Loughborough University

This item was submitted to Loughborough's Research Repository by the author.
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

Recent trends in income redistribution in Australia: Can changes in the tax-benefit system account for the decline in redistribution?

PLEASE CITE THE PUBLISHED VERSION

https://doi.org/10.1111/1475-4932.12154

PUBLISHER

© Economic Society of Australia. Published by Wiley

VERSION

AM (Accepted Manuscript)

PUBLISHER STATEMENT

This work is made available according to the conditions of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) licence. Full details of this licence are available at: https://creativecommons.org/licenses/by-nc-nd/4.0/

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Herault, Nicolas, and Francisco Azpitarte. 2019. “Recent Trends in Income Redistribution in Australia: Can Changes in the Tax-benefit System Account for the Decline in Redistribution?”. figshare. https://hdl.handle.net/2134/36504.

Recent Trends in Income Redistribution in Australia: Can Changes in the Tax-Benefit System Account for the Decline in Redistribution?*

Nicolas Herault†
Melbourne Institute of Applied Economic and Social Research

Francisco Azpitarte
Brotherhood of St Laurence &
Melbourne Institute of Applied Economic and Social Research

Abstract

We examine trends in the redistributive impact of the tax-benefit system in Australia between 1994 and 2009 using a framework that allows us to separate the contributions of taxes, benefits and taxes and benefits combined. Furthermore, we identify the effect of tax-benefit policy reforms on income redistribution over the period. We find that after reaching a peak value in the late 1990s, the redistributive effect of taxes and benefits declined sharply. Although reforms to the tax-benefit system contributed to the decline in redistribution, their contribution was limited compared to the role played by the changes in market income distribution.

Key words: Taxes and benefits; income inequality; progressivity; redistributive effect.

JEL Classification: H23, J22, D31

*We acknowledge the support of a Faculty Research Grant from the Faculty of Business and Economics, University of Melbourne. Francisco Azpitarte would also like to acknowledge the financial support from the Brotherhood of St Laurence and the Spanish Ministerio de Ciencia e Innovación (grant ECO2013-46516-C4-2-R and ECO2010-21668-C03-03) and the Xunta de Galicia (10SEC300023PR). We are grateful to Guyonne Kalb for helpful comments.

†Correspondence to: Nicolas Herault, Melbourne Institute of Applied Economic and Social Research, University of Melbourne, Victoria 3010, Australia (nherault@unimelb.edu.au).

1 Introduction

Over the previous two decades, Australia has witnessed noticeable economic changes. In particular, this period of sustained economic growth led to a substantial increase in real incomes. As recent empirical evidence shows, however, the rise in average living standards was accompanied by an increase in net income inequality and in the concentration of incomes at the top of the distribution (Wilkins 2014, Greenville et al. 2013, Atkinson and Leigh 2007). Importantly, these changes in the mean and dispersion of incomes occurred in a period of significant policy changes, especially with respect to the tax and benefit system. In fact, the previous two decades saw the implementation of major fiscal reforms, which included, among other things, changes to the income tax rates and thresholds, as well as, the tightening of the access to welfare payments and reductions in withdrawal rates of means-tested benefits (Australian Senate 2012, Goodger and Larose 1999). Although, in this context one would naturally wonder what was the role of fiscal reforms in the changes in income distribution and redistribution, this remains largely an unexplored issue. The aim of the present paper is to fill this gap by (i) presenting more evidence on these recent trends and (ii) by assessing the role played by fiscal reforms.

First, we study the trends in the redistributive impact of the income tax and benefit system in Australia between 1994 and 2009. We report standard measures of the redistributive effects of taxes, benefits and taxes and benefits combined. We show the separate contributions of taxes and benefits to overall income redistribution, as well as, the respective roles of the size and progressivity of taxes and benefits.

Time-trends in income redistribution are estimated making use of the cross-sectional Australian Survey of Income and Housing Cost (SIHC) conducted between 1994 and 2009. The rich socioeconomic and income data collected in the SIHC are then fed into a tax-benefit calculator, the Melbourne Institute Tax and Transfer Simulator (MITTS), to compute the values of taxes and benefits. Hence, redistributive effects and progressivity measures can be computed avoiding potential measurement errors due to recall bias or approximate imputation in survey data. The estimated time series reveal significant changes in the redistributive impact of the Australian tax-benefit system over the 1994-2009 period. More specifically, we find that after reaching a peak in the late 1990s, the level of income redistribution achieved by the system significantly declined in the 2000s with this decline being largely driven by the fall in the redistributive effect of benefits.

Second, we assess the role of tax-benefit policy reforms in explaining the trends in income redistribution and income inequality. The 1994-2009 period saw substantial changes to the income-tax schedule, as well as the implementation of policy reforms like the Work-

ing Nation package of 1994, the 2003 Australians Working Together, and the 2006 Welfare to Work reform which all introduced significant changes to the income support system. We show that these reforms altered the functional relationship between pre-fiscal and post-fiscal incomes by modifying the budget constraints and the effective tax rates faced by different households along the income distribution.

Evidence on the trends in redistribution and the effect of policy reforms on redistribution over the recent decades is limited. Whiteford (2013, p. 39) computes the redistributive effect of income taxes and benefits between 1981 and 1996, and finds little change over that period. Using data from the SIHC and the Household Income and Labour Dynamics in Australia (HILDA) survey, Wilkins (2014, p. 82) shows that the redistributive impact of taxes and benefits somewhat decreased between 1994 and 2009. These studies, however, are silent on the distributive consequences of policy reforms as they examine the trends in income redistribution without controlling for the changes in the distribution of market income that occurred over the period.

The main contribution of this paper is to provide a clear assessment of the impact of these policy reforms on income redistribution. Our analysis recognizes that any measure of redistributive effect or progressivity depends on the tax-benefit policy parameters but also on the distribution of income to which taxes and benefits are applied. We evaluate the effect of tax-benefit policy reforms using the fixed-income approach proposed by Kasten et al. (1994). This approach allows us to derive time-trends in the redistributive effects and in the progressivity[1] of taxes and benefits in the absence of changes in the distribution of market incomes. This is done by applying the tax and benefit schemes of different periods to a common distribution of income which allows intertemporal comparisons of tax-benefit policies while controlling for concomitant changes in market incomes. We find that although their impact was limited, the tax-benefit reforms contributed to the decline in the redistributive effect of the system in the 2000s. Changes in the distribution of market income played an important role. These results hold regardless of the distribution of income taken as reference and are robust to the choice of the equivalence scale and the degree of aversion to inequality.

The paper is organised as follows. Section 2 presents the measurement framework used to measure the redistributive effect of the tax-benefit system and the contribution of taxes and benefits to overall redistribution. In Section 3, we present the data and the features of interest of the tax-benefit calculator. In Section 4, we discuss the changes in the

[1]Note that redistributive effect and progressivity are two distinct features of a redistributive system. A discussion of these two concepts is provided in the next section.

redistributive effect of the tax-benefit system between 1994 and 2009. Section 5 focuses on the role of policy reforms. First, we discuss the main policy reforms implemented during this period and their effects on the relationship between pre and post-fiscal incomes. Second, we present the results from the fixed-income approach to evaluate the effects of policy reforms. Concluding remarks are provided in Section 6.

2 Measurement Framework

We anaylse the changes in the redistributive effect of the Australian tax-benefit system using a simple decomposition that allows us to quantify the separate contributions of taxes and benefits to overall redistribution. As is common in the literature on income redistribution, we focus our analysis on Gini-based measures.[2] For the present analysis, we adopt the widely-used measure of the redistributive effect proposed by Reynolds and Smolensky (1977) and extended by Urban and Lambert (2008). The redistributive effect of taxes, benefits, or net taxes (taxes minus benefits) is given by:

$$RE = G_X - G_N \tag{1}$$

where G_X is the Gini index of pre-fiscal income and G_N is the Gini index of post-fiscal income after tax, benefit, or net tax. Following Lambert (2001) and Kim and Lambert (2009), we consider market income (pre-tax and benefit) as our pre-fiscal income variable for the computation of the redistributive effect of net taxes and of benefits, whereas for income taxes the pre-fiscal variable is gross income defined as the sum of market income plus benefits.[3] Table 1 shows the correspondence between pre and post-fiscal variables and the different income variables for taxes, benefits and net taxes.

Table 1. Income variables

	Tax	Benefits	Net tax
Pre-fiscal	Gross income	Market income	Market income
Post-fiscal	Net income	Gross income	Net income

[2]For a review of the decompositions methods that have been proposed to evaluate the redistributive effect of fiscal systems see Urban (2009).

[3]In the case where some benefit payments are taxable, income taxes paid by some individuals may be larger than their market income. This rules out the use of market income as the pre-fiscal income for the computation of standard measures of redistributive effects. The income variables, their components, and the data used to derive them are discussed in Section 3.

Within this framework, the redistributive effect of net taxes, RE_{NT}, can be expressed as a function of the separate effects of taxes and benefits as:

$$RE_{NT} = RE_T + RE_B \tag{2}$$

where RE_T and RE_B are the redistributive effects of taxes and benefits, respectively. In order to understand changes in redistribution, it is useful to distinguish the separate impact of benefits and taxes. Following Kakwani (1977, 1984), we express the redistributive effects as a function of the size and progressivity of taxes and benefits minus the effect of reranking:

$$RE_T = \frac{t}{1-t} P^T - R_T \tag{3}$$

$$RE_B = \frac{b}{1+b} |P^B| - R_B \tag{4}$$

where t and b are the average tax and benefit rates defined as the proportion of aggregate pre-fiscal income paid in taxes and received in benefits, respectively; P^T is the progressivity of taxes as measured by Kawani's disproportionality index and $|P^B|$ is the absolute value of the index for benefits; and R_T and R_B are the measures of reranking that capture the changes in the ranking of tax units by income in the transition from pre- to post-fiscal income.[4]

Kakwani's progressivity measure is defined as the difference between the concentration index of taxes or benefits and the Gini coefficient for pre-fiscal income, G_X.When taxes are progressive, the concentration curve of taxes lies below the Lorenz curve of income which implies a positive value of P^K. In the case of benefits, a negative value of the index indicates progressivity. This is because progressive benefits are more concentrated at the bottom so that their concentration curve is above that of income.

[4]The reranking introduced by taxes or benefits is obtained as a residual. It measures the difference between the concentration index of post-fiscal incomes, computed with units ranked according to pre-fiscal incomes, and the Gini coefficient for post-fiscal incomes, G_X. For a discussion on these measures see Urban (2009).

3 Data Sources and Methods

We use the repeated cross-sectional data from the Australian Survey of Income and Housing Cost (SIHC) conducted by the Australian Bureau of Statistics (ABS) between 1994 and 2009. The SIHC is a survey designed to collect detailed information on the income sources and socioeconomic characteristics of a set of nationally representative households and their members. In particular, the SIHC provide rich information on the various components of labour and capital income that we use to generate the income measures used in the analysis.[5]

The values of taxes and benefits are based on calculation of entitlements by a tax-benefit calculator, the Melbourne Institute Tax and Transfer Simulator (MITTS), not the reported receipt.[6] MITTS allows the derivation of all major social security and family payments, rebates and income taxes, ensuring a reasonable approximation to net income and avoiding potential measurement errors due to recall bias or approximate imputation in survey data. Benefits that are computed include Age and Disability Support pensions, Widow, Wife and Carer pensions and pensions from the Department of Veteran's Affairs. Income allowances include Newstart and Youth allowances, as well as, Mature Age, Sickness, Widow, and Partner allowances. Other included payments are parenting payments, rent assistance, Austudy, ABSTUDY, Special Benefits and Family Tax Benefit, Parts A and B. Non cash-benefits are not modelled in MITTS and are not considered in the analysis. For the estimation of income tax liabilities MITTS applies the relevant income tax schedule (marginal tax rates and income thresholds) as well as the Medicare levy and surcharge and the various tax rebates, including the Pensioner, Low Income Earner, Dependent Spouse, and Sole Parent rebates, and the Senior Australians and Mature Age Workers tax offsets and the Family Tax Assistance and Family Tax Payment.

The market income variable is derived from SIHC data and it includes the value of wages and salaries from all jobs, own unincorporated business income, investment income including interests, rents, and dividend income, private pensions, and other types of private income. The self-employed are considered in the anlysis and negative values for

[5] As documented by Wilkins (2014), there were some changes in the SIHC in the 2000s and it is impossible to construct fully consistent income series for the 1994-2010 period. We use the most consistent measures provided in these surveys. In particular, we use a measure of wage and salary income that consistently excludes salary sacrifice and a measure of business and investment income that consistently excludes income received by silent partners. Most importantly, our conclusions regarding the impact of tax-benefit policy reforms are based on a fixed-income approach designed to control for changes in the distribution of market incomes – whether these are genuine or due to changes in the data collection process (see Section 5.2).

[6] For a description of MITTS, see Creedy *et al.*(2002).

capital income are ignored. Gross and net incomes are computed using the tax amounts and benefit payments calculated by MITTS. Gross income is equal to market income plus the value of benefits whereas net income is equal to gross income net of taxes.

The unit of analysis is the individual, where each individual in an income unit is assigned the total income of the unit per adult equivalent. Following Banks and Johnson (1994) and Jenkins and Cowell (1994), the adult equivalent size, s, is obtained using the following parametric scales:

$$s = (n_a + \theta n_c)^{\delta}$$

where n_a and n_c are respectively the number of adults and children in the unit, θ is the weight attached to children and δ measures the extent of economies of scale. The weight attached to children, θ, was set at 0.6 and the economies of scale parameter was set at δ =0.8. Lastly, all the results are aggregated to the population level using the weights provided with the SIHC.

4 Income Redistribution in Australia, 1994-2009

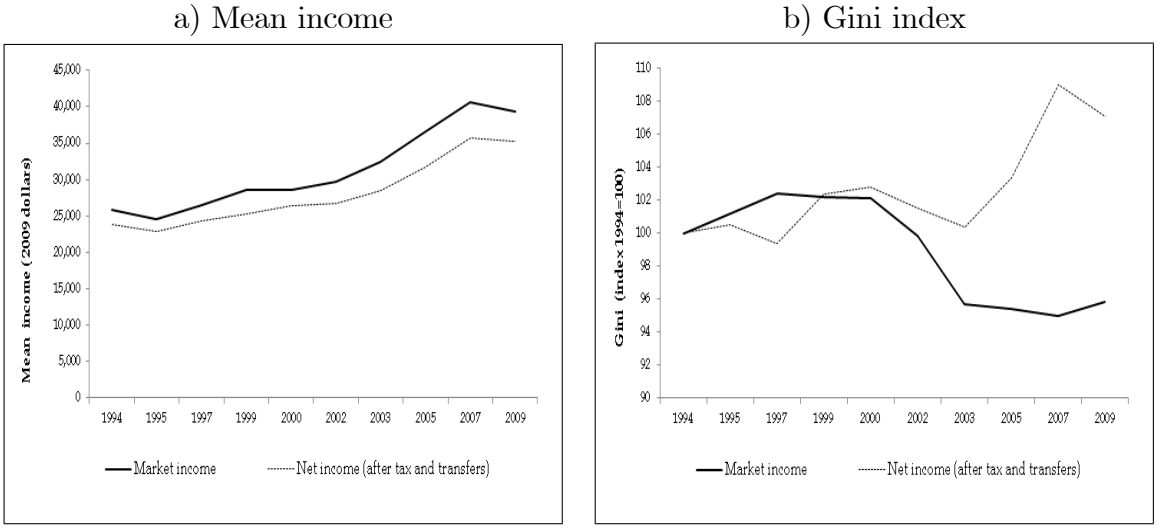
Between 1994 and 2009 Australia witnessed a period of strong economic growth that led to a significant rise in average real income. As Figure 1 shows, there was a remarkable increase in both real market and net incomes. By 2009 mean market income was $39,377, more than $13,000 larger than the mean value in 1994 (in 2009 dollars). The change in net income was of a similar order of magnitude with the mean growing from $23,803 in 1994 to $35,280 by 2009, which implies an annual growth rate of more than 2.5 per cent.

As documented elsewhere (Wilkins 2014, Greenville *et al.* 2013, Atkinson and Leigh 2007), the growth in average net income in Australia was accompanied by an increase in the inequality of its distribution as measured by the Gini index.[7] Figure 1 shows that the Gini coefficient of net income rose by nearly 10 per cent between 1994 and 2007. Interestingly, this rise in net income inequality took place despite the decline in market income inequality. The Gini of market income was fairly stable until 2000, when it started to decline, so that by 2009 the value of this index was almost 5 per cent lower than in 1994. Thus, although income taxes and benefits contributed to a more equal distribution of income in each year (the Gini index for net income is always below that of market

[7] Wilkins (2014) suggests that even though these trends are apparent in both the HILDA and the SIHC, they may be somewhat overstated in the SIHC due to the changes introduced by the ABS in the data collection process in the 2000s.

income), the diverging trends in market and net income distribution suggest important changes in the redistributive capacity of Australia's fiscal system for the period under analysis.

Figure 1. Mean Income and Gini Index, 1994-2009



Notes: Income variables equivalised as described in Section 3. Mean income values in 2009 dollars. Gini series expressed in index form (1994=100).

Source: Authors' calculations based on MITTS and SIHC data.

Table 2 presents the evolution of the redistributive effects of the net tax, benefits and taxes from 1994 to 2009. The table also shows the separate contributions of taxes and benefits to overall redistribution, as well as, the average tax and benefit rates and the measures of progressivity and reranking. Our estimates show sizeable changes in income redistribution between 1994 and 2009. After reaching a maximum value in the late 1990s, when the redistributive effect of the combined tax and benefit system, RE_{NT}, was above 0.22, a steady decline started so that it had fallen to around 0.17 by 2009, a decline of nearly 28 per cent.[8] Estimates of the separate contributions of taxes and benefits suggest that benefits account for most of the redistribution achieved by the fiscal system. Despite the downward trend, the contribution of benefits to the redistributive effect of the tax-benefit system remained above 63 per cent for the whole period under analysis. This is in spite of the fact that the magnitude of taxes, as a proportion of income, is substantially larger than that of benefits. In this regard, Australia is similar to most

[8]To check the robustness of the**se** results we also estimated the redistributive effects for the 2001-10 period using data from the HILDA survey. Results from this analysis available upon request yields very similar time-trends in income redistribution. See also Wilkins (201**4**) for a comparison of the time-trends in income redistribution using SIHC and HILDA data.

advanced economies, with the notable exception of the US where the tax system plays a large role in income redistribution (Bastagli et al. 2012).

Both the absolute and relative contribution of benefits to redistribution started to decline in the early 2000s so that the equalizing effect of benefits by the end of the decade was at its lowest level in the period under examination. As the progressivity of benefits barely changed over the period, this decline can be almost entirely attributed to the fall in the average benefit rate, which declined from 16.7 in 2000 to 11 per cent in 2007, the lowest recorded level of the period. In other words, it is the size of the benefit system that was reduced, not its level of progressivity. Note that the reduced size of the benefit system is to be expected during periods of rapid economic growth as people move out of income support. Conversely, the economic slowdown following the Global Financial Crisis of 2008 certainly explains most of the increase in the size and in the redistributive effect of the benefit system between 2007 and 2009.

The redistributive effect of the income tax also declined over the last decade. By 2009, it had declined to 0.061, a reduction of nearly 20 per cent from its peak value of 0.076 recorded in 1999. However, as this fall of was of smaller magnitude than that of benefits, the relative contribution of taxes to overall redistribution increased. In contrast with benefits, the decline in the redistributive effect of taxes is not clearly attributable to a single factor. The average tax rate shows no clear trend, while tax progressivity tended to decline between 1997 and 2005, going from a peak value of 0.27 to 0.23, but it then increased in 2007 and 2009.

Table 2. Redistributive effect of tax and benefits, 1994-2009

		Benefits (B)				Taxes (T)			
Year	RE_{NT}	RE_B (%)	b	$\|P^B\|$	R_B	RE_T (%)	t	P^T	R_T
1994	0.217	0.153 (70.2)	16.2	1.107	0.002	0.064 (29.8)	20.9	0.251	0.002
1995	0.222	0.156 (70.5)	16.8	1.098	0.002	0.065 (29.5)	20.7	0.256	0.002
1997	0.231	0.157 (68.1)	16.9	1.099	0.002	0.074 (31.9)	21.7	0.270	0.001
1999	0.221	0.145 (65.6)	15.1	1.119	0.002	0.076 (34.4)	23.2	0.256	0.001
2000	0.220	0.153 (69.5)	16.7	1.085	0.002	0.067 (30.5)	20.8	0.260	0.001
2002	0.212	0.144 (68.0)	15.7	1.084	0.003	0.068 (32.0)	21.9	0.248	0.001
2003	0.195	0.128 (65.9)	13.6	1.087	0.002	0.066 (34.1)	22.7	0.232	0.002
2005	0.185	0.119 (64.2)	12.6	1.079	0.002	0.066 (35.8)	23.0	0.226	0.001
2007	0.167	0.105 (63.1)	11.0	1.083	0.002	0.062 (36.9)	20.9	0.237	0.001
2009	0.177	0.115 (65.0)	12.1	1.092	0.003	0.062 (35.0)	20.1	0.251	0.001

Notes: $\mathrm{RE_{NT}}$, $\mathrm{RE_B}$, $\mathrm{RE_T}$ are the redistributive effects of the next tax, benefits and taxes. For taxes and benefits, the number in parenthesis indicates the percentage of overall redistribution accounted by each of these; b and t are the average benefit and tax rates; $\mathrm{|P^B|}$ and $\mathrm{P^T}$ are Kakwani's indices of progressivity; and $\mathrm{R_B}$ and $\mathrm{R_T}$ are the reranking measures.

Source: Authors' calculations based on MITTS and SIHC data.

5 The Role of Tax-Benefit Policies

5.1 The Australian Tax-Benefit System, 1994-2009

Australia has been traditionally described as a liberal welfare regime where strong emphasis is placed on the provision of welfare through market mechanisms. Underpinned by the principle of self-reliance by which every citizen with capacity to work should do so, the Australian welfare system is aimed to help only those who are most in need, limiting the tax burden and the overall spending in order to minimize work disincentives. Thus, Australia is one of the OECD countries with the lowest levels of tax and social expenditures, as well as the country with the most targeted system (Whiteford, 2013).

Over the last two decades, similarly to other developed countries, Australia's social security system has seen major reforms clearly aimed at reducing welfare dependency and promoting self-reliance through paid work (Goodger and Larose 1999, Costello 2006). Australian fiscal policy has been subject to a continuous process of reforms, which can be traced back to the significant reforms of the 1980s and 1990s that led to the broadening

of the tax base. These reforms have been mostly driven by the principle of efficiency more than those of equity and simplicity (Tran-Nam et al. 2006).

Between 1994 and 2009 the tax rate structure underwent multiple changes aimed at mitigating the negative impact of income taxes and benefits on labour supply. The top marginal rate was unchanged from 1994 to 2005, when it was reduced from 47 to 45 per cent, the level at which it remained until 2014. But the range of incomes over which the top marginal tax rate applies was altered due to the large increase in the top tax threshold. In constant 2009 dollars, the latter went from $75,151 in 1994 to $106,907 in 2005 and to $180,000 in 2009. Changes in the second top rate were also significant as it was cut multiple times, falling from 43 per cent in 1994 to 38 per cent by 2009. In contrast, the real value of the tax-free threshold fell from $8,116 in 1994 to $6,000 in 2009, which means that low-income tax payers were affected by bracket creep. To mitigate this effect, the coverage of certain tax offsets, in particular the Low Income Tax Offset, was extended.

The period between 1994 and 2009 also saw substantial reforms to the income support system. The 1994 Working Nation package, the 2000 Australia New Tax System, the 2003 Australians Working Together package, the 2006 Welfare to Work reform, and even the more recent Building Australia's Future Workforce reform in 2011 all introduced policy initiatives to strengthen the incentives to work. This was in part done by reducing the withdrawal rates of most income-tested government benefits. The 100 per cent withdrawal rate applicable to most allowance payments prior to 1994 was first reduced to 70 per cent in 1995 and then to 60 per cent in 2006. As regards family payments, the 1994-2009 period saw a significant increase in the real value of the withdrawal-free threshold that determines the eligibility for the maximum rate of family payments. This increase was accompanied by a reduction in the withdrawal rate that applies for incomes in excess of the withdrawal-free threshold: in 2000 this rate was cut from 50 to 30 cents in the dollar, and from 2004 this rate was further reduced to 20 per cent. Interestingly, recent research shows that despite the emphasis on reducing the disincentives to work, the reforms to the tax-benefit system did not lead to a reduction in the marginal effective tax rates (METRs) faced by families. This is likely to be due to the large income and employment growth recorded over the period since people moving from welfare to work tend to face higher METRs. Harding et al.(2009) and Dockery et al. (2008) find a substantial shift in the distribution of effective marginal tax rates since the 1990s with the proportion of working-age people facing METRs above 50 per cent growing from 4.8 in 1996 to more than 7 per cent in 2006.

Policy reforms during the 2000s increased the conditionality of the system by tightening the access to welfare payments. In the case of unemployment, this was implemented through tougher activity tests and higher penalties for non-compliance, by extending the waiting periods for those who have accumulated some savings, and by imposing a two-year waiting period for new immigrants. Further, the eligibility criterion for the Disability and Parenting pensions was tightened so that only individuals unable to work more than 15 hours per week and sole parents whose youngest kid is under six were eligible, respectively. As a consequence, some sole parents and people with disabilities have been shifted from pensions to allowance payments, which may have affected the redistributive effect of the welfare system given the growing gap between pensions and allowances caused by different rules of indexation.[9]

Figure 2 summarizes the effect of these policy reforms on the relationship between market and net incomes for some key demographic groups. The figures plot the budget constraints for couples with and without children, lone parents and singles for the financial years 1999/00 and 2007/08, a period which covers major reform packages and corresponds to the period in which most of the decline in income redistribution occurred (see previous section).

Before discussing these figures, however, an explanation of how the budget constraints were constructed is in order.[10] First, for each individual of working age in the household survey, market and net incomes are computed using the tax-benefit calculator from MITTS assuming different labour supply points ranging from 0 to 50 hours of work and using observed hourly wage rates.[11] Specifically, 11 labour supply points were considered for all individuals except for men in couple for whom only 6 alternatives were used. Hence, we derive between 6 and 11 points of each individual's budget constraint, which are then linked by linear extrapolation. This budget constraint, therefore, reflects the transformation of market income, including labour and capital income, into net incomes for different labour supply points ranging between 0 and 50 hours.[12] The budget constraints shown in Figure 2 were derived by applying this method on data from the 2007/08 SIHC and

[9] Since the late 1990s allowances have been indexed to the Consumer Price Index, while pensions are indexed to the wage index. As a consequence allowance payments have failed to keep pace with the rise in average income, with a fall of 25 to 35 per cent relative to community living standards (Gregory 2013).

[10] We are grateful to Justin van de Ven for his help in the development of this approach.

[11] For those not in work, predicted wages are used, which are derived from a Mincer equation. Details of the first set of wage (and labour supply) parameters used in MITTS can be found in Kalb and Scutella (2002) and Kalb (2002).

[12] For couples, one member's market income at zero hours of work includes observed market income of the other member. In other words, budget constraints for couple members are constructed by holding fixed the other member's market income.

by averaging over working-age individuals using sample weights. Two sets of budget constraints are presented, corresponding to those obtained using the tax and benefit systems of 2007/08 and 1999/2000, respectively.[13]

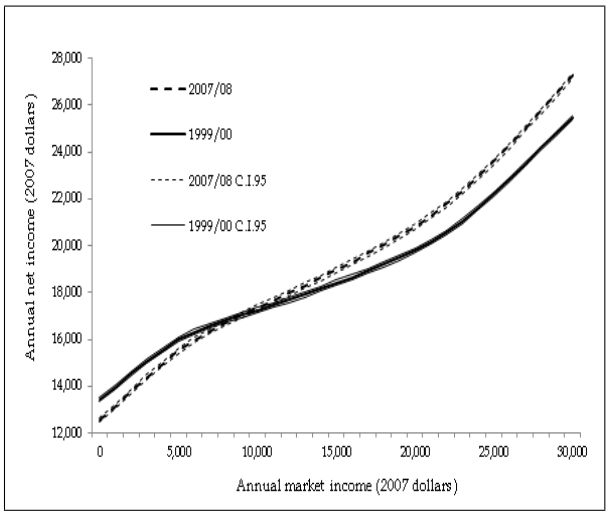
Figure 2 reveals that the various policy reforms implemented between 1999/00 and 2007/08 contributed to increase the slopes of the flattest parts of the budget constraints under the 1999/00 system. In other words, the successive reductions in taper rates and income tax rates ensured that the highest METRs were reduced, in a systematic effort to increase incentives to work. However, these efforts led to asymmetric effects over the income range. As the figures for the different groups clearly show, policy reforms acted to reduce the average effective tax rate of high-income earners. In contrast, policy changes either did not affect the average effective tax rate at low-income levels, or even increased it in the case of singles. This was combined with a general reduction in the highest METRs, a feature which is particularly apparent for couples with children. Within this group, individuals on annual private incomes between $30,000 to $50,000, who were facing particularly high METRs under the 1999/00 system, saw large reductions in their METRs as evidenced by the increased slope of their budget constraints.

Overall, policy reforms between 1999 and 2007 acted to reduce the average effective tax rate of middle and high-income households in all demographic groups. The reduction in top marginal income tax rates, the reductions in taper rates, and the increase in family tax benefit payments are all factors that contributed to this trend. This suggests that these reforms contributed to an increase in disposable income inequality.

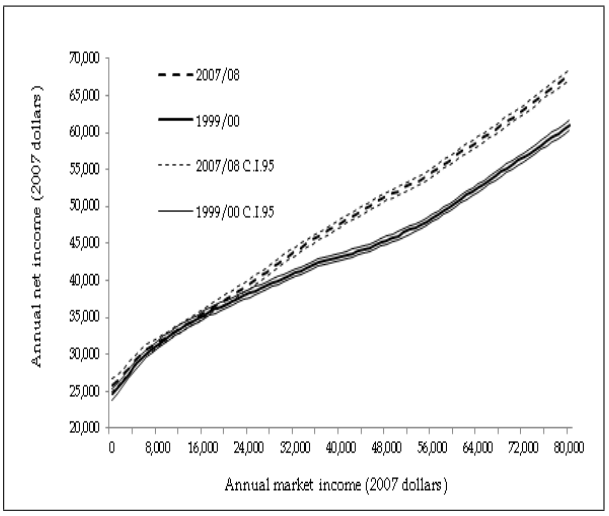
[13] All the payment rates and thresholds from the tax and benefit system of 1999/2000 were uprated to 2008 dollars using the ABS wage index based on average earnings for full-time workers. To some extent, the use of a common uprating factor for all payments and thresholds based on wages rather than the CPI explains why the 1999/2000 benefit system may seem more generous than the 2007/08 system at low levels of market income in Figure 2. This reflects the decisions by policy makers to let allowances grow more slowly than market income over the period.

Figure 2. Relationship between market and net incomes, 1999 and 2007

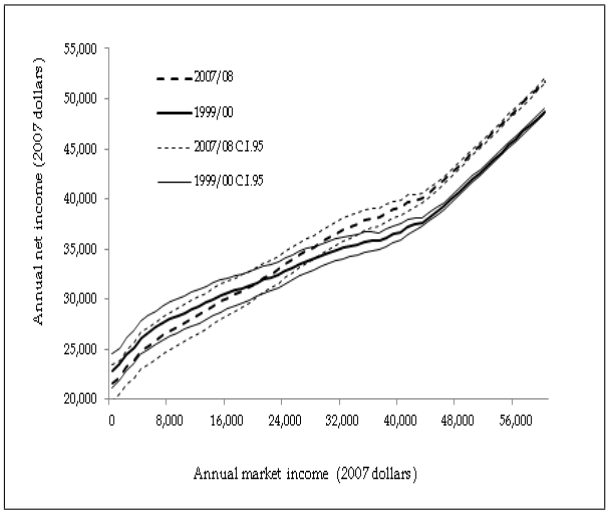
A) Single



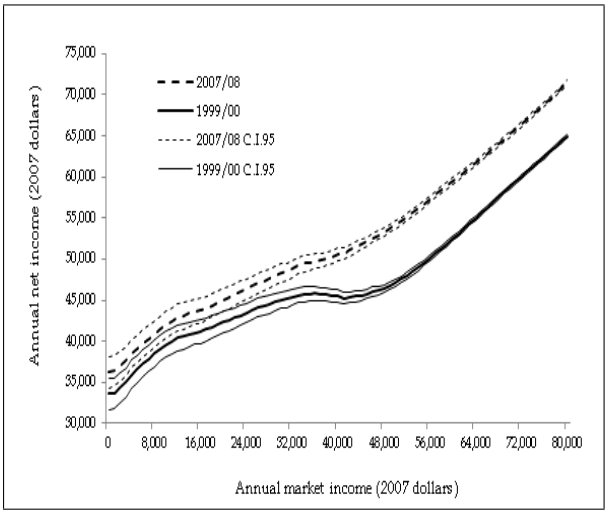
B) Single-parent



C) Couple



D) Couple with children



Notes: C.I. 95 denotes 95% confidence interval. In the case of couples, the budget constraints are those for females. The main qualitative conclusions are the same for males whose budget constraints are available upon request.

Source: Authors' calculations based on MITTS and SIHC data.

5.2 Policy Evaluations: The Fixed-Income Approach

The study of fiscal reforms and their effects on redistribution is relevant from a policy point of view because it is informative about the government's actions to redistribute income and it provides valuable information for the design of future reforms. However, policy reforms are generally implemented as packages combining multiple changes, which means that their distributional consequences are far from obvious. Moreover, observed changes in income redistribution over time are the compound result of (i) trends in the distribution of market incomes and (ii) policy changes that alter the capacity of taxes and benefits to redistribute income. Therefore, assessing the redistributive implications of policy reforms is not a trivial task as one must be able to isolate the policy effect from the effect of other changes in the distribution of market income. The fixed-income approach proposed by Kasten et al.(1994) provides a straightforward framework to isolate these effects. Widely used in the literature on income redistribution and tax policy (for example, see Thoresen 2004, Lambert and Thoresen 2009, Thoresen et al. 2012), this method provides a baseline for the identification of policy effects by keeping the distribution of market incomes fixed and by applying the tax and benefit schemes of different periods to this distribution of reference.[14]

It is important to recognise, however, that this approach only isolates what we could call the immediate policy effects as it does not account in any way for behavioural responses to these policy reforms, a point to which we come back below. Another key issue in this type of analysis is the sensitivity of the conclusions to the choice of the base distribution. To assess the robustness of our findings, we identify the policy effect using three different pre-fiscal income distributions as reference, those of 1999, 2000 and 2007. We find that our results do not depend on the choice of the reference distribution.

Let F denote the distribution of market income and let $N_F(\tau)$ represent the distribution of net income that would result from exposing the distribution F to the fiscal policy τ. All the information required to evaluate the redistributive effect of the tax-benefit system is then summarized in the pair $(F, N_F(\tau))$. The identification of the policy effect using the fixed-income method requires the application of the fiscal policy τ_t from the

[14] Dardanoni and Lambert (2002) propose an alternative method where the policy effect is identified by comparing post-fiscal distributions that have been adjusted to a common base regime in which differences in market income inequality have been eliminated using a transplant-and-compare procedure. The aim is to address the main caveat of the fixed-income approach, which is that results can depend on the choice of the base distribution. However, this is a limitation that does not apply here as we shall see that our results are robust to the choice of the base distribution. Moreover, the transplant-and-compare approach is not as tractable as the fixed-income method, where interpretation is greatly facilitated by the simplicity of the approach.

different periods $t = 1, .., T$ to a base distribution F_B. This allows the construction of the sequence of pairs $\{(F_B, N_{F_B}(\tau_t))\}_{t=1}^{T}$ that can be used to quantify the changes in the redistributive effect that would have been observed in the absence of changes in the distribution of market incomes. To derive the distributions of post-fiscal incomes that result from applying the tax and benefit system from different years to the common distribution we make use of the tax-benefit calculator component of MITTS. For these simulations pre-fiscal incomes are inflated (or deflated) to the year of the tax and benefit system being considered by using the wage index base on average earnings for full-time workers provided by the Australian Bureau of Statistics.[15] Where income tax parameters are varied independently of the benefit parameters, the former are also inflated (or deflated) to the year of the benefit parameters by using the same wage index.

Figures 3 to 5 show graphically the results from the fixed-income analysis. In particular, the figures show the observed and simulated trends of key indicators of redistribution for net tax (Figure 3), benefits (Figure 4), and income taxes (Figure 5) for the 1994-2009 period. Figure 3.a shows that net income inequality would have increased between 1994 and 2009 even in the absence of any change in the distribution of market incomes. This is indicated by the upward trend in the Gini index of net income regardless of the base year used for the evaluation. This means that policy reforms implemented over the period contributed to the decline in the redistributive capacity of the tax-benefit system by increasing net income inequality. Figure 3.b suggests that in a scenario with no changes in the distribution of market income, changes in policies would have led to a decline in the redistributive effect of taxes and benefits of about 5 per cent between 1994 and 2007. This means, however, that policy reforms can account only for a small part of the overall decline in redistributive effect over the period, most of which is due to changes in market income distribution.

The results for benefits presented in Figure 4 indicate that reforms to the benefit system cannot account for the large decline in the redistributive effect of benefits over the period. In fact, the simulated series plotted in Figures 4.a and 4.b. show that most of the variation in the redistributive effect and in the average benefit rate observed since 1994 disappear once changes in market incomes are controlled for. In the absence of changes in market incomes, the redistributive effect of benefits would have been reduced by about 5 per cent between 1994 and 2007, well below the 35 per cent fall actually observed in the data. With regards to the size of benefits, the simulated trends indicate that policy changes alone had a limited impact on the average benefit rate with the level of 2009 being

[15] Australian Bureau of Statistics (cat. no. 6302.0, Table 3, series ID A2734023X).

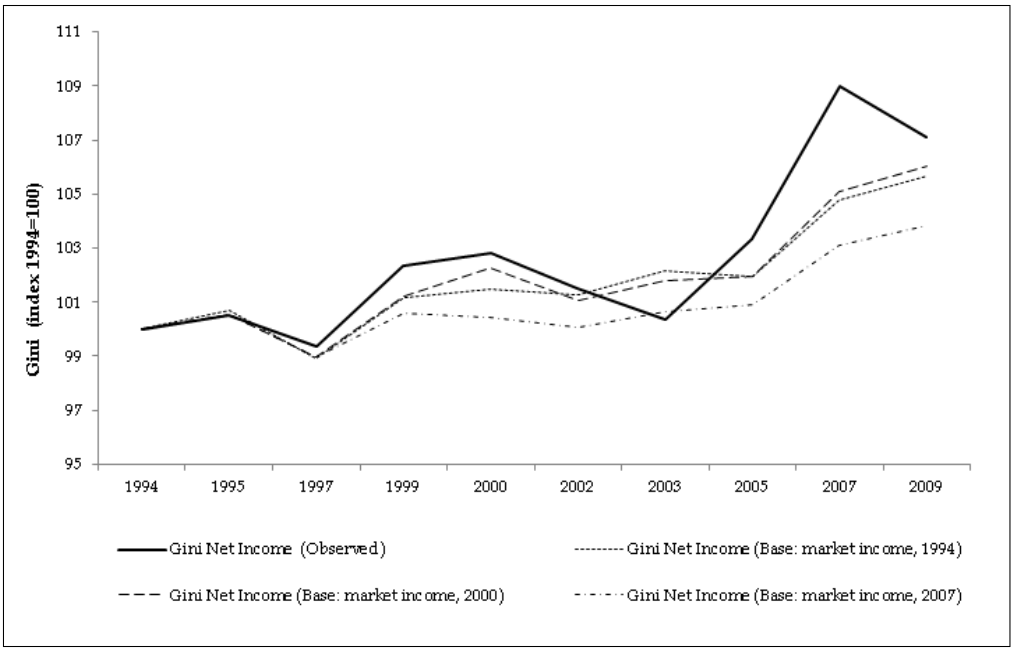
very similar to that in 1994 once changes in market income are accounted for. Again, this implies that the fall in the redistributive effect of benefits was largely driven by changes in market income distribution. This is not particularly surprising as the 1994-2009 period was a period of strong economic growth and increased employment rates, which translated into much less reliance on the income support system. In this context, average benefit rates and their redistributive effect are expected to decrease.

In contrast, the results for taxes shown in Figure 5 indicate that changes to the tax system explain to a large extent the decline in the redistributive effect of taxes over the 1994-2009 period. They show that in the absence of any other changes in the distribution of gross incomes,[16] the redistributive effect of taxes and the average tax rate would have been about 10 to 15 per cent lower by 2009 than in 1994. Reforms to the tax schedule explain this decline. Concretely, the various cuts in marginal tax rates and the increase in the top income thresholds, as well as, the extension of different tax offsets over the period help to explain the reduction in the share of income paid in taxes, despite rapid income growth. Interestingly, however, these policy initiatives cannot explain the decline in tax progressivity observed between 1997 and 2005, although they do explain much of the upward trend in progressivity between 2005 and 2009. In other words, tax reforms, and in particular those introduced between 2005 and 2009, led to a more progressive tax system. Thus, when gross incomes are held fixed, the progressivity of the income tax by 2009 is around 5 to 10 per cent higher than in 1994.

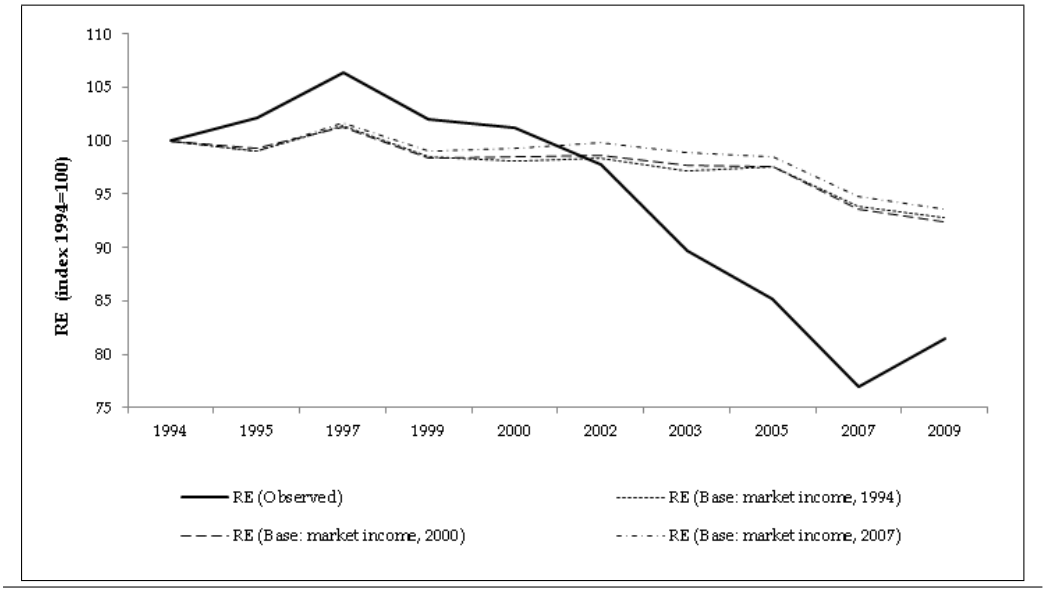
[16]Note that in contrast with benefits and net tax where the policy effect is identified holding the distribution of market income fixed, in the case of income taxes the distribution that is held fixed is that of gross income.

Figure 3 Tax-Benefit Policy Evaluations: Net tax, 1994-2009

a) Gini net income (after tax and benefits)



b) Redistributive effect

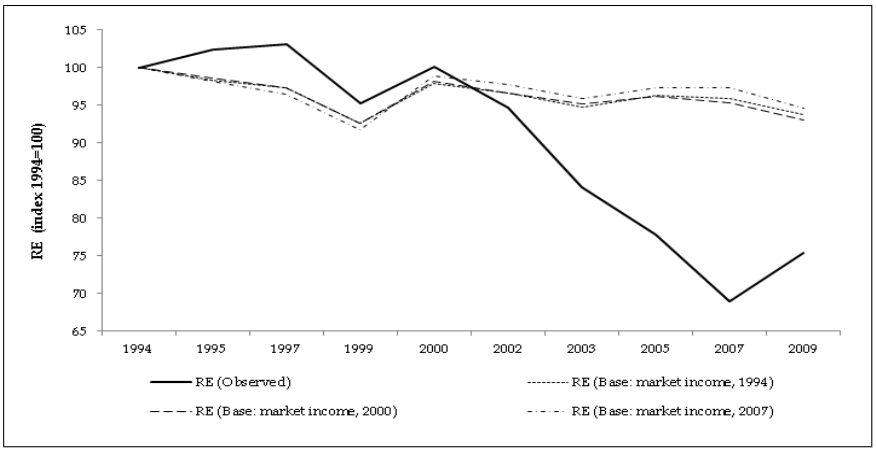


Notes: All series are expressed in index form (1994=100).

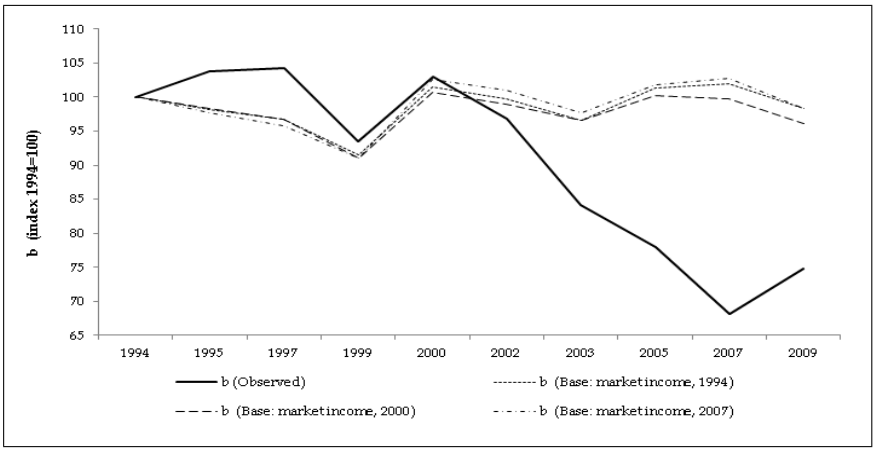
Source: Authors' calculations based on MITTS and SIHC data.

Figure 4. Tax-**Benefit** Policy Evaluations: Benefits, 1994-2009

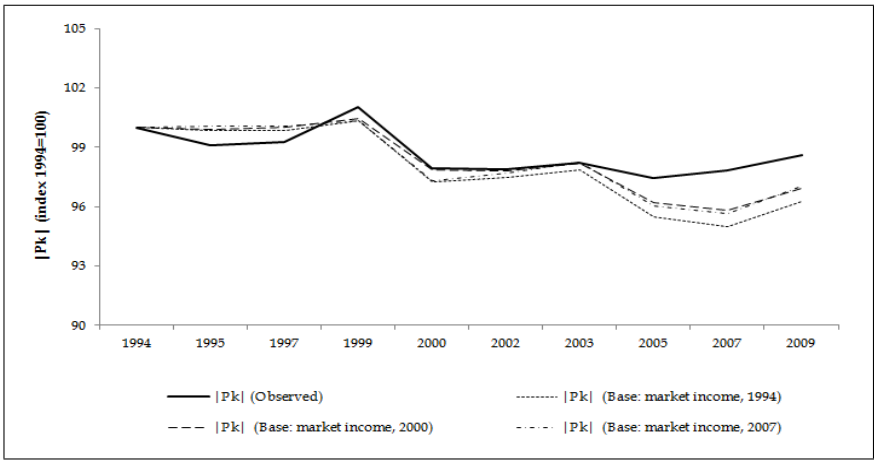
a) Redistributive effect



b) Average benefit rate



c) Progressivity

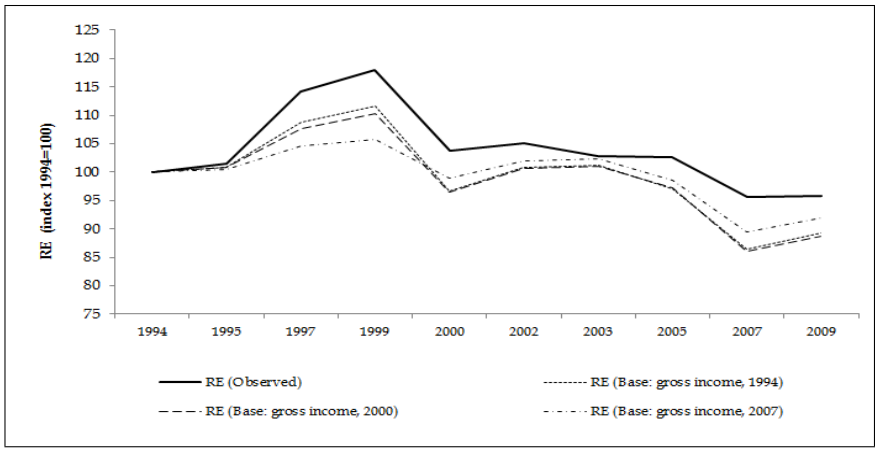


Notes: All series are expressed in index form (1994=100).

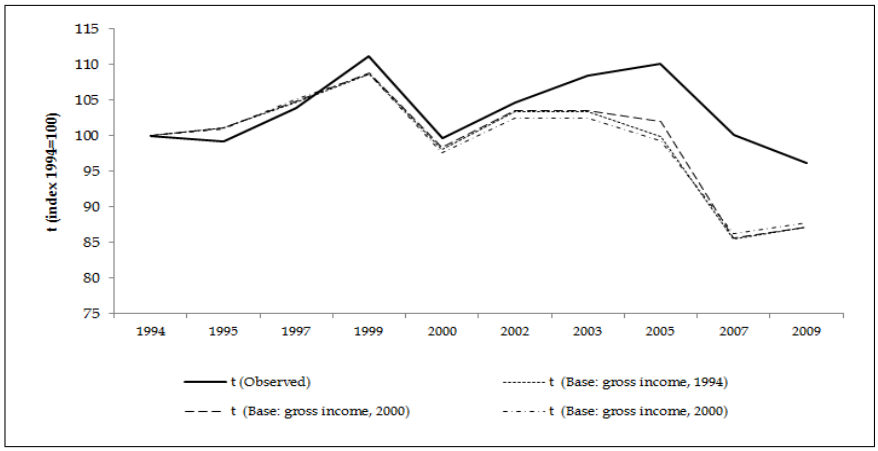
Source: Authors' calculations based on MITTS and SIHC data

Figure 5. Tax-Benefit Policy Evaluations: Tax, 1994-2009

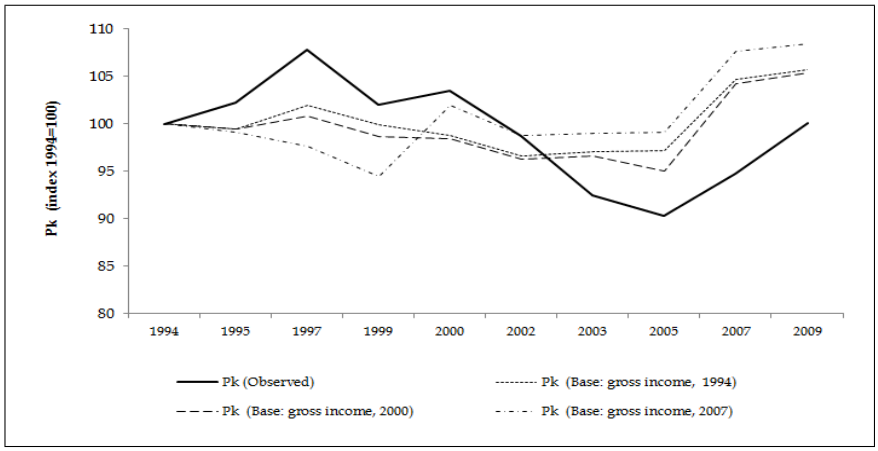
a) Redistributive effect



b) Average tax rate



c) Progressivity



Notes: All series are expressed in index form (1994=100).

Source: Authors' calculations based on MITTS and SIHC data

Conclusions

Over the previous two decades there have been significant changes in the distribution of income in Australia. The rise in average income due to rapid economic growth came along with an increase in net income inequality. This occurred despite the decline in the inequality of market incomes, which poses an interesting question about the redistributive capacity of the tax-benefit system and how it has been affected by the policy reforms implemented over the last twenty years. However, research on the trends in the redistributive impact of taxes and benefits in Australia is very limited. In fact, the recent papers by Whiteford (2010, 2013) and Wilkins (2014) are the only studies that have investigated this issue to date. Besides complementing these studies by presenting the evolution of a broader range of redistributive and progressivity measures between 1994 and 2009, this paper constitutes the first attempt to identify the specific contributions of tax-benefit policy reforms to recent trends in income redistribution.

Consistent with the results from previous studies, we find that the redistributive impact of the tax-benefit system declined in the period between 1994 and 2007. After reaching a peak value in the late 1990s, the net redistributive effect of the system started a steady decline until 2007 so that despite the rise in 2009 the redistributive effect remained nearly 20 per cent lower than in 1994. The analysis show that benefits account for most of the income redistribution in Australia: the contribution of benefits to overall redistribution ranged between 63 and 70 during the period under analysis. However, this contribution started to decline in the early 2000s. This decline was caused by the fall in the size of the benefit system and not by changes in its progressivity. The decline in the demand for welfare payments in a period of employment growth, as well as, the lower growth in welfare payments than in market income, are likely to explain the drop in average benefit rates. Although it is of smaller magnitude, the 1994-2009 period also saw a decline in the redistributive impact of the income tax. In contrast with benefits, this fall cannot be attributed entirely to a single factor as both changes in the average tax rate and in progressivity contributed to it.

We investigate the contribution of the tax-benefit policy reforms since the mid-1990s to the observed decline in income redistribution. Previous studies by Whiteford (2010, 2013) and Wilkins (2014) are descriptive in essence and do not consider the role of policy changes as they are based on summary measures of redistribution that confound changes in the distribution of pre-fiscal income with the impact of policy reforms. We isolate the effect of tax-benefit policies using the fixed-income approach that allows intertemporal comparisons of policies by applying the tax and benefit schemes of different periods to a

common distribution of market incomes. Our results indicate that net income inequality would have increased even in the absence of changes in the distribution of market incomes. This implies that policy reforms contributed to the decline in the redistributive capacity of the fiscal system. However, policy reforms only account for a small part of the decline in income redistribution, most of which was explained by changes in the distribution of market incomes.

Although useful to isolate the immediate impact of policy reforms, the fixed-income analysis provides no insight on the other factors underlying the changes in income redistribution. In particular, it remains silent about the factors behind the changes in market incomes and the extent to which these are induced by behavioral responses to policy reforms. Shedding light on these issues calls for the development of new and more complex analytical approaches. This is the subject of much-needed ongoing research (see Bargain 2012, Creedy and Herault 2011 and Herault and Azpitarte 2014).

References

[1] Atkinson, A.B. and Leigh, A. (2007). The Distribution of Top Incomes in Australia. *Economic Record*, Vol. 83, pp. 247–61.

[2] Australian Senate (2012) Submission to the Senate Inquiry on the adequacy of the allowance payment system for job seekers and others. Prepared by Department of Education, Employment and Workplace Relations, the Department of Families, Housing, Community Services and Indigenous Affairs, the Department of Human Services and the Department of Industry, Innovation, Science, Research and Tertiary Education.

[3] Banks, J., and Johnson, P. (1994). Equivalence scale relativities revisited. *The Economic Journal*, pp. 883-890.

[4] Bargain, O. (2012). Decomposition analysis of distributive policies using behavioural simulations, *International Tax and Public Finance*, 19(5), 708-731.

[5] Bastagli F., Coady D. and Gupta S. (2012). Income Inequality and Fiscal Policy. IMF Staff Discussion Note 12/08. International Monetary Fund.

[6] Costello P. (2006). 2006-07 Budget Speech delivered by the Federal Treasurer to the House of Representatives (http://australianpolitics.com/2006/05/09/peter-costello-2006-federal-budget-speech.html).

[7] Creedy, J., Duncan, A., Harris, M. and Scutella, M. (2002), Microsimulation modelling of taxation and the labour market: The Melbourne Institute Tax and Transfer Simulator, Cheltenham, Edward Elgar.

[8] Creedy, J. and Herault, N. (2011). Decomposing Inequality and Social Welfare Changes: The Use of Alternative Welfare Metrics, WP No. 8/11, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne.

[9] Dardanoni, V., Lambert, P. J. (2002). Progressivity Comparisons. *Journal of Public Economics*, Vol. 86, pp. 99–122.

[10] Dockery, A. M., Ong, R., Flatau, P. and Wood, G. A. (2008). An Analysis of the Impact of Tax and Welfare Reform Measures on Effective Marginal Tax Rates in Australia 1982-2002. *Australian Journal of Labour Economics*, Vol. 11, pp. 203-226.

[11] Goodger, K. and Larose, P. (1999). Changing Expectations: Sole Parents and Employment in New Zealand. *Social Policy Journal of New Zealand,* Vol. 12, pp. 53-70.

[12] Greenville, J., Pobke, C., and Rogers, N. (2013). Trends in the Distribution of Income in Australia. Productivity Commission Staff Working Paper, Canberra.

[13] Gregory, B. (2013). The Henderson Question? The Melbourne Institute and Fifty Years of Welfare Policy. Australian National University, CEPR Discussion Paper Series, No. 682.

[14] Harding, A., Vu, Q. N., Payne, A., and Percival, R. (2009). Trends in Effective Marginal Tax Rates in Australia from 1996–97 to 2006–07. *Economic Record*, Vol. 85, pp. 449-461.

[15] Herault, N. and Azpitarte, F. (2014). Understanding Changes in the Distribution and Redistribution of Income: A Unifying Decomposition Framework, Review of Income and Wealth, *forthcoming*.

[16] Jenkins, S. P., and Cowell, F. A. (1994). Parametric Equivalence Scales and Scale Relativities. *The Economic Journal*, pp. 891-900.

[17] Kakwani, N. C. (1977). Measurement of Progressivity: An International Comparison. *The Economic Journal*, Vol. 87, pp. 71-80.

[18] Kakwani, N. C. (1984). On the Measurement of Tax Progressivity and Redistributive Effect of Taxes with Applications to Horizontal and Vertical Equity. *Advances in Econometrics*, Vol. 3, pp. 149-168.

[19] Kalb, G. (2002). Estimation of Labour Supply Models for Four Separate Groups in the Australian Population", Melbourne Institute Working Paper Series no. 24/02, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne.

[20] Kalb, G. and Scutella, R. (2002) Estimation of Wage Equations in Australia: Allowing for Censored Observations of Labour Supply. Melbourne Institute Working Paper Series no. 8/2002, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne..

[21] Kasten, R., Sammartino, F., and Toder, E. (1994). Trends in federal tax progressivity. In J. Slemrod (Ed.), Tax Progressivity and Income inequality. Cambridge: Cambridge University Press.

[22] Kim, K. and Lambert, P. J.(2009). Redistributive Effect of U.S. Taxes and Public Transfers, 1994-2004. *Public Finance Review*, Vol. 37, pp. 3–26, 2009.

[23] Lambert, P. J. (2001). The distribution and redistribution of income (3rd ed.), Manchester: Manchester University Press.

[24] Lambert, P. J. and Thoresen, O. T. (2009). Base Independence in the Analysis of Tax Policy Effects: with an Application to Norway 1992–2004. I*nternational Tax and Public Finance*, Vol. 16 , pp. 219-252.

[25] Reynolds, M. and Smolensky, E. (1977). *Public Expenditures, Taxes and the Distribution of Income: The United States 1950, 1961, 1970*. Academic Press, New York.

[26] Thoresen, T. O. (2004). Reduced Tax Progressivity in Norway in the Nineties. The Effect from Tax Changes. *International Tax and Public Finance*, Vol. 11, pp. 487–506.

[27] Thoresen, T. O., Bø E. E., Fjærli E., and E. Halvorsen (2012). A Suggestion for Evaluating the Redistributional Effects of Tax Changes: With an Application to the 2006 Norwegian Tax Reform. *Public Finance Review*, Vol. 40, pp. 303–338.

[28] Tran-Nam, B., Addison, G., Andrew, B., Drum, P. and Evans, C. (2006). Personal Income Tax Reform in Australia: The Way Forward. *Australian Tax Forum*, Vol. 21, pp. 441–63.

[29] Urban, I (2009). Kakwani Decomposition of Redistributive Effect: Origins, Critics and Upgrades. Working Papers 148, ECINEQ, Society for the Study of Economic Inequality.

[30] Urban, I. and Lambert, P. J. (2008). Redistribution, Horizontal Inequity and Reranking: How to Measure them Properly. *Public Finance Review*, Vol. 36, pp. 63-87.

[31] Whiteford, P. (2010). The Australian Tax-Transfer System: Architecture and Outcomes. *Economic Record*, Vol. 86, pp. 528-544.

[32] Whiteford, P.(2013). Australia: Inequality and Prosperity and their Impacts in a Radical Welfare State. Crawford School of Public Policy, Australian National University, Canberra.

[33] Wilkins, R. (2014). Evaluating the Evidence on Income Inequality in Australia in the 2000s, *The Economic Record*, 90 (288), pp. 63-89.