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Jumpstart Productivity:

New modelling pinpoints better tax cut program

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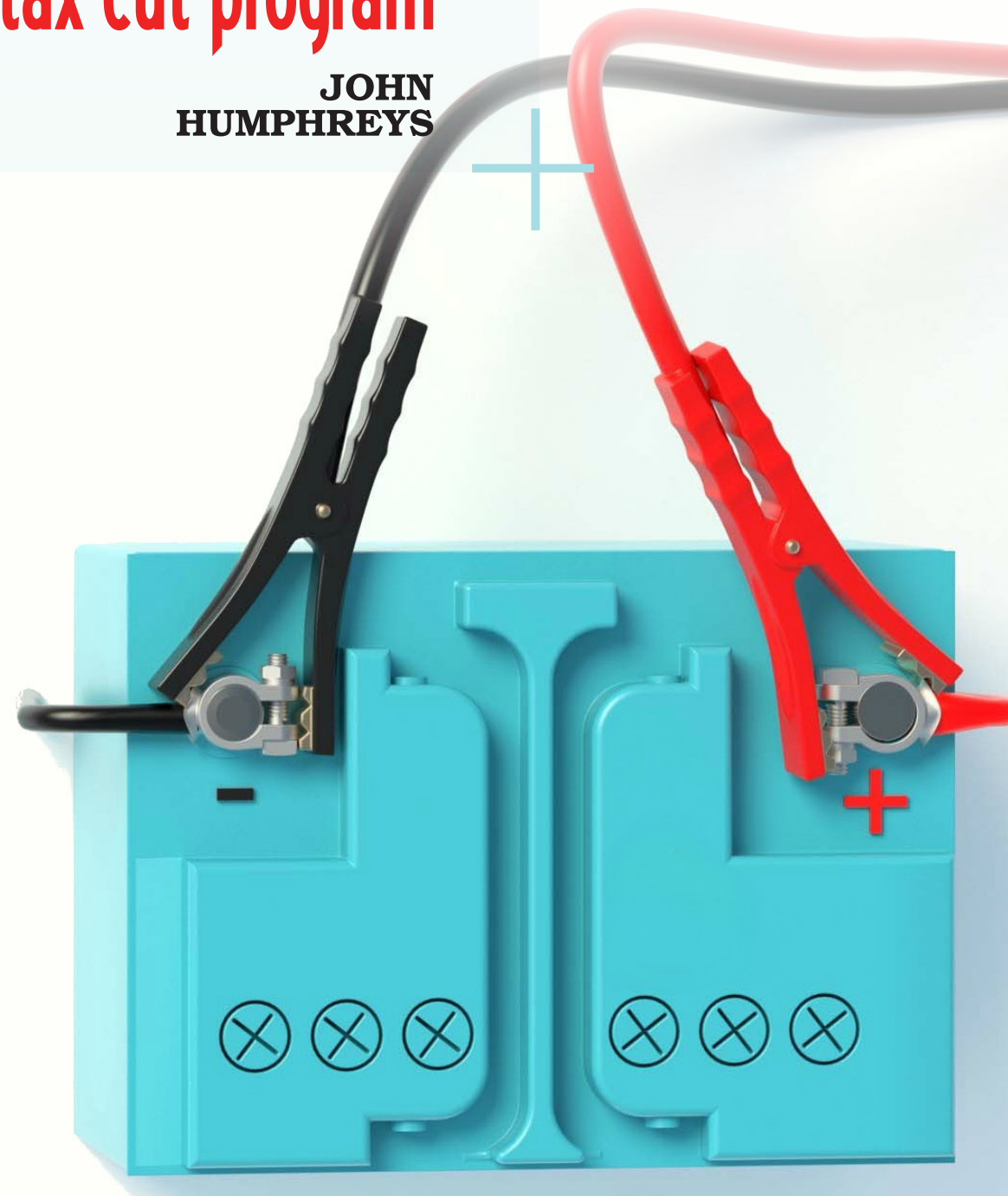

THE CENTRE FOR INDEPENDENT STUDIES

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John Humphreys

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REDUCING THE BURDEN FOR FUTURE GENERATIONS

THE CENTRE FOR INDEPENDENT STUDIES

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Executive Summary

For two consecutive years, the government has successfully passed tax cut legislation. These tax policies sparked a wide-ranging political debate, but unfortunately it was not informed by proper public tax modelling to show the likely impact of the reforms. This paper fills that gap by using a dynamic tax model and the most recent public tax data in order to determine the likely impact on GDP, economic efficiency, and government revenue.

Some of the findings of this report conform to mainstream expectations. As most economists would predict, the structural tax reforms introduced by the government are expected to improve economic output and efficiency. However, the details of this report suggest the government should consider adding a third stage to their tax reform agenda.

The next stage of the government's tax policy should involve scrapping the Low-Middle Income Tax Offset (LMITO), and instead bringing forward the scheduled structural tax reforms so they begin in 2020. The modelling in this report shows that the LMITO fails to increase efficiency, while the future structural tax cuts produce higher benefits than previously understood — which makes them both more desirable and also more affordable than previously believed.

The final conclusion from this report is the urgent need for the government to conduct dynamic tax modelling as a fundamental part of their tax analysis process; following the commendable lead taken by the UK Treasury. Good policy requires good information, and there is no credible reason for ignoring best-practice tax modelling.

Introduction

Accurate information is essential for good policy. If a politician is armed with good intentions but wrong information, they can easily do more harm than good. Given the recent focus on income tax cuts, it is crucial for politicians and the general public to have clear and detailed information about the links between tax policy, tax revenue, and economic performance.

Unfortunately, neither the Australian Treasury nor any other government or university department has done any formal public modelling of the income tax changes. The lack of proper modelling creates two significant problems:

1. We have no clear information about the impact of tax changes on the economy; and
2. Treasury budget estimates are usually wrong — sometimes by large amounts.

Without detailed and accurate information, it is very difficult for politicians and the general public to compare different tax options and make an informed decision about tax policy. This report will fill the information gap by providing detailed analysis of the government's recent income tax changes, and how they impact on economic output, consumer wellbeing, and government revenue.

In addition to reviewing the current legislation, the report will go a step further and model the impact of bringing forward the complete tax cuts to begin in 2020.

Dynamic tax modelling

The need for dynamic tax modelling has been well understood in the tax literature for several decades, and specifically since the seminal work of Martin Feldstein in the 1990s.[1] In this context, the term 'dynamic' refers to the use of elasticities to factor in behavioural changes, as opposed to so-called 'static analysis', which assumes no behavioural response.

There are many ways people might respond to higher marginal tax rates, including:

1. Shift from formal work into household work, illegal work, or more leisure time;
2. Decrease work effort;
3. Rearrange financial arrangements to minimise tax;
4. Illegally evade tax (by operating in cash, through intermediaries, or deception);
5. Downgrade education and career plans;
6. Avoid difficult or risky work and business opportunities;
7. Shift activity into a lower-tax jurisdiction;
8. Decrease savings and capital investment; and
9. Lobby the government for preferential tax treatment.

These consequences won't always occur, and they won't occur for everybody; but when marginal tax rates are changed, at least some people will change some of their behaviour some of the time. Good tax reform will reduce the distortions created by high marginal tax rates, consequently leading to more economic activity, higher wages, and a larger consumer benefit.

There has been some effort to measure specific types of behavioural change, including the 'elasticity of labour supply', which attempts to capture the response 1 (and sometimes response 2) type of reaction mentioned above. The important contribution of Feldstein was to observe that it was possible to capture most (though not all) of the above responses by directly measuring the link between tax rates and taxable income. The relationship is known as the 'elasticity of taxable income'. Given the large and growing literature on this method, it is no longer reasonable to continue with the static modelling assumption of no behavioural change.

The absurdity of static modelling was made clear in an exchange between a US Senator and the relevant bureaucrats responsible for tax modelling. The Senator asked for estimates of how much revenue would be raised from a 100% income tax for income over $200,000 per year. In their laughable response using their static model, the bureaucrats concluded that a 100% tax would raise over $100 billion in the first year, rising to over $200 billion in the following years. Even though people in that hypothetical tax bracket would be working for free, the static model assumed that they would not change their behaviour.[2]

To their credit, US tax modelling has improved somewhat since that incident, though there is still debate about their modelling methodology[3]. A better international example comes from the United Kingdom, where the UK Treasury published dynamic tax modelling of their recent experiment with a 50% top marginal tax rate. Thanks to their transparent and realistic modelling work, the UK government has received more accurate tax information, leading to more rational tax policy.

Unfortunately, the Australian Treasury continues to rely on a static tax model that makes the absurd assumption of zero behavioural changes. This is simply wrong. By ignoring behavioural responses, Treasury is ignoring the issue of productivity, and implicitly assuming that microeconomic reform is irrelevant. Since its static modelling assumes productivity out of existence, it is impossible for decision-makers to strive for higher productivity. As Feldstein summarised:

> "The failure to estimate the efficiency effects of alternative tax changes also leaves the policy process without the information that it needs."[4]

This modelling mistake means that political decision makers (both politicians and voters) don't have accurate information about tax changes. Reasonable people can disagree about the right balance in tax policy; but the lack of information on efficiency — and incorrect information regarding the budget impact — has led to the dumbing down of our tax debate.

There are many issues to consider when looking at tax policy (see Box below), but in the absence of proper modelling, the tax debate in Australia focuses narrowly on the issues of equity and stimulus. These are important topics, but they tell only part of the story. It is true that tax cuts will benefit those who receive them, and it's true that the tax cuts will create a short-term stimulus due to higher consumer spending. But for most tax economists, the crucial point is that tax cuts will reduce the behavioural distortions caused by taxes (as discussed above), which increases productivity — resulting in sustainable increases in economic output, wages, and consumer wellbeing. Indeed, these efficiency benefits are often the rationale for tax cuts in the first place, and yet they are completely ignored by Treasury's static modelling.

Issues to consider when looking at tax policy:

1. Efficiency = long-term impact on economic productivity, wages, and output
2. Adequacy = impact on government revenue and budget balance
3. Equity = the distribution of benefits (or costs)
4. Stimulus = short-term boost (or brake) on the economy due to changed consumption spending
5. Politics = impact on the size of government

This report fills in the missing analysis by providing dynamic tax modelling, which gives crucial information on the relative efficiency of different tax policies. Our dynamic tax modelling also gives more accurate estimates for the impact on government revenue and the budget balance.

These same points were made in a CIS Policy Paper released immediately after the 2019/20 Budget, when the government's second round of tax reform was announced.[5] That paper offered some initial modelling results, which showed the tax cuts planned for 2022/23 and 2024/25 would cost the budget less than expected, and could be introduced earlier without causing large damage to the budget.

Since the Budget, the Australian Taxation Office has released updated tax data and the dynamic tax model has been updated and improved. Our model includes historical data from 2010/11 up to 2016/17, and extrapolates that information forward based on growth trends in taxable income and tax receipts. This data is split by income brackets, which makes it possible to analyse tax policy changes in detail. The model assumes that the behavioural elasticities will be broadly in line with the best available international evidence,[6] which is then supplemented with sensitivity analysis. For more information about the details of the model, see the technical appendix.

The dynamic tax model used in this report shows the impact of specific tax reforms on government revenue, taxable economic activity (proxy for GDP) and economic efficiency. It is common practice to report the GDP numbers as being the economic impact — and they are included in this report for the sake of transparency and completeness — but it should be noted that 'economic efficiency' is a more accurate measure of the personal impact faced by most people.[7]

This research shows the results of the model when applied to the government's 2018 and 2019 tax changes. The first part of the paper looks at the short-term Low and Middle Income Tax Offset (LMITO), showing detailed results for each element of that policy. The following section looks at the long-run structural tax reforms, mostly scheduled for 2022/23 and 2024/25. Finally, the paper gives a more accurate picture (than was possible immediately post-Budget) of the consequences of bringing forward the structural tax reform to 2020.

Low and Middle Income Tax Offset (LMITO)

The Low and Middle Income Tax Offset (LMITO) was first announced in the 2018 federal budget, and was then doubled in the 2019 federal budget. While the government didn't provide a disaggregated estimate of the budget impact, the Parliamentary Budget Office estimated the 2018 LMITO would cost the budget about $16 billion over four years, and the 2019 budget papers imply the 2019 LMITO would cost the budget about $15 billion over four years, for a total of $31 billion.

The LMITO is often reported in terms of the financial benefit received by taxpayers. The 2018 LMITO has a taxpayer benefit of up to $530 per year, and the 2019 policy increased that benefit to $1080 per year, with the maximum benefit going to people earning between $48,000 and $90,000. This information is accurate, but it tells us nothing about behavioural changes and the efficiency consequences of the policy.

While people earning between $48,000 and $90,000 receive the maximum financial benefit, they do not face a different marginal tax rate, so this policy does not change their incentives to earn or report income. It is worth reiterating that people in this income bracket certainly receive a significant *personal* benefit, but this part of the LMITO does not have any direct impact on the efficiency of the tax system.

From an economic perspective, the important part of any tax change is the impact on marginal tax rates; and the LMITO policy actually involves three different

changes wrapped into a single policy. The three parts of the LMITO policy are:

1. The LMITO effectively increases the tax-free threshold, moving more people from the 19% tax bracket into the 0% tax bracket;
2. The phase-in of the additional benefit effectively decreases the marginal tax rate for people earning between $37,000 and $48,000; and
3. The phase-out of LMITO effectively increases the marginal tax rate for people earning between $90,000 and $126,000.

The third stage is particularly important. The LMITO offers a financial benefit for people earning up to $126,000, but the 'phase-out' of the LMITO actually *increases* the marginal tax rate faced by some workers — and it is the marginal tax rate that determines how people change their behaviour. The first two stages will increase economic efficiency, but the third stage will decrease economic efficiency. To know the net impact, it is necessary to use a dynamic tax model.

The three different parts of the LMITO apply to both the 2018 and 2019 policy. Specifically, these are the three tax changes from the 2018 LMITO policy:

A1. Increase tax-free threshold from $20,500 to $21,600, which effectively reduces their marginal tax rates from 19% down to 0%;

A2. Decrease tax rate for incomes between $37,000 and $48,000 by 3%, from 36% down to 33% once the Medicare Levy and tax offsets are included;

A3. Increase tax rate for incomes between $90,000 and $125,333 by 1.5%, from 39% up to 40.5% once the Medicare Levy is included.

These are the three tax changes from the 2019 LMITO policy:

B1. Increase tax-free threshold from $21,600 to $21,900, which effectively reduces their marginal tax rates from 19% down to 0%;

B2. Decrease tax rate for incomes between $37,000 and $48,000 by another 4.5%, from 33% down to 28.5% once Medicare Levy and tax offsets are included;

B3. Increase tax rate for incomes between $90,000 and $126,000 by another 1.5%, from 40.5% up to 42% once the Medicare Levy is included.

The following analysis shows the economic and dynamic revenue results for each of these six different stages of the LMITO policy, and also shows the total impact for the 2018 policy, total impact for the 2019 policy, and the total impact from all LMITO policies.

Economic analysis of LMITO

The economic impact of LMITO is provided in Table 1 below, showing both the change in taxable income (which is a proxy for GDP), and the change in economic efficiency (which is a proxy for consumer welfare). The results from this section will be used to create the dynamic revenue estimates.

The most important — and surprising — result is that the LMITO tax changes will actually decrease GDP and the economic efficiency of the tax system. It is worth repeating that the LMITO policy will give a clear and significant financial benefit to the affected taxpayers. There may be strong equity, stimulus, or political reasons for this policy, but there is not a good efficiency argument for the LMITO.

The reason for this unexpected result is that the efficiency cost of withdrawing the LMITO actually exceeds the efficiency benefits from introducing the LMITO. Looking at the results for the 2019 LMITO changes (B1, B2, B3 on the table), increasing the tax-free threshold will boost GDP by about $0.1 billion, and phasing in the additional LMITO benefit will boost GDP by about $1.0 billion. However, the phase-out of the LMITO will cause higher marginal tax rates, which will decrease GDP by about $1.6 billion. The net impact is -$0.5 billion per year.

It should be noted that all these numbers are relatively small compared to the total size of the economy. While half a billion dollars is a huge sum for any one person, the Australian economy has

Table 1: Economic impact of LMITO (per year)

	Taxable income (GDP)	Economic efficiency
A1. 2018 LMITO – increase TFT	$0.2 billion	n/a
A2. 2018 LMITO – decrease rates	$0.7 billion	$0.2 billion
A3. 2018 LMITO – increase rates	-$1.5 billion	-$0.6 billion
2018 total	**-$0.6 billion**	**-$0.4 billion**
B1. 2019 LMITO – increase TFT	$0.1 billion	n/a
B2. 2019 LMITO – decrease rates	$1.0 billion	$0.3 billion
B3. 2019 LMITO – increase rates	-$1.6 billion	-$0.7 billion
2019 total	**-$0.5 billion**	**-$0.4 billion**
Total	**-$1.1 billion**	**-$0.8 billion**

over $1,600 billion turnover per year, and federal government revenue is over $400 billion per year. This is not to justify the economic costs of the LMITO — and it is both disappointing and surprising that the LMITO policy has a cost at all — but put into broader context, the economic cost is relatively small.

The underlying cause of this result is the observed reality that different taxpayers have different behavioural elasticities. The LMITO policy cuts the marginal tax rate for low-income people (earning up to $45,000 per year), but unfortunately these groups are relatively less likely to change their behaviour in response to tax changes; so there is a relatively small impact on GDP and economic efficiency. The phase-out of LMITO effectively increases the marginal tax rate for people earning between $90,000 and $126,000, and unfortunately those taxpayers are relatively more likely to change their behaviour in response to tax changes.

Revenue analysis of LMITO

Building on the economic analysis above, it is now possible to more accurately estimate the impact on government revenue. Table 2 below shows the revenue estimates from each stage of the LMITO policy, with the first column showing static estimates as a reference point, and the second column showing the dynamic estimates.

The static estimates are based on the assumption of no behavioural change, and no impact on GDP or economic efficiency. The total cost is estimated to be just over $31 billion, which is roughly the same as the estimates coming from the Australian Treasury and Parliamentary Budget Office.

By factoring in behavioural changes and the economic consequences discussed above, it's possible to calculate more accurate dynamic revenue estimates. In this instance, because LMITO is expected to decrease taxable income, the revenue cost of LMITO will actually be higher than the government's static estimate. Instead of $31 billion, the total cost of both LMITO policies over four years may end up being closer to $35 billion.

As with the economic analysis above, these expected results are driven by the economic costs from phasing out the LMITO for people earning between $90,000 and $126,000. The first two stages of LMITO (A1, A2 and B1, B2) will cost the budget slightly less than expected, but the third stage of LMITO (A3 and B3) will raise less than the government hopes.

To check the robustness of these estimates, Table 3 shows the results of two different types of sensitivity analysis. The first row of results uses global average estimates for the tax elasticity, but includes different long-run growth estimates. The second row of results allows for variation in both the tax elasticity and the growth estimates.**

These estimates are not intended as alternative estimates. The base case scenario (central column) is closer to global best practice, but the sensitivity analysis shows how sensitive the results are to changes in elasticity assumptions. As can be seen in Table 3, the results are broadly similar across all scenarios, which gives us a high degree of confidence in the model results.

Table 2: Static and dynamic revenue impact from LMITO (2019/20 to 2023/24)*

	Static estimates	**Dynamic estimates**
1. 2018 LMITO – increase TFT	-$9.7 billion	-$9.6 billion
2. 2018 LMITO – decrease rates	-$11.2 billion	-$10.1 billion
3. 2018 LMITO – increase rates	$4.6 billion	$1.8 billion
2018 total	**-$16.3 billion**	**-$18.0 billion**
4. 2019 LMITO – increase TFT	-$2.6 billion	-$2.6 billion
5. 2019 LMITO – decrease rates	-$16.8 billion	-$15.5 billion
6. 2019 LMITO – increase rates	$4.6 billion	$1.6 billion
2019 total	**-$14.8 billion**	**-$16.5 billion**
Total	**-$31.2 billion**	**-$34.5 billion**

* Totals may not sum in the table due to rounding.

Table 3: Revenue impact from LMITO; sensitivity analysis (2019/20 to 2023/24)

	Sensitivity (low)	**Base case**	**Sensitivity (high)**
Fixed ETI; variable growth	-$34.7 billion	-$34.5 billion	-$34.3 billion
Variable ETI and growth	-$33.0 billion	-$34.5 billion	-$36.3 billion

Structural tax reform

The centrepiece of the government's 2018/19 and 2019/20 budgets was a package of tax cuts totalling more than $300 billion over the coming eleven years. The short-term changes are mostly related to LMITO (as discussed above), with most of the structural tax reform delayed until 2022/23 or 2024/25, with the latter time period being beyond the range of the budget forward estimates.

The following analysis will ignore the LMITO changes and focus only on the structural tax reforms. These are split into seven tax changes, including five adjustments to thresholds, the removal of the 37% tax bracket, and reducing the 32.5% tax rate down to 30%. Table 4 shows the list of these seven structural tax reforms, along with a revenue estimate based on the (incorrect) static assumption of no behavioural change. Note that these tax changes do not equal the $302 billion promised by the government as these structural reforms do not include LMITO (considered above) and these estimates only include the coming 10 years, instead of 11 years as reported by the government in some cases.

The dynamic tax model was applied to each of these changes individually to show how they impact on the broader economy, and to give a more accurate estimate of how much they will impact on the budget. This process highlights the importance of dynamic tax modelling, since the results in some instances are drastically different from the advice that was given by Treasury to the government. In aggregate, the static estimates are wildly misleading.

It should be noted that these estimates are an update and expansion on earlier dynamic tax modelling work that was done in response to the 2018 and 2019 budgets.[8] The benefit of the current modelling is that it takes advantage of an updated tax model (with more recent income and tax data, and some structural upgrades), and also provides more disaggregated results.

Table 4: Incorrect revenue impact from government's proposed tax reforms (static estimate)***

	Static estimates
1 – Increase 37% threshold from 87,000 up to $90,000 Announced 2018; started 2018	-$5.7 billion
2 – Increase 37% threshold from $90,000 up to $120,000 Announced 2018; starts 2022	-$35.3 billion
3 – Increase 32.5% threshold from $37,000 up to $41,000 Announced 2018; starts 2022	-$40.4 billion
4 – Increase 45% threshold from $180,000 up to $200,000 Announced 2018; starts 2024	-$7.4 billion
5 – Remove the 37% tax bracket Announced 2018; starts 2024	-$30.1 billion
6 – Increase 32.5% threshold from $41,000 up to $45,000 Announced 2019; starts 2022	-$37.3 billion
7 – Reduce 32.5% tax rate down to 30% Announced 2019; starts 2024	-$78.8 billion
Total	**-$235.1 billion**

** The 'base case' scenario uses mainstream tax elasticity assumptions with an average of 0.4 for average incomes, but 0.2 for low incomes and 0.6 for high incomes. The 'low elasticity' column uses 0.2 for average incomes, 0.1 for low incomes and 0.3 for high incomes; while the 'high elasticity' column uses 0.6 for average incomes, 0.4 for low incomes and 0.8 for high incomes.

*** Totals may not sum in the table due to rounding.

Economic analysis of structural tax reforms

The economic impact of structural tax reforms is given in Table 5 below, including both the taxable income (proxy for GDP) and the change in economic efficiency (proxy for consumer welfare). The results from this section will be used to create the dynamic revenue estimates.

These results show that the structural tax reforms will create a large economic benefit, with GDP expected to increase by over $36 billion per year (2.1% of GDP), and the economic efficiency of the tax system improving by over $12 billion per year. There are several points that should be noted from these results:

- These benefits are in addition to the financial benefit that taxpayers personally receive;
- These benefits represent an improvement in the underlying structural efficiency of our tax system, leading to a sustained boost in wages and employment, giving taxpayers the double benefit of both higher wages and lower taxes on those wages; and
- The largest benefits come from removing the 37% tax bracket entirely, and then reducing the 32.5% tax bracket down to 30%.

These results contrast sharply with the economic analysis of the LMITO tax policy. While both the LMITO and the structural tax reforms provide meaningful financial benefits to the recipients, they have very different impacts on GDP and the efficiency of the tax system. The LMITO causes a small reduction in economic efficiency, while the structural reforms create a large and sustainable improvement. This distinction was missing from Treasury modelling, since they implicitly assumed that all tax changes had no impact on efficiency; this once again highlights the importance of doing proper dynamic tax modelling.

Revenue analysis of structural tax reform

Building on the economic analysis above, it is now possible to more accurately estimate the impact on government revenue. Table 6 below shows the 10-year revenue estimates from each stage of the structural tax reform, with the first column showing static estimates as a reference point, and the second column showing the estimates from dynamic tax modelling.

As with the earlier analysis of the LMITO tax changes, the static estimates are based on the incorrect assumption of no behavioural change, and no impact on GDP or economic efficiency. The static approach creates the exaggerated revenue estimate of -$235 billion over 10 years.

After factoring in behavioural changes and the economic analysis discussed above, it's possible to create more accurate dynamic estimates. Since the structural tax reforms result in significant economic benefits (see 'economic analysis' above), the dynamic tax analysis shows a smaller revenue impact than the static analysis.

Table 5: Economic impact of the structural tax reforms (per year)

	Taxable income (GDP)	Economic efficiency
1 – Increase 32.5% threshold to 90k	$0.6 billion	$0.2 billion
2 – Increase 32.5% threshold to 120k	$5.3 billion	$1.9 billion
3 – Increase 32.5% threshold to 41k	$1.2 billion	$0.3 billion
4 – Increase 45% threshold to 200k	$3.3 billion	$1.4 billion
5 – Remove 37% tax bracket	$10.9 billion	$3.9 billion
6 – Increase 32.5% threshold to 45k	$1.3 billion	$0.3 billion
7 – Reduce 32.5% tax rate to 30%	$13.8 billion	$4.6 billion
Total	**$36.4 billion**	**$12.6 billion**

Table 6: Static and dynamic revenue impact from structural tax reforms (2019/20 to 2028/29)¶

	Static estimates	Dynamic estimates
1 – Increase 32.5% threshold to 90k	-$5.7 billion	-$2.5 billion
2 – Increase 32.5% threshold to 120k	-$35.3 billion	-$16.7 billion
3 – Increase 32.5% threshold to 41k	-$40.4 billion	-$37.5 billion
4 – Increase 45% threshold to 200k	-$7.4 billion	$1.2 billion
5 – Remove 37% tax bracket	-$30.1 billion	-$4.9 billion
6 – Increase 32.5% threshold to 45k	-$37.3 billion	-$34.4 billion
7 – Reduce 32.5% tax rate to 30%	-$78.8 billion	-$50.1 billion
Total	**-$235.1 billion**	**-$145.0 billion**

¶ Totals may not sum in the table due to rounding.

The difference is significant. Instead of the expected revenue cost of $235 billion (over 10 years), dynamic analysis shows that the structural tax reforms will have a much lower revenue cost of $145 billion (over ten years), which is 38% less than the government's static estimate. The difference between the two estimates is crucially important, as the revenue cost is often a key factor when considering tax policy changes. If the government was aware of the significantly lower budget impact, they may have chosen to introduce the reforms more quickly.

Looking more closely at the estimates in Table 6, several points are worth noting:

- Most of the revenue improvement comes from removing the 37% tax bracket and reducing the 32.5% tax rate down to 30%, which follows logically from the economic analysis that showed those two parts of the tax reform created the largest economic benefit;
- For many elements of the tax reform, the static estimate is more than double the dynamic estimate — which once again highlights the problem with static estimates;
- With the 4th part of the tax reforms (increasing the 45% threshold to $200,000), the dynamic analysis suggests that change would not cause any loss of revenue (and maybe even a small increase) due to the significant economic benefits; and
- While the smallest benefits came from increasing the 32.5% threshold (the 3rd and 6th part of the reforms), it's important to remember that those changes directly impact on low-income earners, so there may be equity and political reasons to support those changes.

Looking specifically at the parts of the tax reform announced in the 2019 budget (the last two changes), the static estimate incorrectly suggests that those changes would cost the budget about $116 billion over 10 years. In contrast, the dynamic estimates show the true cost will be about $87 billion over 10 years. Those specific changes are expected to generate more than $15 billion in additional economic activity every year (in addition to the direct financial benefit to taxpayers), which represents excellent value for money.

To check the robustness of these estimates, Table 7 shows the results of two different types of sensitivity analysis. As with the LMITO sensitivity analysis, the first row uses global average estimates for the tax elasticity, but includes different long-run growth estimates. The second row allows for variation in both the tax elasticity and the growth estimates. Once again, these estimates are not intended as alternative estimates, but rather they show how sensitive the results are to changes in elasticity assumptions.

The first sensitivity analysis (first row) shows that the results are broadly similar across all scenarios, indicating that the long-term growth assumptions do not drive the results.

The second sensitivity analysis (second row) shows a higher variance, which highlights the crucial importance of the 'elasticity of taxable income' when conducting dynamic tax analysis. One of the important conclusions from this report is the need for more research into the elasticity of taxable income in Australia.

It is worth noting that all scenarios show broadly the same story, with the revenue cost of the tax reforms being significantly less than the government's static analysis.

Table 7: Revenue impact from structural tax reforms; sensitivity analysis (2019/20 to 2028/29)

	Sensitivity (low)	Base case	Sensitivity (high)
Fixed ETI; variable growth	-$149.9 billion	-$145.0 billion	-$140.1 billion
Variable ETI and growth	-$184.3 billion	-$145.0 billion	-$109.7 billion

Bring forward income tax changes to 2020

To their credit, the government has successfully introduced tax reform policy twice in the past two years. The analysis above shows that Australia can expect to reap significant benefits from the structural tax reforms scheduled for 2022 and 2024. However, the starting date for the structural reforms is disappointingly late, and the early reliance on a LMITO policy is costly and inefficient. Given the significant economic benefits that come from the structural tax reforms, the government should take the next logical step by scrapping the LMITO policy and bringing forward the genuine tax reforms to start sooner.

If this idea was modelled using the (incorrect) static assumption of no behavioural change, the results would show a large decrease in government revenue, which pushes the budget back into deficit. This would have been the advice received by the government from Treasury. Suffice to say, the government is keen to avoid that scenario, which may explain the late start-date for the structural tax reforms. However, proper dynamic modelling reveals that it would be possible to bring forward the structural tax reform while still maintaining a budget surplus. Once again, this highlights the importance of having proper public tax modelling done before policy decisions are made.

Table 9 shows the revenue impact of removing LMITO and bringing forward all other tax cuts announced in the 2018 and 2019 budgets, shown for each year over the forward estimates. Bringing forward the proposed tax reforms would have a large impact on the budget (-$23 billion over four years) but nowhere near as large as predicted by Treasury's incorrect static approach. This change has the double benefit of avoiding the economic costs from LMITO, while bringing forward the substantial economic benefits of the tax reforms.

The impact on the budget would depend on exactly when the structural tax reforms were scheduled to begin. Table 10 shows the updated budget situation based on three different tax policy scenarios, including:

1. Bring forward all tax reforms to begin in January 2020
2. Bring forward all tax reforms to begin next financial year (July 2020)
3. Bring forward the tax cuts planned for 2022/23 to begin next financial year (July 2020), and bring forward the tax cuts planned for 2024/25 to begin the following year (July 2021).

As the table shows, building on current budget estimates, all of these reform proposals are achievable without pushing the budget into deficit.

The benefit of the first option (bringing forward structural tax reform to January 2020) is that we can start experiencing the economic benefits as quickly as possible; though the downside is relatively small budget surpluses in 2019/20 and 2020/21, which gives the government little room to move. The third option provides a compromise solution. Bringing forward the reforms to 2020 and 2021 will ensure the economic benefits start to flow relatively soon, while the budget maintains a healthy surplus in all years. In addition, all of the above options would ensure that the new tax system was introduced during the current term of parliament, removing the political uncertainty that comes from legislating many years into the future.

Table 9: Revenue impact of abolishing LMITO and bringing forward tax cuts (2019/20 – 2029/30)

	Remove LMITO	Bring forward tax cuts from 2018 budget	Bring forward tax cuts from 2019 budget	Total impact
2019/20	$8.4 billion	-$6.2 billion	-$9.7 billion	-$7.6 billion
2020/21	$8.5 billion	-$6.5 billion	-$10.2 billion	-$8.2 billion
2021/22	$8.7 billion	-$6.7 billion	-$10.8 billion	-$8.8 billion
2022/23	$8.8 billion	-$0.4 billion	-$7.0 billion	$1.5 billion
TOTAL	**$34.5 billion**	**-$19.8 billion**	**-$37.7 billion**	**-$23.1 billion**

Table 10: Budget balance under various 'early tax cut' scenarios

	Current budget	1. Start Jan 2020	2. Start July 2020	3. Half 2020; half 2021
2019/20	$7.1 b	$3.3 b	$7.1 b	$7.1 b
2020/21	$11.0 b	$2.8 b	$2.8 b	$9.3 b
2021/22	$17.8 b	$9.0 b	$9.0 b	$9.0 b
2022/23	$9.2 b	$10.7 b	$10.7 b	$10.7 b
TOTAL	**$45.1 b**	**$25.8 b**	**$29.6 b**	**$36.1 b**

Conclusion

Australia deserves a better quality of tax debate, which is properly informed with detailed analysis based on proper economic modelling. The current Treasury modelling exaggerates the budget cost of tax reform while implicitly assuming no efficiency benefit — which leads to a distorted and misleading public discussion about tax policy.

This paper provides the only detailed and public dynamic analysis of the government's tax reforms. The results provide a few important lessons:

1. The Low and Middle Income Tax Offset (LMITO) will cost the budget about 10% more than expected, and will actually decrease GDP and economic efficiency;
2. The structural tax cuts represent genuine tax reform, and they cost the budget about 38% less than expected, while increasing economic efficiency and boosting GDP by over 2%; and
3. Bringing forward the structural tax reforms to 2020 is both achievable and desirable, with several different options that would keep the budget in surplus.

A final conclusion goes beyond the specifics of this proposal. As highlighted repeatedly in the above modelling, making the absurd static assumption of no behavioural change can give grossly inaccurate and misleading results. Good policy requires good information, and yet that information is currently missing from the tax debate due to the lack of proper modelling.

It should be a bipartisan matter of urgency that the Australian Treasury follow the lead of the UK Treasury and start to conduct proper (and public) dynamic tax modelling before they provide any tax advice or revenue estimates. The consequence will be a more informed public debate and better tax policy, which is something we can all support.

Appendix: Australian Dynamic Tax Model

The conceptual framework for dynamic tax modelling using the elasticity of taxable income is presented in detail in Saez et al. (2012).[9] The core of the model is the relationship between the change in tax policy and the change in taxable income. To be specific, the relevant equation is:

$\Delta z = e * \alpha * \%\Delta(1-\tau) * z^1$

Where:

Δz	= change in taxable income; this is the output from the model
e	= elasticity of taxable income
α	= adjustment necessary when dealing with sub-set of the tax base
$\%\Delta(1-\tau)$	= percentage change in after-tax income
z^1	= taxable income that existed before the change in tax policy

The calculation for α is:

$\alpha = z^m / (z^m - z^*)$

Where:

z^m	= average taxable income for people in the relevant tax bracket
z^*	= cut-off income for the relevant tax bracket

Most of the underlying data for this model comes from the official taxation statistics published by the Australian Taxation Office. The most recent statistics available are for the 2016/17 financial year.[10] To be usable in the model, the ATO data needs to be modified in the following ways:

1. Population, income, taxable income and tax data aggregated by year and income bracket.
2. The data is split into more narrow income brackets, to allow for more specific tax policy scenarios to be modelled.
3. Based on recent historical trends (as reported in the taxation statistics) and budget documents, the 2016/17 income and tax data are extrapolated forward in order to create estimated 2019/20 income and tax data, split by income brackets.

Information on the marginal tax rates is taken from the federal budget and ATO. The marginal tax rates applied in the model includes the nominal tax rates, the Medicare Levy, the income tax offsets (both LITO and LMITO) and any other income levy applicable at that point in time. These are combined to give the 'actual income tax rates', and these are the tax rates applied to the taxable income to create tax estimates.

The only additional piece of data necessary is an estimate for the elasticity of taxable income, which is the most crucial assumption of the model. There is not much published information on the size of the elasticity in Australia, but thankfully there is a large

and growing body of evidence coming from America and Europe that we can draw on in making an appropriate elasticity assumption.

The majority of published estimates fall between 0.2 and 0.8, with the higher estimates generally associated with high-income earners. A complete review of the literature goes beyond the scope of this paper, but some key benchmarks include:

- The US Congressional Budget Office provides a good overview of the relevant literature, with most elasticity estimates falling between 0.3 and 0.7;[11]
- Kleven suggests a reasonable midpoint of 0.4 for the average worker;[12]
- Saez argues that the elasticity is less than 0.4 for average incomes, though his evidence suggests that the elasticity for high-income earners is closer to 0.6;[13]
- A review of recent studies by Giertz has a range of 0.2 to 1.1 with most estimates clustered around 0.4 to 0.6, and the higher estimates for high-income earners;[14]
- Burns and Ziliak recently tried a new approach that estimated an elasticity of 0.4 to 0.6[15];
- Brewers, Saez and Sheppard found a UK elasticity of just under 0.5;[16]
- The UK government suggests a range of 0.4 to 0.7 for high-income earners, which is based on their summary of the literature and recent experience;[17] and
- Feldstein himself suggested an elasticity just over one[18], and some reports have indicated an elasticity as high as 1.9[19], though these are considered outliers.

Drawing on the above research, the dynamic tax model used in this report includes the following elasticity assumptions:

- Elasticity of 0.6 for high-income earners, with sensitivity analysis from 0.4 to 0.8
- Elasticity of 0.4 for average incomes, with sensitivity analysis from 0.2 to 0.6
- Elasticity of 0.2 for low-income earners, with sensitivity analysis from 0.1 to 0.3

The above elasticities represent the short-term impact of tax policy on taxable income, and the results are generally observable within the first year of tax policy reform. Factoring in the long-term impact of tax policy on taxable income is both more difficult and more controversial. Drawing on evidence from growth theory and international economics, the dynamic tax model assumes a small growth premium (or penalty) of 0.1% for each percentage point change in the tax/GDP ratio[20]. Given the small changes, the small impact, and the short-term focus, this assumption makes little difference to the results, as can be seen in the sensitivity analysis.

Finally, once there is an estimate for the change in the taxable income, it is fairly straightforward to estimate the impact on government revenue, using the below equations:

1. $\Delta R = \Delta M + \Delta B$
2. $\Delta M = \Delta \tau * z^1$
3. $\Delta B = \tau^2 * \Delta z$

Where:

ΔR = change in government revenue

ΔM = mechanical (static) impact, assuming no behavioural change

ΔB = behavioural change, which is also the measure for deadweight loss

$\Delta \tau$ = change in the tax rate

z^1 = taxable income for relevant tax bracket (tax base), before tax policy change

τ^2 = new tax rate, applied to the relevant tax bracket

Δz = Change in taxable income (the tax base)

The model allows the user to modify the scenarios by adjusting the tax rates, tax brackets, and the relevant years. Results are provided for the year of introduction, for the forward estimates (next four years) and for the next ten years. The model also provides estimates for other related variables such as investment and fiscal externalities, though these were not included in the above report.

Endnotes

1 Feldstein, M. (1999), "Tax Avoidance and the Deadweight Loss of the Income Tax", *Review of Economics and Statistics*, 1999, 81, pp 674-680.

2 Mitchell, D. (2002), *The Correct Way to Measure the Revenue Impact of Changes in Tax Rates*, Backgrounder No. 1544, The Heritage Foundation, 3 May.

3 Current US tax modelling factors in some behavioural responses to tax changes, though they assume that tax changes cannot have an impact on economic growth. For further discussion, see Mitchell (2002) above.

4 Feldstein, M. (2006), *The Effect of Taxes on Efficiency and Growth*, NBER Working Paper 12201, p12.

5 Humphreys, J. (2019), *Bring forward the tax cuts*, CIS Policy Paper 101, Centre for Independent Studies.

6 Elasticity estimates were based on evidence from the US and UK, most of which suggests an elasticity of about 0.4 on average and 0.6 for high income earners. The elasticity for low-income earners was assumed to be 0.2. Sensitivity analysis was done for all scenarios, with an elasticity ranging from 0.1 to 0.8.

7 While it is common to focus on the GDP results, these are not the best way to measure the benefit to society. GDP measures total (traded) output, but doesn't factor in the loss of leisure time for workers. The measure of 'economic efficiency' factors in both increased production and lost leisure to give the net benefit. This is sometimes referred to as 'consumer surplus' or 'net utility'.

8 See Humphreys (2019) as above; and Humphreys, J. (2018), *Taxing Issues: Submission to the Senate Standing Committee on Economics Legislation regarding the Treasury Laws Amendment (Personal Income Tax Plan) Bill 2018*, Australian Taxpayers Alliance.

9 Saez, E., Slemrod, J. and Giertz, S. (2012), "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review", Journal of Economic Literature, American Economic Associaiton, 50/1, pp3-50.

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16 M. Brewer, E. Saez and A. Shephard, 'Means-testing and tax rates on earnings', in J. Mirrlees et al. (eds), Dimensions of Tax Design: The Mirrlees Review, OUP for IFS, Oxford, 2010, http://www.ifs.org.uk/mirrleesreview/dimensions/ch2.pdf.

17 HM Revenue & Customs (2012), *The Exchequer effect of the 50 per cent additional rate of income tax*, March 2012, HM Revenue & Customs. https://webarchive.nationalarchives.gov.uk/20140206181159/http://www.hmrc.gov.uk/budget2012/excheq-income-tax-2042.pdf

18 Feldstein, M. (1999), ibid.

19 Reynolds, A. (2019), "Optimal Top Tax Rates: A Review and Critique", Cato Journal, 39:3, Cato Institute, pp635-665.

20 For an example from the growth theory literature, see: Barro, R. (1998), *Determinants of Economic Growth: A Cross-Country Empirical Study*, MIT Press Books, The MIT Press, edition 1, volume 1, number 0262522543. For a discussion of the tax-growth literature from international economics, see: Humphreys, J. and Stoeckel, A. (2005), *Free Trade Agreements: Making Them Better*, RIRDC #05/035, Rural Industries Research and Development Corporation.

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Related works

John Humphreys, Budget 2019: *Why the long-term tax cuts should be fast-tracked*, CIS Policy Paper 19 (4 April 2019)

Matthew O'Donnell and Robert Carling, *Too Little; Too Late: Personal Income Tax Reform in Australia*, CIS Policy Paper 5 (June 2018)

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