Parliamentary Budget Office

BEHAVIOURAL ASSUMPTIONS AND PBO COSTINGS

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PBO information papers

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Overview

A key role for the Parliamentary Budget Office (PBO) is to provide advice to parliamentarians on the estimated financial implications, or 'cost', of policy proposals they are considering. We provide independent advice that can be interpreted in the same way as the costings presented by the government in the budget, prepared to the same standards and using the same concepts.

Our advice is typically sought by members of the Opposition and minor parties as they cannot ask government departments for such advice. We provide our costing advice on a confidential basis if the parliamentarian requests it, and therefore it is the decision of the parliamentarian on whether or not to publicly release the costing.

A costing critically depends on the details of the specification of the proposed policy, as well as our assumptions about how people affected by the policy would be likely to change their behaviour in response to the policy.

This information paper explains our approach to determining the behavioural assumptions we apply when estimating the cost of policy proposals. We are guided by three principles. Behavioural assumptions aim to be:

1 consistent across similar policies

2 backed by empirical evidence

3 informed by expert advice.

Given that a policy costing can be particularly sensitive to assumed behavioural responses, we are committed to transparency around these assumptions. The advice we provide to parliamentarians includes detailed information on the assumptions that have been made in preparing the costing and the basis for these assumptions. Where assumptions are particularly uncertain, we may include sensitivity analysis in our advice to parliamentarians.

To further improve transparency and gather feedback, this paper presents a consolidated list of the behavioural assumptions we have made in costings that were publicly released during 2019 (see Appendix A). In particular, this list includes behavioural assumptions that we used in costings in the 2019 Post-election report of election commitments. We welcome feedback on any of the assumptions included in this list, including the provision of alternative evidence where available. We invite you to email any comments to feedback@pbo.gov.au.

1 Policy costings and behavioural assumptions

A policy costing provides an estimate of the impact that a proposed policy would have on the budget if it were implemented. The PBO information paper *What is a Parliamentary Budget Office costing?* explains what a costing is designed to capture and how a costing estimate is generated.[1] It explains that a key role for us is to determine the most appropriate data, models and assumptions to use in order to estimate the budget impact of a policy proposal. It also highlights that costing estimates critically depend on the details of the policy specification and the assumptions made about how people and organisations affected by the policy would be likely to respond to it.

In this paper, we explain how we determine the behavioural assumptions that underpin our costings.

Our costings always capture how individuals, businesses or organisations who are directly affected by a proposed policy would be likely to respond to it. Some policy proposals are designed to induce a particular behavioural response, while others may induce unintended behavioural responses. In either case, it is necessary to make assumptions about how those affected by a proposal may respond in order to accurately estimate the budget impact of a proposal. Sometimes we determine that these responses may be significant and would materially affect a costing, while in other cases we determine that there may be no behavioural response that needs to be taken into account. Some behavioural responses can be precisely estimated, while others are much more uncertain.

In broad terms, there are two types of behavioural responses we consider when undertaking a costing. First, there are the behavioural responses that would be expected to have a temporary impact on the budget. These are driven by individuals or businesses changing the timing of their spending or saving behaviour around the start (or end) date of a proposal. The introduction of a temporary investment incentive, for example, would be expected to lead some businesses to change the timing of investments around the period that the proposal applies to take advantage of the incentive. The second type of behavioural response we consider is one that has an ongoing budget impact. A proposal to increase the highest marginal tax rate, for example, may lead some high-income earners to find ways to permanently reduce their taxable income, affecting tax collections in all years after the proposal is implemented.

Our costings do not generally capture the fiscal impacts of the potential broader economic impacts of policy proposals, such as from changes in aggregate prices, employment levels or productivity growth. These broader economic impacts are not usually quantified in our costings unless the funding mechanism is specified, and there is compelling evidence on the direction, size and timing of the broader economic effects. Where we do not include broader economic effects, our advice to parliamentarians does include a qualitative discussion of these impacts when we consider they could be material. Further discussion about estimating broader economic impacts is provided in our information paper *Including broader economic effects in policy costings*.[2]

In determining the direction and magnitude of the assumptions we make about behavioural responses, we apply three principles. These are outlined in Figure 1 and discussed further in Sections 2 to 4 of this paper.

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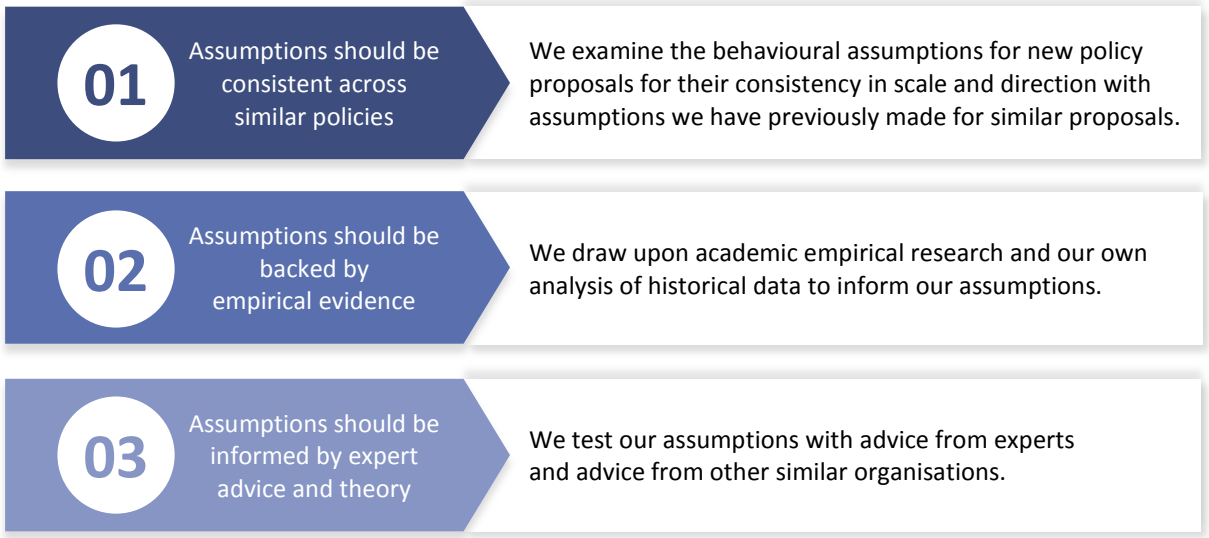
[1] See PBO Information paper no. 02/2017, *What is a Parliamentary Budget Office costing?*

[2] See PBO Information paper no. 03/2017, *Including broader economic effects in policy costings*.

Figure 1: Three principles applied in determining behavioural assumptions



We are committed to transparency around the behavioural assumptions that we apply in our costings. This includes being transparent about our assumptions, and the justification for these, in our costing advice to parliamentarians, as well as providing sensitivity analysis where assumptions are particularly uncertain. This is discussed further in Section 5.

As part of our commitment to transparency, we have provided a consolidated list of behavioural assumptions at Appendix A. This list details behavioural assumptions we have made in costings that were published in 2019, including those used for costings in the *2019 Post-election report of election commitments*.[3] Where available, links to any research or data used in determining the assumptions have been provided.

[3] Parliamentary Budget Office, 2019, *2019 Post-election report of election commitments*.

2 Consistency across policies

A principle that the PBO applies when determining behavioural assumptions is to take a consistent approach across policies. Assumptions are, of course, updated over time to reflect new information and changes in the broader environment. This implies that when two policy proposals are expected to have a similar impact on similar groups, we would generally assume similar behavioural responses. Conversely, when one policy proposal has a relatively large impact on those affected and another has a small impact, we would expect a stronger behavioural response to the proposal that has a larger impact. This principle assists comparisons across different costings.

2.1 We draw upon behavioural assumptions for policy proposals we have costed before

We have costed a wide range of policy proposals over time. A starting point for determining the behaviour assumptions that will be applied in any new costing is to understand whether we have previously costed the same or a similar proposal and, if so, what behavioural assumptions were used. Before applying a previous assumption, however, we have to determine that it is still applicable. For instance, we explore whether new data or evidence is available that either supports the existing assumption or requires it to be revised. We also examine whether there have been changes to government policy or economic conditions that suggest a different behavioural response may occur.

We regularly review completed policy costings, including reviewing the behavioural assumptions that were applied, to identify areas for improvement in future costings.

2.2 Our costing models usually imply that behavioural responses will be proportionate to the policy impact

Many of our costings are estimated using administrative data for individuals, families, businesses or other affected groups to simulate the effects of a policy proposal. These micro-simulation models generally incorporate assumptions that any responses to changes in income tax, prices or costs would be proportionate to the magnitude of the change. These assumptions are applied through elasticities.[4] This helps to ensure proportionality of behavioural impacts across two or more proposals affecting a similar policy area, such as the personal income tax system, child care subsidies, or the out-of-pocket costs of health care.

Box 1 illustrates how taxable income elasticities are used to capture behavioural responses to changes in marginal tax rates and how these vary across individuals, depending on their income levels.

[4] In economics, an elasticity is a parameter that captures what the percentage change in one variable would be for a given percentage change in another variable. For example, a price elasticity measures the percentage change in consumption of a particular good or service that is expected to result from a one per cent increase or decrease in the price. Elasticities are estimated using econometric studies.

2.3 We review assumptions used when costing budget measures

Other government agencies make behavioural assumptions when costing budget measures. In the interests of preparing costings consistent with those prepared for the government, we often draw upon these assumptions in our own costings. Before accepting these assumptions, we thoroughly assess them, just as we scrutinise the assumptions that we have made before. We also look to consult with other agencies to understand their analysis, thought processes and the information they have used to determine their assumptions.

Box 1: Taxable income elasticities help ensure consistency across personal income tax costings

Policies that make changes to personal income tax rates and thresholds are likely to lead some individuals to look for ways to change their taxable income. If marginal tax rates are increased, for example, some individuals may look to find additional deductions, delay the realisation of capital gains, or restructure their investments to reduce their taxable income, which will reduce the amount of tax raised by the change in policy. Such a policy may also lead to individuals choosing to work more or less, but there is considerable uncertainty regarding the direction, magnitude and timing of the effect of personal income tax changes on labour supply, and this is not usually incorporated into PBO costings.

Taxable income elasticities measure how responsive individuals are to changes in marginal tax rates. Specifically, they measure the percentage change in an individual's taxable income that is expected to result from a percentage change in their net-of-tax rate. The net-of-tax rate is one minus the individual's marginal tax rate; it measures the proportion of an additional dollar of income that an individual would keep after tax is taken out. For instance, the highest marginal tax rate is currently 47 per cent (including the Medicare levy). For taxpayers facing this rate, their net-of-tax rate, shown as a percentage, is 53 per cent.

We assume that individuals with a taxable income above the highest threshold (currently $180,000) have a taxable income elasticity of 0.2. These individuals are assumed to reduce their taxable incomes in response to increases in the highest marginal tax rate, and increase their taxable incomes in response to decreases in the highest marginal tax rate. For instance, a 2019 election commitment by the Australian Greens involved increasing the highest marginal tax rate by two percentage points (see *Introduce a 35 per cent minimum tax rate on incomes above $300,000 and make the deficit levy permanent* PER618); our elasticity assumption reduced the revenue gain from this proposal by around 40 per cent relative to a scenario in which no behavioural response is assumed.

Individuals with a taxable income below the highest threshold are assumed to have a taxable income elasticity of zero. It is assumed that these individuals would not adjust their taxable incomes in response to a change in marginal tax rates, reflecting that there are limited options available to lower-income earners, particularly wage and salary earners, to restructure their investments.

There is a broad range of taxable income elasticities estimated in the empirical literature across a number of developed economies. The elasticities we use are close to the median estimates in the literature, and setting a higher elasticity for higher-income earners is consistent with the literature.[5] Having a standard approach to taxable income elasticities helps to ensure behavioural responses are consistent across costings that make changes to income tax rates and thresholds.[6]

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[5] See, for instance, Klemm, A., Liu, L., Mylonas, V. and Wingender, P., 2018, *Are Elasticities of Taxable Income Rising?*, International Monetary Fund. Many of the estimates in the empirical literature capture both a tax-planning response and a labour-supply response.

[6] Where a policy proposal would make a more substantial change to marginal tax rates (eg increasing the highest marginal tax rate by 10 percentage points), or would target very high income earners (eg those with taxable incomes above $1,000,000), these elasticities may no longer be appropriate. In such cases we apply our judgement and may deviate from the taxable income elasticities that are estimated from recent experiences for the whole population.

3 Empirical research

Another principle the PBO applies in determining behavioural assumptions is that, wherever possible, they should be informed by empirical research or analysis.

3.1 Peer-reviewed academic research is usually the 'gold standard' for quantifying behavioural responses

There are numerous empirical studies in academic literature that estimate price or taxable income elasticities, as well as other behavioural responses to policy changes. Some of these studies show very robust results and others suggest significant variations in responses across countries, sectors or time.

While we aim to back up all behavioural assumptions with evidence from empirical literature, it can often be challenging to find academic studies that directly apply to a specific policy proposal. For instance, the best evidence we may be able to obtain might be an empirical study from another advanced economy that estimates the behavioural response of a similar policy to the one proposed. Such research can still be extremely useful in providing evidence of how, and to what extent, those affected may respond to particular policy changes. Figure 2 outlines a set of questions we ask ourselves to determine whether a particular empirical study should inform a behavioural assumption.

Figure 2: How the PBO evaluates an empirical study for use in a costing

How similar are the policies in both scale and scope?	If, for example, the study examined the response to a policy of a different scale to the policy proposal being costed, we would consider whether to modify the behavioural response.
Are those affected by the policy in the study broadly representative?	We look for similarities in the distribution of incomes, tax rates, and the overall policy environment for the population in the study and the costing population.
Is the behavioural response estimated with a high degree of precision?	Studies that estimate a broad range of possible responses are still informative, but can suggest a higher degree of uncertainty for a costing. In such cases we look to provide sensitivity analysis around the behavioural assumption and its impact on the costing.
Is there any reason to be sceptical of the methodology?	For instance, some commissioned research may not be independent and would generally be treated with caution as evidence of a particular behavioural response.
Is there other literature that supports the study?	A collective body of evidence is always more reliable than a single study. As such, we look to see if the results of a particular study are consistent with others.

As a general rule, empirical studies help to define a range within which a behavioural response is likely to fall. The more reliable the study or the collection of studies, the narrower this range is likely to be. There are many cases, however, where a reliable and applicable study is difficult to obtain and we need to rely on other evidence.

3.2 There is often data available for us to undertake our own empirical research

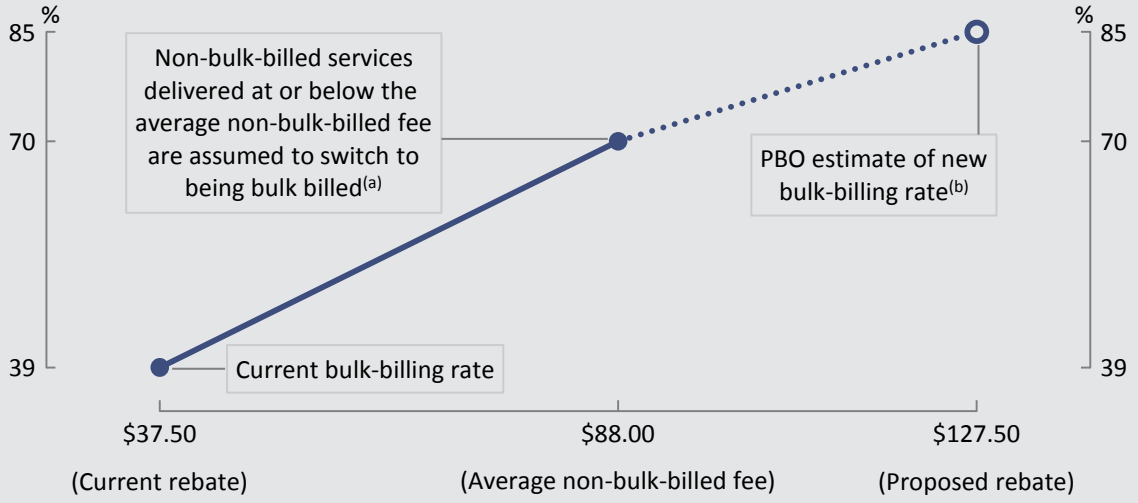
We have access to high-quality historical data that may be used to estimate behavioural responses to past policy changes, or to help inform a behavioural assumption. Our own research can be used to complement academic research, or to inform cases where reliable academic or other empirical research is not available. Box 2 provides a case study of an election commitment costing where we undertook empirical research to inform a behavioural assumption.

Box 2: Case study – Medicare for cancer treatment

A 2019 election commitment made by the Australian Labor Party, and costed by the PBO, was a proposal to amend the Medicare Benefits Schedule (MBS) to reduce out-of-pocket costs for cancer patients. The *Medicare cancer plan* (PER372), amongst other things, would have introduced a new MBS item covering visits to oncologists and cancer surgeons for the purpose of providing ongoing treatment following a cancer diagnosis. The proposed MBS item would attract an 85 per cent rebate of $127.50 and would be required to be bulk billed.

The proposed rebate would be significantly higher than both the rebate for existing items and the average fee currently charged for non-bulk-billed services. Given this, we considered that the proportion of affected services that would be bulk billed under the proposal would increase significantly. We used the existing relationship between bulk-billing rates under the current rebate and the percentage of services where the practitioner accepts at or below the average fee for non-bulk-billed services to project bulk-billing rates under the proposed rebate increase. This is illustrated for MBS item 105 (cancer surgeons) in Figure 3, where the bulk-billing rate is assumed to increase from 39 per cent to 85 per cent as a result of the increase in the rebate.

Figure 3: Cumulative percentage of services provided for different fees/rebates – MBS item 105 (cancer surgeons)



(a) Currently, 39 per cent of services are bulk billed. Half of the remaining 61 per cent of services (31 per cent) are assumed to be delivered at or below the average non-bulk-billed fee.

(b) Given that the proposed rebate is well above the average non-bulk-billed fee, we assume that half of all remaining services (15 per cent) would switch to being bulk billed.

4 Expert advice

The third principle the PBO applies in determining behavioural assumptions is that assumptions should be consistent with theory and, wherever possible, tested with experts. Expert advice is particularly useful for new and novel proposals where there is little empirical evidence to draw upon. We ensure that any consultations with experts are conducted in a way that maintains the confidentiality of requests from parliamentarians.

4.1 We look to draw upon theoretical literature to understand the likely impact of behavioural responses

Theoretical literature can help inform the likely direction of any behavioural response and whether the magnitude of the budget impact would be small or large. For instance, economic literature suggests that reducing the price of a particular product or service (by introducing a subsidy, for example) will usually result in an increase in demand for the particular product or service. There may also be theoretical models in literature that indicate the degree of price sensitivity of consumers for particular products or services.

Having drawn upon theoretical literature, we often look to estimate the financial impact of a range of plausible behavioural responses across a range of different scenarios. This analysis is generally done at the level of those affected, such as taxpayers, families or businesses, rather than at the aggregate level. In the case of a policy proposal that increases a particular tax, for instance, this analysis may reveal that those affected can easily find ways to avoid the tax increase. In other cases, this type of analysis may reveal that a particular behavioural response would not have a material budget impact relative to the overall impact of the proposal.

4.2 We consult with experts to test and complement our thinking

Expert advice is particularly useful when considering behavioural responses to new or novel proposals and to test our thinking. The experts we reach out to include people in government departments, business or academia that specialise in particular policy areas. In many cases these experts may have independently considered the policy proposals that we are analysing, or can otherwise bring their specific experience to explore the potential consequences of a proposed policy. We have a panel of advisors who have expertise across a broad range of areas and are available for consultation when the need arises.[7] On occasions, the expert panel members refer us to an alternative expert with the right knowledge.

4.3 We consult across the OECD network of Parliamentary Budget Officials and Independent Fiscal Institutions

There are a range of organisations across Organisation for Economic Cooperation and Development (OECD) countries that cost policy proposals, including government departments and independent fiscal authorities. All of these organisations have to make assumptions about behavioural responses. While the policy context may vary considerably across countries, other country experiences can inform our thinking, particularly when a policy proposal has similarities to a policy that has been implemented in another country. The OECD Network of Parliamentary Budget Officials and

[7] For more detail, refer to Media release: *PBO establishes panel of expert advisors*, 21 December 2017.

Independent Fiscal Institutions enables us to tap into the work of other parliaments, PBOs and fiscal councils.[8] This network gives us an opportunity to discuss budgeting issues, share practical experiences on working methods, identify good practices and contribute to standard setting.

4.4 We form our own expert judgement

Ultimately, all assumptions around behavioural responses require a degree of expert judgement. Even when we have collected a strong evidence base to inform a particular assumption, such evidence rarely relates to exactly the same policy in the same context. Box 3 provides an example of where we developed a behavioural response that drew upon empirical literature, involved our own empirical analysis of historical data, and was complemented by an analysis of possible scenarios, expert consultation and, finally, our own expert judgement.

Box 3: Case study – Negative gearing and the capital gains tax discount

The Australian Labor Party and the Australian Greens both made election commitments in 2019 that involved the removal of negative gearing and changes to the capital gains tax discount (see *Negative gearing and capital gains tax (CGT) reform* PER414, and *Phase out the current tax treatment of negative gearing and the capital gains tax discount* PER660). Each of the proposals would only apply to assets purchased after the policy start date, providing a strong incentive for investors to bring forward their asset purchases to before this date. This would ensure these investors would continue to access negative gearing and the existing capital gains tax discount on these assets.

There is international empirical evidence to suggest that some individuals bring forward transactions to reduce the impact of a future property tax increase.[9] To back up this evidence, we conducted our own empirical research on the introduction of the goods and services tax (GST) on 1 July 2000, which increased the cost of new housing. By analysing new housing purchases in the years before and after the introduction of the GST, we estimated that approximately 10 per cent of purchases that would have been made in the 12 months following the GST introduction, and a further 5 per cent of purchases that would have been made between 12 and 24 months after the GST introduction, were brought forward to before 1 July 2000 in order to avoid the GST.

The empirical evidence, both domestic and international, was based on relatively small increases in the cost of housing. We looked at a number of scenarios for property investors under both proposals and found that, for many investors, the proposals would have a larger impact on the cost of an investment property[10] than the introduction of the GST had for new properties. After consulting with an outside expert, we applied our expert judgement and assumed that both proposals would induce a more significant behavioural response. Specifically, we assumed that 20 per cent of purchases that would have been made in the 12 months after the start date, and 10 per cent of purchases that would have been made between 12 and 24 months after the start date would be brought forward to before the start date.

[8] For more information on the network, see http://www.oecd.org/governance/budgeting/oecdnetworkofparliamentarybudgetofficialspbo.htm.

[9] See, for instance, Office for Budget Responsibility, 2016, *Working paper No. 10, Forestalling ahead of property tax changes*.

[10] The additional costs were measured as the denied deductions and the increased tax upon the sale of the property, expressed in today's dollars.

5 Ensuring transparency

The PBO is committed to transparency around behavioural assumptions. This helps parliamentarians understand how individuals and businesses affected by their policy proposals are likely to respond, and provides assurance to the wider public that we think carefully about the assumptions we make.

5.1 We include details of our behavioural assumptions in our costings advice to parliamentarians

Our advice to a parliamentarian about their policy proposal details all of the key assumptions we have made to estimate the cost of the policy proposal, including behavioural assumptions. As a general rule, this specifically includes the assumed magnitude of the behavioural response, with a discussion about some of the ways those affected may respond.

We also note in our costings advice the degree of uncertainty in the estimated budget impact associated with our behavioural assumptions. The extent of this uncertainty depends upon the sensitivity of the estimates to particular behavioural responses, the strength and reliability of the underlying evidence, and the degree of confidence we have in applying our expert judgement.

5.2 We undertake sensitivity analysis for highly uncertain assumptions

In some cases, the estimated budget impact of a proposal will be very sensitive to a highly uncertain behavioural assumption. In our costings advice, we typically quantify the impact that such a behavioural assumption has on the financial implications of a policy proposal, both in dollar terms and as a percentage of the overall budget impact. In the interests of transparency, we often provide additional sensitivity analysis that states how the estimated financial impact of a policy proposal would change with a smaller or a larger assumed behavioural response.

5.3 The attached list of behavioural assumptions is provided in the interests of transparency

Appendix A provides a consolidated list of the behavioural assumptions that have been used in a wide range of published PBO costings during 2019, including the election commitment costings in the 2019 Post-election report of election commitments. These cover a broad range of policy areas, including personal income tax, business tax, superannuation, transfer payments, immigration, child care, education, and health.

Each example provided at Appendix A includes a link to at least one published costing. This provides the details of the policy specification that is relevant to the particular behavioural assumption, along with the other assumptions, methodology, and data that were used to undertake the costing, and a discussion of the uncertainties associated with the costing. While some assumptions are common to a number of policy proposals, some are specific to a particular policy specification. The behavioural assumptions used in our future costings of similar policy proposals may differ from those in Appendix A, particularly if there are differences in the details of the proposed policy specifications.

Behavioural assumptions are regularly reviewed and updated when new evidence comes to light. We welcome scrutiny of these assumptions and invite comments on them. Supporting empirical evidence for these or alternative behavioural assumptions would be particularly welcome. Please provide any feedback to feedback@pbo.gov.au.

References

Klemm, A., Liu, L., Mylonas, V. and Wingender, P., 2018, *Are Elasticities of Taxable Income Rising?*, International Monetary Fund.

Office for Budget Responsibility, 2016, *Working paper No. 10, Forestalling ahead of property tax changes*.

Parliamentary Budget Office, 2019, *2019 Post-election report of election commitments*.

PBO Information paper no. 02/2017, *What is a Parliamentary Budget Office costing?*

PBO Information paper no. 03/2017, *Including broader economic effects in policy costings*.

Appendix A: Consolidated list of behavioural assumptions used in published PBO costings in 2019

Contents

Education

Fully subsidise higher education

Assumption: There would be a 5 per cent increase in Technical and Further Education (TAFE) and Vocational Education and Training (VET) students, and a 1 per cent increase in undergraduate students under free tuition.

Justification: Based on consultation with experts. A review of Australian research also indicated that the response to price is limited in general, but certain groups of potential students would be modestly influenced by price (for example, see a submission by Chapman to the Higher Education and Research Reform Bill 2014).

Costing: PER649

Increase child care subsidies

Assumption: There would be a price elasticity of -0.13 for the decision to use child care, and a price elasticity of -0.25 for the decision to change the hours of formal child care use.

Justification: Based on a published paper by Breunig, Weiss, Yamauchi, Gong and Mercante from 2011 (Child care availability, quality and affordability: are local problems related to labour supply?). The elasticities in the paper have been applied in conjunction with consideration of Australian Bureau of Statistics data (Cat. No. 4240.0, 2018) relating to preschool education.

Costing: PER305

Increase salaries of early childhood educators

Assumption: There would be no material change in the aggregate number of projected early childhood educators.

Justification: Paying early childhood educators more would not be expected to result in a material change in demand for early childhood education. In relation to this specific policy, there was uncertainty around which educators would be affected, making it difficult to quantify any behavioural response.

Costing: PER348

Introduce free access to preschool for three-year-old children

Assumption: The proportion of three-year-old children accessing preschool programs in long day care or formal early childhood education settings would rise from 60 per cent to 90 per cent after three years.

Justification: Based on the behavioural response of families with four-year-old children when the free preschool program was introduced nationally, although the response is somewhat smaller to reflect developments in the broader early childhood education sector. Information on the take-up of previous funding arrangements by state is available at the Council on Federal Financial Relations.

Costing: PER307, PER635

Health

Abolish the private health insurance rebate

Assumption: There would be a price elasticity of -0.6 for the base tier (lowest income group), -0.3 for Tier 1, -0.15 for Tier 2, and -0.05 for Tier 3 (highest income group).

Justification: Lower-income earners are likely to be most sensitive to price changes. The elasticities are based on the behavioural impacts of previous downgrades in private health insurance cover, informed by a 2011 research paper from the Melbourne Institute by Cheng (Working Paper No. 26/11). The elasticities are larger than some of those estimated in the literature because the proposed premium changes would be much larger—the literature tends to consider only marginal changes.

Costing: PER636

Expand Medicare to cover dental care

Assumption: Take-up of the expanded scheme would be 65 per cent of the eligible cohort.

Justification: Based on current dental attendance rates for the Australian population and data for the Child Dental Benefits Schedule.

Costings: PER377, PER639

Fully fund opioid substitution therapies

Assumption: The number of opioid-dependence treatment patients would increase by around one-third relative to the baseline.

Justification: Consistent with recent peer-reviewed research by Chalmers and Ritter in 2012 (Subsidising patient dispensing fees: the cost of injecting equity into the opioid pharmacotherapy maintenance system). Also accounts for both an increase in average treatment duration and an increase in the number of patients commencing opioid-dependence treatment each year as a result of the lower out-of-pocket costs.

Costing: PER644

Introduce Medicare items for cancer treatment

Assumption: There would be an increase in bulk billing rates for particular services. For instance, oncology specialists would increase bulk billing rates to 100 per cent (for item 105), surgeons to 85 per cent (for item 105) and consultant physicians to 80 per cent (for item 116).

Justification: This is based on an analysis of detailed Medicare billing data.

Assumption: The number of bulk-billed professional attendances would increase by 5 per cent of the total baseline services.

Justification: Removing out-of-pocket costs (some of which are significant) would be expected to increase demand for services or lead to providers implementing an alternative schedule of care.

Costing: PER372

Remove the private health insurance rebate from policies that cover public hospital treatment only

Assumption: Affected policy holders with incomes above the Medicare levy surcharge threshold would switch to a different policy.

Justification: Most affected individuals would benefit more from paying for a better private health insurance policy than paying the Medicare levy surcharge. Those affected that are earning below the Medicare levy surcharge threshold may choose to cease holding private health insurance, but this would have no impact on the revenue collected from the Medicare levy surcharge.

Costing: PER378

Immigration

Abolish boat turnbacks and offshore detention

Assumption: Boat arrivals would increase to levels in the 2012-13 financial year (a maximum of around 25,000 asylum seekers).

Justification: Based on historical analysis from the Parliamentary Library (Boat arrivals and boat 'turnbacks' in Australia since 1976: a quick guide to the statistics) and consultation with experts. The proposed policy is less deterrent-focussed than both the baseline policy settings and those which existed when the number of people seeking asylum peaked at around 25,000 in 2012-13. While the abolition of both boat turnbacks and offshore detention may result in asylum seeker arrivals rising above this peak, the 2012-13 figure was considered to be the most reliable indicator of the potential response to this policy, noting that the actual response could vary widely depending on domestic and international circumstances, which are extremely difficult to predict and incorporate into a policy costing.

Costing: PER625

Increase the Temporary Skilled Migration Income Threshold

Assumption: Businesses would not replace temporary foreign workers with local workers.

Justification: Evidenced by the strict labour-market-testing requirements in place as part of the visa application process, and based on a 2016 academic paper by Breunig, Deutscher and To (The relationship between immigration to Australia and the labour market outcomes of Australian workers), which showed no material change in labour market outcomes for Australians as a result of the skilled migrant intake.

Assumption: There would be a labour demand elasticity of -0.5 for subclass 482 visas and -0.4 for subclass 186 and subclass 187 visas.

Justification: Based on 2008 research commissioned by the Australian Fair Pay Commission (Research Report No. 9/09).

Assumption: The increase in visa application charges would cause employers to switch to sponsoring a cheaper visa (subclass 400) for 20 per cent of applications.

Justification: The primary consideration for visa applications is likely to be the financial cost. Raising the visa application charge and salary threshold for the Temporary Skilled Migration visas (subclass 482) would create an incentive for short-stay visa applicants to move to cheaper subclass 400 visas.

Costing: PER280

Reduce processing time for parent visas

Assumption: All prospective applicants for contributory parent visas would apply for much cheaper parent visas.

Justification: Contributory visas are more expensive, but have shorter processing times—reducing the processing time for the cheaper visa removes the incentive to pay for the expensive visa.

Costing: PER626

Replace Temporary Sponsored Parent visa with Long Stay Parent visa

Assumption: Applications for the proposed Long Stay Parent visa would increase in proportion to the difference between the costs of the current and proposed visas.

Justification: The primary consideration for visa applicants is likely to be the financial cost.

Costing: PER274

Infrastructure and transport

Electric vehicle purchasing targets

Assumption: The Government fleet average leasing period would extend from three years to five years.

Justification: Vehicles are currently leased for an average period of three years but given the additional infrastructure requirements and lower maintenance costs, electric vehicles are likely to be leased for a longer period.

Costing: PR18/00628

Legal and justice

Increasing penalty units

Assumption: There would be no change in the total volume of penalty units.

Justification: Compliance enforcement arrangements by government agencies are assumed to be the primary determinant of behaviour.

Costing: PER458

Superannuation

Changes to superannuation contributions caps

Assumption: Where high-income earners are unable to save as much in superannuation they would save this amount outside superannuation (before tax) rather than increase consumption.

Justification: Most affected superannuation savings are voluntary and affect high-income earners. A 2015 Grattan Institute report by Daley and Coates (Super tax targeting) suggests that increasing tax rates on discretionary savings changes the composition of savings, but has little impact on total savings for high-income earners.

Costings: PER420, PER681

Close the First Home Super Saver Scheme to new entrants

Assumption: 20 per cent of first home buyers with taxable incomes over $37,000 would have participated in the scheme.

Justification: Projected take-up of the First Home Super Saver Scheme is below the take-up that was projected for the former First Home Saver Account scheme, but greater than the actual take-up of the former scheme (see the Parliamentary Library 2014 article, First Home Saver Accounts scheme closure). At this point, there is little data available on those who have made voluntary contributions with the intention of withdrawing these for the purchase of a first home.

Costing: PER401

Prevent borrowing by self-managed superannuation funds

Assumption: Some self-managed superannuation funds would reduce their borrowings in response to the 2017-18 Budget measure *Superannuation – integrity of limited recourse borrowing arrangements*, and some would utilise alternative investment strategies under the proposal. These behavioural responses would reduce the revenue impact of the policy proposal by 40 per cent.

Justification: The Australian Taxation Office's December 2018 Self-managed super fund quarterly statistical report shows that the growth of Limited Recourse Borrowing Arrangement assets slowed dramatically since the 2017-18 Budget measure.

Costing: PER416

Prohibit default superannuation funds from providing insurance products to young and low-balance members, with claims paid by the government

Assumption: Behavioural responses would not have a material budget impact.

Justification: Some individuals may choose to remain within their default fund as a result of the proposal, whereas they would have chosen a different fund otherwise. The proportion of individuals exercising choice of fund is already low, so this response is unlikely to have a material impact.

Costing: PR19/00952

Taxes

Abolish accelerated asset depreciation for aircraft, the oil and gas industry, and motor vehicles

Assumption: Businesses would not change their investment decisions.

Justification: Affected business would still need to invest in these assets. There are a number of significant factors that affect investment decisions in these industries and for the specified assets.

Costing: PER608

Accelerated depreciation

Assumption: 7.5 per cent of capital expenditure would be brought forward over the costing period.

Justification: The increase in depreciation deductions available in the first year after purchasing a new asset would provide an incentive for businesses to bring forward investment.

Assumption: 2.5 per cent of capital expenditure that would have occurred in the two years prior to the start date would be delayed until after the start date.

Justification: Businesses would receive higher tax deductions in the first year after purchasing a new asset if these are purchased after the policy's start date.

Assumption: Investment in eligible assets would increase by 0.5 per cent, substituted from ineligible assets.

Justification: Businesses would have an incentive to shift discretionary investment from ineligible assets to assets that would qualify for the relatively more generous depreciation deductions.

Costing: PER347

Apply a minimum final withholding tax on fixed trust distributions to non-residents

Assumption: Fixed trusts would restructure to avoid the proposal, reducing the total revenue impact by 70 per cent.

Justification: Fixed trusts with significant foreign beneficiaries can easily restructure to a company to avoid the withholding tax.

Costing: PER412

Cap deductions for managing tax affairs

Assumption: Taxpayers and tax accountants would adjust their behaviour to reduce the impact of the policy proposal by an average of 30 per cent.

Justification: Setting a cap on a particular deduction may result in some individuals claiming the deduction under a different label, and individuals claiming large deductions are likely to be engaged in ways to minimise their taxes. Setting a cap may also act as a signal to individuals and tax accountants as to an appropriate amount to spend on managing tax affairs, which may result in some individuals increasing their deductions up to the cap. The magnitude of this behavioural response is informed by the taxable income elasticities that are applied to changes to marginal tax rates and thresholds.

Costing: PER399

Cap pay packages of banking executives

Assumption: 30 per cent of income currently above the pay cap would not be affected by the cap.

Justification: Financial institutions would have a strong incentive to find ways to keep executive pay higher, without technically breaching the cap. For instance, a proportion of salary could be deferred to later years, or executives may be able to split income with their family members.

Assumption: Executives would not have the ability to bring forward a portion of taxable income to before the implementation date.

Justification: Shareholders of the major banks rejected a number of executive remuneration packages in response to the Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry and have been assessed to be unlikely to support a bring-forward in payments.

Costing: PER676

Changes to company tax rate

Assumption: Companies would continue to pay the same proportion of their after-tax income as dividends.

Justification: Company decisions on dividend payout ratios are affected by a number of considerations and these vary significantly across companies. There is little evidence that the company tax rate is a significant determinant of this.

Costing: PER623

Changes to highest marginal tax rate

Assumption: When a proposal to increase the highest marginal tax rate is announced in advance, affected individuals would bring forward 5 per cent of their income from the first year of the policy to before the policy implementation date.

Justification: High-income earners usually have some discretion over the timing in which income is realised, particularly for capital gains. This is supported by research by HM Revenue & Customs in 2012 (The Exchequer effect of the 50 per cent additional rate of income tax) and the Canadian PBO in 2016 (The fiscal and distributional impact of changes to the Federal personal income tax regime).

Costings: PER422, PER618

Changes to marginal tax rates and thresholds

Assumption: There would be a taxable income elasticity of 0.2 for all taxable income above the threshold for the highest marginal tax rate (currently $180,000), and a taxable income elasticity of zero for all taxable income below this threshold.

Justification: The wider empirical literature estimates a range of taxable income elasticities, but the average estimate is close to 0.2, with lower elasticities for lower-income earners (see 2018 research by the International Monetary Fund, Are elasticities of taxable income rising?).

Costings: PER411, PER422, PER425, PER618, PER624, PR19/00955, PR19/00956

Changes to taxation of petroleum resource rents

Assumption: Oil and gas production would not fall significantly over the costing period as a result of the proposal.

Justification: Oil and gas production is often driven by long-term contracts and there is limited scope for affected businesses to alter production from existing projects.

Costing: PER609

Collaboration premium for research and development (R&D) tax offsets

Assumption: Expenditure on collaborative R&D activities would increase by 25 per cent, substituted from non-collaborative R&D expenditure.

Justification: Australia has one of the lowest rates of collaboration in the OECD, suggesting that there is significant room to increase business spending on collaborative R&D. However, this increase would be somewhat limited by non-financial factors, such as lack of time or expertise (see Australian Bureau of Statistics Cat. No. 8158.0, 2016-17).

Costing: PER349

Deny tax deductions for business travel to certain jurisdictions

Assumption: Businesses would not reduce travel.

Justification: There are several reasons for business travel, most of which are not dependent on the overall costs of it.

Costing: PER412

Deny tax deductions for royalties sent to foreign residents

Assumption: Some companies would change their royalty structures to avoid the impact of the proposal, reducing the total revenue impact by 70 per cent.

Justification: There are a number of potential strategies and restructuring that businesses could pursue in order to avoid the proposal. For example, subsidiaries in Australia could enter into service agreements or loans instead of paying royalties.

Costing: PER412

Extending the taxable payments reporting system

Assumption: Around 40 per cent of contractors would not comply with the taxable payments reporting system.

Justification: Based on the historic experience of similar industries that are already in the taxable payments reporting system.

Costing: PER354

Fringe benefits tax exemption for electric vehicles

Assumption: The number of newly purchased electric vehicles being salary sacrificed would double.

Justification: The proposal makes salary sacrificing arrangements for electric vehicles more attractive. Given the relatively low level of salary sacrifice (around 8 per cent of vehicle purchases in 2017-18), and the potential for high growth in electric vehicle sales in coming years, a doubling in novated leases for electric vehicles would not be unreasonable.

Costing: PR18/00605#03

Impose small levy on banks

Assumption: Banks would absorb the cost of the levy, not passing it on to consumers or reducing dividends.

Justification: Given the relatively small size of the levy, banks have been assessed as unlikely to pass on any of the cost to consumers or shareholders.

Costing: PER397

Increase Australian Taxation Office compliance resources

Assumption: Voluntary compliance by taxpayers would increase. The additional revenue from voluntary compliance would be between 5 per cent and 12 per cent higher, depending on the level of specified compliance funding.

Justification: The increased likelihood of being caught in an audit or other compliance process would increase the incentive for taxpayers to voluntarily comply with the tax system.

Costing: PER409

Increase emissions standards for the definition of a luxury car tax fuel-efficient vehicle

Assumption: There would be no material behavioural response.

Justification: Buyers of luxury vehicles are not as price sensitive as buyers of cheaper vehicles.

Costing: PER612

Increase in bank levy

Assumption: Approximately 75 per cent of the increased levy amount would be passed on to bank customers.

Justification: The explanatory memorandum of the Major Bank Levy Bill 2017 provides some information on international studies that suggest that some of the bank levy would be passed on to consumers.

Costing: PER675

Increase the GST registration threshold

Assumption: Around 80 per cent of eligible companies (by GST debt value) with a debit GST balance, and all companies currently in a net refund position, would remain registered for GST.

Justification: There are other benefits associated with GST registration, such as being able to claim input tax credits and the ease of conducting business.

Costing: PER657

Introduce a broad package of revenue measures

Assumption: Behavioural responses to a broadening of the tax base and increases in tax on high-wealth individuals are broadly offsetting.

Justification: A broader tax base may lead to fewer opportunities for those affected to reduce the tax they pay. Conversely, a higher overall tax burden provides a stronger incentive for those affected to make greater use of alternative avoidance and evasion strategies. The effects are assessed as being broadly offsetting for the particular set of proposed changes.

Costing: PER475, PER687

Introduce a carbon tax

Assumption: Carbon emissions would decrease by approximately 1.3 per cent per year.

Justification: Based on a 2013 modelling report provided to the Climate Change and Energy Authority (Climate change mitigation scenarios).

Costing: PER613

Introduce a fossil fuel car tax and increase emissions standards for the definition of a luxury car tax fuel efficient vehicle

Assumption: There would be no material change to the timing of non-electric vehicle purchases in response to the limited duration of the proposal.

Justification: There is likely to be high growth in electric vehicle purchases over time in the baseline, and the proposed changes are projected to occur in the high-priced vehicle segments where consumers are less likely to be price sensitive and therefore would not alter their spending patterns to avoid paying additional tax.

Costing: PER612

Introduce a road-user charge on every kilometre driven by electric vehicles

Assumption: There would be no behavioural response to the introduction of road-user charging.

Justification: There is limited information available about the effects of applying a flat road-user charge per kilometre driven, with studies more focused on the effects of road-user charges applied at specific times of the day, such as peak travel times. In an analysis conducted for the Fuel Indexation (Road Funding) Bill 2014, the demand for transport fuel was found to be relatively inelastic with regards to price. By extension, the number of kilometres travelled would also be relatively inelastic with regards to price.

Costing: PR18/00610

Legalise and tax cannabis

Assumption: There would be a 15 per cent increase in demand for cannabis products in the first year, and demand would then grow in line with population growth.

Justification: Based on assessments from examining the evidence on consumption rates from the Canadian legalisation experience (Statistics Canada, National Cannabis Survey).

Costing: PER646

Make franking credits non-refundable for individuals

Assumption: There would be a taxable income elasticity of 0.2 for affected individuals.

Justification: Consistent with the wider empirical literature across advanced economies (eg International Monetary Fund, Are elasticities of taxable income rising?).

Costing: PER419

Make franking credits non-refundable for individuals and superannuation funds

Assumption: 5 per cent of dividends that would have been paid in the first year of the policy would be brought forward to before the policy implementation date.

Justification: Given this policy was announced ahead of the 2019 election, a number of firms announced the early payment of dividends in anticipation of a change of government, including Westpac. As a result, we assumed that more firms would have brought forward their dividends to the financial year before the policy would have started.

Costing: PER419

Make franking credits non-refundable for individuals, with an exemption for pensioners

Assumption: There would be no material budget impact from individuals drawing down on their assets in order to qualify for the age pension.

Justification: While the proposal may increase the incentives for some affected individuals to qualify for the age pension, it would have little impact on these incentives for most individuals affected (noting that these incentives are already strong for some individuals). The budget impact of a small number of individuals choosing to reduce their assets and qualify for the age pension would be immaterial relative to the overall budget impact of the proposal.

Costing: PER419

Make franking credits non-refundable for superannuation funds

Assumption: Affected self-managed superannuation funds would adjust their investments to reduce the revenue impact of the proposal by 20 per cent.

Justification: Affected self-managed superannuation funds could roll assets into an Australian Prudential Regulation Authority fund and maintain access to franking credits, suggesting that the response is likely to be relatively large. This behavioural response is equivalent to self-managed superannuation funds moving around a quarter of their listed Australian equities to Australian Prudential Regulation Authority funds. RiceWarner's analysis for the Coalition of self-funded retirees in 2018 (Removing the refundability of franking credits) also assumed a behavioural response leading to a 20 per cent revenue offset.

Costing: PER419

Make media subscriptions, donations and purchases tax deductible for individuals

Assumption: Total subscriptions from individuals would increase by 10 per cent.

Justification: A tax deduction reduces the effective price of media subscriptions, which would make them more attractive.

Costing: PER603

Minimum tax rate on discretionary trust distributions

Assumption: Affected individuals and trustees would find ways to reduce the impact of the proposal by 25 per cent.

Justification: Individuals face strong incentives to minimise the effect of this policy and there are alternative income-splitting strategies that are available (eg paying wages to family members, using a company instead of a trust and paying dividends, or simply finding other tax-effective investments), which suggest a large behavioural response. However the overall response may be limited by a number of factors, including transaction costs, existing compliance measures (such as the Australian Taxation Office Trust Taskforce), less flexibility in the alternatives, and that people hold discretionary trusts for reasons other than income splitting.

Costings: PER404, PER619

Minimum tax rate on high incomes (Buffett Rule)

Assumption: Affected individuals would find ways to reduce the impact of the proposal by around 30 per cent.

Justification: A large behavioural response is consistent with that assumed in 2012 by the Joint Committee on Taxation in the US to the proposed Buffett Rule. It reflects that high-income individuals typically have a degree of control around the realisation of income, particularly capital gains and investment income.

Costing: PER618

Phase out the capital gains tax discount

Assumption: Five per cent of affected asset sales in the first year, 2.5 per cent in the second year, and 1.25 per cent in the third year following implementation would be brought forward by 12 months to maximise the capital gains tax discount.

Justification: The proposed capital gains tax rate applied in the phase-in period would depend upon the point of sale. Given that sellers would have some discretion around when they sell assets, they would look to sell them at a point that maximises their after-tax capital gain.

Costing: PER660

Reduce the Division 293 threshold

Assumption: Individuals with income between the current and proposed threshold would reduce their voluntary concessional contributions by 10 per cent.

Justification: Increasing the tax rate on some superannuation contributions reduces the incentive for individuals to make voluntary contributions. The Division 293 threshold was reduced from $300,000 to $250,000 in 2017-18—future research comparing voluntary contributions in 2016-17 and 2017-18 may lead to an empirical estimate of the size of this behavioural response.

Costing: PER420

Remove fuel tax credits

Assumption: Businesses would not reduce fuel usage.

Justification: In analysis conducted for the Fuel Indexation (Road Funding) Bill 2014, the demand for transport fuel was found to be relatively inelastic.

Costing: PER608

Remove negative gearing and reduce the capital gains tax discount

Assumption: There would be a taxable income elasticity of 0.2 for individuals affected by negative gearing changes, and a capital income elasticity of 0.3 for individuals affected by capital gains tax changes.

Justification: Consistent with wider empirical literature across advanced economies (eg International Monetary Fund, Are elasticities of taxable income rising?), noting that higher elasticities are estimated for capital income.

Costings: PER414, PER660

Remove negative gearing and reduce the capital gains tax discount, with existing assets grandfathered

Assumption: Twenty per cent of affected asset purchases in the first year and 10 per cent in the second year following implementation would be brought forward prior to the implementation date in order to take advantage of grandfathering.

Justification: Consistent with research by the Office for Budget Responsibility's in 2016 (Working paper No. 10). In addition, the introduction of the GST in 2000 had a bring-forward effect on new housing purchases (about 10 per cent in year one and 5 per cent in year two). A bigger response is assumed for the removal of negative gearing because it would be expected to have a larger impact on investment housing costs than the introduction of the GST had on new housing costs.

Costings: PER414, PER660

Remove negative gearing, with an exemption for new dwellings

Assumption: The proportion of negatively geared investment in new dwellings would increase from 22 per cent before the policy is implemented to 30 per cent by 2029-30.

Justification: Australian Bureau of Statistics data (Cat. No. 5609.0, November 2018) was used to estimate the proportion of investment in new dwellings for owner-occupiers. This was used as a proxy for the proportion of negatively geared investment in new dwellings. The estimated proportion is consistent with unpublished Reserve Bank of Australia data and an investor survey from Mortgage Choice (see Established dwellings preferred investment choice, 27 July 2017). We expect the proportion of investment in new dwellings to increase over time due to the exemption.

There is little reliable data on the proportion of negatively geared *investment* in new dwellings. While there are surveys that estimate the proportion of *properties* purchased by investors that are new dwellings, estimating the impact of the exemption for new dwellings requires an estimate of the proportion of negatively geared investment in dollar terms. Differences in rental yields between new and established properties may mean that this proportion is very different to the proportion of new properties.

Costing: PER414

Remove the 'safe harbour' and 'arm's length' debt tests from thin capitalisation rules

Assumption: Some companies would alter their behaviour in order to avoid the impact of the proposal, reducing the revenue impact by 10 per cent after the first year and by 2 per cent in subsequent years.

Justification: Based on the company response to previous changes to thin capitalisation rules. This response could include changes to future worldwide financing arrangements to raise worldwide gearing levels.

Assumption: Companies would revalue their asset bases or alter their behaviour in other ways to avoid the increase in debt deductions denied, reducing the revenue impact by a further 50 per cent.

Justification: Based on the company response to previous changes to thin capitalisation rules.

Costing: PER412, PER632

Tax deductions for employing more workers

Assumption: Affected companies would not make material changes to the number of workers they employ and would not increase salary and wage rates.

Justification: The additional deduction is small in magnitude and would be unlikely to factor significantly in employment decisions. In addition, it would not be possible to carry the deduction forward, limiting the ability of companies not in a taxable position to fully utilise the deduction. The financial impact of the proposal is largely from current employment and any change to employment is likely to be at the margin.

Costing: PER657

Tax deductions for employing particular workers

Assumption: The number of new employees meeting the eligibility criteria of the proposal would increase by 10 per cent relative to current levels.

Justification: Employers would have an incentive to employ individuals meeting the eligibility requirements rather than those not meeting the requirements. Job seekers would also have an incentive to try to meet the eligibility requirements.

Costing: PER360

Trade and investment

Double Foreign Investment Review Board (FIRB) fees and penalties

Assumption: Individuals would be more likely to self-report breaches when penalties are higher.

Justification: Self-reported breaches attract a much smaller penalty than those arising from compliance activity. As such, doubling both penalties would increase the incentive for individuals to self-report.

Costing: PER405

Increase penalties for breaching anti-dumping provisions

Assumption: There would be no material reduction in the level of illegal dumping activity.

Justification: There is limited information on cases completed since July 2013 when the anti-circumvention provisions were introduced.

Costing: PER356