

# *The central role of a well–designed income tax in “the modern economy”*

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## **Abstract**

*Two of the most fundamental changes in the Australian economy since the middle of the 20th century have been the dramatic fall in fertility and the rise in female labour force participation. Over the same period, the progressivity of the income tax has declined significantly, despite rising inequality, and the individual as the tax unit has been replaced by a system of “quasi-joint” taxation for families, creating high effective tax rates for partnered mothers as second earners. In this article, we draw on household survey data to show that this direction of reform has been counterproductive, with strong negative effects on female labour supply and saving and, in turn, on productivity and the tax base. The analysis highlights the efficiency merits of a well-designed, individual-based income tax over consumption taxation in “the modern economy”.*

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**Keywords:** personal income taxation; consumption taxation; life cycle labor supply and saving; inequality; gender discrimination.

## 1. Introduction

Two of the most fundamental changes in the Australian economy since the 1950s have been the decline in fertility, from around 3.5 in the 1960s to 1.9 today, and the rise in female labour force participation made possible by the decline in fertility. With these changes, the majority of working age adults now lives in couple households and most have two earners. In the vast majority of cases, the male partner on a higher wage is the primary (or higher income) earner with a labour supply that is typically found to be far less responsive to changes in the net wage than that of the female partner. To assess the relative merits of alternative tax systems, we need a modelling approach that takes account of this reality of the 21st century.

According to the 2015 tax discussion paper, *Re:think*,<sup>1</sup> “Australia’s reliance on income taxes remains much the same as it was in the 1950’s”. The discussion paper argues for less reliance on income taxation, particularly the taxation of capital income, in order to “support the modern economy” said to be characterised by “financial deregulation, the growth of multinational companies using global supply chains and the increasing digitisation of global commerce”.

The tax discussion paper does not discuss the economic implications of the shift in the economy from single to two-earner couple households. Instead, much of the assessment of the relative merits of reducing reliance on income taxes draws on the results of general equilibrium models in which all households are represented as single person with a single labour supply elasticity.<sup>2</sup> While a model of this kind may have been acceptable in the 1950s when most households were single-earner, it cannot be expected to yield reliable results for assessing the role of income taxation in “the modern economy” of two-earner households.

The tax discussion paper also fails to acknowledge that, while reliance on income taxes as a proportion of total tax revenue may be much the same as in the 1950s, the rate structure and the tax unit for families have changed dramatically. The overall progressivity of the rate scale has declined significantly despite rising inequality and the individual as the unit of taxation for families has been replaced by a system of “quasi-joint” taxation with many partnered mothers as second earners facing marginal tax rates that are well above the top rate on personal income. In this article, it is argued that these changes, introduced incrementally since the 1980s, have been

1 Treasury (2015), *Re:think: tax discussion paper*.

2 See KPMG (2010), “GCE analysis of the current Australian tax system”, Department of Treasury, Canberra; KPMG (2011), “Economic analysis of the impact of using GST to reform taxes”, a report prepared for CPA Australia; and L Cao, A Hosking, M Kouparitsas, D Mullaly, X Rimmer, Q Shi, W Stark and S Wende (2015), “Understanding the economy-wide efficiency and incidence of major Australian taxes”, Treasury working paper, WP 2015-01, Australian Government.

counterproductive in their impact on average wage earners and their negative effects on female labour supply and saving and, in turn, on productivity and the tax base.

The article is organised as follows. Section 2 begins with an overview of the rise in inequality in Australia, together with the shift towards a less progressive income tax, drawing on data from the two most recent Australian Bureau of Statistics (ABS) household expenditure surveys (HES), 2003–04 and 2009–10. The 2009–10 data are then used to investigate the tax discussion paper’s analysis of the regressive effect of the Australian income tax due to bracket creep over the next decade. Using a sample that includes non-participants in addition to those “in-work”, we show that a consumption tax is far more regressive.

Section 3 discusses the incremental transformation of the 1980s progressive individual-based family income tax into one of “quasi-joint” taxation and the potential for strong negative effects on female labour supply and household saving. A concluding comment highlights the central role of a well-designed income tax in “the modern economy” with two-earner households.

## 2. Rising inequality and falling taxes on top incomes

### 2.1 Rising inequality

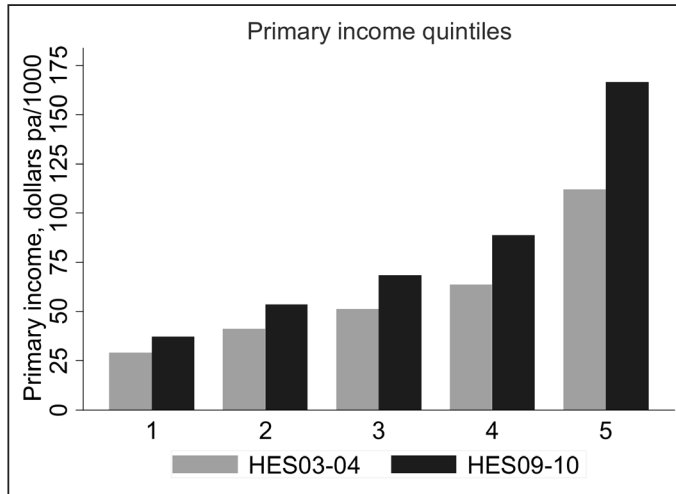
There is now an extensive literature on the rise in inequality of income and wealth in developed economies.<sup>3</sup> Survey data for Australia indicate that the shares of income of those in the top percentiles of the income distribution have grown dramatically. Apps and Rees<sup>4</sup> investigate the change in the distribution of individual incomes in Australia drawing on data for matching samples of couples selected from the two most recent ABS HES files, 2003–04 and 2009–10. The samples are selected on the criteria that both partners are aged from 20 to 60 years and the primary income partner is employed for at least 25 hours per week.<sup>5</sup> The study finds a significant increase in inequality based on the change in the distribution of the primary income of couples over the six-year period. The key result is shown graphically in Figure 1 below.<sup>6</sup>

3 See, for example, A Atkinson, T Piketty and E Saez (2011), “Top incomes in the long run of history”, 49(1) *Journal of Economic Literature* 3–71; A Atkinson (2015), *Inequality*, Harvard University Press; T Piketty and E Saez (2003), “Income inequality in the United States, 1913–1998”, 118(1) *Quarterly Journal of Economics*, 1–39.

4 P Apps and R Rees (2013), “Raise top tax rates, not the GST”, 28 *Australian Tax Forum* 679–693.

5 Records reporting negative incomes are also excluded. The HES 2003–04 sample contains 2447 couple income unit records and the HES 2009–10 sample, 2408 records.

6 The graph is constructed using the results reported in table 2 of Apps and Rees (2013), above note 4.

**Figure 1: Rising inequality**

In quintile 1, there is a 28.6% increase in nominal primary income. In quintile 3, the rise is 33.9% and in quintile 5, 48.8%. When we split the top quintile into deciles, we find that the nominal increase in decile 9 is 42.37% and in decile 10, 52.17%. The nominal rise in the top percentile is 71.02%.

## 2.2 *Falling taxes on top incomes*

As in most OECD countries, the Australian personal income tax (PIT) is piecewise linear. Income tax simulations in Apps, Long and Rees<sup>7</sup> show that the optimal degree of progressivity in a piecewise linear tax system rises as inequality increases, which suggests we should find more steeply rising average tax rates on incomes over the period. Far from a more progressive income tax, the period saw a succession of reforms that provided the largest tax cuts for those in the top percentiles of the distribution of income.

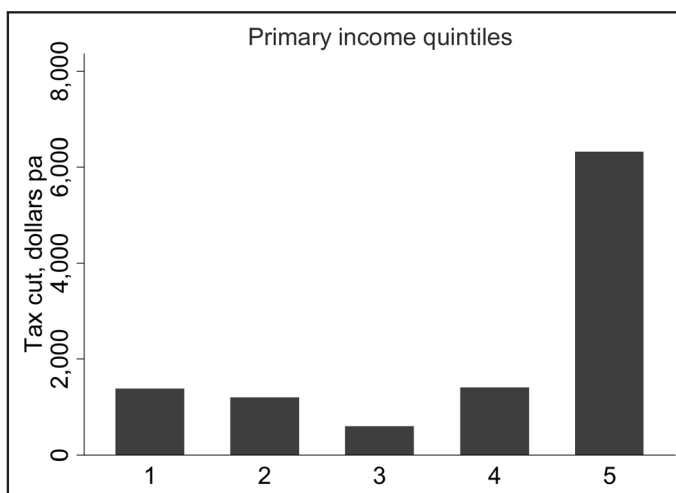
Over the short period from 2004–05 to 2008–09 alone, the top bracket limit rose from \$70,000 to \$180,000 and the top marginal rate fell another two percentage points, concentrating billions of dollars of tax cuts in the upper percentiles of the income distribution. Those in the middle of the distribution gained little to nothing, an outcome achieved by combining tax cuts at the top with the low income tax offset (LITO).

7 P Apps, N Long and R Rees (2014), “Optimal piecewise linear income taxation”, 16(4) *Journal of Public Economic Theory* 523–545.

The LITO raised the zero rated threshold for those on very low incomes while simultaneously denying the “middle” the full gain of a higher threshold through its gradual withdrawal above a relatively low income threshold. For example, in 2009–10 the LITO was set at \$1,350 with a withdrawal rate of four cents in the dollar above a threshold of \$30,000. The PIT rate scale contained a zero rated threshold of \$6,000 and marginal rates of 15 cents and 30 cents applying to taxable incomes from \$6,001 to \$35,000 and from \$35,001 to \$80,000, respectively. The LITO, when combined with the PIT scale, had the effect of increasing the zero rated threshold of the PIT scale from \$6,000 to \$15,000, while its withdrawal of four cents in the dollar raised marginal rates across the middle of the distribution. Under the effective or *true* marginal rate scale, a rate of 19 cents in the dollar applied to incomes from \$30,001 to \$35,000 and of 34 cents to incomes from \$35,001 to \$63,750. From this latter income threshold, the marginal rate then fell back to the 30-cent rate of the PIT scale that applied up to the \$80,000 bracket limit. The LITO served the sole purpose of reducing the transparency of the true rate scale. The scale was no longer strictly progressive.

Figure 2 plots the quintile distribution of nominal tax cuts over the period. The profile reflects the concentration of billions of dollars of tax cuts in the top percentiles and the shift in the tax burden towards the “middle”. The nominal tax cut in quintile 1 is \$1,388 and in quintile 3, \$602. In quintile 5, the gain is \$6,215. When we split the top quintile into deciles, we find that the gain in decile 9 is \$3,907 and in decile 10, around \$9,000 (40% of the total). In the top percentile, the gain is close to \$50,000.

**Figure 2: Shift in the tax burden towards the “middle”**



While income taxes fell over the period, it is important to note that the GST brought with it a tax mix change, from income to consumption, and therefore many in the “middle” are likely to have lost. Full compensation for a shift towards consumption taxation requires a more progressive rate scale across the entire distribution of income, which clearly did not happen.

### 2.3 Bracket creep and the GST

The tax discussion paper, *Re:think*, and the 2015 *Intergenerational report*<sup>8</sup> warn that “...bracket creep affects lower and middle income earners proportionally more than higher income earners”. Both documents compare average tax rates on three incomes in 2013–14, \$37,500, \$75,000 and \$150,000, with the rates that will apply in 2023–24 if incomes rise to the expected levels reported in Table 1. The income of \$75,000 is selected as representative of average ordinary full time earnings in 2013–14. The average tax rate (ATR) for each income is calculated using the 2013–14 rate scale. The increments in the ATRs over the ten-year period, shown in the last row of Table 1, appear to demonstrate that bracket creep is highly regressive.

**Table 1: Bracket creep from 2013–14 to 2023–24**

Income in 2013–14	\$37,500	\$75,000	\$150,000
Income in 2023–24	\$52,000	\$104,000	\$208,000
ATR in 2013–14	10.3	22.7	30.5
ATR in 2023–24	17.8	27.4	34.3
INCREMENT in ATR	7.5	4.7	3.8

The analysis raises a number of questions. Given the concern for the current budget deficit, why is bracket creep not seen as an opportunity for raising additional revenue to reduce the deficit? And if the concern is solely for the regressive impact of bracket creep, why not adjust the rate scale?

More fundamentally, in view of the tax discussion paper’s support for less reliance on income taxes as a proportion of total revenue, we might ask the question: how does the distributional impact of bracket creep compare with that of a revenue neutral expansion of the GST? To answer this question, we first compare the change in average tax rates over the ten-year period under matching assumptions using the sample of 2,408 couples drawn for the 2009–10 HES.

8 Australian Government (2015), “2015 *Intergenerational report, Australia in 2055*”, Commonwealth of Australia, Canberra.

With the exclusion of records reporting usual weekly hours of work of less than or equal to 25 hours for the primary earner, the sample represents “in-work” couples across the middle and upper segments of the distribution of primary income. When we index the incomes in the 2009–10 HES data to 2013–14, we find that the three incomes in Table 1 tend to be equally distributed across the sample, with \$37,500 approximating the mean primary income of decile 1, \$75,000 that of quintile 5, and the income of \$150,000 falling within the 92nd percentile. We can therefore expect the change in average tax rates by primary income over the ten-year period based on this HES sample to strongly reflect the figures in Table 1. This is, in fact, what we find.

Table 2 reports the additional tax in 2023–24, and ATRs in 2013–14 and 2023–24 in each quintile of primary income. The increment in the ATR declines from 6.18 in quintile 1 to 2.82 in quintile 5. Bracket creep is indeed regressive for the selected sample even though the absolute value of the additional tax burden in quintile 5 is more than *double* that of quintile 1.

**Table 2: Primary income**

Primary income quintile	1	2	3	4	5
Additional tax in 2023–24 \$pa	3,470	3,531	4,209	4,558	7,062
2013–14 ATR%	12.58	19.29	22.73	26.07	33.26
2023–24 ATR%	18.76	23.68	26.82	29.48	36.08
INCREMENT in ATR	6.18	4.39	4.08	3.41	2.82

To make a comparison with the GST, we repeat the analysis based on household income within each primary income quintile. We use the data on household consumption expenditure on goods and services available in the HES to compare the distributional impact of bracket creep with an expansion of the GST that is revenue neutral in the sense that it raises the same revenue as bracket creep over the period, assuming no behavioural effects. For the purpose of the analysis, we take the case of an expansion of the GST in the form of a new rate on all goods and services, in addition to the existing rate of 10% on the current narrower base. The required broad-based rate for revenue neutrality with bracket creep is 5.45%.

The upper panel of Table 3 reports the additional tax burden in 2023–24 and average tax rates on household income in 2013–14 and 2023–24. The increment in the ATR in each quintile, shown in the fourth row, closely matches the results in Table 2. The last two rows of the table report the additional tax and rise in average tax rate in each quintile under a revenue neutral increase in the GST on all goods and services. The result suggests that bracket creep and a revenue neutral expansion of the GST tend to be equally regressive.



**Table 3: Household income**

Primary income quintile	1	2	3	4	5
Additional tax in 2023–24 \$pa	4,761	5,320	6,383	7,336	9,620
2013–14 ATR%	11.57	17.35	20.57	23.67	31.05
2023–24 ATR%	17.48	21.92	24.84	27.58	34.10
INCREMENT in ATR	5.92	4.57	4.27	3.90	3.05
GST: Additional tax	4,905	5,592	6,239	7,179	9,506
GST: INCREMENT in ATR	6.10	4.80	4.17	3.82	3.02

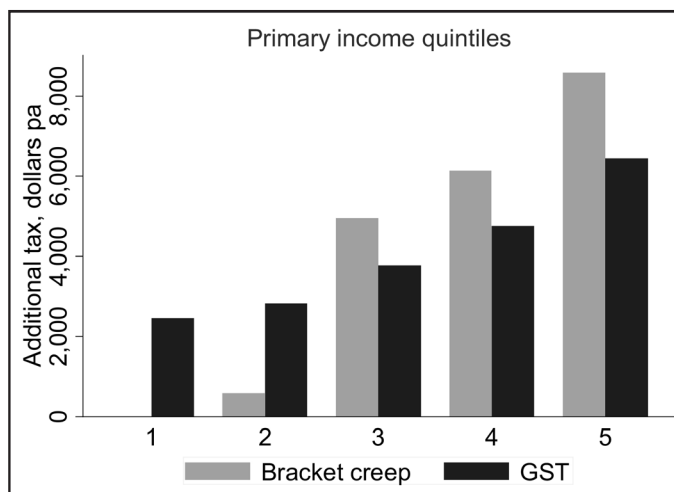
The results in the preceding tables are however misleading because they are based on a sample that excludes households with taxable incomes below the zero rated threshold who would not be affected by bracket creep but would obviously be affected by a GST increase. To assess the true impact of bracket creep and an expansion of the GST that raises the same revenue, we need a more representative sample. We illustrate this point by expanding the sample to include all couples except those reporting negative private incomes. The sample size increases from 2,405 to 5,252 income unit records. The average 2013–14 taxable income of quintile 1 falls to zero and that of quintile 2, to \$15,664. The revenue neutral rate of GST falls to 4.11%.<sup>9</sup>

Consequently, as indicated in Table 4 and shown graphically in Figure 3, a tax on consumption is far more regressive overall than bracket creep. Moreover, unlike bracket creep, the regressivity cannot be addressed by adjusting the rate scale. Compensation for those on low incomes for a rise in the GST requires cash transfers which, if income tested, will raise effective tax rates for low income earners known to have responsive labour supplies. Furthermore, we can expect the income test for couples to be defined on joint income thresholds that match those of family benefits, with negative effects on second earner labour supply and, in turn, on the tax base.

**Table 4: Bracket creep vs revenue neutral expansion of GST – full sample**

Primary income quintile	1	2	3	4	5
Bracket creep: additional tax \$pa	0	576	4,951	6,141	8,583
GST: additional tax \$pa	2,457	2,824	3,774	4,757	6,441

<sup>9</sup> Note that the lower GST rate implies lower additional taxes in Table 3. For example, in quintile 5, the additional tax due to the rise in the GST falls to \$7,169 and the increment in the ATR falls to 2.28 percentage points.

**Figure 3: Bracket creep vs revenue neutral expansion of GST**

It is of interest to recall that the Henry Review<sup>10</sup> recommends a simplified income tax rate scale of 35 cents in the dollar for most incomes above a zero rated threshold of \$25,000. If this is the underlying tax policy agenda of *Re:think*, we can expect much of the additional revenue from an expanded GST to fund not only compensation for those on low incomes, but also a reduction in the top tax rate to yield a result in ten years that closely matches that in Figure 2.<sup>11</sup>

## 2.4 Labour supply elasticities

Support for lower tax rates on top incomes is usually based on the argument that there are efficiency gains from reduced disincentive effects. The argument requires evidence of a significant labour supply response to the rise in the wage rate at higher income levels. This evidence is difficult to find because neither cross-section nor panel data indicate a sufficiently large increase in labour supply across the top percentiles of earnings, as illustrated in Table 5. The table reports data means of primary earnings and hours of work by quintiles of primary earnings based on the 2003–04 and 2009–10 HES samples of “in-work” couples described above.

10 See Australia’s Future Tax System Review Panel (2009), *Australia’s future tax system: report to the Treasurer* (Henry Review).

11 For a detailed analysis of the Henry Review’s recommendations for a simplified tax system, see P Apps (2010), “Why the Henry Review fails on family tax reform”, in C Evans, R Krever and P Mellor (eds), *Australia’s future tax system: the prospects after Henry*, Thomson Router Australia Ltd, ch 5, 103–127.

**Table 5: Primary earnings and hours of work: 2003–04 and 2009–10 HES**

Primary earnings quintile	1	2	3	4	5
2009–10 Primary earnings \$pa	37,207	54,868	70,191	91,401	164,982
2003–04 Primary earnings \$pa	28,075	40,166	50,157	61,908	106,133
2009–10 Hours pa	2,080	2,220	2,297	2,409	2,515
2003–04 Hours pa	2,131	2,245	2,302	2,390	2,532

The data means for hours of work show no significant changes over the period. This suggests that the disproportionate rise in earnings in quintile 5 reflects higher nominal wage rates and, therefore, that labour supply elasticities tend to zero across the top percentiles. The relatively small change in hours as earnings rise steeply from the fourth to the fifth quintile also indicates very low to zero labour supply elasticities towards the top of the wage distribution.<sup>12</sup> These data support the view that higher taxes on top incomes would not have significant disincentive effects on labour supply or the pre-tax earnings of primary earners.

In an attempt to bypass this evidence, a number of studies turn to data on gross earnings over time. For example, Brewer, Saez and Shephard<sup>13</sup> use data across the Thatcher years of tax cuts and CEO pay rises to obtain strongly positive estimates which they then attribute to a greater input of “unobservable effort”. Since there was a large-scale process of deregulation of financial markets over the period, there is a major statistical problem in identifying the growth of top earnings as being due to a large increase in “unobservable effort”.

More recently, Piketty, Saez and Stantcheva<sup>14</sup> argue that a fall in earnings or taxable income in response to a higher tax rate is largely a reflection of an increase in tax avoidance and evasion as income is underreported or diverted to forms which are subject to lower tax rates, or to weakened bargaining power and consequently a lower share of rents, for example, of senior executives in diverting rents from company shareholders to themselves. The authors recommend that tax avoidance and evasion be dealt with directly and not through the tax scale. Based on low estimates of labour supply elasticities at the top, they propose a higher top tax rate in response to rising

12 The decline in elasticities becomes more accentuated towards the top percentiles. From deciles 9 to 10, for example, the average wage rises by 63.3% while hours increase by only 3.7%.

13 M Brewer, E Saez and A Shephard (2008), “Means-testing and tax rates on earnings”, paper prepared for the Mirrlees Review, Institute of Fiscal Studies, London.

14 T Piketty, E Saez and S Stantcheva (2014), “Optimal taxation of top labor incomes: a tale of three elasticities”, 6(1) *American Economic Journal: Economic Policy* 230–271.

inequality, a recommendation that is consistent with the results for the structure of optimal tax rates reported in Andrienko, Apps and Rees.<sup>15</sup>

### 3. Taxation of families – the tax unit

#### 3.1 The “targeting fallacy”

Income tax reforms over the last three decades have not only shifted the tax burden towards middle wage earners, but also disproportionately towards partnered working mothers. In the early 1980s, families received universal child payments. During the Howard Government years, universal child allowances were completely replaced with payments withdrawn on joint income while, at the same time, the rate scale of the individual-based income tax became far less progressive. Australia now has a system of “quasi-joint” family taxation, with the highest marginal tax rates applying across average incomes and to the income of the second earner.<sup>16</sup>

With these reforms, we lost the well-established efficiency merits of a progressive individual-based income tax.<sup>17</sup> Individual taxation is recognised as superior to joint taxation for efficiency reasons because the partner with the lower earnings and higher labour supply elasticity, typically the female, faces a lower marginal tax rate under a progressive rate scale. This is consistent with the Ramsey rule for efficiency.<sup>18</sup> Given that the available evidence indicates that male labour supply is relatively unresponsive to a change in the net wage while female labour supply is highly responsive, a strongly progressive rate scale, together with universal family payments, minimises disincentive effects for a given degree of redistribution or revenue constraint.

The argument for income testing is based on purported cost and revenue savings from reducing family benefits as income rises, as implied for example by the following statement in *Re:think*:

15 Y Andrienko, P Apps and R Rees (2014), “Optimal taxation, inequality and top incomes”. Available at <http://ftp.iza.org/dp8275.pdf>.

16 The first step towards joint income-tested child payments was the introduction of the “Family Income Supplement” during the Hawke and Keating years. Family cash benefits under this reform were initially paid together with universal family allowances, which were no longer indexed. In 2000, the Howard Government combined the two payments in Family Tax Benefit Part A and in subsequent Budgets completely eliminated universality.

17 See, for example, the seminal paper by M Boskin and E Sheshinski (1983), “Optimal tax treatment of the family: married couples”, 20 *Journal of Public Economics* 281–297. For a survey, see P Apps and R Rees (2009), *Public economics and the household*, Cambridge: Cambridge University Press.

18 This says that the tax imposed on a source of labour should be smaller, the larger the (compensated) labour supply effect, an effect that is found to be significantly higher for women than for men.

"Reducing effective tax rates is not straightforward because reducing the rate at which payments are withdrawn, or removing them altogether, would extend assistance to higher income levels".

We label this view the "targeting fallacy". It fails to recognise that the after-tax income an individual receives is made up of what is left after applying her marginal tax rate to her entire income, *plus* a "virtual" or "effective" lump sum. For someone in the lowest tax bracket, this is equal to the actual lump sum or cash payment. For someone in the next higher tax bracket, it is equal to the actual lump sum plus an amount which corrects for the fact that the tax rate actually paid on income in the lower bracket is less than the marginal tax rate in the second bracket. The higher the tax bracket considered, the larger is this virtual lump sum under a progressive rate scale. "Withdrawing" the universal lump sum over, say, the second bracket, by means of adding a withdrawal rate, e.g. 20 cents in the dollar, to the existing marginal tax rate, represents simply an increase in the marginal tax rate in that bracket and actually increases the "virtual" lump sum.<sup>19</sup> If the increased tax revenue from this is then used to reduce the tax rate on the top tax bracket, all that has been achieved is a change in the structure of marginal tax rates that can imply a large shift in the tax burden from the top to the middle.<sup>20</sup> The rhetoric of "targeting" and "abolishing middle class welfare" serves simply to direct attention away from this fact.

It is not the "universality" of the payment, but the value of the payment and the structure of marginal tax rates that is the relevant basis for evaluating the cost of a tax system. What matters is the way in which a particular tax structure trades off fairness of the distribution of tax burdens against deadweight welfare losses arising from its effects on work incentives due to changes in net wage rates.<sup>21</sup>

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- 19 P Apps and R Rees (2010), "Australian family tax reform and the targeting fallacy", 43(2) *Australian Economic Review* 153–75, presents numerical examples to illustrate the way in which a revenue neutral reform that seemingly replaces a universal payment with a targeted payment can be misrepresented as one that saves tax revenue for funding income tax rate cuts for all. The true reform is shown to involve the replacement of a progressive rate scale with an inverted U-shaped scale that shifts the tax burden towards the "middle".
  - 20 This has been the case not only in Australia, but also in a number of other high income countries. For a study which analyses the changes in actual tax systems in 189 countries over the period 1981–2005, see K Peter, S Buttrick and D Duncan (2010), "Global reform of personal income taxation, 1981–2005: evidence from 189 countries", 63(3) *National Tax Journal* 447–478. In high and upper middle income countries, there was a huge reduction in top tax rates over this period, at the same time as income inequality was increasing substantially in many of them.
  - 21 There is also the misconception that a system of universal benefits creates higher administration costs of the tax system, as if the uniform payment is physically made to everyone and then the withdrawn portions have to be physically returned to the tax authority. If the uniform payment and withdrawal rates are incorporated into the tax system, no such costs arise.

As well as providing inefficiently high disincentives to second earner labour supply, joint taxation is unfair because the amount of tax paid by couples with the same total income is the same, regardless of hours worked by each partner to earn the total income. A high wage single-earner household pays the same amount in tax as one containing two lower wage earners working longer hours for the same total income and, for those with a child in the preschool years, buying in child care and related services out of their post-tax income. For horizontal equity, we require a system that imposes a lower tax burden on two-earner households working longer hours to earn a given joint income. This outcome is achieved under a progressive individual-based income tax, and the more progressive the rate scale, the higher the degree of horizontal as well as vertical equity.

### 3.2 *Labour supply and household saving*

*Re:think* acknowledges that Australia does not rank well in terms of female labour force participation, noting that:

“Australia’s workforce participation rates, particularly female participation rates, are lower than most comparable Organization for Economic Co-operation and Development (OECD) countries. For example, while the participation rate of women between the ages of 15 to 64 in Australia has increased from 65.3 percent in 2000 to 70.5 per cent in 2013, Australia is ranked 13<sup>th</sup> of the 34 OECD countries for female participation.” (p 44)

According to the OECD,<sup>22</sup> in 2012 the Australian female participation rate was 70.4% and the male rate was only 12.1 percentage points higher. This relatively small gender gap in participation rates conceals a far wider gap in hours of work, of over 40%, due to a high rate of female part-time employment. A more reliable picture of the potential impact of Australia’s family tax policies can be obtained by comparing male and female labour supply profiles over the life cycle defined not on the age of “head of household,” as is usual in the economics literature,<sup>23</sup> but on the presence of dependent children and age of the youngest child.

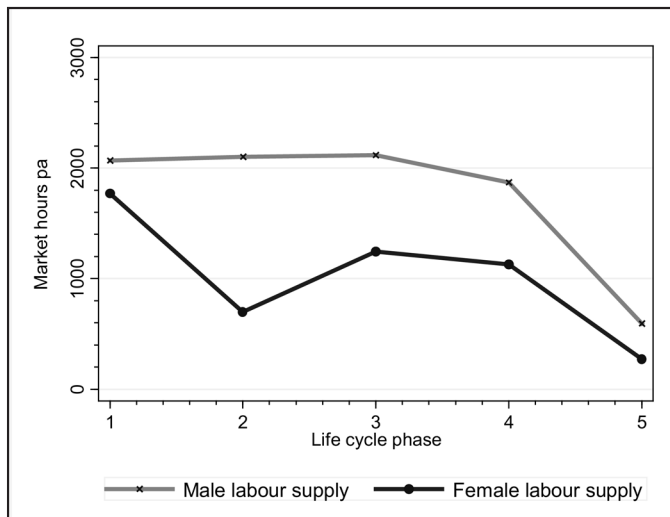
22 See OECD (2014), *Achieving stronger growth by promoting a more gender balanced economy*, report prepared for the G20 Labour and Employment Ministerial meeting, Melbourne, 10–11 September.

23 Life cycle models defined on the age of “head” result in a misreading of the data. For a survey of the literature, see O Attanasio and G Weber (2010), “Consumption and saving: models of intertemporal allocation and their implications for public policy”, 48 *Journal of Economic Literature* 693–751. The studies find that male and female labour supplies and household consumption initially rise together with age and then fall towards retirement. The approach misses the large fall in female supply that takes place after the arrival of the first child because consumption and labour supplies are averaged across couples over what we call here phases

Drawing on data for couples in the 2009–10 HES, Figure 4 plots the profiles of average annual male and female hours of work across the life cycle defined on the following five family phases:<sup>24</sup>

- (1) pre-children;
- (2) at least one child of preschool age is present;
- (3) children are of school age or older but still dependent;
- (4) parents are of working age but with no dependent children in the household; and
- (5) retirement age (60+ years).

**Figure 4: Gender labour supply gap**



In phase 1, the pre-child phase, there is a relatively small gender gap in labour supply. This is followed by a dramatic fall in female hours in phase 2. The explanation is straightforward. The arrival of the first child creates an additional work choice. One

1 and 2. For a detailed analysis, see Apps and Rees (2009), above note 17, ch 5; and P Apps and R Rees (2010), "Family labor supply, taxation and saving in an imperfect capital market", 8 *Review of Economics of the Household* 297–323.

24 The "pre-child" phase includes couples of working age, defined as 20 to 60 years, with no dependent children and a female partner aged less than 42 years. The sample excludes records reporting negative private incomes.

parent, typically the mother on a lower wage, can work at home providing child care and domestic services as an alternative to working in the market and buying in care and related services.<sup>25</sup> This is supported by time use data which show that the fall in female hours is more than matched by a rise in the allocation of time to work at home, which is primarily child care.<sup>26</sup>

A striking feature of the profiles in Figure 4 is that much of the gender gap in phase 2 persists into phase 3 when children are of school age or older, and then into phase 4 when they are no longer dependent and parents are still of working age. This “persistence” of female labour supply decisions made in the preschool years, which the literature attributes to a loss of human capital,<sup>27</sup> suggests that the family tax system has a high long-term cost due to continuing disincentive effects.

The potential for a high cost to the economy becomes even more evident when we consider the impact of female labour supply choices on household private income and, in turn, on saving. When household expenditure survey data are organised according to family life cycle phases as in Figure 4, we find that saving tracks household income which, in turn, tracks female labour supply. As shown in Apps and Rees<sup>28</sup>, median saving, calculated as the difference between disposable income and consumption expenditure, is found to be at its highest level in phase 1 and falls to its lowest level in phase 2. While saving begins to rise in phase 3, it never returns to its phase 1 level.

### 3.3 *Heterogeneity*

The labour supply profiles in Figure 4 are based on averages and therefore conceal the high degree of heterogeneity in female labour supply across phases 2 to 4 as indicated by the distribution of employment status in phases 1 to 4 in Figure 5.

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25 Note that the substitution is not between consumption and “leisure”.

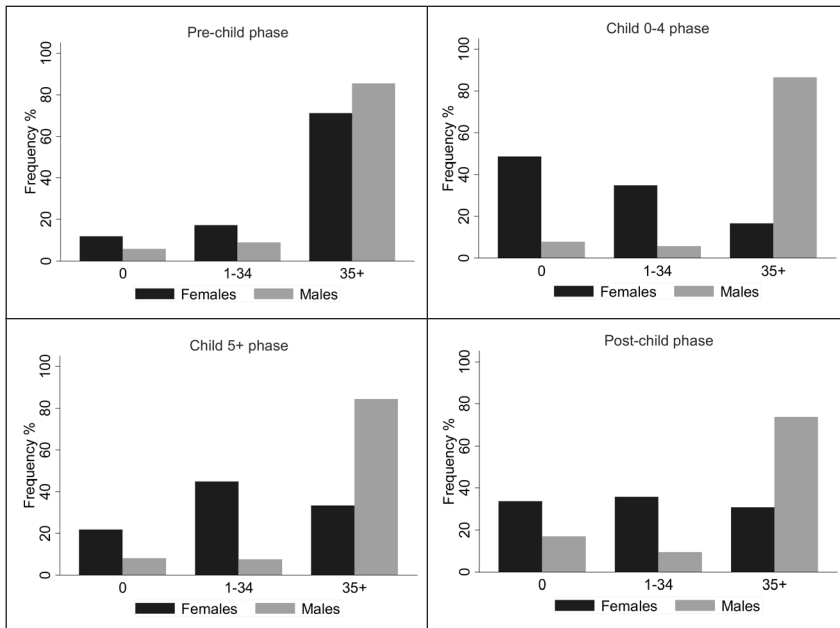
26 See Apps and Rees (2009), above note 17.

27 See, for example, Shaw, K (1994), “The persistence of female labor supply: empirical evidence and implications”, 29 *Journal of Human Resources* 348–378.

28 Apps and Rees (2010), above note 23.



**Figure 5: Employment status: phases 1 to 4**



While in phase 1, both partners tend to work full time<sup>29</sup> for close to the same wage rates, there is a high degree of heterogeneity in female labour supply in subsequent phases up to the retirement phase. Full-time male employment remains at around 85% across phases 2 and 3 and falls to 74% in phase 4. In contrast, female full-time employment falls to 17% in phase 2, rises to 33% in phase 3 and falls again in phase 4, to 31%. Part-time female employment also falls in phase 4. These data provide further evidence of a high degree of persistence in female labour supply decisions throughout the life cycle.

We also find that saving tracks female labour supply within each phase. This becomes evident when we split the sample of couples in phases 2 to 4 into two types according to median second hours within each quintile. Table 6 reports quintile data means of second earnings by type, with those below the median labelled type "H1" and those at

29 "Full-time" is defined as 35 hours per week or more and "part-time" as 1–34 hours per week.

or above the median, type “H2”.<sup>30</sup> The table also reports quintile regression estimates of household saving that control for the number and age of children.

**Table 6: 2nd earnings and saving by primary income, phases 2 to 4 (2009–10 HES)**

Primary income quintiles	34,265	54,701	71,982	96,648	201,855
H1: 2nd earnings \$pa	330	9,745	9,494	16,794	12,835
Saving \$pa	-8,227	331	4,095	14,268	54,642
H2: 2nd earnings \$pa	24,425	37,410	43,001	60,451	67,281
Saving \$pa	297	9,075	16,167	30,634	76,973

The strong positive relationship between saving and second earnings across the entire distribution of primary income indicates that the saving rate of the second earner is significantly higher than that of the primary earner. The aggregate level of saving across quintiles 2 to 4 by H2 households exceeds that of the top quintile of H1 households. Reforms that raise effective tax rates on partnered mothers as second earners in order to fund a revenue shortfall from lower taxes on saving or capital income can therefore be expected to have the perverse effect of reducing the overall level of saving as households switch from type H2 to type H1.

The preceding profiles of labour supply and saving behaviour, and the high degree of heterogeneity within each phase, provide compelling evidence that the assessment of marginal excess burdens of taxes on capital, labour and consumption requires a modelling approach that recognises that most adults of working age live in couple households and that the vast majority have two earners with different labour supply and saving elasticities. Studies based on general equilibrium models that assume a single-person household with a single labour supply elasticity, and which ignore the evidence on saving rates, as in Cao et al<sup>31</sup> and KPMG<sup>32</sup>, cannot be expected to yield reliable results for “the modern economy”.

30 Both types are found to have close to the same predicted second wage within each quintile, a result which indicates that the high degree of heterogeneity at a given primary income is not driven by the second wage.

31 Cao, Hosking, Kouparitsas et al, (2015), above note 2.

32 KPMG (2010), above note 2, and KPMG (2011), “Economic analysis of the impact of using GST to reform taxes”, a report prepared for CPA Australia.

## 4. Concluding comment

It is generally accepted that the developments in financial deregulation, globalisation and digitalisation that have taken place over recent decades have played a role in causing the significant increases in inequality of income and wealth evident in a number of advanced economies, including Australia. By highlighting these changes in the global economy and presenting a selective analysis of bracket creep, the tax discussion paper, *Re:think*, seeks to provide support for reducing the role of income taxation as a source of revenue in “the modern economy”. This article has drawn on household survey data to demonstrate that this is a perverse response to the observed growth in inequality, as are the reductions in top tax rates and shifts in the overall tax burden toward the middle of the income distribution that have taken place over the last three to four decades. It is an equally perverse and seriously inadequate response to the dramatic changes in family structure, fertility and female labour supply that have taken place over the same period.

We have emphasised the importance of basing the analysis of taxation on a modelling approach that recognises that in today’s economy, most adults of working age live in couple households and most have two earners. We have presented an analysis of the life cycle labour supply and saving behaviour of couples which highlights the central role that can be played by a well-designed, progressive, individual-based income tax in the 21st century economy. Going forward, this is the appropriate direction for policy to take. A shift toward consumption taxation, which addresses none of the real problems of Australia’s current tax system, would serve only to exacerbate the problem of growing inequality.

