



Australian
National
University

Crawford School of Public Policy

TTPI

Tax and Transfer Policy Institute

Effective marginal tax rates

TTPI – Policy Brief 1/2016 August 2016

David Ingles

Senior Fellow, Tax and Transfer Policy Institute
Crawford School of Public Policy, Australian National University

David Plunkett

Former Policy Analyst with Department of Social Services

Tax and Transfer Policy Institute
Crawford School of Public Policy
College of **Asia and the Pacific**
+61 2 6125 9318
tax.policy@anu.edu.au

The Australian National University
Canberra ACT 0200 Australia
www.anu.edu.au

CRICOS Provider No. 00120C

Effective Marginal Tax Rates

An Effective Marginal Tax Rate (EMTR) measures the loss resulting from income taxation combined with the withdrawal of a cash transfer or welfare benefit, applied to earning an extra (marginal) dollar of income. EMTRs are a result of the interaction of tax and welfare systems. Specifically, a high EMTR is a consequence of:

- [progressive personal income tax rates](#)
- means tested, i.e. tapered/phased out cash welfare benefits
- means tested in-kind benefits such as childcare assistance.

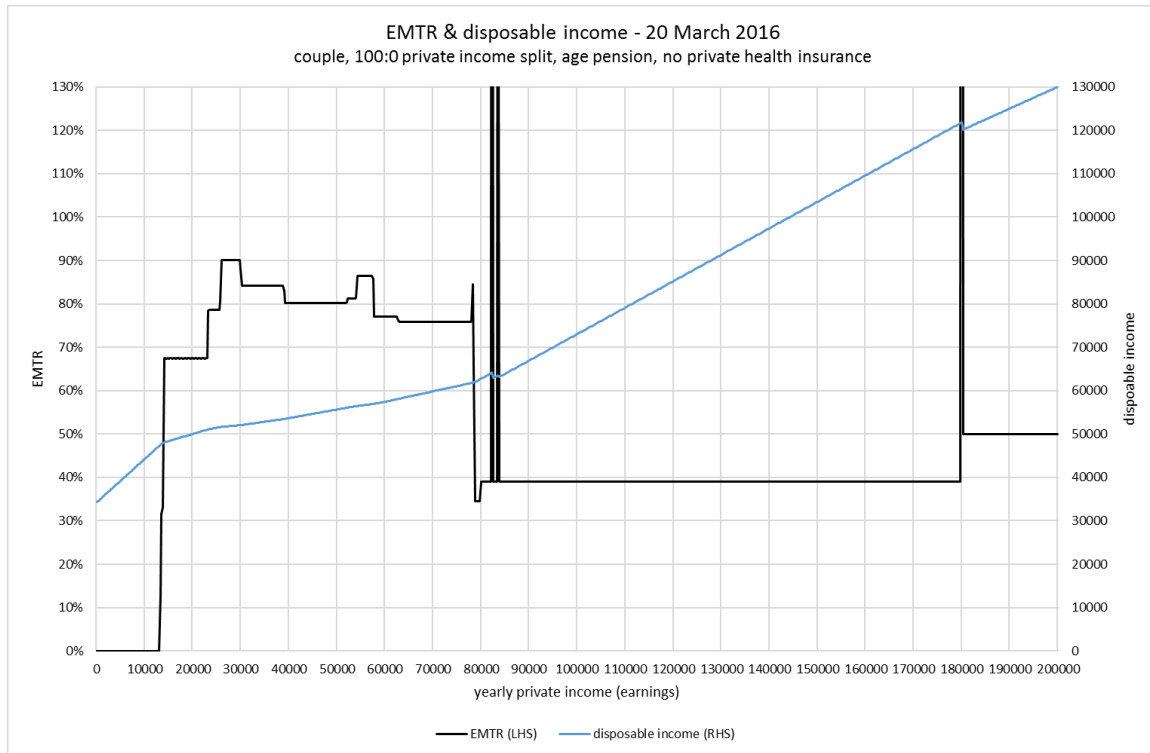
The EMTR applying for an individual or household resulting from a combination of income tax and withdrawal of particular welfare benefits can be presented in a chart that shows the EMTR at various points of earned income. Normally we look at the EMTR for the income unit in the tax or transfer system. In the income tax, the unit is the individual but in the welfare system it is often a couple or a couple with children, as this is the usual basis of assessment for social security purposes. This requires a range of assumptions about how the income is split within the couple; e.g. 100:0, 60:40 and so on. So the EMTR calculation implies that the marginal

dollar of income is split in the same way, although we can also calculate on the basis that extra income goes to one or other in a couple, as shown later.

EMTR charts can be supplemented by disposable income graphs. If there were no tax-transfer system, these lines would be a ray through the origin. The tax-transfer system lifts the disposable income at the origin (when private income is zero) and flattens the disposable income line. Where EMTRs approach 100%, the disposable income line becomes completely flat, meaning that as private income rises disposable income is unchanged.

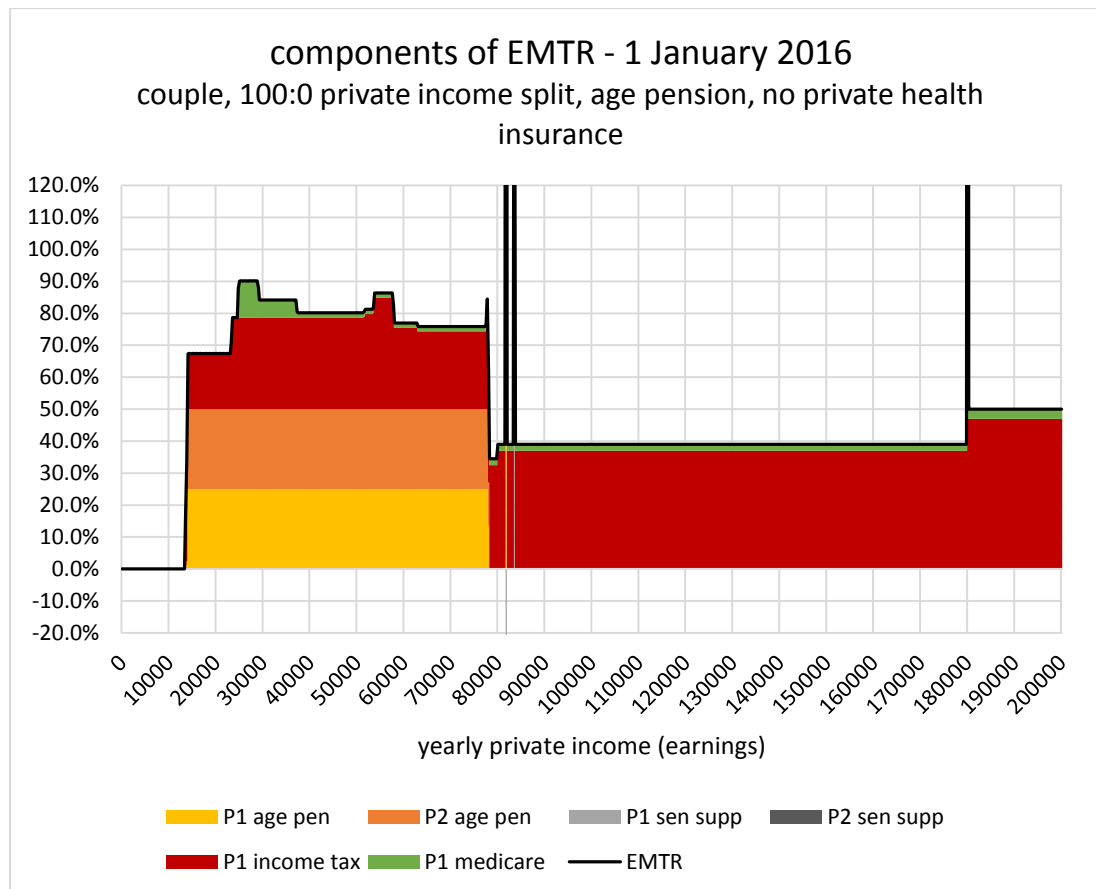
Figure 1 illustrates the EMTR for a couple that receives the age pension, as they earn increasing private income and the pension tapers as a result of the income test. It also shows the disposable income line for this couple. The line flattens over the range of the pension taper.

Figure 1 EMTR and disposable income (blue line) age pensioner couple



An EMTR chart can also show the importance of the different tax and welfare components in producing the EMTR at any point. Figure 2 shows how the different tax and welfare components contribute to the EMTR for the same age pensioner couple.

Figure 2 Components of EMTR for an age pensioner couple



High EMTRs arise from complex interactions of different payments and taxes and can only be unravelled by modellers using sophisticated computing. Because of this, it is tempting to suggest that they do not matter as individuals may have no idea what their EMTR is. The [Productivity Commission](#) rejected this argument, suggesting “If families are in a situation where they are facing a very high EMTR (especially if it exceeds 100%), most will be able to tell they are working for very little (or no) additional money” (p.887).

There have been studies of the number of people affected by high

EMTRs – e.g. [Harding 2008](#). (See also the brief survey in [Ingles 2009](#)). Typically such studies show relatively low numbers so impacted – in the range of 5-7% of working age Australians. However, not all those impacted will show up in these estimates as people may simply reduce their participation so as to bring their incomes below the levels where high EMTRs apply. Sole parents and to a lesser extent couples with children are the most likely family types to be affected, along with the unemployed. Harding notes that for mothers married to low income fathers, it may not be

worth working because of benefit withdrawal and the cost of childcare.

EMTRs are necessarily a theoretical construct. The tax and welfare systems do not have exactly the same definition of 'income' (in some cases the latter includes assets and/or deeming) and moreover can apply over different time periods. In the case of say Newstart benefits, this period can be as little as a fortnight, as compared to annual income in the tax system. Nonetheless EMTRs are useful in analysing the disincentive effects of tax-transfer interactions, so long as we keep in mind that they are theoretical constructs.

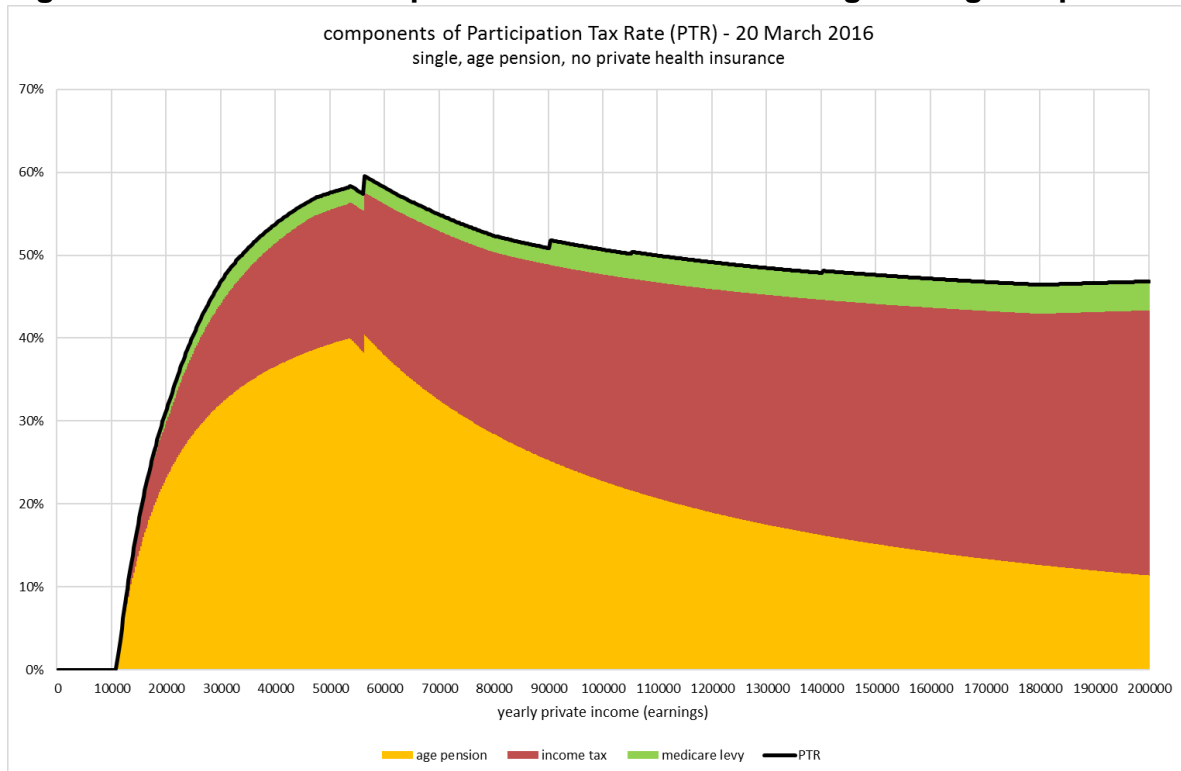
Typically indirect taxes such as payroll tax and GST are not included in EMTR calculations. This partly reflects the lesser visibility of such taxes, and the possibility that there is a sort of fiscal illusion going on. [Tax salience](#) is important here. Macro calculations of '[tax wedge](#)', by comparison, can take account of some indirect taxes. For example OECD calculations typically include payroll tax.

Participation tax rate

Instead of focusing on the EMTR for an extra dollar of private income, we can expand the unit of calculation for the EMTR. For example, we might look at the tax rate on an extra hour of earnings, [or an extra day](#), or a whole week. These measures are in effect an Effective Average Tax Rate (EATR). The EATR is mathematically equal to the weighted average of the EMTRs over the relevant range.

The concept can be expanded further to encompass the entirety of a person's earnings. The resultant measure of the impact of the tax-transfer system on gains from taking up work is referred to as the Participation Tax Rate (PTR). The PTR shows the net impost on working as a proportion of the gross salary. It is defined as 1 minus the financial gain to work as a proportion of gross earnings. It is essentially the average effective tax rate at the given income not including the value of benefits received, but taking account of benefit withdrawal.

Figure 3 – Participation tax rate: Single age pensioner



Other welfare benefits including childcare

We also need to consider the range of programs which impact the EMTR. For example it has become more common to include childcare in these calculations.

The Productivity Commission [Report on childcare](#) found that the financial returns from a primary carer returning to work dropped off markedly over 5 days, for some earners becoming negative on the 4th or 5th day. A key question here is whether those returning to work are required by their employer to work a full week, or whether they have a choice to adjust their number of hours to work part-time or a shortened week. This Report noted that very high EMTRs result when a number of policies interact, in this case the welfare payments Family Tax Benefit (FTB) A and B, income tax

rates and tapering of childcare assistance.

Modelling the impact of childcare assistance can be challenging. It requires assumptions about the number of hours of care which in turn relates to hours worked. With older school age children, childcare may not be necessary as they can stay at home for part of the day unattended. A little younger and outside school hours care comes into the picture. Younger still and we are probably talking about long day care.

There is also the added difficulty of relating childcare use to hourly rates of pay, especially where work is part-time. The usage pattern and hence costs will be different if hours worked are concentrated into a couple of days a week, as opposed to the same hours

spread more or less evenly over a full week. Some people will also have access to informal assistance, for example from relatives.

Then, calculating the net impact as an EMTR raises the question of how much to increment childcare use with each increase in wages. An EMTR may require each plotted point to have a separate set of assumptions about childcare usage.

For example, if we model rising total income for a secondary earner (assuming the primary income is fixed), we know that income can rise either because hours are rising

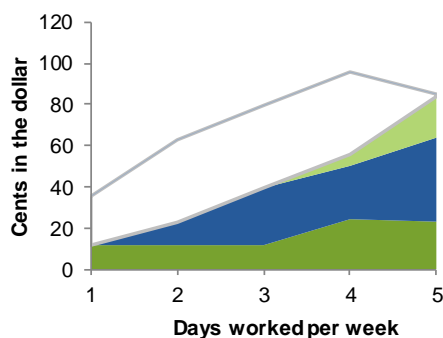
(implying more use of childcare) or because the implicit hourly wage rate is rising. To overcome this difficulty, such modelling tends to be based on 'cameos' – i.e. a stylised family type with an assumed income for the primary earner, and an assumed hourly wage rate for the secondary earner. Rising income of the latter corresponds with assumed changes in hours of care. This was the approach of the Productivity Commission, as shown in Figure 4. This figure relates to a single headed family, but the PC had 10 cameos in all with various family types.

Figure 4: Daily EMTR for sole parent (Productivity Commission)

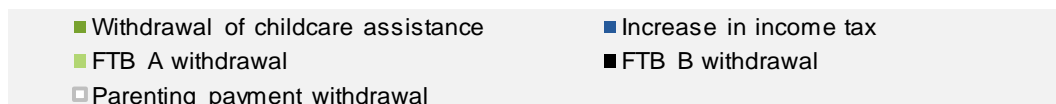
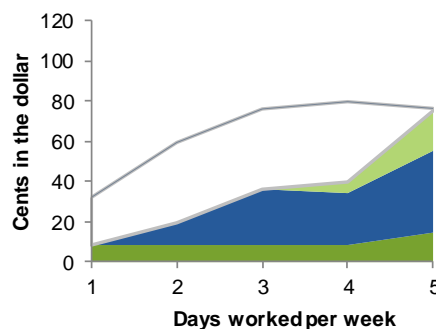
| Family structure | Number of children (ages) | Type of ECEC used | Wage rate of mother (\$/hour/child) | Partners income (per annum) \$ | Other factors |
|------------------|---------------------------|-------------------|-------------------------------------|--------------------------------|---------------|
| Single | 2 (2 and 3) | LDC | \$7.27 | \$31.54 | Na none |

Effective marginal tax rates

Current

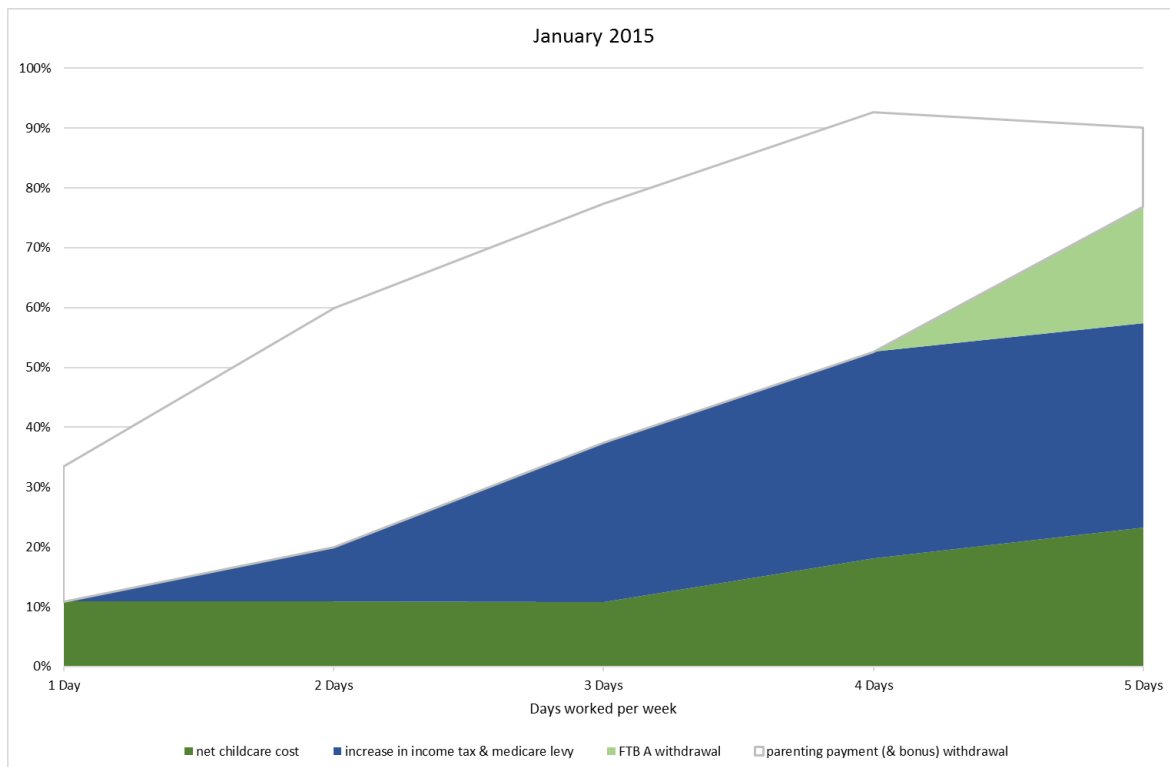


Recommended reform



Source Productivity Commission 2015 Box E3 cameo 1. The 'recommended reform' is similar to the Government announced changes, although these changes have not been enacted.

Figure 5: D Plunkett re-work of PC 'Current' chart

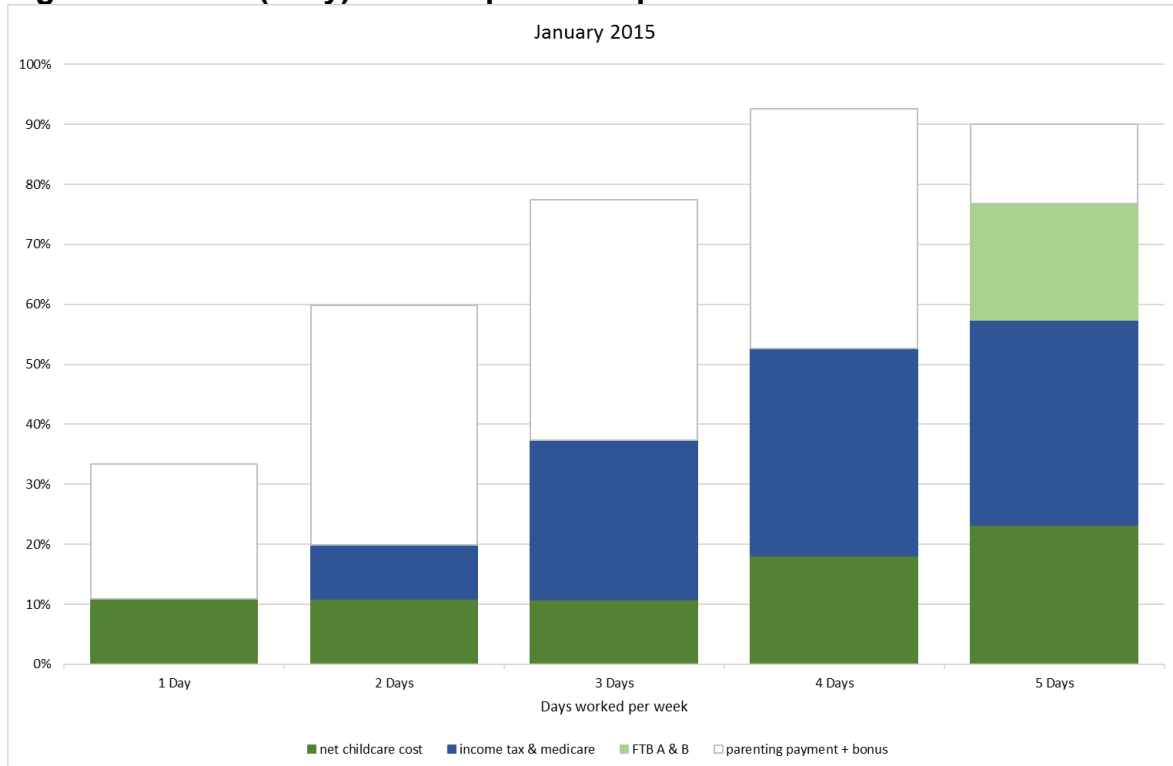


There are some minor differences in the results. There is still Parenting Payment (PPS) payable at day 4 of income, so the change to day 5 should show some percentage loss of PPS; however, the PC chart shows 0%. That has a flow on effect for FTB A as it's not withdrawn while PPS is still in pay, consequently they show FTB A effects on day 4 whereas Figure 4 shows day 5 only. The PC labelling of withdrawal of childcare assistance is a misnomer, as it is actually increasing, not withdrawing. What they seem to be plotting is the change in net childcare costs. These caveats are here noted to make the point that EMTR modelling

can be a complex and difficult task, and even experts may get different results.

The 'area chart' approach in the above chart tends to imply intermediate values that are not actually there. For something with discrete, and chunky, values like days worked, individual columns may be better, as shown in Figure 6.

Figure 6 EMTRs (daily) for sole parent as per PC cameo 1

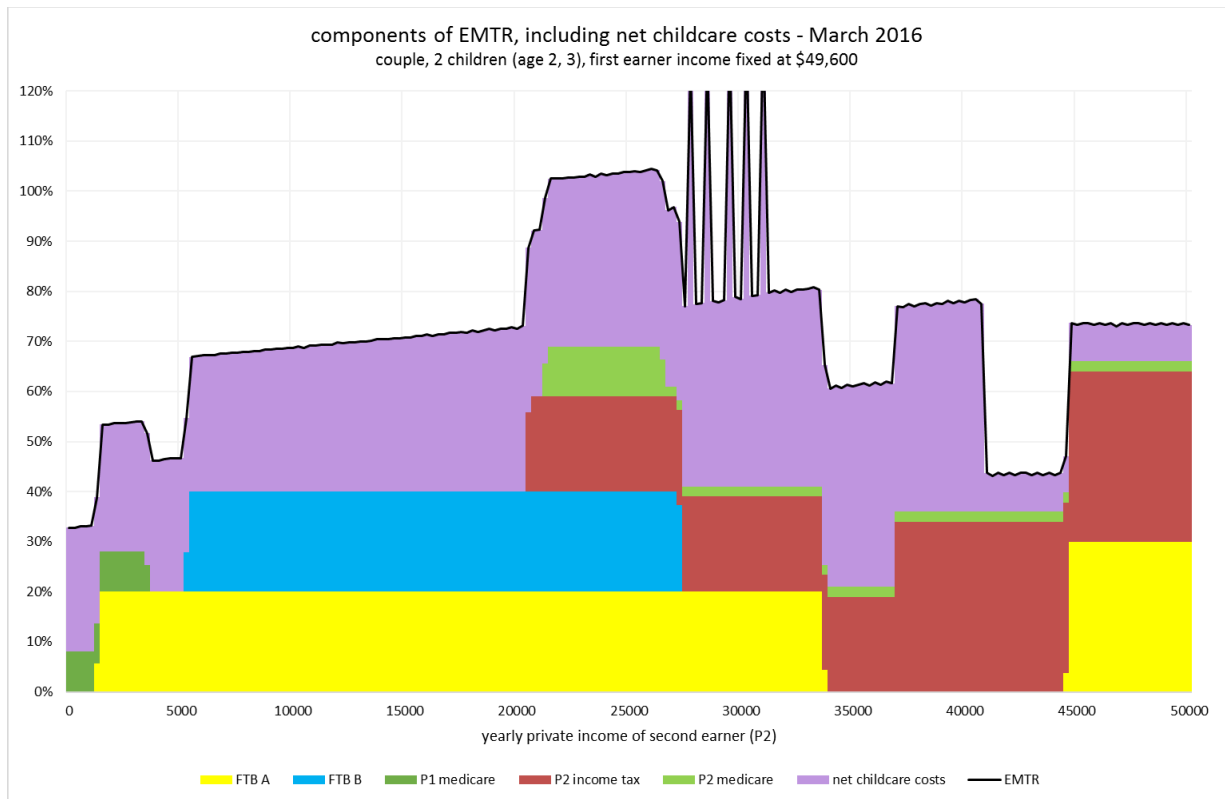


Secondary earners in a couple

There is an argument that the high EMTR for a couple in a conventional EMTR chart is “felt” or directly impacts on the secondary or lower earner not the primary earner, if hours of the primary earner are fixed, or close to it. For example, if an income split of say

60:40 is assumed, this ratio is applied to the marginal dollar of each adult in the household to calculate the EMTR whereas in practice the marginal dollar will likely be earned by the secondary earner. We can model this using a fixed income for the primary earner.

Figure 7 EMTR chart if primary earner income is fixed, couple with 2 children age 2 & 3

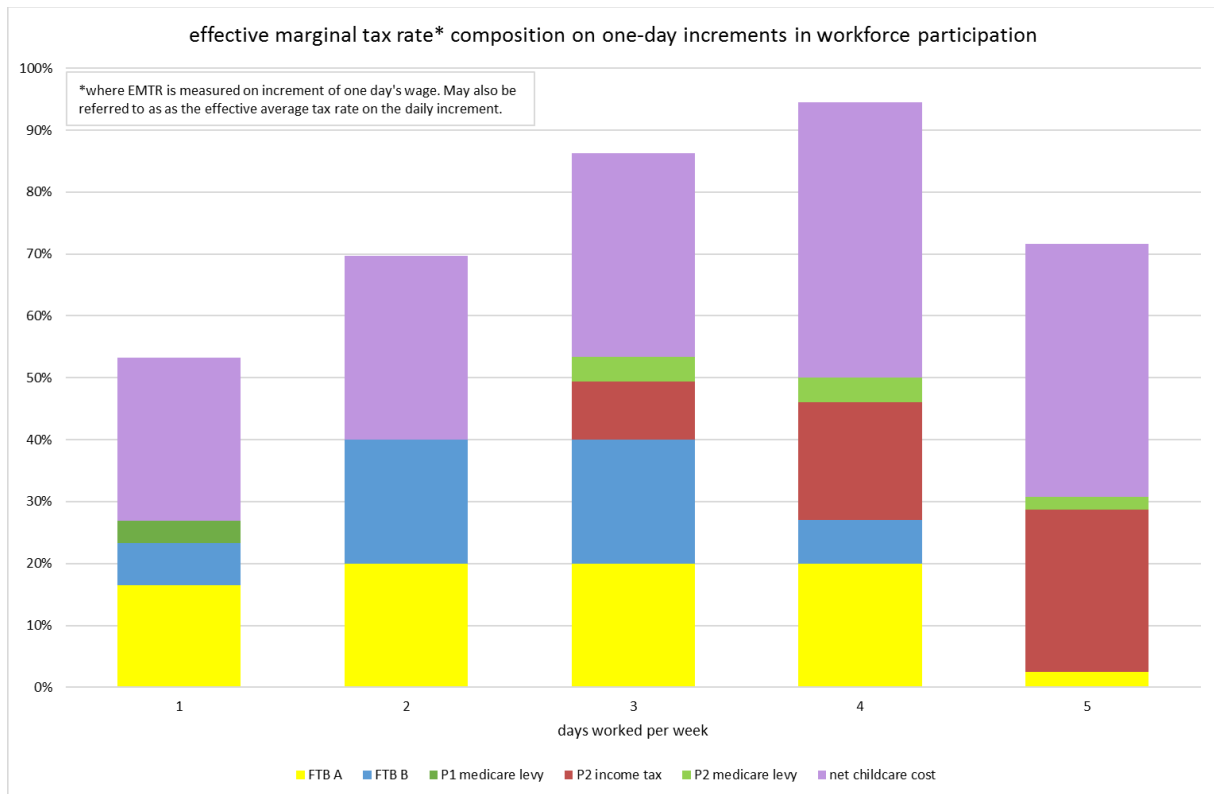


Note: Income of the primary earner is fixed at the minimum wage plus 41%, full year full time (\$49600). Income of second earner is min wage plus 20% (\$20.75/hour). We wished to use a graph for low wage but full time earners, not necessarily on the minimum wage. We had the idea of using parameters similar to the PC, but they have 10 different cameos with very wide ranges of assumed earnings. This ratio is based on the ratio of men's to women's wages, full time averages. Hours of care are

10/day at \$8.50/hr. One aspect of long day care is that care is effectively charged for 10 hours in a full day, to a maximum of 50 hours per week. To mimic this, the assumption is that care hours grow faster than working hours, so that a 38 hour working week translates to 50 hours of care use.

Figure 8 provides the same information in the more realistic bar chart, which recognises that childcare is typically charged in full-day blocks.

Figure 8 Per-day EMTR chart if primary earner income is fixed, couple with 2 children age 2 & 3



Why do we care about high EMTRs?

The calculation of EMTRs and their use in policy debates assumes that people are motivated by money, that their choices are influenced by effective tax rates at the margin, and that their behaviour may change accordingly. But this is not the only motivation of individuals to earn income and in particular, to do paid work. We need to take account of other factors, such as long term benefits from work. Someone might work to gain experience or to maintain attachment to the labour force, notwithstanding any short-term financial disincentives.

There are also administrative ways we push people to work even in the

possible absence of short-term financial rewards, for example the Newstart work test. Figure 9 shows very high EMTRs for a person on Newstart allowance but these extend over a limited range of income, so it is possible to jump right over the 'hump' on attaining a job. Newstart recipients may be faced with discrete job offers rather than choices to work more or fewer hours.

This may become more problematic for a couple, especially if the job offer is for part-time work, as they may need the income but be deterred by the high EMTR on a relatively low wage (up to \$40,000 a year as shown in Figure 10).

Figure 9 Single person, Newstart Allowance

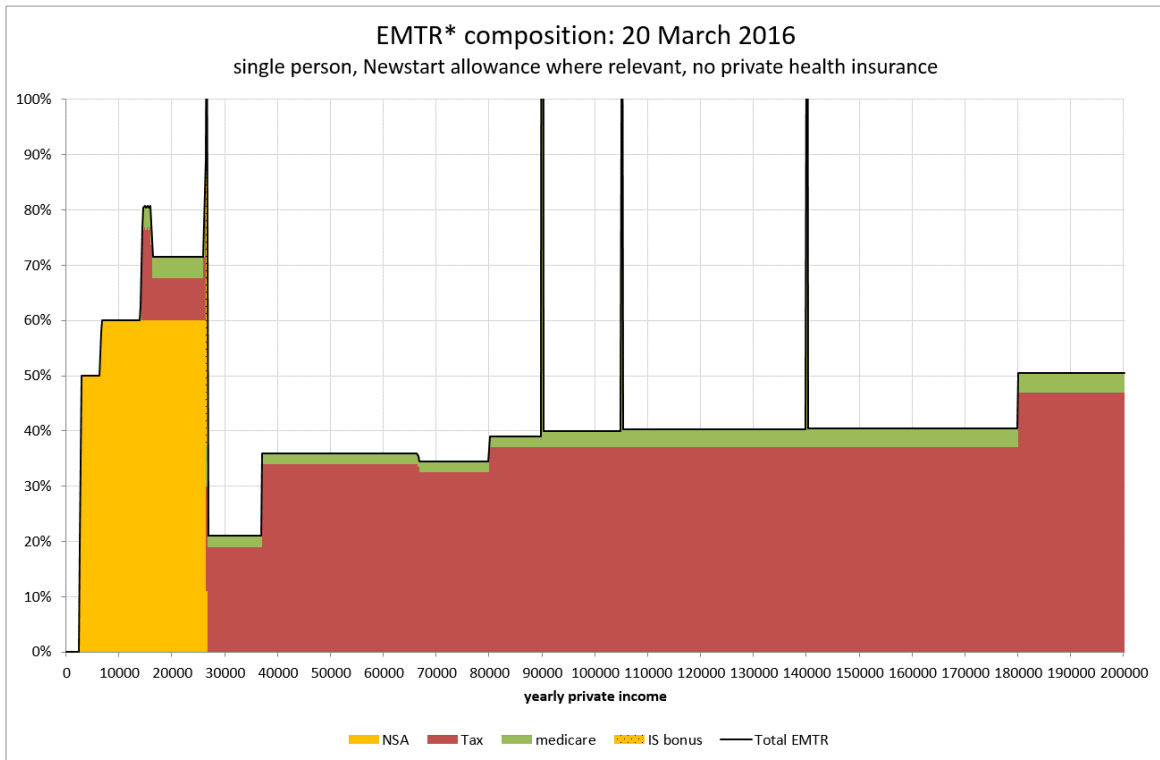
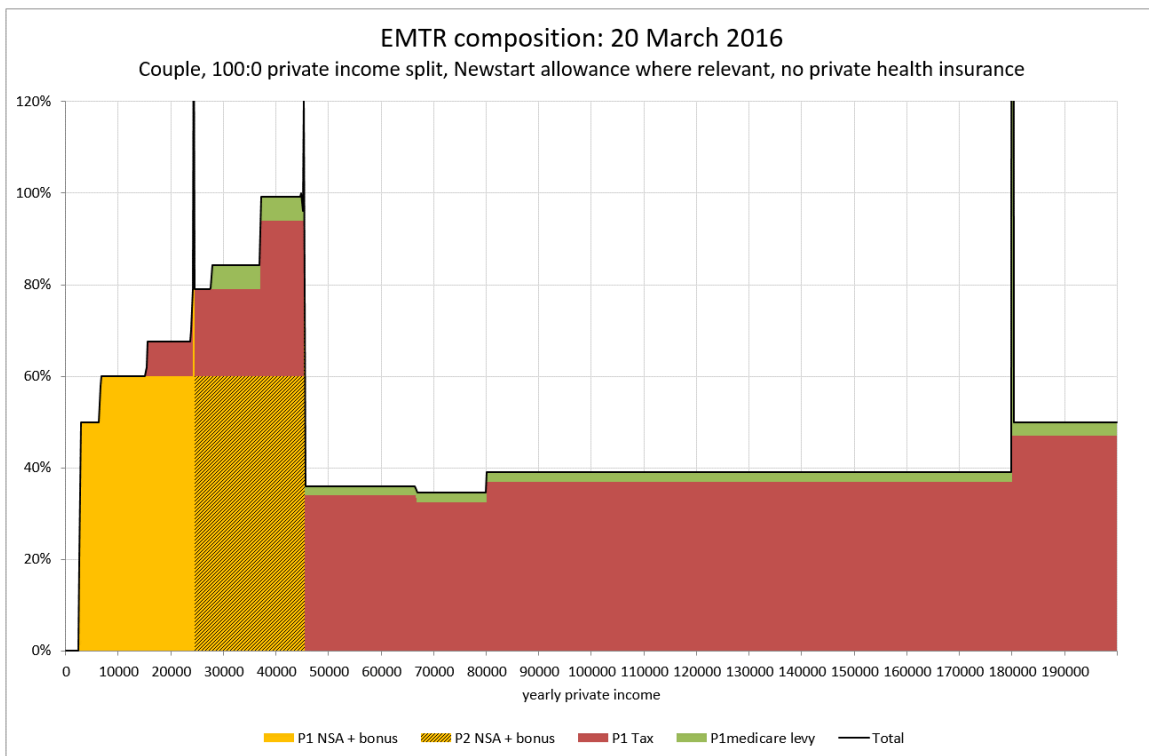


Figure 10 couple, Newstart allowance



The elasticity of labour supply

Economists refer to elasticities of labour supply (or work choices) at the 'intensive' and 'extensive' margin.

The 'extensive margin' refers to 'how many people work', or the choice to work (or not).

The 'intensive margin' refers to 'how much a given number of people work, on average', for example, how many hours a person chooses to work. In the area of retirement decisions, there is evidence the extensive margin is much more important than the intensive one, as it affects the decision to stay at work or leave (and retire). There is also [evidence that labour supply is elastic](#) (responsive) around this margin. Once having left work, older workers may find it very difficult to get back into the labour force and so their labour supply may be more inelastic, but at the point of retirement they are likely to have much more choice.

Policy implications

It is often seen as desirable to reduce high EMTRs so as to reduce this barrier to increased earning or work participation. One way to reduce EMTRs is to reduce benefits, an option which some find attractive but most do not.

Other ways to reduce EMTRs include to reduce tapers or to reduce tax and benefit taper interactions. In means testing, there can be options to sequence tapers so that they do not overlap. However in reducing EMTRs there is a risk that by incentivising the target group we are disincentivising two other groups – 1. Those newly brought into the assisted group as a

result of lower tapers, and 2. Those paying higher taxes to finance the higher benefit or reduced taper (which will usually have a net fiscal cost).

The ultimate desirability of a change depends on the economic distortions produced by the transfer system relative to the distortions induced by income taxation, not the fiscal cost itself. For example, we know that work effort of secondary earners in a couple (usually, women) is more elastically supplied than for primary earners (usually, men). See, for example, this [European metastudy](#), and some results for Australia [here](#). On this basis, reducing taxes on the former by raising them on the latter may well make economic sense.

The [Henry Tax Review](#) makes three recommendations that impact particularly on EMTRs. They are that: all welfare payments should be made non-taxable; a higher income tax threshold of \$25,000 should be established, allied with a standard rate of 35 per cent; and the family-payment income test should become a standard taper of 15 or 20 per cent applying to an integrated family payment. [Ingles 2009](#) suggested that

The tax-free status of the pension at first reduces the EMTR but later raises it, so the EMTR structure becomes less smooth. It is not clear that this is a net improvement [see the earlier discussion about DSP]. There is a net improvement for allowees...There would be a net improvement for families, which are not affected by tax exemption as family payments are already exempt. The single taper of 15 or 20 per cent

replaces existing tapers of 20 and then 30 per cent so EMTRs are generally improved, particularly for secondary earners whose income puts the family into income zones where the base rate of FTB-A is lost... In general, the recommendations of the Henry Tax Review are a slight improvement on the current situation but they do not address really fundamental issues and lack a coherent underlying rationale.' (pp14-15)

Newstart, Sickness and Youth Allowance

An option (see Ingles 2009) is a flat 50 per cent taper for these allowances. A critical issue here is that the economy is not currently creating as many full time as part-time jobs (306,000 part-time compared to 150,600 full-time in the [past 3 years](#)). This means that the idea that Newstart allowees can 'jump over' the high EMTR part of the graph – shown above - is becoming less tenable. If we wish to create a continuous incentive to earn extra income in Newstart recipients, some taper reduction might appear indicated.

Age pension

It is tempting to assume that high EMTRs are bad and should be levelled wherever possible. However this conclusion is too simplistic. For example it has been suggested that in relation to the age pension, [the optimal taper is 100%](#). This is a modelling result which stems from the fact that a

high taper first, reduces the number of pensioner affected by tapering (more are above the cut-out points) and second, reduces the marginal rates of income tax which are used to finance the pension. However this conclusion, while perhaps apposite if the only objective of the pension is a strict anti-poverty one, is less convincing if the 'near-poor' are a concern and if adequate earnings replacement rates are a policy goal.

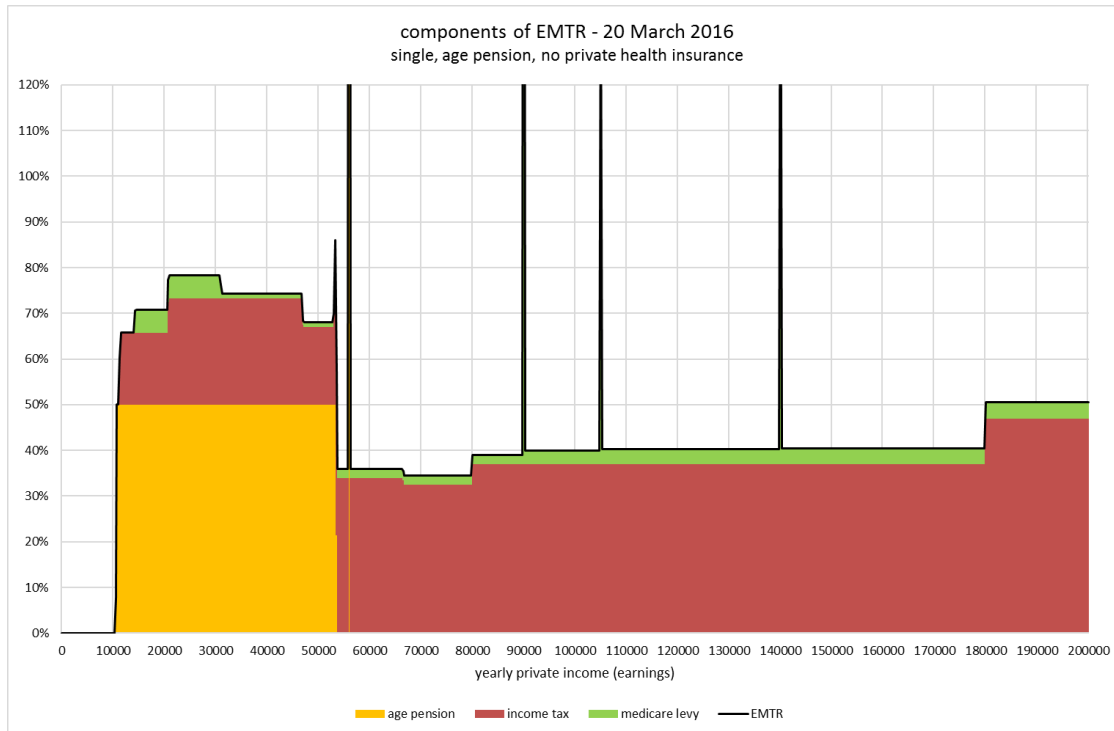
[Ingles and Stewart 2015](#) suggest rebalancing assistance for the aged away from the tax system (where superannuation tax concessions cost some \$30 billion annually) and towards the pension system, by reducing EMTRs. Options to achieve this include lowering the taper (a 25 per cent taper would interact with income tax to produce EMTRs around 50 percent) or shielding pensioners from tax until their income reaches the means test cutout points – which also produces EMTRs of 50 per cent. Both these proposals extend the range of high EMTRs, but flatten them compared to those now current. These authors modelled retirement systems with a flat 35 per cent taper and showed that this produced a quite defensible structure of earnings replacement rates.

In Australia, there is a discount for earnings in the age pension means test, the Work Bonus, so the EMTR depends on the source of income. The first \$250 of fortnightly employment income is not assessed and is not counted under the pension income test. The bonus operates in addition to the pension income test free area. Some researchers have modelled reforms which disregard earned

income entirely, and find that they markedly increase labour force

participation. The charts presented here assume that income is earned.

Figure 11 - EMTR single age pensioner



Other EMTR-focused options include [abolishing the means test](#), or enhanced earnings disregards.

Incentives for women’s workforce participation

In its [Game changers](#) Report, the Grattan Institute suggested that “removing disincentives for women to enter the paid labour force would increase the size of the Australian economy by \$25 billion per year”. They note that the major influences on female workforce participation are marginal tax rates and the net costs of childcare, but don’t make any policy recommendations. This Report also looked at labour force participation among older workers. Options include increasing the pension and preservation ages, which illustrate that there are other policy approaches, in

many cases, than those focussing only on EMTRs.

We have already noted that the Productivity Commission has recommended changes to childcare subsidy arrangements designed to reduce work disincentives. Other measures could focus on income support and tax arrangements. For example, [Hayes and Redmond 2014](#), consistent with [Apps and Rees 2010](#), call for a universal (taxable) family payment. Apps alternatively considers means testing family payments only on the primary earner’s income.

Figure 12 EMTRs for single person with 2 children age 8 and 10 (childcare not inc.)

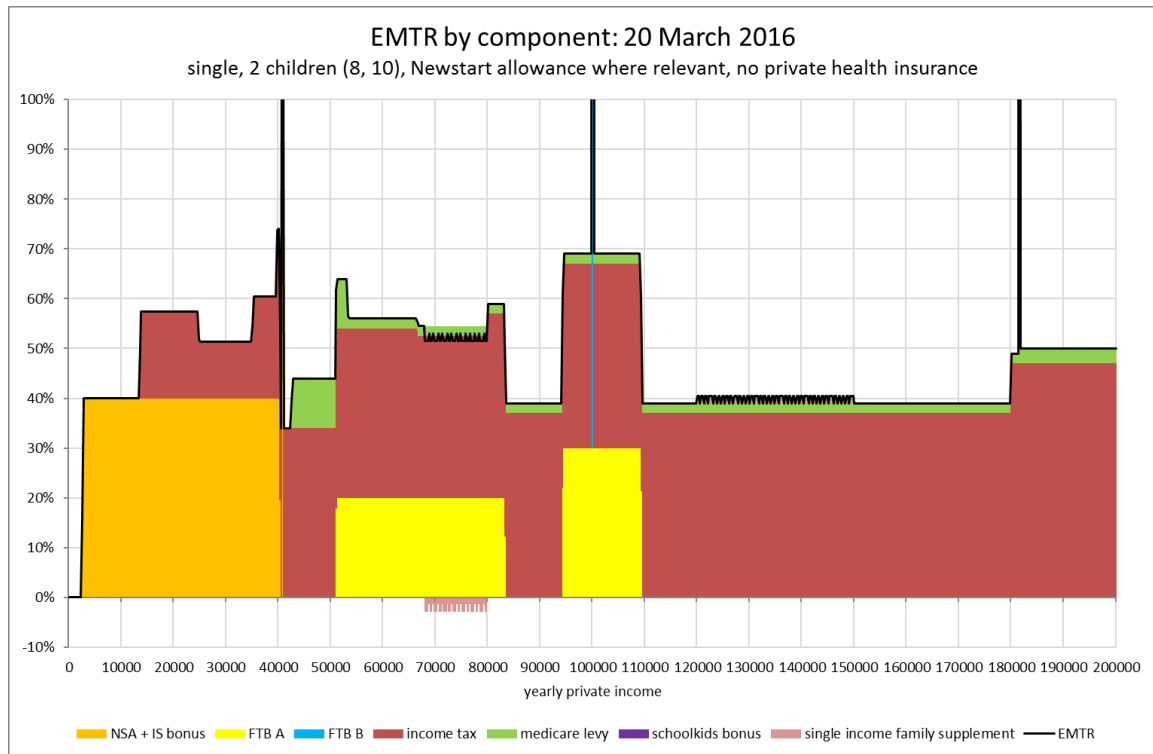
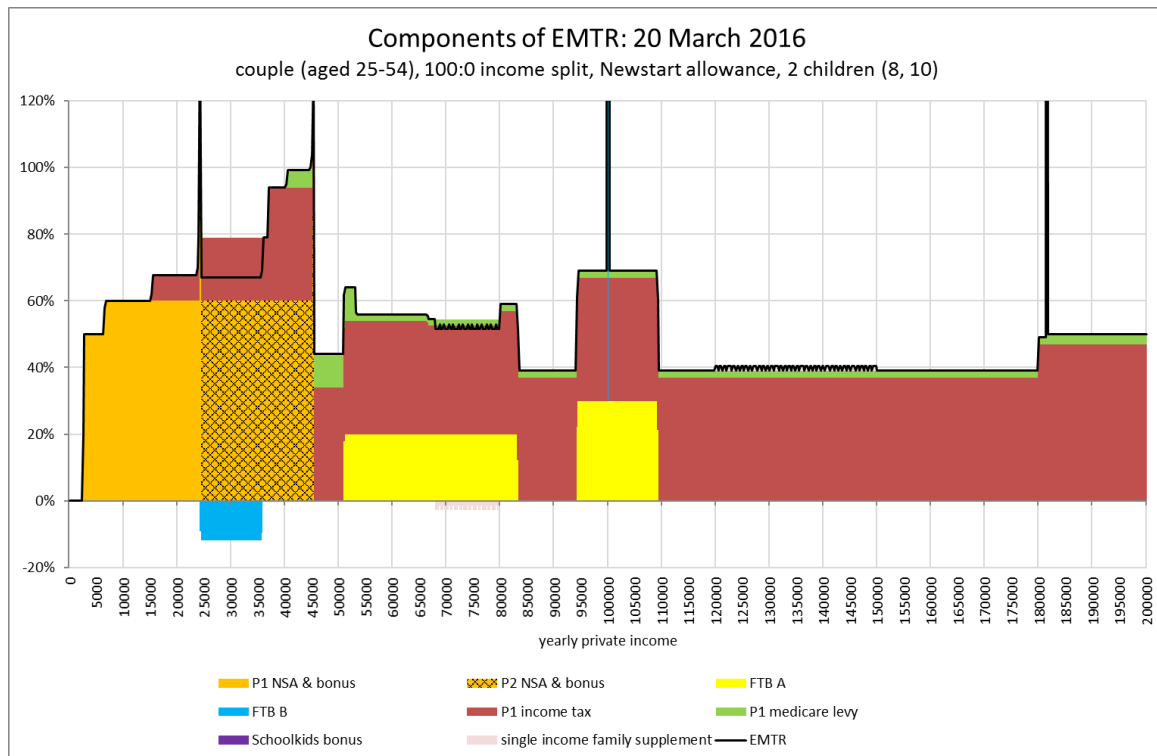


Figure 13 EMTRs couple with children, 8 and 10, no childcare



In such a household the withdrawals for partner 1 income support, partner 2 income support and FTB A are deliberately sequenced (in that order). Sequencing is one approach to avoiding income test stacking (and possible high EMTRs).

Despite the aforementioned sequencing, EMTRs are still high over the partner 2 withdrawal range because of a unit of assessment problem – the reductions in P2's income support is 'invisible' to the tax system so P1's income tax rates simply stack on top.

Ingles 2009 canvassed reducing the FTB-A taper to a flat 15 per cent and abolishing the two-tier taper (now 20 per cent initially and 30 per cent above \$95,000). The Henry Tax Review suggested similar changes.

Disability and sickness

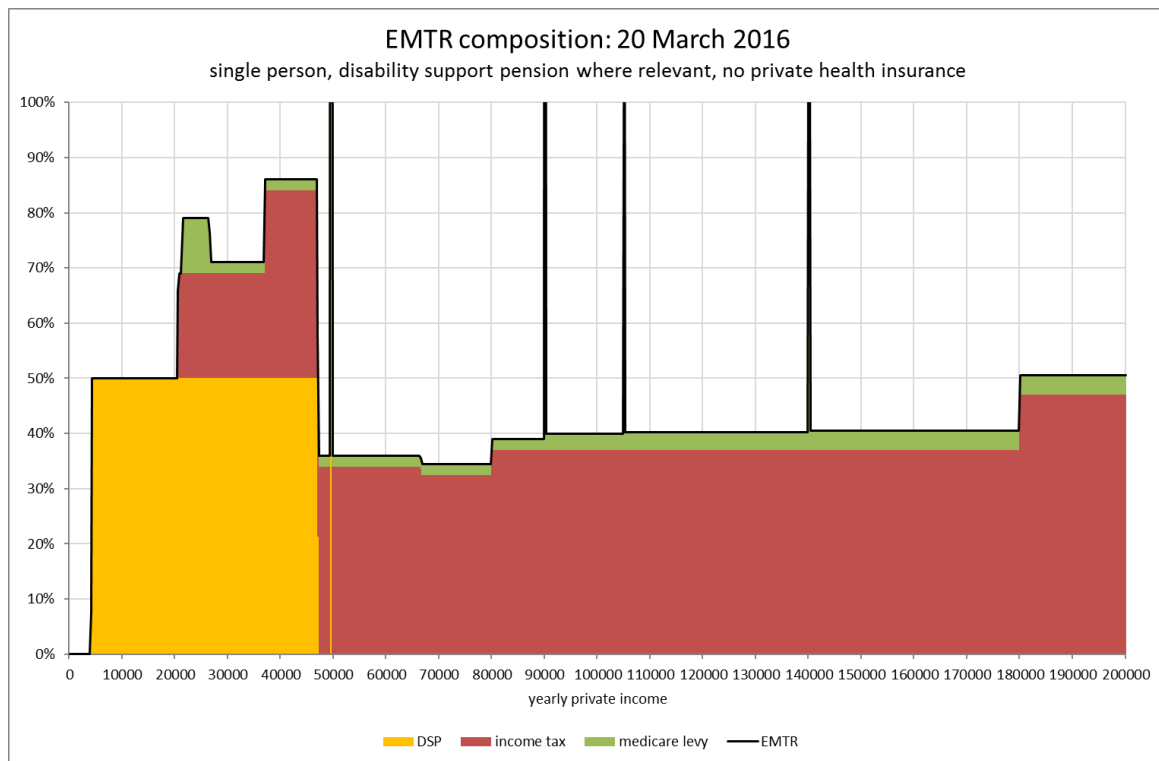
In the area of disability that Government has effectively tightened access by moving some moderately disabled people onto Newstart or Youth Allowance under 'welfare to work' reforms. This has raised EMTRs at low incomes but reduced them at middle incomes. To materially reduce work disincentives for this group would require something similar to New Zealand's national compensation scheme, which pays non-means tested but taxable benefits related to prior earnings.

Various Australian governments have looked at this, but the constitutional and other impediments have always proved too difficult. By contrast earnings-related pay for sickness was early established in wage agreements and has proved enduring. Once time limits expire for sick pay, the sick or disabled person is thrown onto the benefit system and faces EMTRs similar to those shown for Newstart allowees. However if they are sick for an extended period they may move onto Disability Support Pension (DSP).

The EMTR charts for disability pensioners look similar to those for pensioners with small tweaks. DSP and Carer pension is not taxable, so the initial EMTR is 50 per cent exactly. However when tax does cut in it is additive to the taper, so EMTRs become higher than for the age pension. In the latter case the taxation of the pension has the paradoxical result of smoothing EMTRs as tax applies to the increase in net income after tapering.

An EMTR chart for single DSP is shown at figure 14. Note that this is an even more theoretical illustration than is usually the case for these charts. This is due to the apparent conflict between EMTRs associated with increasing hours of work and basic qualification issues for DSP, which depend on the applicant not being able to work more than 15 hours a week.

Figure 14 EMTR chart for single Disability Support Pension



Housing assistance

Commonwealth rent assistance is designed to phase out at a higher income than other payments, and so its means test does not ‘stack’. However, state housing rental rebates do phase out sooner and this can create very high EMTRs in the phase-out income range.

An option canvassed in the Henry Tax Review is to abolish the separate State Housing Rental Rebate (SHRR) schemes and replace them with a greatly expanded scheme of Commonwealth rental assistance. This might be quite expensive, but it would remove one of the current serious poverty traps (not illustrated here) and assist low-income renters in a major way.

Major reforms

Major reform proposals to address EMTR problems tend to involve the replacement of current arbitrary schedules of tax rates by income with simple linear tax structures, usually involving variants on a guaranteed minimum income or negative income tax, ideas that go back to the 1970s or earlier. This includes for example demogrant schemes including Basic Income, which is again in the spotlight with trials in several places such as [Ontario](#) and a recent referendum in Switzerland, which failed to pass but garnered 23 per cent support.

The problems with these broad proposals is that, if we are to provide basic support comparable to current pension rates, the implied linear tax rates can be very high indeed – over

50 per cent ([Dawkins et al 1998](#)). This can be partly addressed by paying higher rates for 'categorical' groups such as the aged and the disabled and lower rates for people who can normally be expected to be in the workforce. See, for example, the scheme outlined in the Henderson [Poverty Inquiry Report](#) 1975). However the tax rates suggested by Henderson (around 40 per cent) are no longer viable as they would now have to be considerably higher.

[Ingles 2009](#) canvassed options for reducing the very high linear tax rates involved in demogrant or negative income schemes. These options

mainly involve tax base broadening – eliminating some very large tax expenditures in the income tax, and expanding payroll tax and/or the Goods and Services Tax (GST). Low income compensation would be provided through the demogrant itself. While these measures could produce a viable scheme, they are so radical in the current political context as to be effectively unavailable.

This Policy Brief is based on graphs produced by David Plunkett, who maintains a spreadsheet model of the tax/transfer system. His blog is at <http://ravebydave.blogspot.com.au/>

Further reading

Apps, P (2015) '[The Central Role of an Income Tax in a Modern Economy](#)' 30 *Australian Tax Forum* 845

Chetty R and Saez E (2009) '*Teaching the Tax Code: Earnings responses to an experiment with EITC recipients*,' Non-Technical Summary of NBER [Working Paper No. 14836](#) (March 4, 2015)

Colombino (2015) '[Is unconditional basic income a viable alternative to other social welfare measures?](#)' *IZA World of Work*

Kalb G (2007) 'Interaction of the Tax and Social Security Systems in Australia: The Effect on Effective Marginal Tax Rates' *The Australian Economic Review*, vol. 40, no. 2, pp. 186–93

Productivity Commission (2014), 'Early Childhood Education and Childcare', [Appendix E \(Effective Marginal Tax Rates\)](#)

Productivity Commission (2015) 'The Incidence of the Tax and Transfer System', [Chapter 5, Tax and Transfer Incentives](#)

Whiteford, P (2013) '[The Financial impact of welfare, tax and childcare arrangements](#)', CEDA Chapter 3, *Women in leadership: Understanding the Gender Gap*

OECD Tax/benefit studies and EMTR charts are all available here: <http://www.oecd.org/els/benefits-and-wages-statistics.htm> and here <http://www.oecd.org/els/soc/benefits-and-wages-country-specific-information.htm>