Improving the Efficiency of the Australian Tax System: a model-based analysis

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Outline

• Marginal Excess Burdens (MEBs)
• MEBs and economy-wide models
• A Small CGE Tax Model
• The (large) CGETAX Model
• MEBs for broad-based taxes
• MEBs for narrow-based taxes
• Preliminary findings and potential further developments
Marginal Excess Burdens
Tax Efficiency and Excess Burdens

• One stated aim of the Tax White Paper process is to reduce tax-based disincentives to work, save and invest.
• The economic costs of these tax-based disincentives are measured by deadweight losses or excess burdens (EBs). EBs represent the losses to consumers over and above the revenue that is raised from them.
• Different taxes have smaller or larger consumer costs for the last dollar of revenue that they raise. Marginal EBs (MEBs) differ.
• To maximise efficiency, taxes with high MEBs would be reduced and taxes with low MEBs would be raised, until MEBs converge.
• Once equity is also taken into account, higher MEBs can be justified for taxes that are redistributive or progressive.
• EBs can be illustrated using work disincentives in the labour market.
Introduction to EBs in the Labour Market: open economy in the long run

• $N_S$: compensated (constant utility) labour supply

• $W_D$: wage where the rate of return on capital equals the post-company tax rate required on the world market

• $W_S = W_D$ - tax wedge

• Average Excess Burden: $AEB = EB/Revenue$

• Marginal Excess Burden: $MEB = \Delta EB/\Delta \text{Revenue}$ for a small tax change

• $AEB$ and $MEB$ both depend on tax wedge and $N_S$ elasticity
MEBs in the Labour Market

• For a proportional labour tax, \( t \), the MEB is:
  \[
  \text{MEB} = \frac{\eta \cdot t}{1 - \eta \cdot t}
  \]
• \( \eta \) = compensated labour supply elasticity \textit{wrt} the after-tax wage
• \( t \) = tax paid expressed as a share of the after-tax wage
• So the MEB depends on the product of the compensated elasticity of the labour supply and the tax rate.
• Defining the tax rate more usually as a share of the pre-tax wage, \( ta \):
  \[
  \text{MEB} = \frac{\eta \cdot \{ta/(1-ta)\}}{1 - \eta \cdot \{ta/(1-ta)\}}
  \]
• For a progressive tax the MEB is higher, where \( ta \) is the average rate and \( tm \) is the (higher) marginal rate that drives the work disincentive.
  \[
  \text{MEB} = \frac{\eta \cdot \{[tm/(1-tm)] \cdot (tm/ta)\}}{1 - \eta \cdot \{[ta/(1-tm)] \cdot (tm/ta)\}}
  \]
MEBs and economy-wide models
Tax Efficiency and Excess Burdens


• Used an uncompensated labour supply elasticity of 0.15 as their central case (same value used here).

• “There is growing evidence that MEBs may be in the range of 15 to 50 cents for an economy like that of the United States.”

• “We hope that the large estimates we report will contribute to future debate on tax reform in the United States and to a discussion of possibly modifying the cost-benefit criterion for public goods evaluation.”
Earlier Australian MEB modelling

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<th>strengths</th>
<th>applications</th>
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Recent Australian MEB modelling

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<th>model</th>
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<tr>
<td>Small model</td>
<td>Labour taxes, asset income taxes (“work &amp; save”)</td>
<td>this seminar</td>
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<tr>
<td>CGE TAX (extended and updated version of IE CGE model)</td>
<td>Labour taxes, corporate tax, asset income taxes, specific taxes (“work, save &amp; invest”)</td>
<td>this seminar and Treasury consultancy referred to in recent Treasurer media release</td>
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A small CGE Tax model
Purposes and Taxes

- A small model for greater accessibility and transparency.
- Test bed for behavioural responses to taxes on asset income ("save").
- Based on small open economy.
- Simplifies by modelling non-housing GDP only.

Taxes:
- personal income tax
- company tax
- GST
- Payroll tax
- superannuation contributions tax (labour tax)
- superannuation earnings tax (asset income tax)
- externality tax group
- economic rents tax group
Firms

- Maximise profit subject to a production function in which there is a continuum of differentiated labour, some of which is subject to payroll tax ($nt$) and some of which is untaxed ($nu$).
- $Y=f(k,n(nt,nu))$
- Elasticity of substitution between capital and labour composite of 0.8: influences MEB for company tax.
- Elasticity of substitution between taxed and untaxed labour of 2: influences MEB from payroll tax.
- A Lomax (or Pareto type II) distribution for firm size of employing firms is fitted. It is used to determine the proportion of employees that are taxed (before behavioural responses) as a function of the payroll tax threshold set by policy. Model also allows for exemptions for self-employed and most not-for-profit organisations.
Households

- Ramsey-style model. An infinitely-lived representative household maximises discounted future utility. Utility \( u \) at a point in time depends on consumption of a continuum of differentiated consumption goods \( c \) (the Dixit-Stiglitz model) and leisure \( l \).

- Coverage of the GST determines the split (before behavioural responses) between consumption goods that are taxed \( ct \) and untaxed \( cu \).

- \[ V = \int e^{-\delta t} u(c(ct, cu), l) \, dt \]

- Elasticity of substitution between \( ct \) and \( cu \) is 0.9: influences MEB for GST base broadening.

- Elasticity of intertemporal substitution is 0.2: influences MEB for tax on asset income.
Labour Supply Elasticities

• Underlying labour supply parameters:
  • Elasticity of substitution between consumption and leisure of 1.1.
  • Ratio of available leisure to employment calibrated to 48%.

• Implies labour supply elasticities with respect to after-tax real wage:
  • uncompensated 0.15 (same as Ballard et al.)
  • compensated 0.40 (Gruber and Saez (2002), “The elasticity of taxable income: evidence and implications”, *Journal of Public Economics*)

• This approach of using target uncompensated and compensated labour supply elasticities to choose the two underlying labour supply parameters is recommended by Ballard (2000), “How many hours are in a simulated day? The effects of time endowment on the results of tax policy simulation models”.

• Labour supply compensated elasticity influences MEBs for personal income tax on labour income, payroll tax, GST and company tax.
The (large) CGETAX Model
Purposes and Broad Taxes

• Purpose is to capture excess burdens from:
  • taxes affecting work, investment, saving decisions;
  • narrowness/unevenness in these taxes; and
  • specific taxes e.g. property, insurance and alcohol.

• Broad Taxes:
  • personal income tax
  • company income tax
  • GST
  • payroll tax
  • superannuation taxes
Examples of Specific Taxes

Property taxes:
  • Stamp duty on conveyancing
  • Municipal rates
  • Land tax

Mining taxes:
  • Royalties
  • Petroleum rent resource tax

Alcohol taxes:
  • Wine and cider WET
  • Beer excise
  • Spirits excise

Other:
  • Insurance taxes
  • Customs duty
Comparison with previous models: detail and calibration data

<table>
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<th>Small model</th>
<th>IE CGE model</th>
<th>CGETAX</th>
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<td>Tax Revenue</td>
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<td>2012/13</td>
<td>MYEFO 2017/18 projection</td>
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Comparison with previous models: substitution

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<th>CGETAX</th>
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<td>present vs future</td>
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<td>NA (0)</td>
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<td>within consumption</td>
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<td>0.6 broad; 0.6-2.4 detailed</td>
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<td>between occupations</td>
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<tr>
<td>between taxed and untaxed labour</td>
<td>2.0</td>
<td>NA</td>
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MEBs for broad-based taxes
Calculation of MEBs

- In modelling the MEB from a tax rise, the gain to the government budget is returned to the consumer as a lump sum “transfer”. So the consumer only loses from the adverse behavioural responses to the tax rise. This loss is measured by the equivalent variation (EV), the maximum amount they would be prepared to pay to stop the tax rise occurring. If $V(P,M)$ is the indirect utility function and “b” and “a” represent before and after the tax rise, the EV is defined as follows.

\[ V(P_b,M_b - EV) = V(P_a,M_a) \]

- Then $\text{MEB} = \frac{\text{EV}}{\text{transfer}}$

- The MEB shows the consumer loss per dollar of improvement in the government budget from the tax rise.
Calculation of MEBs: two methods

• The first method of calculating an MEB is numerical simulation of the tax rise. The model output for the EV and “transfer” is plugged into the MEB formula. The shortcoming of this approach is that it does not provide an economic interpretation of the MEB result.

• The second method of calculating an MEB is to solve the model analytically rather than numerically to obtain an MEB formula of the type presented earlier, relating the MEB to tax rates and elasticities. The analytical method shows exactly what drives an MEB.

• The numerical simulation method was used for both models. For some taxes, it was also feasible to use the analytical method in the small model. In all five of these cases, the two methods produced identical results. This means we can have high confidence in the integrity of the MEBs produced by the numerical simulations.
Labour Tax MEBs

- Raise uniform labour income tax
  - CGETAX: 24%
  - Small model: 29%

- Reduce payroll tax threshold
  - CGETAX: 20%
  - Small model: 25%

- Raise payroll tax rate
  - CGETAX: 28%
  - Small model: 37%
Labour Tax MEBs

• The MEBs are higher in the small model but importantly follow similar patterns for both models. This will be seen in each slide.

• The MEB from raising a uniform, proportional tax on labour income arises from the work disincentive effect of a larger labour market tax wedge. The MEB for this tax provides a useful point of comparison for other MEBs, including for payroll tax.

• Raising the payroll tax rate has a higher MEB: its high threshold makes payroll tax narrowly-based and therefore more inefficient.

• Lowering the payroll tax threshold has a lower MEB: this broadens the base of payroll tax, making it more efficient.

• So from an efficiency perspective, the best of the three options here is to broaden the base for payroll tax by lowering the rate.
The diagram illustrates the changes in GST MEBs with different policy scenarios:

- **Raise Uniform Labour Income Tax**: The orange bar shows a 24% increase with CGETAX, while the blue bar shows a 29% increase with the small model.
- **Broaden GST Base**: The orange bar indicates a 10% increase, and the blue bar shows a 17% increase.
- **Raise GST Rate**: The orange bar shows a 13% increase, and the blue bar shows a 23% increase.

The x-axis represents the percentage increases, ranging from 0% to 35%.
GST MEBs

• Similar to the labour taxes, GST has a work disincentive effect by adding to the labour market tax wedge.

• However, the GST MEBs are lower than the labour tax MEBs. The consumer spending on which the GST relies is funded partly out of labour income, but it is also partly funded out of government transfers and spent asset income. This makes GST less of a tax on labour, reducing the strength of its work disincentive effect.

• Equally, by raising the cost of living for recipients of government transfers, GST is less equitable than a pure labour tax.

• Finally, broadening the base of the GST makes it more efficient and so has a lower MEB than raising the rate.
Individuals Income Tax MEBs

- **raise uniform labour income tax**: 24% (CGETAX) vs. 29% (small model)
- **raise uniform asset income tax**: 34% (CGETAX) vs. 47% (small model)
- **PIT income levy**: 26% (CGETAX) vs. 32% (small model)
- **PIT % surcharge**: 37% (CGETAX) vs. 45% (small model)

The bar chart compares the tax surcharge and income levy under different scenarios for CGETAX and the small model.
Individuals Income Tax MEBs: labour vs assets

- The MEB for asset income is higher than for labour income. Saving disincentive effects are perhaps bigger than work disincentive effects.
- This is despite the low assumed values for the elasticity of intertemporal substitution and the low tax on asset income relative to labour income (franking credits, low super earnings tax etc).
- Taxing asset income reduces the return in future consumption from foregoing current consumption, bringing consumption forward. However, this applies even for people who are mainly reliant on labour income and so don’t pay much asset income tax. This narrowness of the asset income tax base makes it inefficient.
- Judd (1985) and Chamley (1986) made a case that the optimal rate of tax on asset income is zero. In our model setup it is positive but low.
Individuals Income Tax MEBs: proportional vs progressive

- The MEB for a personal income tax levy calculated as a fixed proportion of income falls in between the MEBs for uniform taxes on labour and asset income: personal income is made up of a mix of both types of income.

- A percentage surcharge on personal income tax payments has a higher MEB. Such a surcharge is progressive, like the personal income tax scale itself. It therefore lifts marginal tax rates more than average tax rates, adding to disincentive effects.

- Of course the same progressive feature that gives the percentage surcharge a larger MEB also gives it a larger redistributive effect.
Comparing MEBs: small model vs CGETAX
Comparing MEBs

- The MEBs from the two models follow similar patterns. For these broad-based taxes, the main economic mechanisms are similar in both models.
- However, the MEBs in the large model are lower. On average they are three-quarters of the size of the small model MEBs. Why?
- The large model includes fixed factors of production – residential land, non-residential land and industry-specific fixed factors e.g. minerals. Their fixed supply reduces economic flexibility, muting behavioural responses. This likely adds to the realism of the model.
- Another consideration is aggregation bias. Industry-based elasticities need to be smaller in single sector models than in multi-industry models to generate the same aggregate responses.
- Further, only CGETAX can provide MEBs for the narrow-based taxes.
MEBs for narrow-based taxes
Property Taxes

- Municipal rates: 21%
- Land tax: 32%
- Non-res conveyancing duty: 161%
- Residential conveyancing duty: 75%
Property Taxes

• As the Henry Review pointed out, land is an efficient tax base because it is in fixed supply.

• The MEB for municipal rates is lower than for land tax because rates are more broadly based e.g. rates apply to owner-occupied housing.

• However, rates are not always uniform across land uses and so do distort land allocation. The Henry Review recommended a reformed land tax that was uniform across land uses.

• Conveyancing duty is triggered on a change of property ownership. This gives it the very narrow base of ownership transfer costs. The resulting very high effective rate leads to very high MEBs.

• The disincentive to move from conveyancing duty means the housing stock is used less efficiently than it would with greater mobility.
Mining Taxes

- Mineral rents: -34%
- Royalties: 14%
Mining Taxes

- Access to mineral resources provides mining company shareholders with economic rents. Royalties based on value of production are a disincentive to production. In principle, a well-designed rent tax does not distort production.

- Thus, the MEB for a minerals rent tax is considerably lower than for royalties.

- The MEBs for both taxes are lower than otherwise because of foreign ownership of mining companies. Foreign shareholders share the tax burden with Australian shareholders. This leads to the negative MEB for a minerals resource tax.

- The petroleum resources rent tax is an example of a minerals resource tax.
Alcohol Taxes

- Wine: -11%
- Cider: 15%
- Beer: 18%
- Spirits: 41%
Alcohol Taxes

• One benefit of the unusually high degree of industry detail in CGETAX – 278 industries – is that it distinguishes different alcohol beverages so that the inefficiencies from unevenness in alcohol tax can be modelled.

• The Henry Review made the interim assumption that taxation of full strength beer reflected the external costs of alcohol consumption.

• Applying that assumption in CGETAX means that wine is undertaxed and spirits are overtaxed.

• Hence, wine has a low MEB, which in fact is negative. Conversely, spirits has a high MEB.

• There would a substantial gain in consumer welfare from introducing uniform volumetric taxation of alcoholic beverages to equalise these MEBs.
Company Tax and Franking Credits

- Reducing franking credits: 29%
- Raising company tax: 53%
Company Tax and Franking Credits

• In an open economy, foreign investors require a given, world post-company tax rate of return. Thus, higher company tax eventually leads to higher pre-tax rates of return by lowering real wages. This leads to two inefficiencies.
  • Company tax adds to the labour market tax wedge, adding to work disincentives.
  • Company tax raises the cost of capital, lowering the capital-labour ratio and reducing productivity.

• Additionally, in Australia the tax base is narrowed through the return of some company tax revenue under our franking credits system.

• The modelling of company tax for the IE CGE model, inherited in CGETAX, was developed with Treasury for the Business Tax Working Group. It allows for many important features of the company tax system.

• The main additional inefficiency taken into account is profit shifting from Australia to lower taxed jurisdictions. The main additional efficiency taken into account is that part of company tax falls on Ricardian economic rents, such as those garnered from mining resources.
Company Tax and Franking Credits

• CGETAX introduces two other refinements in modelling company tax.
  • It separately models foreign investment in Australia and Australian investment abroad, rather than modelling foreign investment in Australia in net terms. This means it more fully captures the high level of foreign investment in Australian companies. To the extent that company tax applies to economic rents, this increases the efficiency of company tax.
  • It recognises that by reducing the net tax paid on asset income, franking credits reduce saving disincentives. Not taking this into account leads to overstatement of the excess burden from company tax.

• Taking all of the above into account, company tax has a high MEB. The work disincentive, investment disincentive, profit shifting and leakage of revenue through franking credits, outweigh the benefits of indirectly taxing some Ricardian rents and reducing the tax burden on asset income through franking credits.

• Reducing franking credits as a way of raising revenue has a lower MEB, similar to that seen earlier for asset income tax.
Company Tax: How High Is It?

- The Centre for Business Taxation at Oxford University maintains an international database of effective average tax rates (EATR) for corporate tax.
- For Australia, the cut in our statutory rate from 36% in 1999-2000 to 30% in 2001-02, reduced the EATR fell from 32.5% to 27.1% from 2000 to 2003. Among a broad group of 46 countries, this improved our ranking from 35th in 2000 to 23rd in 2003, taking us to the middle of the field.
- By 2015 our EATR was 25.3% but deeper company tax rate cuts elsewhere took us back to 35th out of 46 countries. So the international competitiveness of our corporate tax rate is now low and back to where we started before the previous major cut.
- Our rate would need to be cut to around 25% to bring it back up to the middle of the international field.
Insurance Taxes and Customs Duty

- Import duties: 13%
- Insurance taxes: 56%
Insurance Taxes and Customs Duty

- With its fine industry detail, CGETAX not only distinguishes insurance from superannuation but also distinguishes different forms of insurance.

- Insurance tax is a narrow tax that is levied on gross premiums. Further, the true price of insurance is the expected net premium measured as the gross premium net of benefits, making the tax base even narrower.

- Effective tax rates are high for motor vehicle and other general insurance, and lower for health insurance and life insurance.

- High effective tax rates lead to the high MEB for insurance tax.

- When import protection was high, customs duty had a high MEB and was much studied. However, with Australian tariffs now low, the MEB for customs duty is low. This doesn’t mean customs duty should be increased as that might invite retaliation from other countries.
Preliminary findings and potential further developments
Preliminary findings

• In line with Ballard et al., we find most MEBs fall in the range of 15 to 50 cents in the dollar. Our estimates are preliminary.

• The efficiency of the tax system would be improved by raising taxes with low MEBs e.g.:
  • broadening the base of payroll tax by lowering thresholds; and
  • broadening the base of GST.

• This could fund reducing taxes with high MEBs e.g.:
  • cutting company tax to (say) 25%;
  • abolishing stamp duty on conveyances and insurance taxes.

• Further efficiency gains can be made by evening up some taxes e.g.:
  • moving to volumetric taxation of alcohol;
  • taxing asset income more evenly (but not more highly overall).

• Such changes would not only reduce disincentives to work, save and invest, but would also reduce distortions in patterns across the three areas.
Potential Further Developments

• To date, the unevenness of taxation of asset income has been investigated in a separate, static CAPM model. It is likely this could be integrated into CGETAX using a recursive utility function approach. Kanc (2004) uses a recursive utility approach and provides the closest point of comparison with our modelling.

• Housing raises modelling issues. For example, it is unclear whether it is reasonable to apply the open economy assumption that a foreign investor is the marginal investor determining investment levels in housing. Further, the income-tax free status of owner-occupied housing is arguably the major distortion in the housing market but is unlikely to change. So is there a point to modelling it?

• The trade-off between equity and efficiency could be investigated systematically by introducing a social welfare function (SWF) into the small CGE model and simulating an optimal tax system under alternative SWF parameters.

• Likely public release of small model for transparency.