



FACULTY OF
BUSINESS &
ECONOMICS

Melbourne Institute Working Paper Series

Working Paper No. 2/14

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for the Decline in Redistribution?

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Melbourne Institute Working Paper No. 2/14

ISSN 1328-4991 (Print)

ISSN 1447-5863 (Online)

ISBN 978-0-7340-4341-2

January 2014

* 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 Spanish Ministerio de Ciencia e Innovación (grants ECO2008-03484-C0201/ECON and ECO2010-21668-C03-03) and the Xunta de Galicia (10SEC300023PR). Correspondence to: Nicolas Herault, <nherault@unimelb.edu.au>.

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Abstract

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

JEL classification: H23, J22, D31

Keywords: Taxes and transfers, income inequality, progressivity, redistributive effect

1 Introduction

Over the last two decades, Australia has witnessed important economic changes. In particular, this was a period of sustained and strong economic growth that 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 2013, 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 transfer system. In fact, the last two decades saw the implementation of important fiscal reforms, which included, among other things, several cuts in the two top marginal tax rates and significant increases in the top income tax 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). Interestingly, despite the potential distributional implications of these initiatives, the recent trends in redistribution and the contribution of the fiscal reforms to the worsening of the income distribution remains an unexplored issue. It is the main aim of the present paper to fill this gap in two steps.

First, we study the trends in the redistributive impact of the income tax and transfer system in Australia between 1994 and 2009. We follow the measurement framework and methods outlined in Urban and Lambert (2008) and Kim and Lambert (2009) that permit to quantify the separate contributions of taxes and transfers to overall income redistribution, as well as, the respective roles of the size and progressivity of taxes and transfers. Time-trends in income redistribution are estimated making use of the various editions of the Australian Survey of Income and Housing Cost (SIHC) conducted between 1994 and 2009. The rich socioeconomic and income data collected in the SIHCs 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 are computed avoiding potential measurement errors due to recall bias or approximate imputation in survey data. The estimated time series reveal important changes in the redistributive impact of the Australian tax-transfer 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 impact of benefits.

The second goal of this paper is to assess the role of tax-transfer policy reforms in explaining the trends in income redistribution and income inequality. The 1994-2009 pe-

riod saw important changes to the income-tax schedule, as well as the implementation of policy packages like the Working Nation package of 1994, the 2003 Australians Working Together package, and the 2006 Welfare to Work package which all introduced significant changes to the income support system. As shown in Section 5, 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 these policy reforms over the recent decades is limited. Whiteford (2013, p. 39) computes the redistributive effect of income taxes and transfers between 1981 and 1996 and finds little change over that period. Using data from the SIHC and the HILDA survey, Wilkins (2013, p. 38-41) shows that the redistributive impact of taxes and transfers somewhat decreased between 1994 and 2009. These works, however, are completely uninformative about the distributive consequences of policy reforms as they examine the trends in income redistribution without controlling for the important transformations in the distribution of market income that occurred over the period. Here the main contribution of this paper is to provide a clear assessment of the impact of these policy reforms on income redistribution. Using the *fixed-income* approach proposed by Kasten *et al.* (1994), we derive time-trends in the redistributive effects and in the progressivity of taxes and transfers in the absence of changes in the distribution of market incomes. This is done by applying the tax and transfer schemes of different periods to a common distribution of income which allows intertemporal comparisons of tax-transfer policies while controlling for concomitant changes in market incomes. We find that although their impact was limited, the reforms to the tax-transfer system contributed to the decline in the redistributive impact in the 2000s. Moreover, this result holds regardless of the distribution of incomes taken as reference.

The paper is organised as follows. Section 2 presents the measurement framework used to derive trends in income redistribution and its vertical, horizontal and reranking components. 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 redistributive effect of the tax-transfer 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 analyse the changes in the redistributive impact of the Australian tax-transfer system using decomposition techniques that permit to quantify the separate contributions of taxes and transfers to overall redistribution. As it is common in the literature on income redistribution, we focus our analysis on Gini-based measures.¹ For the present analysis, we adopt the notation used by Kim and Lambert (2009) and express the redistributive effect of taxes, benefits, or net taxes (taxes minus benefits) as:

$$RE = G_X - G_N, \quad (1)$$

where G_X and G_N are, respectively, the Gini indices of pre-fiscal income and post-fiscal income after tax, benefit, or net tax. Kakwani (1984) proposed the following decomposition of the redistributive effect:

$$RE = V^K - R, \quad (2)$$

where V^K is the vertical effect of redistribution net of reranking and R is the overall level of reranking introduced by taxes, benefits, or net taxes. Reranking occurs when there are changes in the ranking of tax units by incomes in the transition from pre- to post-fiscal incomes. The Kakwani's measure V^K is interpreted as the inequality reducing effect that one would be observed if there was no reranking in the transition from pre- to post-fiscal incomes. As shown by Kakwani (1977), in the absence of reranking the vertical component of taxes or transfers, when these are considered separately, is given by:

$$V^K = G_X - C_N = \frac{g}{1-g} P^K, \quad (3)$$

where C_N is the concentration index of net income, g is the average tax or benefit rate, and P^K is Kawani's measure of progressivity.² In the case of the net tax, Lambert (1985) shows that the net vertical effect depends exclusively on the average levels and progressivity of taxes and transfers and it can be expressed as:

¹For a review of the decompositions methods that have been proposed to evaluate the redistributive effect of fiscal systems see Urban (2009).

²This 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 transfers, a negative value of the index indicates progressivity. This is because progressive transfers are more concentrated at the bottom so that its concentration curve is above that of income.

$$V^K = \underbrace{\frac{tP_T^K}{1-t+b}}_{S_T} + \underbrace{\frac{b|P_B^K|}{1-t+b}}_{S_B}, \quad (4)$$

where S_T and S_B denote, respectively, the contribution of taxes and benefits to the net vertical effect, t and b are the average tax and benefit rates as measured by the proportion of income accounted by taxes and benefits, P_T^K is the progressivity of taxes, and $|P_B^K|$ is the absolute value of the progressivity index for benefits.³

Further, we follow the methods outlined in Urban and Lambert (2008) to separate out the contribution of horizontal inequity from the vertical component, where horizontal inequity is the unequal treatment of tax units with the same pre-fiscal income (i.e., the unequal treatment of equals). In particular, they propose to break down V^K into:

$$V^K = V - H. \quad (5)$$

Here, V is the vertical effect that would remain once the horizontal inequity induced by the unequal treatment of equals, H , is eliminated. Thus, the term V is the potential redistributive effect that would be observed if the reranking and the horizontal inequities in the system were eliminated. The estimation of the horizontal contribution requires the definition of close equal groups (CEGs) in terms of equivalised pre-fiscal income for which a bandwidth is needed. Following van den Ven, Creedy, and Lambert (2001, 381), we use an optimal bandwidth that maximizes the vertical component V .

Given a set of CEGs, the horizontal component can be derived as:

$$H = C_N - C_{\tilde{N}}, \quad (6)$$

where $C_{\tilde{N}}$ is the concentration index of a counterfactual post-fiscal income distribution derived assuming that all units in a CEG face common tax and transfer rates equal to the ratio of taxes and transfers to total pre-fiscal income for that particular CEG.⁴ Thus, by measuring the departure of actual post-fiscal incomes from those generated by a fiscal system that is horizontal inequity-free within CEGs, the measure H is consistent with the notion of horizontal inequity followed by King (1983) and Jenkins (1994). The

³As shown in Lambert (1985), in contrast with the vertical component V^K , Kakwani's measure of progressivity, P^K , cannot be decomposed into the separate contributions of taxes and transfers to the overall progressivity.

⁴In the case of net tax, the sign of the transformation depends on the difference between the total transfers and taxes paid by the CEG. For more details on how to compute the horizontal component see Urban and Lambert (2008).

combination of equations (2), (5), and (6) leads to the following decomposition of the redistributive effect:

$$RE = V - H - R, \tag{7}$$

proposed in Urban and Lambert (2008). These authors recommend the use of this decomposition because, as they show, this is the only decomposition of RE into vertical, horizontal, and reranking components that takes into account all forms of reranking that have been identified in the literature. The reranking term in (7), R , is equal to the contribution of reranking in Kakwani's decomposition (2) and it captures the reordering of income units within CEGs, the reranking of entire CEGs, and also the shuffle of units across CEGs in the transition from pre to post-fiscal income.⁵ In practice, the reranking term is computed as a residual after the computation of the horizontal and vertical components.

3 Data Sources and Methods

To study the trends in the redistributive impact of the income tax and transfer system in Australia between 1994 and 2009 we use the various editions of the Australian Survey of Income and Housing Cost (SIHC) conducted over that period. 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 SIHCs provide rich information on the various components of labour and capital income that we use to generate our measure of pre-fiscal income. 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. MITTS allows the derivation of all major social security transfers, 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. Transfers 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,

⁵Following the work by Aronson, Johnson, and Lambert (1994), various decompositions of the redistributive effect have been proposed in the literature. However, as shown in Urban and Lambert (2008) these decompositions fail to account for the within and entire group forms of reranking.

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 unit of analysis throughout 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 $\delta = 0.8$. These values produce scales that are similar to the OECD scales.

Following Kim and Lambert's (2009) analysis of the U.S. tax-transfer system, we consider market income as our pre-fiscal income variable for the computation of the redistributive effect of the net tax and benefits, whereas for income taxes the pre-fiscal variable is gross income defined as the sum of market income plus benefits. Table 1 shows the correspondence between pre and post-fiscal variables and the different income variables for taxes, benefits and net taxes. Market income 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. Gross income and net income (after tax and transfers) values are derived using the tax amounts and transfer payments calculated by MITTS. Lastly, all the results are aggregated to the population level using the weights provided with the SIHCs.

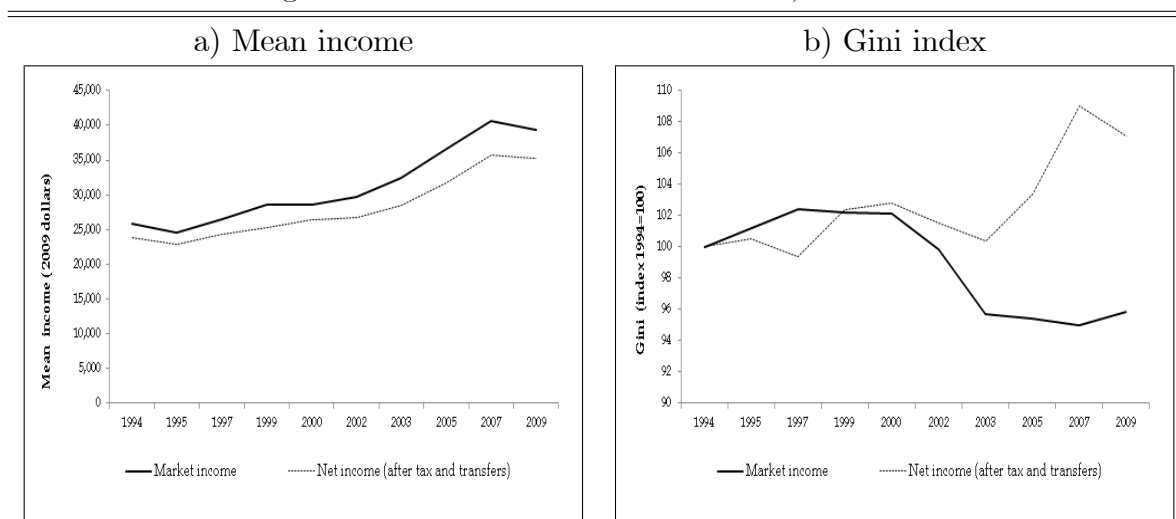
Table 1. Income variables

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

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 the average real incomes. As Figure 1 shows, there was an important 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 it has been documented elsewhere (Wilkins 2013, 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. As shown in Figure 1, 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 improvement in the distribution of market income. 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 its 1994 value. Thus, although income taxes and transfers contributed to a more equal distribution of income in each year (the Gini index for net income is always below that of market income), the diverging trends in market and net income 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 equalised 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 effect of taxes, transfers, and net tax between 1994 and 2009. In each case, the redistributive effect (RE) and the vertical (V), the horizontal (H), and the reranking (R) components are shown. Moreover, the table includes Kakwani's measures of progressivity (P^K) and vertical effect (V^K) and, in the case of net tax, the separate contributions of taxes and benefits to V^K are also reported. For the definition of the close equal groups involved in the decomposition of the redistributive effects we use those bandwidths that maximize the value of V . For 2009, it was found that in the case of taxes, transfers, and net tax, the preferred bandwidths were \$50, \$75, and \$100, respectively.⁶ Following Kim and Lambert (2009) we use these bandwidths in the computations for the other years after adjusting for inflation using the Consumer Price Index produced by the Australian Bureau of Statistics.

Our estimates show important changes in income redistribution between 1994 and 2009. After reaching a maximum value in the late 1990s, when the net redistributive effect RE of the combined tax and transfer system was above 0.22, a steady decline started so that it had fallen to around 0.18 by 2009.⁷ This trend was driven by the changes in the vertical and horizontal components of redistribution. In the case of the vertical effect, a substantial decline in both V^K and V occurred after 1997 with the value of these two measures reaching their minimum in 2007. We find that the unequal treatment of close equals enhanced the redistributive impact of the net tax in most year as suggested by the negative values of H . However, this contribution steadily declined over the period and turned positive in 2007 when horizontal inequities started to reduce, rather than increase, the redistributive impact of net taxes. Our estimates based on the optimal bandwidths indicate that the effect of reranking was fairly constant in the period under analysis and that removing the reranking induced by the fiscal system would increase the redistributive impact of the net tax by less than 3 per cent.

Estimates of the separate contributions of taxes and transfers (S_T and S_B) to the vertical redistribution of the net tax suggest that transfers account for most of the redistribution achieved by the fiscal system. 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 advanced economies, with the notable exception of the US where the tax system plays a large role in income redistribution (Bastagli *et al.*

⁶For the maximization, a grid of bandwidth values given by the sequence $\{5, 10, \dots, 1000\}$ was considered.

⁷To check the robustness of the 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 (2013) for a comparison of the time-trends in income redistribution using SIHC and HILDA data.

2012).

Table 2 shows that the contribution of benefits to vertical redistribution was above 80 per cent in most years between 1994 and 2009. However, both the absolute and relative contribution of income transfers started to decline in the early 2000s so that the equalizing effect of transfers by the end of the decade was at its lowest level in the period under examination. The figures on the separate redistributive impact of taxes and benefits reported in the upper part of the table suggest that the decline in the equalizing effect of benefits can be almost entirely attributed to the fall in the average transfer rate: after a period of stability between 1994 and 2000, the transfer rate declined from 16.7 in 2001 to 11 per cent in 2007, the lowest recorded level of the period. In other words, it is the size of the transfer system that was reduced, not its level of progressivity. Note that the reduced size of the transfer system is to be expected during periods of rapid economic growth. By contrast, the economic slowdown following the Global Financial Crisis of 2008 certainly explain most of the uptick in the size and in the redistributive effect of the transfer system between 2007 and 2009.

The changes in the redistributive effect of the income tax system were of smaller magnitudes. However, by 2009 its redistributive effect was below the peak level observed in the late 1990s. This decline was mostly driven by the fall in the vertical equity of the income tax observed since 1999, whereas the average tax rate remained fairly stable. Hence, in contrast to the evolution of the benefit system, it is the reduction in tax progressivity rather than changes in the size of the tax system that explains the decline in its redistributive effect. Indeed, tax progressivity as measured by Kawani's disproportionality index P^K declined from 0.27 in 1997 to 0.23 in 2005 and, despite increases in the following years, by 2009 tax progressivity was still below its level at the start of the decade.

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

Tax (T)								
Year	RE	t	P_T^K	V^K	$V(\%)$	$H(\%)$	$R(\%)$	
1994	0.064	20.9	0.251	0.066	0.067 (103.8)	0.001 (1.1)	0.002 (2.7)	
1995	0.065	20.7	0.256	0.067	0.068 (103.6)	0.001 (1.2)	0.002 (2.4)	
1997	0.074	21.7	0.270	0.075	0.075 (101.3)	-0.000 (-0.4)	0.001 (1.7)	
1999	0.076	23.2	0.256	0.077	0.077 (100.8)	-0.001 (-0.9)	0.001 (1.8)	
2000	0.067	20.8	0.260	0.068	0.069 (102.4)	0.000 (0.4)	0.001 (2.0)	
2002	0.068	21.9	0.248	0.069	0.070 (103.2)	0.001 (1.0)	0.001 (2.2)	
2003	0.066	22.7	0.232	0.068	0.068 (102.8)	0.000 (0.4)	0.002 (2.4)	
2005	0.066	23.0	0.226	0.068	0.068 (102.9)	0.000 (0.7)	0.001 (2.1)	
2007	0.062	20.9	0.237	0.063	0.064 (104.0)	0.001 (2.1)	0.001 (1.9)	
2009	0.062	20.1	0.251	0.063	0.065 (105.1)	0.002 (3.0)	0.001 (2.1)	

Benefits (B)								
Year	RE	b	$ P_B^K $	V^K	$V(\%)$	$H(\%)$	$R(\%)$	
1994	0.152	16.2	1.107	0.154	0.138 (91.1)	-0.015 (-10.1)	0.002 (1.2)	
1995	0.156	16.8	1.097	0.157	0.151 (97.2)	-0.006 (-3.9)	0.002 (1.1)	
1997	0.157	16.9	1.099	0.158	0.145 (92.4)	-0.013 (-8.7)	0.002 (1.1)	
1999	0.145	15.1	1.118	0.147	0.134 (92.6)	-0.012 (-8.7)	0.002 (1.3)	
2000	0.152	16.7	1.084	0.155	0.141 (92.4)	-0.014 (-9.2)	0.002 (1.6)	
2002	0.144	15.7	1.083	0.146	0.144 (99.9)	-0.002 (-1.9)	0.002 (1.8)	
2003	0.128	13.6	1.087	0.130	0.129 (100.7)	-0.001 (-1.1)	0.002 (1.7)	
2005	0.118	12.6	1.078	0.121	0.118 (99.3)	-0.003 (-2.6)	0.002 (1.9)	
2007	0.105	11.0	1.083	0.107	0.111 (105.5)	0.003 (3.2)	0.002 (2.3)	
2009	0.115	12.1	1.091	0.118	0.123 (107.8)	0.006 (5.2)	0.003 (2.6)	

Net Tax (T-B)								
Year	RE	$t - b$	V^K	$S_T(\%)$	$S_B(\%)$	$V(\%)$	$H(\%)$	$R(\%)$
1994	0.217	8.1	0.221	0.026 (11.9)	0.195 (88.1)	0.201 (92.9)	-0.019 (-9.2)	0.004 (2.1)
1995	0.221	7.4	0.226	0.026 (11.8)	0.199 (88.2)	0.217 (97.9)	-0.009 (-4.1)	0.004 (2.0)
1997	0.230	8.5	0.234	0.031 (13.5)	0.202 (86.5)	0.216 (93.7)	-0.018 (-8.0)	0.004 (1.7)
1999	0.221	11.6	0.225	0.033 (15.1)	0.191 (84.9)	0.208 (94.0)	-0.017 (-7.9)	0.004 (1.9)
2000	0.219	7.6	0.224	0.028 (12.8)	0.195 (87.2)	0.206 (94.1)	-0.017 (-8.1)	0.004 (2.2)
2002	0.212	9.6	0.217	0.029 (13.6)	0.188 (86.4)	0.213 (100.5)	-0.004 (-2.0)	0.005 (2.5)
2003	0.194	12.1	0.199	0.030 (15.4)	0.168 (84.6)	0.197 (101.3)	-0.002 (-1.2)	0.004 (2.5)
2005	0.185	13.3	0.189	0.032 (17.1)	0.157 (82.9)	0.185 (100.4)	-0.003 (-2.1)	0.004 (2.5)
2007	0.166	12.2	0.171	0.035 (20.5)	0.136 (79.5)	0.176 (105.7)	0.005 (3.0)	0.004 (2.6)
2009	0.176	10.4	0.182	0.034 (18.9)	0.147 (81.1)	0.189 (107.3)	0.007 (4.4)	0.005 (2.9)

Notes: RE is the redistributive effect; t and b are the average tax and transfer rates; P^K and V^K are Kakwani's indices of progressivity and vertical effect; $S_T(\%)$ and $S_B(\%)$ show the contributions of taxes and transfers to V^K as proportion of V^K in the case of the net tax; $V(\%)$, $R(\%)$, and $H(\%)$ are the vertical, horizontal, and reranking components expressed as proportion of RE .

Source: Authors' calculations based on MITTS and SIHC data

5 The Role of Tax-Transfer Policies

5.1 The Australian Tax-Transfer 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. However, unlike other liberal systems where the transfer system is financed by contributions from employers, welfare payments in Australia are only funded from general taxation revenue as there are no social security contributions. 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 while 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 2005, 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 has remained since then. 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 1994 dollars, the latter went from \$50,000 in 1994 to \$71,128 in 2005 and to \$119,759 in 2009. Changes were also significant in the second top rate 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 in the 1994-2009 period which means that low-income tax payers were affected by bracket-creeping. To mitigate this effect, the coverage of certain tax offsets, in particular the Low Income Tax Offset, were extended.

The period between 1994 and 2009 also saw important reforms to the income support system. The *Working Nation* package in 1994, the *Australians Working Together* package of 2003, 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-transfer system did not lead to a reduction in the marginal effective tax rates (METRs) faced by families, perhaps because of the large income growth over the period. Harding *et al.*(2009) and Dockerey and Flatau (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 pension 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.⁸

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 the results, however, an explanation of how the budget constraints

⁸Since the late 1990s allowances are 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).

were constructed is in order. 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.⁹ 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.¹⁰ The budget constraints shown in Figure 2 were derived by applying this method on data from the 2007/08 SIHC and by averaging over working-age individuals using sample weights. Two sets of budget constraints are presented, corresponding to those obtained using the tax and transfer systems of 2007/08 and 1999/2000, respectively.¹¹

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 whereas they either did not affect it at low-income levels, or even reduced it in the case of singles. This came along 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

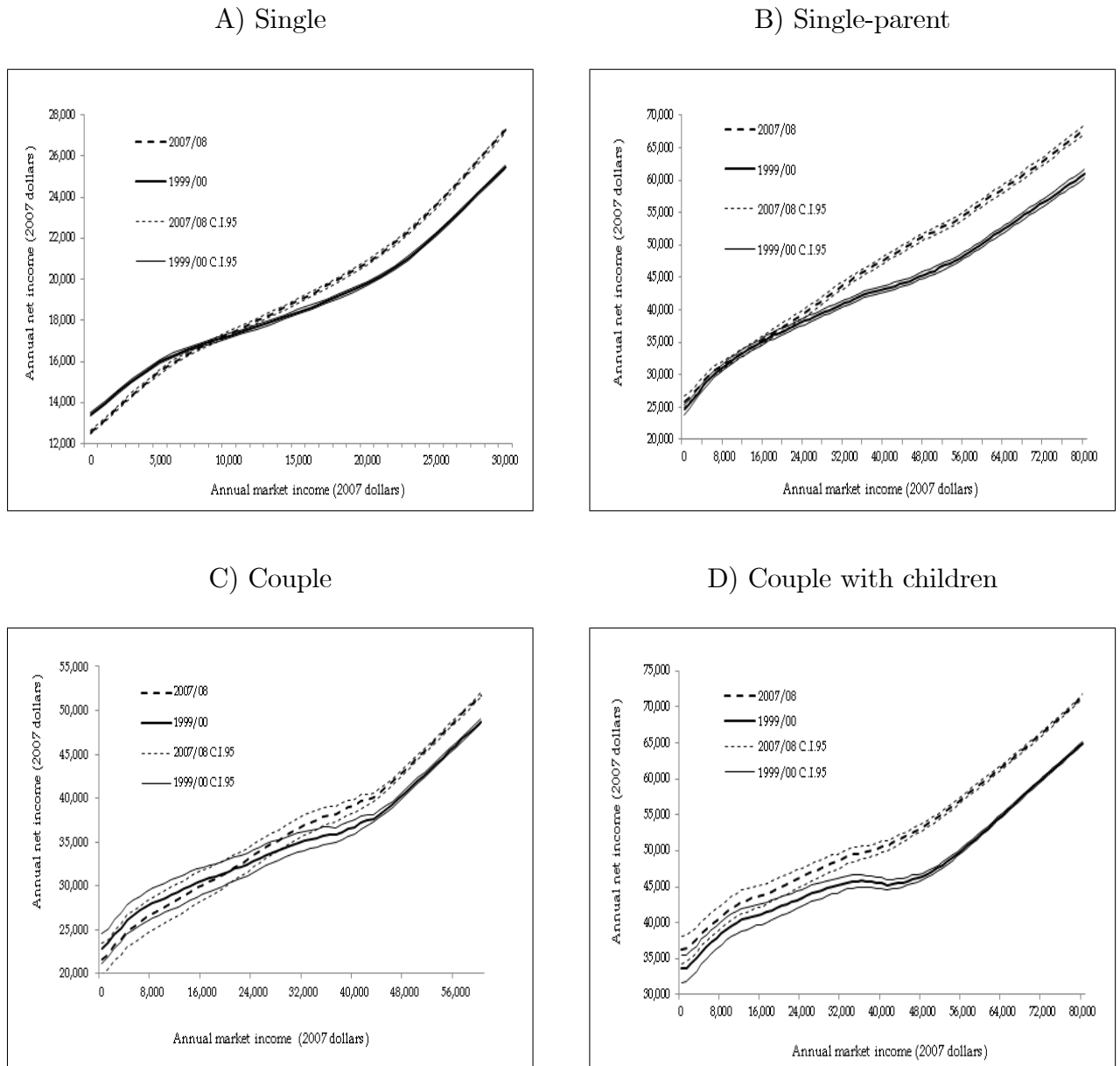
⁹For those not in work, predicted wages are used, which are derived from a Mincer equation. Details of the first set of wage (and labour supply) parameters used in MITTS can be found in Kalb and Scutella (2002) and Kalb (2002).

¹⁰For 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.

¹¹All the payment rates and thresholds from the tax and transfer 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 transfer system may seem more generous than the 2007/08 system at low levels of market income in Figure 2. Hence, at least at low income levels, the interest of these budget constraints lies more on the slopes of the budget constraints than on their absolute levels.

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 important factors that contributed to this trend. This suggests that these reforms contributed to an increase in disposable income inequality.

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



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 important 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 transfers 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 Thorensen 2004, Lambert and Thorensen 2009, Thorensen *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 transfer schemes of different periods to this distribution of reference.¹²

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 important 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-transfer 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

¹²Dardadoni 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 $t = 1, \dots, T$ 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 impact that would have been observed in the absence of changes in the distribution of market incomes. To derive the distribution of post-fiscal variables that results from applying the tax and transfer 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 transfer system being considered by using the wage index base on average earnings for full-time workers provided by the Australian Bureau of Statistics.¹³ 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-transfer 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 transfers 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 therefore due to changes in market income distribution.

The results for benefits presented in Figure 4 indicate that reforms to the transfer 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 impact 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 impact of transfers 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. As regards the size of benefits, the simulated trends indicate that policy changes alone had a limited impact on the average transfer rate with the level of 2009 being very

¹³Australian Bureau of Statistics (cat. no. 6302.0, Table 3, series ID A2734023X).

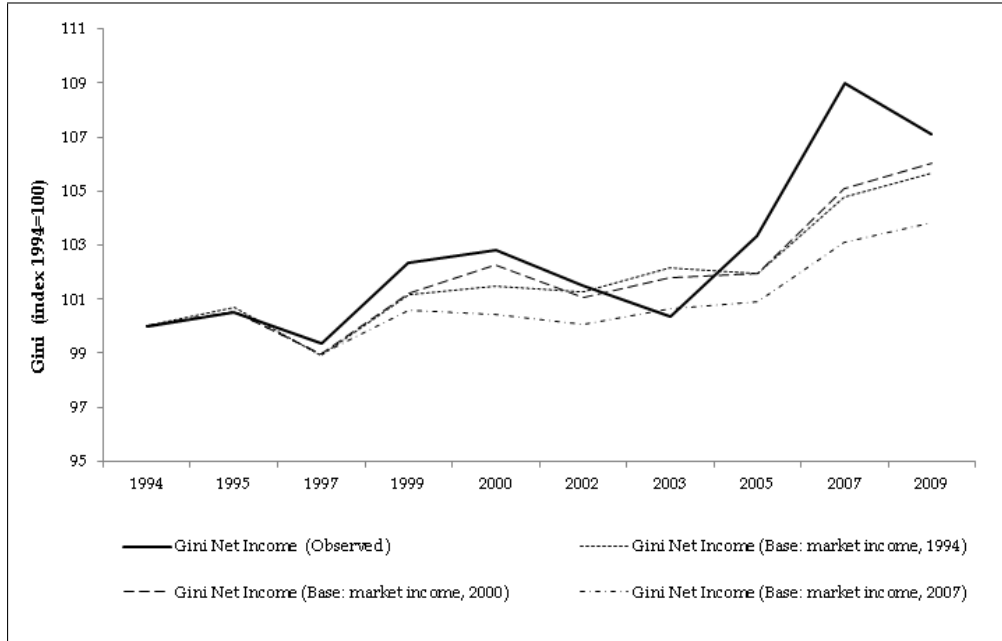
similar to that in 1994 once changes in market income are accounted for. Again, this implies that the fall in the redistributive impact of benefits was largely driven by changes in market income distribution. This is not particularly surprising as the 1994-2009 period was a period of strong economic 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 impact of taxes over the 1994-2009 period. They show that in the absence of any other changes in the distribution of gross incomes,¹⁴ the redistributive impact 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.

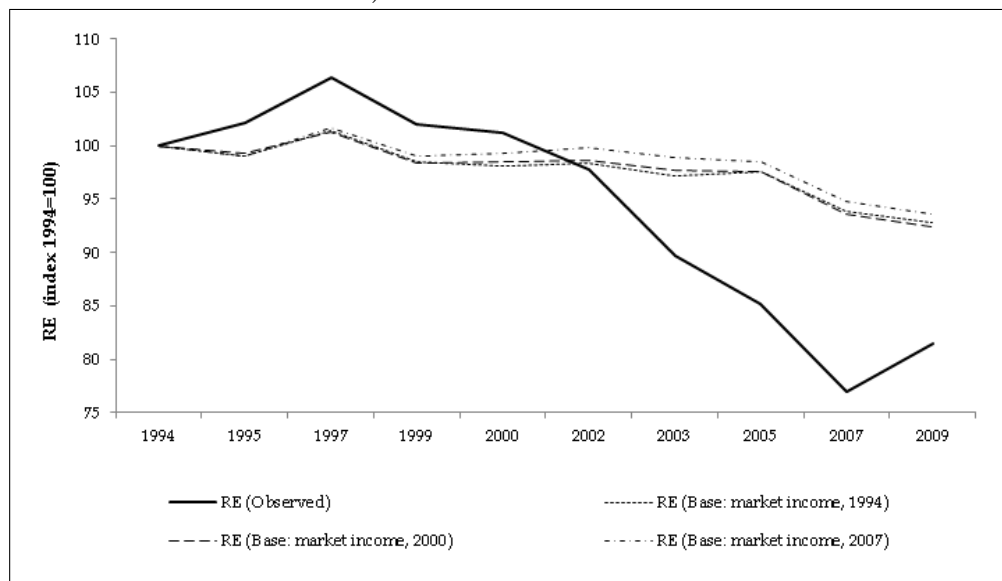
¹⁴Note that in contrast with benefits and net tax where the policy effect is identified holding the distribution of market income fixed, in the case of income taxes the distribution that is held fixed is that of gross income.

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

a) Gini net income (after tax and benefits)



b) Redistributive effect

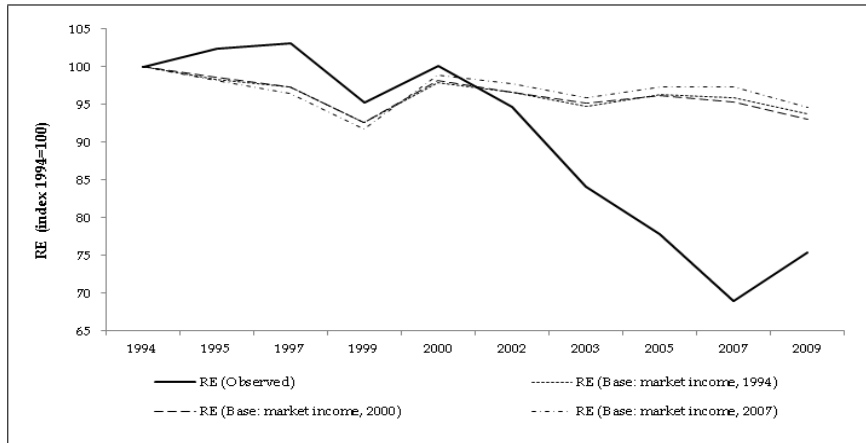


Notes: All series are expressed in index form (1994=100).

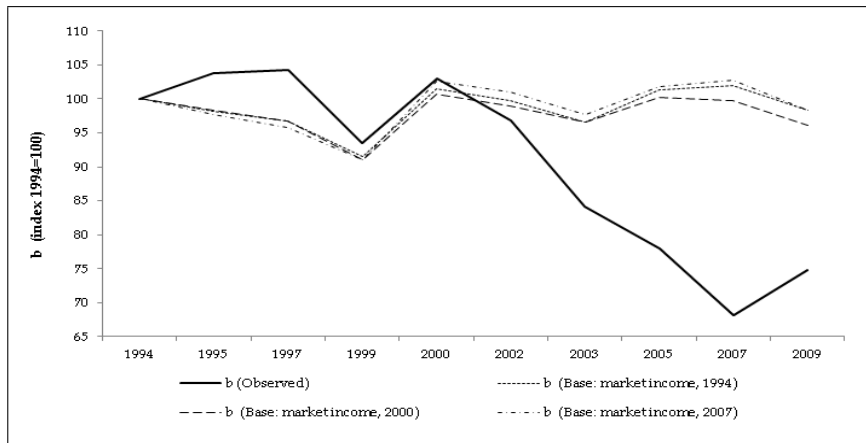
Source: Authors' calculations based on MITTS and SIHC data.

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

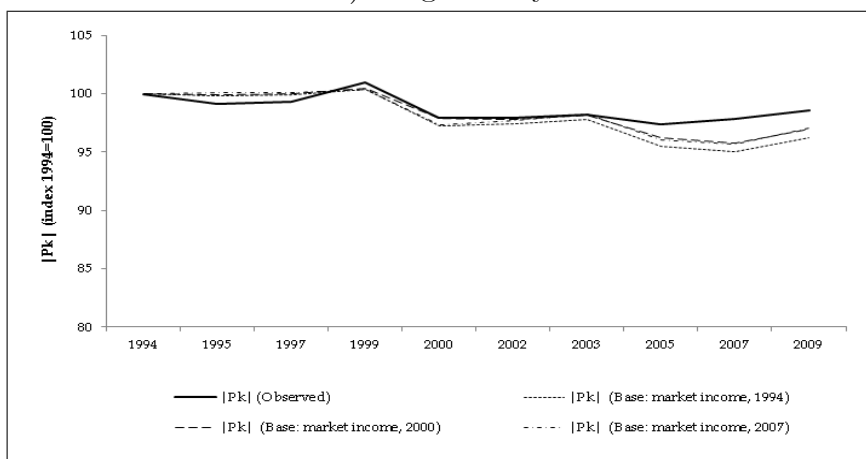
a) Redistributive effect



b) Average benefit rate



c) Progressivity

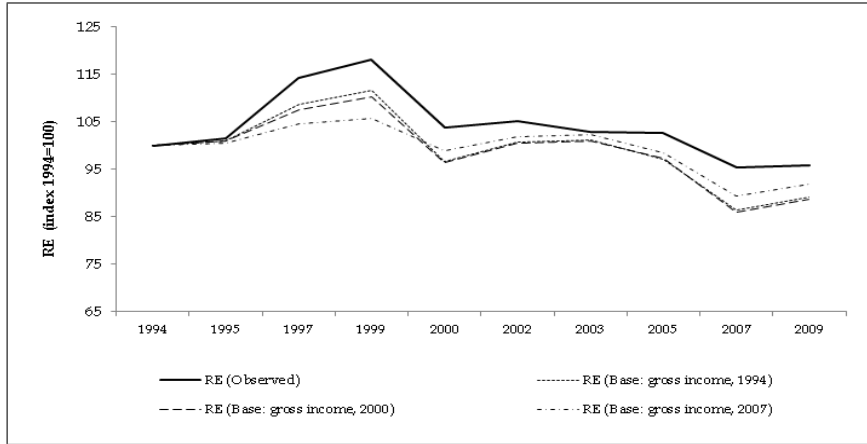


Notes: All series are expressed in index form (1994=100).

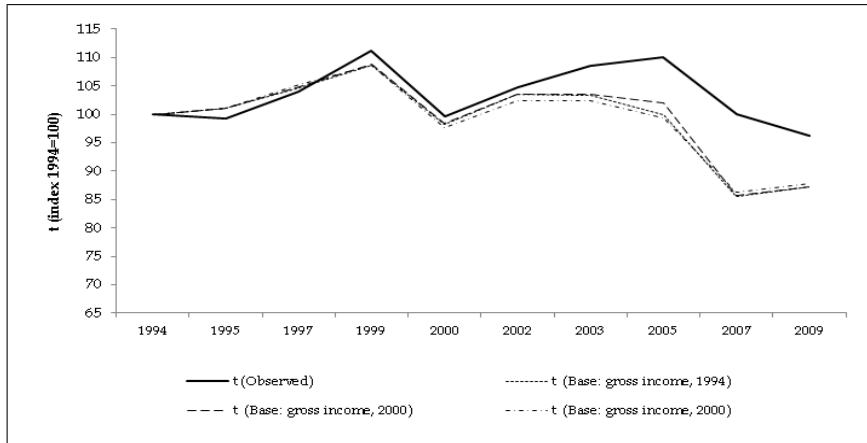
Source: Authors' calculations based on MITTS and SIHC data

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

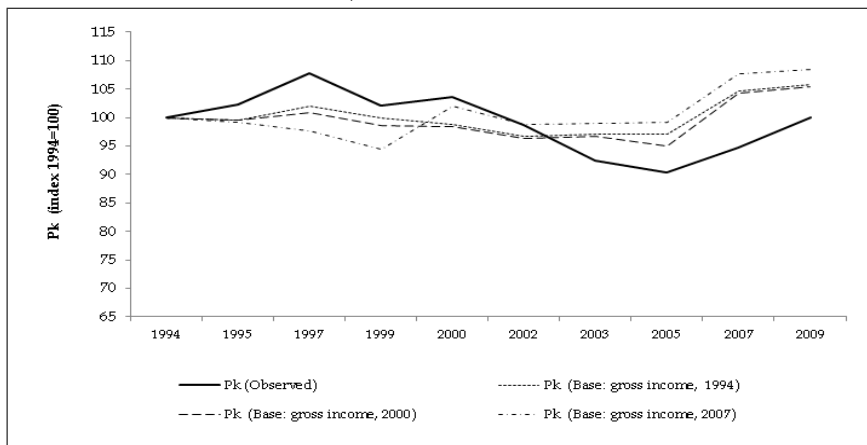
a) Redistributive effect



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 last two decades there has 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 improvement in the distribution of market income, which poses an interesting question about the redistributive capacity of the tax-transfer system and how this has been affected by the policy reforms implemented over the last twenty years. Despite its relevance, however, research on the trends in the redistributive impact of taxes and benefits in Australia is very limited. In fact, the recent works by Whiteford (2010, 2013) and Wilkins (2013) 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-transfer policy reforms to recent trends in income redistribution.

Consistent with the results from previous studies, we find that the redistributive impact of the tax-transfer 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 in the 2000s so that the redistributive impact by 2009 was about 20 per cent lower than in 1994. The decomposition of the redistribute effects shows that this decline was largely driven by the vertical and horizontal components of income redistribution with the contribution of reranking remaining small and fairly constant over the whole period. Transfers account for most of the income redistribution in Australia: they contributed more than 80 per cent to vertical redistribution until 2005. However, this contribution started to decline in the early 2000s. This decline was caused by the fall in the size of the transfer 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 inability of welfare payments to keep up with income growth are likely to explain this drop in average transfer 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 transfers, this decline was caused by a reduction in tax progressivity rather than by changes in the average tax rate.

We investigate the contribution of the tax-transfer policy reforms since the mid-1990s to the observed decline in income redistribution. Previous studies by Whiteford (2010, 2013) and Wilkins (2013) provide no insight on 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-

transfer policies using the *fixed-income* approach that allows intertemporal comparisons of policies by applying the tax and transfer 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 2013).

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