base did not grow much at first.

But Fig. 2 also shows that eventually taxable realized capital gains rose to a high of 15 % in 2006, just before the Global Financial Crisis. The difference between share lines (3) and (4) in Fig. 1 is explained by the growth in the share of capital gains. What is unknown is the degree to which this difference is simply the result of the broadening of income counted in the tax base due to the tax reforms of 1985.

4.3 Effects of adjustments on alternative top income groups

Figure 3 summarises the effects of excluding dividend imputation credits and taxable realized capital gains on alternative top income groups. It shows the percentage difference in the income share of each top income group using an income series including dividend imputation credits and capital gains (share series (2) in Fig. 1 for the top 1 per cent) and one that does not (share series (4) in Fig. 1 for the top 1 per cent). We focus only on 1985 to 2010 since, as discussed above, virtually no difference exists in these series before the 1985 tax reforms. The difference between our adjusted Atkinson and Leigh top income series (including taxable realized capital gains and imputation credits) and our preferred series without them is greatest for the highest top income group, those in the top 0.1 per cent. In spike year 1988, the difference is 40.9 %—all caused by including dividend imputation credits. It falls to 14.2 % in 1989 but builds again as a greater share of capital gains becomes taxable. The peak difference in the two series—54.5 %—occurs in 2006, the tax year before the Global Financial Crisis.

The difference in these two series is greatest for the top 0.1 per cent since they get the most disproportionate amount of imputation credits and realized capital gains entering the tax base after the implementation of the 1985 tax reforms. While the 1988 spike is still observable for the 0.1 to 0.5 and the 0.5 to 1.0 percentile top income groups, it is smaller, as is the spike for the sum of these groups captured in the top 1 per cent.

How much the yearly differences in these two series affect differences in their growth depends on the years chosen. Using Fig. 1 values, series (2) top 1 per cent share growth

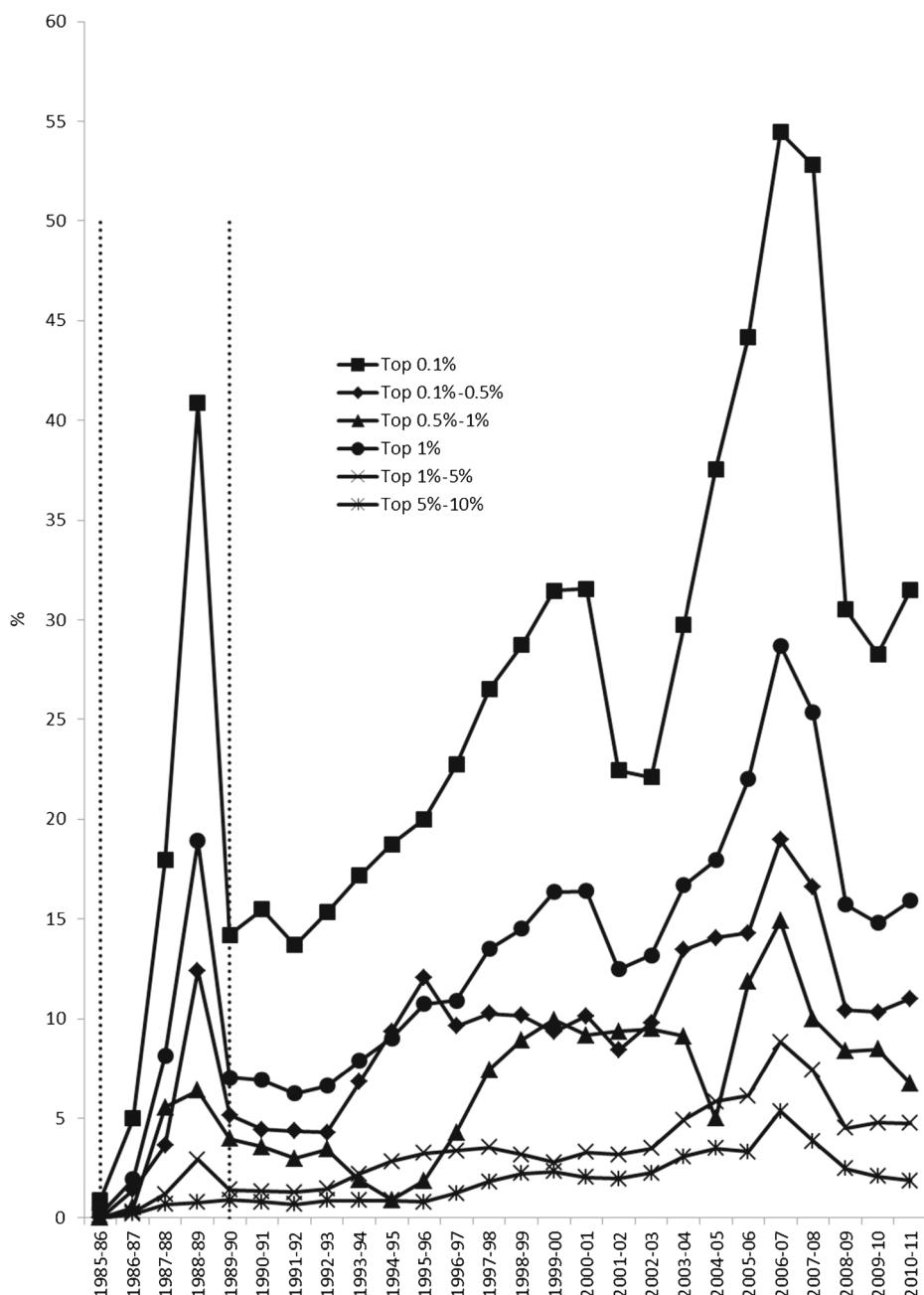


Fig. 3 Percentage increase in income share of top income groups each year resulting from the inclusion of imputation credits and taxable realised capital gains

between 1985 and 2010 is 86.5 % vs. 61.2 % in our preferred series—41.3 % higher. For the top 0.1 per cent, series (2) growth is 56.4 % higher.

4.4 Changes in top income shares using our preferred series

In Fig. 4 we use our preferred top income series measure which excludes taxable realized capital gains and dividend imputation credits (series 4 from Fig. 1) to show how levels and trends in the share of various top income groups have changed between 1970 and 2010.

Focusing first on the second vingtile group (the top 5 to 10 percentile groups), we see a slight decline (2.7 %) in their share of income between 1970 and 2010. There is a slight increase between 1970 and 1985, a small spike in 1986 to 1988, but one that is much less pronounced than for the top 1 per cent and a slight overall decline since, but with some growth after 2008.

When we look at those in the bottom part of the top vingtile group (the top 1 to 5 percentiles), there is a slight increase (5.2 %) in their share of income between 1970 and 2010. There is a slight decline before 1986, a small spike in 1986 to 1988, a return to slightly below their 1970 level in 1989, and modest growth since. They also display some growth after 2008.

We reproduce the share of income held by the top 1 per cent first reported in Fig. 1. Their share of income increased substantially between 1970 and 2010 (39.7 %). There was a clear decrease in their income share between 1970 and 1985, followed by a substantial spike in 1986 to 1988. Their income share in 1989 was noticeably higher than in 1985, returning to approximately their share of income in the early 1970s. It continued to grow until 2000. The recession in most Western industrialised countries in 2001 may explain the drop in their income share in 2001 and its increase over the next six years until the start of the Global Financial Crisis. After falling back to its 2000 level in 2008, it grew over the last two years.

When we subdivide the top 1 per cent, we find that the lower half of this population (those in the 0.5 to 1.0 percentile group) look more like those in the lower 9.5 percentiles of the top decile in their trend. Their share of income increased by 15.0 % from 1970 to 2010. They exhibited a small decline in income share between 1970 and 1985, a spike in income for 1986 to 1988, a return to just slightly below their 1970 level in 1989, and modest growth since. They also exhibit some growth after 2008.

Only the top 0.1 to 0.5 and the top 0.1 percentile groups substantially increased their share of income between 1970 and 2010—by 31.4 % and 98.3 %, respectively. Both groups experienced declines in income shares between 1970 and 1985, a substantial but temporary spike in income share for 1986 to 1988, and a fall in 1989, but to share levels slightly below those in 1970 for the 0.1 to 0.5 percentile group and appreciably higher for the top 0.1 per cent. Both groups experienced substantial increases in their share through to 2000, a drop-off in share in 2001, followed by increases to just over their 2000 levels by the start of the Global Financial Crisis. They have also increased their share since 2008.

Even in our preferred series without realized capital gains there has been a substantial increase in the top 1 percent's income share between 1970 and 2010 (39.7 %). But we also find a wide divergence between the growth of those in the top 0.1 to 0.5 percentile (31.4 %) and especially in the top 0.1 percentile (98.3 %) income groups compared to the bottom half of that percentile group (15.0 %) since 1970, with most of that difference occurring between 1985 and 2000.

5 How should capital gains be treated in top incomes series?

We have argued that major changes in tax laws first announced in 1985 make our top income series excluding taxable realized capital gains the most consistent way to measure levels

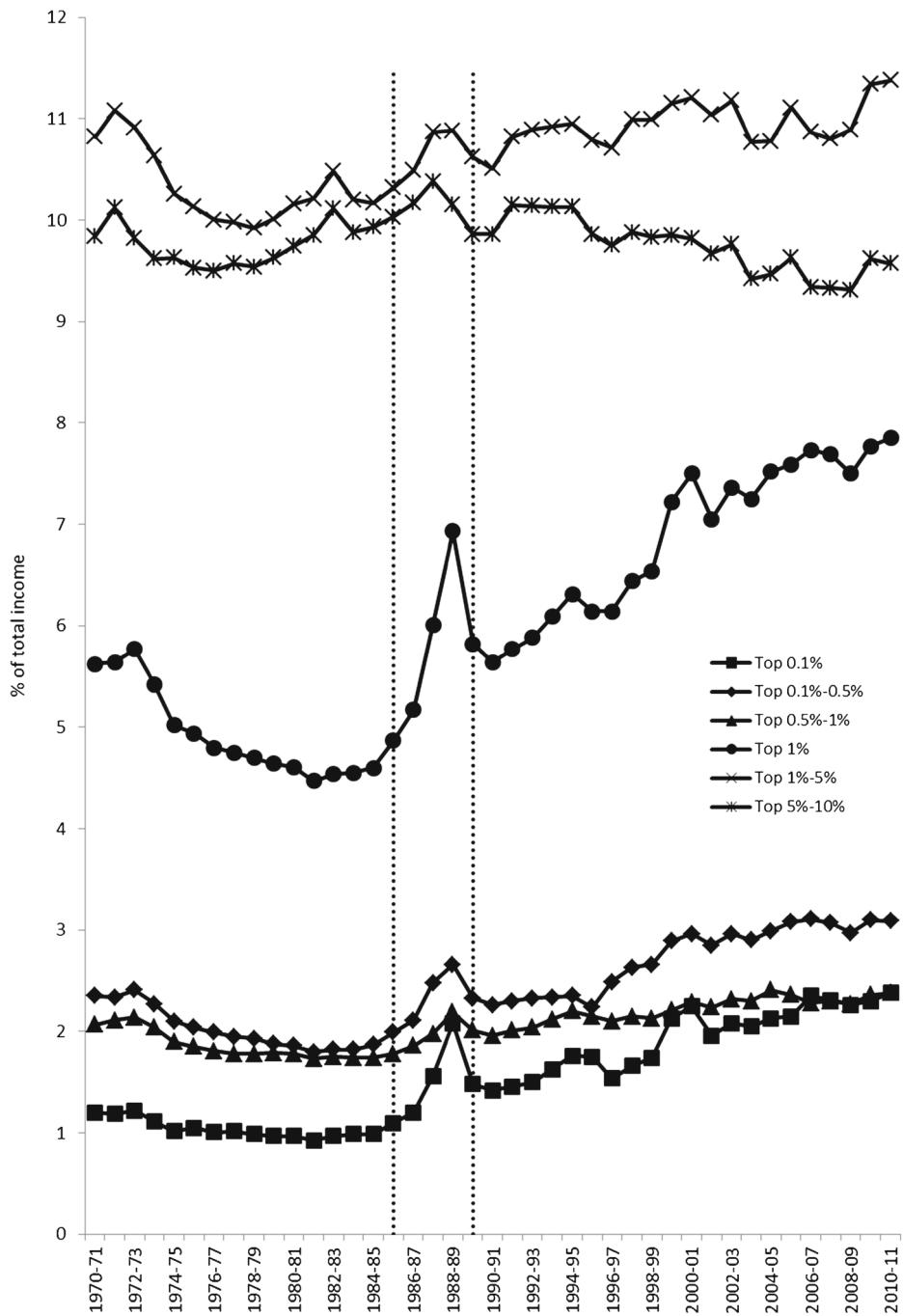


Fig. 4 Top income share for various top income groups using our preferred income measure

and trends in top incomes in Australia. Here we make a broader point about the appropriate treatment of capital gains in top incomes series. In 12 of the 22 country studies that

Atkinson et al. [10] review, the personal income tax record data used to measure top incomes does not include capital gains. Another five—Australia, Germany, New Zealand, Norway, and the United Kingdom—include taxable realized capital gains together with other sources of income in their tax-record-based series during the years capital gains were taxed, thus potentially leading to the kinds of problems we find for Australia. Only five countries—Canada, Japan, Spain (since 1981), Sweden, and the United States—have rich enough personal tax-record-based data to provide a top income series both including and excluding taxable realized capital gains.¹⁷

As we have shown above, excluding capital gains from the Australian series makes it more comparable, not only to the 12 countries that also exclude capital gains, but also to the five countries that provide a consistent series without taxable realized capital gains for the same purpose. Because only a few countries have consistently taxed capital gains over all data years and made that data available to researchers, most cross-national comparisons of top incomes have focused on series that do not include capital gains. Using the Atkinson and Leigh Australian data series in such comparisons overstates the share of income held by its top income groups and their share of growth since the tax reforms of 1985 relative to these 17 country series that exclude capital gains. Atkinson et al. ([10] Fig. 8 p. 41) provide one example of simple cross-national comparisons of top 1 per cent income shares affected by this problem. Another example of the problem is evident in the attempt by Roine and Waldenstrom ([25], Fig. 6) to identify structural breaks in Anglo-Saxon countries with these same 1 per cent top income country data sets excluding capital gains. The rigorous econometric methods [25] use are appropriate to find statistically robust macroeconomic-based shifts in means and trends in inequality over time. They correctly identify a single break in the Australian data for 1949–2002. The break year is 1985. But since they use the Atkinson and Leigh data series, a substantial part of this break is related to a change in tax policy, which broadened the personal income tax base, rather than a change in underlying economic factors. This same issue can be seen in the 1988 break point they find for the United States, which to some degree is also driven by the Reagan-era tax reforms, which also shifted income from corporate to the personal income tax base at this time.

But does it matter in terms of levels, yearly variance, and overall trends to solely focus on taxable income excluding capital gains? Morelli et al. [20] compare cross-country variation in the impact of including taxable realized capital gains income on trends in the share of taxable income of the top percentile between 1970 and 2010. They show that this difference varies considerably across the five countries discussed above where tax record data permit this type of comparison. The series with taxable realized capital gains in the United States and Sweden have much greater yearly variation and faster growth than the series without capital gains. This is much less the case in Canada, Japan, and Spain. But importantly, all these series only capture taxable realized capital gains. In their major study of the consequences of including taxable realized capital gains on top income trends in Sweden, Roine and Waldenstrom [24, 26] demonstrate that the addition of taxable realized capital gains substantially increases the level, variance, and growth trend of top income shares in recent years. But they, consistent with Atkinson et al. [10], also acknowledge

¹⁷ Our taxonomy here is based on Atkinson et al. ([10], Table 4). Morelli et al. ([20], Table 20) include Germany as a country with both a series including and excluding capital gains, but capital gains in Germany are not separated after 1998. Roine and Waldenstrom ([25], Table 1; [26], Fig. 1) include Finland in their analysis as a country with both series, but they do so only for 1987–2004.

that, based on the classical Haig-Simons definition of income, all capital gains accrued in a given year should be included rather than taxable realized capital gains. They also make this point in their review of the top income and wealth literature (Roine and Waldenstrom [27] fn. 21).

Haig-Simons principles (income equals consumption plus the increase in net wealth) suggest that for horizontal equity reasons a tax base should capture income from all sources in a given year. If tax systems followed this ideal, they would be the perfect data source for measuring the share of income going to top income groups. But no personal income tax system includes income from all sources in its tax base. This is especially the case with respect to capital gains, since—as discussed by Auerbach [11] and Barthold [13]—Haig-Simons principles would suggest that taxes should be placed on capital gains accrued from all assets each year. When capital gains are taxed, the tax is usually placed on realized capital gains. And it is not even placed on all sources of realized capital gains. So even after all assets purchased before 19 September 1985 have been realized and hence this eccentricity in Australian tax history has run its course, it is not clear that taxable realized capital gains is a useful measure of accrued capital gains.

The reason is that taxable realized capital gains *include* as current income, asset appreciation that may have occurred years or decades earlier. This is because individuals can choose, through the timing of transactions, when to realize capital gains for tax purposes. Hence, income recorded as taxable realized capital gains this year may not be due to increases in net wealth this year. Additionally, taxable realized capital gains *exclude* accrued gains this year from assets that are not recorded on this year's tax returns, either because the asset was not sold, was sold but held in a tax-sheltered account, or was carved out of the tax code (e.g. primary housing). Armour et al. [5, 6] make this point and then show that a comprehensive income definition in the spirit of Haig-Simons, considering yearly-accrued capital gains rather than focusing on the delayed reporting of capital gains that appear in IRS tax return data, dramatically reduces the observed growth in income inequality and top income shares between 1989 and 2007 in the United States.

5.1 Evidence from household survey data on capital gains

Below we use data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey to compare the size and distribution (across income groups) of taxable realized capital gains with the size and distribution of accrued capital gains on this type of taxable assets. We then compare them to the size and distribution of accrued capital gains on assets that are non-taxable (i.e. owner-occupied homes and superannuation funds). In keeping with top income literature conventions, our sharing unit is the tax unit.¹⁸

This analysis of the HILDA Survey data is simply illustrative of the potential implications of including alternative measures of capital gains, and does not attempt to precisely

¹⁸The HILDA Survey is a nationally representative household panel study that began in 2001 with 13,969 respondents aged 15 years and over in 7,682 households. Face-to-face interviews are conducted annually with all household members aged 15 years and over. Detailed income information is collected from each respondent, which is aggregated by the data managers to produce annual aggregate income at both the person level and household level. See Wooden and Watson [30] and Watson and Wooden [29] for more details. To be consistent with the approach taken for tax record data, we restrict to persons aged 15 years and over and restrict non-capital gains income to components that are required to be reported to the tax office.

replicate the tax-based analysis. In particular, even excluding capital gains, the measures of income of both the top income groups (the numerator) and the population as a whole (the denominator) used for the HILDA Survey analysis differ from those used for the tax-based analysis. The HILDA Survey income measure used for the top income groups contains income components not in the tax data, since they are not taxable, while the income total comes from the HILDA Survey data itself rather than from the National Accounts—the latter of which is a broader measure of income which includes components not in the HILDA Survey income total, such as employer social security contributions. These differences in income measures act to increase the measured top income shares in the HILDA Survey relative to those measured using the tax and National Accounts data. We indeed obtain higher estimates of top income shares for the HILDA Survey analysis than produced by the tax-based analysis. For example, in 2006–07, the income share of the top 1 per cent (excluding capital gains) is 10.6 % using the HILDA Survey (see Table 3) and 7.7 % using tax records and National Accounts data.

The HILDA Survey does not specifically ask about capital gains. To estimate these values we impute both taxable realized capital gains and yearly accrued capital gains on all assets. Taxable realized capital gains are imputed by first ranking all tax units in the Australian Tax Office (ATO) “1 per cent individual sample file” (produced for each tax year since 2003) into percentiles of ATO taxable (i.e. total assessable income less deductions) income and assigning the mean value of ATO total taxable income of each percentile to tax units ranked in a similar manner in the HILDA Survey data. While we could do this for all years since 2003, we focus only on tax years 2006 and 2009. We focus on these two years because, in addition to information on owner-occupied housing, which is reported each year, the HILDA Survey collected a detailed wealth supplement in 2006 and 2010. With these data we are able to estimate accrued capital gains, both on assets that are taxable and those that are not. Conveniently, these are two particularly interesting years—2006 is the tax year prior to the start of the Global Financial Crisis when capital gains were at a global business cycle peak, and the 2009 tax year is a much worse period for capital gains.

Our estimates of accrued capital gains on owner-occupied housing are based on estimates of home values provided by respondents. For a household that sells the home between one wave and the next, the capital gain in that year is approximated by the change in the ABS house price index over the last year for the capital city of the state of residence [3].

Our estimates of accrued capital gains on non-owner-occupied housing, unincorporated businesses, equities and superannuation funds are based on asset holdings in 2006 and 2010, when detailed household wealth data was collected in the HILDA Survey. Our estimates of accrued capital gains on non-owner-occupied housing are approximated by changes in the ABS house price index, while unincorporated businesses and equity and superannuation fund holdings are assumed to track the Australian Stock Exchange ASX200 share price index.¹⁹

In Table 2 we report the share of capital gains held by top income groups in Australia across our four alternative measures of capital gains. In 2006 the top 1 per cent of tax units in the HILDA Survey data received 20.9 % of the \$26.2 billion in taxable realized capital

¹⁹ See the Appendix of Burkhauser et al. [14] for details on the imputation methods. For all three income variables, we have artificially restricted personal income inclusive of capital gains to be non-negative. However, we find that including negatives does not change the pattern of results evident in Tables 2 and 3.

Table 2 Distribution of alternative measures of capital gains, 2006 and 2009

	Realized taxable capital gains		Accrued taxable capital gains		Accrued non-taxable capital gains		Accrued taxable and non-taxable capital gains	
	\$	(%)	\$	(%)	\$	(%)	\$	(%)
2006–07								
Location in income distribution								
Bottom 90 %	1,054	57.7	6,522	25.8	18,666	47.3	28,180	43.5
Percentiles 91 to 95	2,336	6.8	60,806	13.3	113,379	16.0	176,916	15.2
Percentiles 96 to 99	5,986	14.5	171,055	30.1	196,802	22.1	357,033	24.1
Top percentile	34,727	20.9	707,523	30.8	518,277	14.6	999,406	17.1
Total	26,229,391,372	100.0	362,514,535,198	100.0	565,036,702,409	100.0	927,551,236,616	100.0
Mean	1,648		22,772		35,494		58,267	
Median	1,037		0		6,833		14,327	
2009–10								
Location in income distribution								
Bottom 90 %	385	68.3	2,027	37.8	7,637	41.8	10,463	44.3
Percentiles 91 to 95	545	5.1	18,096	18.8	50,123	15.2	62,509	14.6
Percentiles 96 to 99	1,963	15.4	30,796	25.6	103,035	25.1	130,859	24.6
Top percentile	5,700	11.2	86,849	17.8	295,979	17.9	351,798	16.5
Total	8,669,889,477	100.0	82,186,727,070	100.0	280,353,965,813	100.0	362,540,692,440	100.0
Mean	509		4,822		16,447		21,269	
Median	359		0		0		0	

Negative capital gains are set equal to zero. For capital gains by location in the income distribution, individuals are ordered in each column by the income measure indicated in the column heading. Dollar amounts are in 2009–10 Australian dollars
Authors' calculations using data from Release 11.0 of the HILDA Survey and taxation data from *Taxation Statistics* (various years)

gains declared. The top 10 per cent received 42.2 %, thus showing the degree that this source of income is skewed to the top part of the income distribution. The top 1 per cent held an even larger share of accrued capital gains on taxable assets—30.8 %. But more importantly, this is a larger share of a much larger amount of \$362.5 billion. In contrast, the top 1 per cent held only 14.6 % of the \$565.0 billion of accrued capital gains on non-taxable assets, which largely comprise owner-occupied housing. Overall they held 17.1 % of the \$927.6 billion of total accrued capital gains. It should not be surprising that accrued capital gains were so much larger than realized capital gains in 2006, since realized capital gains are only a subset of accrued capital gains in 2006 plus the realization of accrued capital gains from previous years. In the peak year of the global business cycle, the accrued value of financial assets and owner-occupied housing were enormous relative to taxable realized capital gains. In contrast, in 2009, all four measures of capital gains were much diminished. The share of realized and accrued taxable assets held by the top 1 per cent fell substantially, while their share of accrued non-taxable assets rose somewhat.

Table 3 shows how these varying patterns of capital gains translate into our alternative measures of top incomes. Column 1 is our estimate of the share of income excluding capital gains in 2006 and in 2009 based on the HILDA Survey data. We find little change in the share of this measure of income (10.6 % in 2006 and 10.5 % in 2009) between these two years. When we include taxable realized capital gains in our income measure in column 2, the share of the top 1 per cent income rises to 11.0 % in 2006; but falls to 10.5 % in 2009. This reflects the drop in total taxable realized capital gains in these two years that disproportionately occurred at the top end of the distribution reported in Table 2. But this drop is even more pronounced in column 3 of Table 3 when we use accrued capital gains on taxable assets rather than taxable realized capital gains in our income measure—a fall from 15.7 % to 10.7 %. As can be seen in Table 2, this is so much larger both because the total dollar drop in accrued gains was so much larger than in realized gains and because it was more concentrated at the top end of the distribution. When we use accrued capital gains on assets that are not taxable (column 4 of Table 3), there is little change in the top 1 per cent share. This drops from 10.8 % to 10.7 % despite the very large fall in the dollar value of these assets, because their distribution is much more evenly spread across the income distribution. Note that these levels in both years are very close to those in column 1 which measures income without capital gains. Column 5, which includes all accrued capital gains, shows a fall from 13.0 % to 10.8 % reflecting a blend of the previous two columns.

6 Discussion

The world top incomes database the Paris School of Economics maintains on its website cuts the start-up costs for cross-national comparisons. Atkinson et al. [10] and the 22 country studies that they review discuss in detail the creation of these top income country series and provide warnings to potential data users of the possible breaks in comparability that can arise because of changes in tax legislation and the behaviour they engender. These are important core data for those interested in studying long-term levels and trends in income inequality and how they vary across countries.

But Australia provides a cautionary tale of how comprehensive tax reform legislation can substantially alter a top income series and its comparability with earlier years. The huge short-run spike in top income shares [8] report for 1987 and 1988 is to a large degree a direct result of comprehensive tax reform that, as a side effect, distorted their “pre-tax income” top income series by the introduction of tax credits. More important, what appears

Table 3 Distribution of income including alternative measures of capital gains, 2006 and 2009

	Income without capital gains			Income with accrued taxable capital gains			Income with accrued non-taxable capital gains			Income with accrued taxable and non-taxable capital gains		
	\$	(%)	\$	(%)	\$	(%)	\$	(%)	\$	(%)	\$	(%)
2006-07												
Location in income distribution												
Bottom 90 %	29,170	63.7	30,225	63.5	38,078	53.5	50,685	59.4	61,002	55.1		
Percentiles 91 to 95	97,515	11.3	99,851	11.1	155,854	12.1	200,468	13.1	262,520	13.2		
Percentiles 96 to 99	147,899	14.3	153,884	14.3	299,539	18.7	322,104	16.7	465,219	18.7		
Top percentile	441,509	10.6	476,236	11.0	1,009,953	15.7	830,369	10.8	1,293,981	13.0		
Total	657,294,375,852	100.0	683,523,765,745	100.0	1,019,808,907,295	100.0	1,222,331,073,521	100.0	1,584,845,606,549	100.0		
Mean	41,290	42,937	46,062	42,937	76,784	47,810	99,556	54,576				
Median	29,233	31,208	37,211	31,208								
2009-10												
Location in income distribution												
Bottom 90 %	30,104	63.7	30,489	63.7	32,647	61.8	39,974	60.8	42,973	60.5		
Percentiles 91 to 95	102,568	11.3	103,113	11.3	116,539	12.3	144,664	12.2	158,530	12.3		
Percentiles 96 to 99	155,032	14.5	156,996	14.5	180,211	15.2	239,665	16.2	262,666	16.4		
Top percentile	449,227	10.5	454,927	10.5	514,755	10.7	637,765	10.7	691,214	10.8		
Total	727,831,670,558	100.0	736,501,561,146	100.0	810,018,397,253	100.0	1,008,185,635,605	100.0	1,090,372,362,213	100.0		
Mean	42,699	43,208	47,521	43,208								
Median	29,996	30,644	31,996	30,644								

Negative capital gains are set equal to zero. For incomes by location in the income distribution, individuals are ordered in each column by the income measure indicated in the column heading. Dollar amounts are in 2009–10 Australian dollars
Authors' calculations using Release 11.0 of the HILDA Survey and taxation data from *Taxation Statistics* (various years)

to be an increase in the share of income controlled by the top 1 per cent following the tax reforms—because of the rise in their dividend income, both in the short-run and even in the long-run—may to some degree simply be a fuller capturing of the earnings of companies in the Australian personal income tax base. Prior to the 1985 tax reforms, companies were able to pay their shareholders in the form of capital gains that, if held for one year, were not taxed and hence not in the personal income tax base. The 1985 tax reforms dramatically increased the share of earnings from companies captured in the personal income tax base by taxing these long-term capital gains, but did so only gradually on assets purchased after 19 September 1985. For this reason, we argue that the Atkinson and Leigh top income series including realized capital gains overstates the growth in share of income of the top 1 per cent after 1985. Our corrected Australian series not only more consistently traces the share of income excluding capital gains held by the top 1 percent of Australians but also is more comparable for cross-national comparisons.

However, even some of the rise in dividends in our preferred top income series excluding taxable realized capital gains comes from a behavioural change in the way that companies reward their stockholders. Not only was the marginal tax on dividends reduced but also the marginal tax on capital gains was increased by the 1985 tax reforms, thus levelling the marginal tax rates on these alternative methods of distributing profits to shareholders. To the degree that profits that were “paid” to stockholders in untaxed long-term capital gains prior to the 1985 tax reforms were shifted to payments in dividends thereafter, this is another way that changes in tax rules and their effects on behaviour may be distorting the Australian top income series even in the top income series we provide excluding taxable realized capital gains. The irony is that major tax reforms in 1985 that fixed a tax system “broken and beaten by an avalanche of avoidance, evasion, and minimisation” by broadening its income base and levelling the marginal rate across sources of income has had the side effect of substantially increasing the share of income Atkinson and Leigh capture in their top income measures, thereby resulting in their conflating this broadening of the tax base with a rise in the share of income held by top income groups.

More broadly, the decline in the share of top incomes Atkinson and Leigh find in the 1970s and early 1980s may in part be explained by these top income groups’ growing use of trusts to avoid the classical company tax system that the comprehensive tax reforms of 1985 ended. It was this tax avoidance behaviour, together with the very rapid inflation that lowered the real income levels at which the top marginal tax rate on personal income kicked in, that motivated these reforms. To the degree that top income groups were better able to shift their income into trusts and non-taxable capital gains prior to the 1985 tax reforms to avoid having their income counted in the tax base, tax-based studies like those of Atkinson and Leigh will also conflate increases in relative tax avoidance over this period by top income groups with a decline in their income shares.

The Australian experience we document is unlikely to be unique and we suggest similar re-examination of tax system changes for other top income country series. For instance, Roine and Waldenstrom ([25], footnote 17)—using 18 country top income data series without capital gains—in the most sophisticated attempt to date to capture structural breaks in these series, recognize the potential problem of being unable to separate out realized capital gains in Norway and New Zealand as well as Australia. They suggest that in Norway and New Zealand especially, the “spikey” pattern of top income shares in recent years may be largely influenced by the failure to fully strip out realized capital gains.

A major conclusion of Roine and Waldenstrom ([25], pp. 843–844; 2012) is that the Nordic countries seem to be almost as Anglo-Saxon as Australia and New Zealand with

respect to the increase in their top income shares in recent times. Our results suggest that when the portion of the structural break they find in the current Australia top income series simply due to changes in the definition of taxable income in the tax reforms in 1985 are accounted for using our adjusted data series, Australia will look even more like these Nordic countries.

Furthermore, the lone 1989 structural break that Roine and Waldenstrom ([25], Fig. 6) find in the current New Zealand top income data is coincident with the introduction of an imputation corporate tax system in place of its classical corporate system similar to the one we discuss for Australia as part of their 1985 tax reforms. Atkinson and Leigh ([9], p.153) in their study of New Zealand recognise the possibility that this change in tax legislation may be responsible for the increase in top income reported in their series. But they do not adjust their data series to account for this expansion of the tax base that is disproportionately held by top income groups. Hence using it is likely to conflate such an expansion with an increase in the share of income they hold. We predict that if similar adjustments were made in their data series to the ones we have introduced for Australia, New Zealand also would look more like these Nordic countries.

When and how countries tax capital gains is just one way differences in the tax base and its growth can conflate the growth of top incomes in tax-based top income series and make their comparison across countries problematic. Countries that tax realized capital gains will capture a greater share of the income of high income groups. This is especially the case in Australia and the United States, where realized capital gains on owner-occupied housing are not taxed and thus not included in the tax base. Another difference is in the taxation of the rental value of owner-occupied housing. Broadening the tax base in this way based on Roine and Waldenstrom's [27] findings is likely to have the opposite effect, i.e., lowering the top income shares in these countries. Most country series acknowledge these possibilities in the documentation they provide with their core data. But additional work on the data series themselves is needed to better harmonise these series across countries.

Finally, our findings using household survey data make a more general point with respect to capital gains and their effect on levels and trends of top income series. Armour et al. [5] show that top income series in the United States are sensitive to the choice of measure chosen to capture capital gains. We find the same is the case in Australia. Given the sensitivity in our results across alternative measures of capital gains, taxable realized capital gains may be a poor proxy for those attempting to show the importance of the more theoretically appropriate inclusion of yearly accrued capital gains in their top income series.

Acknowledgments We thank Andrew Leigh for providing the computer code used to produce top income shares in Atkinson and Leigh [8]. We thank Daniel Feenberg, Andrew Leigh, Stephen Jenkins, Jeff Larrimore and Dean Lillard for reading earlier drafts of this paper. This paper uses the confidentialised unit record file from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA Project was initiated and is funded by the Commonwealth Department of Social Services and is managed by the Melbourne Institute of Applied Economic and Social Research.

Disclaimer The findings and views reported in this paper are those of the authors only.

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