ACT
Government

REVENUE NEUTRALITY OF TAX REFORM

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INTRODUCTION

In 2012-13, the ACT Government began a 20-year tax reform program. Under the program, commercial land tax has been abolished, and stamp duty and insurance duty have been progressively reduced, and revenue from these sources has been replaced by progressive increases to general rates.

Tax reform is occurring over a 20-year period, in five year stages. The first stage of tax reform was from 2012-13 to 2016-17, and the second stage began in 2017-18. This paper deals with the tax reform to date, covering 2012-13 to 2018-19.

The Treasurer's message from the 2012-13 Budget, when the tax reform program was first announced, states the program "is broadly revenue neutral – it's not about raising the overall amount of tax the Government receives" (ACT Government Treasury, 2012, ACT Budget 2012-13 - Treasurers Message).

There have been some claims that the reform program has not been revenue neutral. Such claims are generally based on both general rates and stamp duty revenue increasing over the reform period.

Before tax reform, general rates revenue increased by wage price index (WPI), as well as due to new properties and an increase in average unimproved values from lease variations. Since 2011-12, increases in general rates revenue above the increases from these factors can be attributed solely to tax reform.

Before tax reform, stamp duty rates that applied were in place from 1 July 2002. Therefore, any increases in stamp duty revenue since then and prior to tax reform were from increases in property turnover and/or increases in property prices, generally in line with economic growth. Since 2011-12, changes in stamp duty revenue can be attributed to changes in property turnover and/or property prices, and progressive cuts to stamp duty rates. Therefore, any increases in stamp duty revenue since 2011-12 can be attributed to price and turnover growth outpacing the progressive cuts to stamp duty. To isolate the effect of tax reform on stamp duty revenue, the effect of other variables needs to be removed.

Before tax reform, 10 per cent duty applied to general insurance premiums and 5 per cent duty applied to life insurance contracts. Any increases in insurance duty revenue before tax reform commenced arose from increases in the number of policy purchases and/or increases in premiums. Since 2011-12, changes in insurance duty revenue can be attributed to changes in the number of policy purchase and/or premiums, and progressive cuts to insurance duty rates. Therefore, any increases in insurance duty revenue since 2011-12 can be attributed to policy purchases and premium growth outpacing the progressive cuts to insurance duty. Again, to isolate the effect of tax reform on insurance duty revenue, the effect of other variables needs to be removed.

This paper evaluates whether the tax reform program has been revenue neutral to date. The program would be broadly revenue neutral if the revenue generated from the sources above under the tax reform program is approximately equal to the revenue generated from these sources if tax reform had not occurred. This paper defines revenue to be approximately equal if the difference in revenue is 'small' in comparison to the total revenue generated from these sources over the reform period to date, in both cases (with and without tax reform). The revenue generated under tax reform can be readily estimated, whereas the revenue generated without tax reform (the counterfactual) is more difficult to establish and is discussed in the methodology section below.

Tax reform primarily relates to replacing inefficient taxes, such as stamp duty and insurance duty, with broad based land taxes such as general rates. Therefore, the revenue generated under tax reform and under the counterfactual does not consider the payroll tax changes that have been implemented since 2012-13. Since 2012-13, the ACT Government has progressively increased the payroll tax-free threshold from $1.5 million per annum to $2 million per annum in 2018-19. Since payroll tax is a tax on business whose total taxable wages exceed the tax-free threshold and the tax rate applies to total taxable wages that exceed the tax-free threshold, the changes to the threshold have reduced the payroll tax burden on the commercial sector. The implications of excluding payroll tax from this analysis will be discussed further in the paper.

EXECUTIVE SUMMARY

Assuming tax reform has not had an effect on economic activity, over the first 7 years of tax reform, the Government has raised approximately $62 million less in revenue than would have been the case in the absence of tax reform. The difference in revenue is small in comparison to the total revenue generated from the relevant tax lines in both cases, with and without tax reform. The difference in revenue is 1.33 per cent of the total revenue generated with tax reform and 1.31 per cent of the total revenue generated without tax reform.

Using these figures, during the first 7 years of tax reform the Government has forgone revenue from the residential sector and has raised additional revenue from the commercial sector. However, this does not take into account the progressive increases in the payroll tax-free threshold, which have reduced the payroll tax burden on the commercial sector. The amount of forgone revenue from payroll tax is being separately calculated and will be provided as part of the broader analysis of the tax reform program.

These figures are sensitive to a number of the assumptions made, including in relation to the effect on economic activity. Sensitivity analysis confirms that while the precise revenue impact varies to some degree, on alternative plausible assumptions the Government has forgone a small amount of revenue. Given that the amount of revenue forgone is a small percentage of total revenue generated from the relevant tax lines, the paper concludes that the tax reform program has been broadly revenue neutral to date.

METHODOLOGY

To establish whether tax reform has been broadly revenue neutral, the revenue that has been raised from stamp duty, general rates and insurance duty since 2012-13 is compared to the revenue that would have been raised from these sources and commercial land tax without tax reform (the counterfactual).[1]

When modelling the counterfactual, the definition of the counterfactual needs to be considered. Possible definitions of the counterfactual are the amount of revenue that would have been raised from these sources over 20 years if:

1. policy settings were kept constant from 2011-12 onwards;
2. for the first stage, policy settings were kept constant from 2011-12, and for the second stage, policy settings were kept constant from 2016-17 (the last year of stage one);
3. stamp duty, insurance duty and commercial land tax were immediately abolished and replaced with corresponding increases in general rates, which would increase each year by new properties, lease variations and WPI; or
4. in each year, stamp duty and insurance duty revenue reduce by the reform path and changes with other variables (property price and turnover), and general rates revenue increases by the reform path and changes with other variables (WPI and new properties).

Given the Government designed the reform package to take place over 20 years and to be "broadly revenue neutral overall", definition one is the most appropriate and has been used to model the counterfactual (ACT Government Treasury, 2012, ACT Budget 2012-13 - Chapter 3.2 2012-13 Taxation Reform). Therefore, the counterfactual uses 2011-12 rates settings to estimate counterfactual revenue and assess revenue neutrality over the entire tax reform program to date.

The effect that commercial land tax abolition, progressive reductions in stamp duty and insurance duty, and the progressive increase in rates are likely to have had on economic behaviour also need to be considered.

Stamp duty imposes a tax on the property market. The effect the tax has on the number of transactions in the property market depends on the elasticities of supply and demand. If demand or supply are relatively inelastic, the tax would lead to a minimal impact on economic behaviour and efficiency in the short term. In this case, the progressive reductions in stamp duty would not lead to a significant change in economic behaviour, property turnover or property prices from year to year. Alternatively, if demand or supply are relatively elastic, the tax would have an impact on economic behaviour and efficiency. In this case, the progressive reductions in stamp duty would lead to a change in economic behaviour: an increase in property turnover and an increase in property prices each year.

For simplicity of analysis, it is first assumed that tax reform has not had a significant effect on economic activity. This means that all variables are held constant at their yearly observed values except rates for stamp duty, general rates, commercial land tax and insurance duty. Some examples of the variables held constant are: the number of rateable properties and their average unimproved values (AUV), WPI, property growth, property turnover and property prices. The observed values of these variables and different rates settings with and without tax reform are used to estimate actual and counterfactual revenue. This removes the effect of other variables and ensures that identified impacts are solely attributable to tax reform.

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[1] From 1 July 2012 commercial properties were no longer subject to land tax. A portion of the commercial general rate settings from 1 July 2012 provided revenue replacement for commercial land tax.

However, widely accepted economic theory is that a decrease in a transaction tax will lead to a change in economic activity (i.e. an increase in property turnover and property prices). The ACT Government commissioned a detailed analysis of the impacts of the tax reform program on the economy, the community's revenue base and Canberrans across the income distribution. One of the key issues investigated is the impact of tax reform on economic activity and efficiency. This analysis has identified the impact of the tax reform program on residential property turnover and prices. These commissioned analyses are discussed later in the report, and findings from one of them are used to incorporate some changes in economic activity into the revenue neutrality analysis.

DATA

The data used for this analysis is ACT Government unit record general rates data and unit record stamp duty data.

Unit record general rates data

The unit record general rates data contains all rateable properties in the ACT by financial year. For each property, the data includes information on its location (suburb, section, block and unit number), land use, unimproved value (UV), AUV, levy code and the rates rebate the property owner/s receive on their rates bill.[2]

The levy code is used to determine if a property is classified as commercial, residential or rural for rates purposes. Using the levy code, rural properties and all diplomatic properties are excluded from the analysis since the calculation of rates for these properties is different to other properties and is unaffected by tax reform.[3] The land use variable is used to exclude broadacre properties since the yearly data does not consistently include these properties.

For residential units, the AUV of the parcel proportionate to the number of residential units in the parcel (AUVRP) is generated by summing the AUV of the individual units over suburb, section, and block for residential units in the block. The unit entitlement for residential units is also calculated, by dividing the AUV of the individual unit with AUVRP.

Fixed, valuation, gross, and net charges are also calculated for each property. The fixed charge and valuation charge are calculated based on the fixed charge amount, AUV thresholds and rating factors that apply in each rating period (i.e. financial year). Table 9 in the appendix provides more information on these by financial year. The gross charge for each property is simply the fixed charge plus the valuation charge, and the net charge is the gross charge minus any applicable rebate.

Unit record stamp duty data

The unit record stamp duty data contains all property transactions in the ACT by financial year. For each property transaction, the data includes information on its location (suburb, section, block and unit number), transaction/execution date, dutiable value, duty payable, concession value, concession descriptor and duty payable after concession.[4]

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[2] Due to current data limitations, information on deferments and waivers is not available, and the data does not include properties that are rateable for only part of a financial year.

[3] Land use is used to exclude diplomatic properties for 2012-13 data since levy code does not identify diplomatic properties under a separate classification for this year.

[4] Due to current data limitations, information on deferments and waivers is not available.

In this case, rural properties are not excluded since their stamp duty is affected by tax reform. Rural properties are grouped with either residential or commercial properties in the data set and cannot be separated out. However, given the small number of rural property transactions each year, this with not have a significant effect on residential and commercial stamp duty revenue estimates.[5]

In 2018-19, stamp duty on commercial property transactions of $1.5 million or less was abolished as part of the tax reform program. However, the data still contains information on property transactions that fall under this category, and therefore, counterfactual stamp duty that would have been raised on commercial property transactions of $1.5 million or less can be calculated.

Transaction/execution date determines the stamp duty rates that apply, and this can vary from the date at which stamp duty is collected.[6] Given that the stamp duty rates depend on the transaction/execution date, this date is used to sort property transactions by financial year, in order to obtain stamp duty revenue estimates by financial year.

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[5] Rural properties are grouped with either residential or commercial properties from 2012-13 to September 2017. From September 2017 onwards rural properties are classified separately. To maintain consistency across the years, this paper classifies rural properties with residential properties from September 2017 onwards. Rural properties are grouped with residential instead of commercial properties from September 2017 onwards due to differential stamp duty rates for commercial and non-commercial property transactions from 7 June 2017 onwards.

[6] For example, stamp duty payable depends on the transaction/execution date, but the amount is payable 12 months after this date for off the plan and land only transactions before the introduction of the Barrier Free Model.

ANALYSIS

Stamp duty and insurance duty

Table 1 presents the estimates for stamp duty and insurance duty revenue.

The actual estimates in table 1 apply the changes that have occurred under tax reform. The links in the appendix provide more information on stamp duty settings under tax reform, noting that settings vary by dates that are slightly different from financial year end and start dates.[7]

Actual stamp duty revenue is estimated using the unit record stamp duty rather than audited figures. This maintains consistency with the counterfactual, so the difference between actual and counterfactual revenue fully reflects the difference due to tax reform, rather than different data and/or methodology.

The counterfactual estimates in table 1 apply stamp duty settings that would have occurred without tax reform, where stamp duty rates would have been frozen at pre-tax reform levels.[8] This is an appropriate assumption, given that the stamp duty rates that applied before tax reform were in place from 1 July 2002 to 5 June 2012.

These estimates take into account concessions on stamp duty.[9] If it is assumed that the same concessions would have applied with and without tax reform, the same dollar amount of concession (if applicable) would be applied for each property transaction in the actual and the counterfactual. However, changes have been made to concessions policy as part of tax reform, and therefore, this assumption is not appropriate.

Instead, it is assumed that the same proportion of concession would have applied with and without tax reform, which allows the dollar amount of concessions and concessions policy to vary in the actual and the counterfactual, but keeps the proportion of assistance constant. To apply the same proportion of concession in the actual and counterfactual, for each property transaction the duty payable after concession in the actual is divided by the duty payable in the actual. This ratio is then multiplied by the duty payable in the counterfactual to infer the duty payable after concession in the counterfactual for each property transaction ('unit record ratio' method).

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[7] For example, properties with transaction dates from 1 July 2002 to 5 June 2012 have stamp duty rates that differ from properties with transaction dates from 6 June 2012 to 4 June 2013.

[8] Some property transactions in the data have a dutiable value of zero. For these transactions, duty payable in the actual and the counterfactual are both set to $20, as per ACT Revenue Office charging practices for transactions that are exempt from stamp duty. Therefore, the difference between actual and counterfactual revenue for these transactions is zero.

[9] For a small proportion of property transactions, there is a small difference between the actual stamp duty payable figure given in the data and the calculated actual stamp duty payable. In certain instances, where the actual concession value is equal to the actual stamp duty payable figure given in the data, the actual concession value may be marginally higher than the calculated actual stamp duty payable. This would result in a negative value for calculated actual stamp duty payable after concessions. For these transactions, actual concession value is adjusted to equal calculated actual stamp duty payable.

This method for determining duty payable after concessions in the counterfactual cannot be applied to commercial property transactions with a dutiable value of $1.5 million or less from 6 June 2018. This is because the duty payable in the actual is zero, and therefore the ratio of duty payable after concession in the actual to duty payable in the actual is undefined. For these commercial property transactions, the paper calculates duty payable after concessions in the counterfactual as duty payable in the counterfactual minus the average concession for commercial properties with a dutiable value of $1.5 million or less from 2004/05 to 2011/12 (i.e. before tax reform commenced). For commercial property transactions where the duty payable in the counterfactual is less than the average concession amount determined, this method would result in a negative value for duty payable after concessions in the counterfactual. For such transactions, duty payable after concessions in the counterfactual is set to zero.

Due to data limitations, the insurance duty forgone estimates in table 1 are based on estimated revenue outcomes for general insurance and life insurance duty from annual Budget Outlook Papers.[10] Actual insurance duty over 2012-13 to 2018-19 are the estimated revenue outcomes.

Counterfactual insurance duty assumes that the average annual growth rate in estimated revenue outcomes for general insurance and life insurance duty from 2006-07 to 2011-12 would apply from 2012-13 to 2018-19.[11] This is an appropriate assumption given that other jurisdictions (e.g. NSW), that have not undertaken similar reforms on insurance duty, have average annual growth rates in estimated revenue outcomes for insurance duty from 2006-07 to 2011-12 that are not significantly different from average annual growth rates from 2012-13 to 2018-19.[12]

Insurance duty forgone in table 1 is the difference between counterfactual and actual insurance duty revenue.

Table 1 shows that the changes to stamp duty and insurance duty have resulted in a decrease in tax revenue by approximately $855 million over the first 7 years of tax reform.

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[10] The ACT Government consolidated annual financial statements provide an aggregate figure for tax revenue from duties but does not disaggregate this into finer categories (e.g. residential stamp duty, commercial stamp duty, insurance duty etc). Therefore, the figure from the consolidated annual financial statements cannot be used to estimate insurance duty forgone.

[11] The average annual growth rate is calculated and applied separately for general insurance and life insurance.

[12] To test for significant differences, the null hypothesis is annual growth rates in estimated revenue outcomes for insurance duty in NSW from 2006-07 to 2011-12 is equal to those from 2012-13 to 2018-19. The p-value from a two-sample t-test assuming equal variances is 0.26 and assuming unequal variances is 0.34. In both cases the p-value is greater than 0.1, so even at a 10 per cent level, there is a failure to reject the null hypothesis that for NSW the annual growth rates in estimates revenue outcomes for insurance duty from 2006-07 to 2011-12 is equal to those from 2012-13 to 2018-19.

Table 1: Estimates of stamp duty and insurance duty revenue with and without tax reform ($'000)[13]

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	**Total**
Residential sector								
Actual residential stamp duty	175,461	178,821	181,052	218,556	262,231	214,055	171,412	**1,401,588**
Counterfactual residential stamp duty	193,603	209,403	223,060	281,849	356,506	299,095	248,083	**1,811,599**
Difference in residential sector	**-18,142**	**-30,582**	**-42,008**	**-63,293**	**-94,275**	**-85,040**	**-76,671**	**-410,011**
Commercial sector								
Actual commercial stamp duty	42,210	57,224	47,830	97,752	110,190	62,064	63,898	**481,168**
Counterfactual commercial stamp duty	42,998	67,882	58,691	124,934	143,926	85,387	93,452	**617,270**
Difference in commercial sector	**-788[14]**	**-10,658**	**-10,861**	**-27,182**	**-33,736**	**-23,323**	**-29,554**	**-136,102**
All sectors								
Actual stamp duty	217,671	236,045	228,882	316,308	372,421	276,119	235,310	**1,882,756**
Counterfactual stamp duty	236,601	277,285	281,751	406,783	500,432	384,482	341,535	**2,428,869**
Insurance duty forgone	3,070	17,942	30,764	47,183	65,227	69,772	74,689	**308,647**
Difference in all sectors	**-22,000**	**-59,182**	**-83,633**	**-137,658**	**-193,238**	**-178,135**	**-180,914**	**-854,760**

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[13] Numbers are rounded to the nearest thousand.

[14] Summary statistics for commercial stamp duty data shows a lower total dutiable value for 2012-13 than expected. This affects the actual and counterfactual commercial stamp duty revenue calculated for 2012-13 and affects the calculated difference in the commercial sector for 2012-13. Using a data extract for commercial stamp duty from 2012-13, the calculated difference in the commercial sector for 2012-13 is $950,000. The discrepancy between the two data extracts results in a difference of $1,738,000 for the difference in the commercial sector for 2012-13. This in turn would result in the total stamp duty difference in the commercial sector over the 7 years being -$134,364,000 instead of -$136,102,000. This discrepancy is small and does not affect the paper's overall results and conclusion.

General rates and commercial land tax

Table 2 presents the estimates for general rates and commercial land tax revenue.

Commercial land tax revenue is included in the estimates, since as part of the tax reform program, commercial properties were no longer subject to land tax from 1 July 2012. A portion of the commercial general rate settings from 1 July 2012 provided revenue replacement for commercial land tax. Therefore, the counterfactual considers the revenue that would have been raised from commercial land tax if it was not abolished.

The actual estimates in table 2 apply the changes that have occurred under tax reform. Table 9 in the appendix provides more information on general rates and commercial land tax settings under tax reform.

Actual revenue is estimated using the unit record general rates data rather than figures from the consolidated financial report. As explained above, this is to maintain consistency with the counterfactual, so the difference between actual and counterfactual revenue fully reflects the difference due to tax reform, rather than different data and/or methodology.

The counterfactual estimates in table 2 apply general rate settings that would have occurred without tax reform. Unlike stamp duty rates, general rates in the counterfactual would not have been kept constant.

The 2012-13 counterfactual general rates revenue is based on the revenue target for that year in the absence of tax reform. The revenue target uses 2012-13 residential and commercial rateable properties, which includes existing and new properties. Previous AUVs (2011 AUVs) and previous rating factors (2011-12 rating factors) are then used to calculate 'hypothetical' 2011-12 revenue for this new stock of properties, for residential and commercial properties separately.[15] This 'hypothetical' 2011-12 revenue is then increased by WPI (December 2011 WPI) to obtain the revenue target (the counterfactual general rates revenue) for 2012-13.[16] The residential and commercial rates revenue target is then used to calculate the fixed charge and rating factor that would have applied in 2012-13 for residential and commercial properties in the absence of tax reform, assuming a 50/50 revenue split between the fixed charge and rating factor elements. This approach is then continued to calculate counterfactual general rates revenue for 2013-14 onwards. Note, estimates of counterfactual general rates revenue assumes the 2011-12 rate-free threshold of $16,500 applied to the AUV of each property would have continued in the absence of tax reform. Table 10 in the appendix provides the residential and commercial fixed charge and rating factors that would have applied from 2012-13 to 2018-19 in the absence of tax reform.

These estimates take into account general rates rebates. As explained above for stamp duty, it is assumed that the same proportion of rebate would have applied with and without tax reform, which allows the dollar amount of the rebate and concessions policy to vary in the actual and counterfactual, but keeps the proportion of assistance constant. The 'unit record ratio' method used for stamp duty concessions is applied to general rates rebates, to infer the general rates liable after concession in the counterfactual for each rateable property.

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[15] Previous AUVs are obtained by merging 2012-13 general rates unit record data with 2011-12 general rates unit record data using the Suburb, Section, Block and Unit number. For new properties, previous AUVs would not be available, and therefore current AUV is used instead.

[16] Keeping with convention, the following WPI measure is used from ABS data: December quarter percentage change from the corresponding quarter of the previous year, for total hourly rates of pay excluding bonuses for all industries in the ACT.

The counterfactual commercial land tax numbers in table 2 apply commercial land tax settings that would have occurred without tax reform, where commercial land tax rates would have been frozen at pre-tax reform levels. Given that the commercial land tax rates that applied before tax reform were in place from 1 July 2005 to 30 June 2012, this is an appropriate assumption.

Pre-tax reform, commercial land tax applied to all commercial properties regardless of whether they were rented out or not, and the land tax rates that applied were based on the AUV of the property. Table 11 in the appendix provides more information on commercial land tax rates before tax reform. Therefore, the unit record general rates data is used to calculate counterfactual commercial land tax using only commercial properties and their AUVs.

Table 2 shows that the changes to general rates and commercial land tax have resulted in an increase in tax revenue by approximately $793 million over the first 7 years of tax reform.

Table 2: Estimates of general rates and commercial land tax revenue with and without tax reform ($'000)[17]

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
Residential Sector								
Actual residential general rates	193,386	217,165	242,589	268,485	284,964	317,911	351,324	**1,875,824**
Counterfactual residential general rates	178,706	190,546	198,388	205,094	211,941	221,329	233,788	**1,439,792**
Difference in residential sector	**14,680**	**26,619**	**44,201**	**63,391**	**73,023**	**96,582**	**117,536**	**436,032**
Commercial sector								
Actual commercial general rates	78,346	102,344	116,819	132,584	145,475	164,241	185,013	**924,822**
Counterfactual commercial general rates	30,673	33,077	35,008	36,622	37,832	40,042	42,566	**255,820**
Counterfactual commercial land tax	41,790	41,153	41,804	43,184	44,417	47,775	52,301	**312,424**
Difference in commercial sector	**5,883**	**28,114**	**40,007**	**52,778**	**63,226**	**76,424**	**90,146**	**356,578**
All Sectors								
Actual general rates	271,732	319,509	359,408	401,069	430,439	482,152	536,337	**2,800,646**
Counterfactual general rates	209,379	223,623	233,396	241,716	249,773	261,371	276,354	**1,695,612**
Counterfactual commercial land tax	41,790	41,153	41,804	43,184	44,417	47,775	52,301	**312,424**
Difference in all sectors	**20,563**	**54,733**	**84,208**	**116,169**	**136,249**	**173,006**	**207,682**	**792,610**

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[17] Numbers are rounded to the nearest thousand.

RESULTS

Table 3 presents the results above by residential and commercial sectors and for all sectors in total.

The estimates show that over the first 7 years of tax reform, the Government has raised approximately $62 million less in revenue due to tax reform. This difference in revenue is small in comparison to the total revenue generated from the relevant tax lines over the reform period to date: 1.33 per cent (1.31 per cent) of actual (counterfactual) revenue. Therefore, the tax reform program has resulted in the Government forgoing a small amount of revenue, but given the small amount of revenue forgone, the program has been broadly revenue neutral to date.

For analysis within the residential and commercial sectors, it is assumed that insurance duty forgone is equally split between the residential and commercial sectors. This is in line with data from Australian Prudential Regulation Authority (APRA) on general insurance gross earned premium for risks located in the ACT from September 2013 to September 2019 (APRA, 2019).

Within the residential sector, the changes to general rates resulted in an increase in tax revenue by approximately $436 million, and the changes to stamp duty and insurance duty resulted in a decrease in tax revenue by approximately $564 million. Therefore, during the first 7 years of tax reform the Government has forgone approximately $128 million in revenue from the residential sector.

Within the commercial sector, the changes to general rates and commercial land tax resulted in an increase in tax revenue by approximately $357 million, and the changes to stamp duty and insurance duty resulted in a decrease in tax revenue by approximately $290 million. Therefore, during the first 7 years of tax reform the Government has raised an additional $66 million from the commercial sector.

These results do not consider the progressive increases to the payroll tax-free threshold, which have reduced the payroll tax burden on the commercial sector. The changes to payroll tax would have resulted in a decrease in tax revenue. If the decrease in tax revenue from the changes to payroll tax is less than $66 million, the additional revenue raised from the commercial sector would be less than $66 million. Alternatively, if the decrease in tax revenue from the changes to payroll tax is greater than $66 million, the Government would have forgone revenue from the commercial sector as well. To evaluate how the total tax burden for the commercial sector has changed as a result of reform, analysis would need to incorporate the changes made to payroll tax.

Table 3 also presents the difference in total revenue with and without tax reform for all sectors by financial year. The 2015-16, 2016-17 and 2018-19 financial years have large differences in total revenue for all sectors. The large differences for all sectors in 2015-16 and 2016-17 result from the large differences in the residential sector, whereas the large difference in 2018-19 result from the large difference in the commercial sector.

Table 3: Estimates of differences with and without tax reform by sectors ($'000)

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
Residential Sector								
Residential rates difference	14,680	26,619	44,201	63,391	73,023	96,582	117,536	**436,032**
Residential duties difference (including 50% of insurance duty forgone)	-19,677	-39,553	-57,390	-86,885	-126,889	-119,926	-114,016	**-564,335**
Difference in residential sector	**-4,997**	**-12,934**	**-13,189**	**-23,494**	**-53,866**	**-23,344**	**3,521**	**-128,303**
Commercial sector								
Commercial rates difference (including commercial land tax)	5,883	28,114	40,007	52,778	63,226	76,424	90,146	**356,578**
Commercial duties difference (including 50% of insurance duty forgone)	-2,323	-19,629	-26,243	-50,774	-66,350	-58,209	-66,899	**-290,426**
Difference in commercial sector	**3,560**	**8,485**	**13,764**	**2,005**	**-3,124**	**18,215**	**23,248**	**66,153**
All Sectors								
Total rates difference (including commercial land tax)	20,563	54,733	84,208	116,169	136,249	173,006	207,682	**792,610**
Total duties difference (including insurance duty forgone)	-22,000	-59,182	-83,633	-137,658	-193,238	-178,135	-180,914	**-854,760**
Difference in all sectors	**-1,437**	**-4,449**	**575**	**-21,489**	**-56,989**	**-5,129**	**26,768**	**-62,150**

The large differences in the residential sector in 2015-16 and 2016-17 are the result of strong residential property price growth in Canberra in these years. Figure 1 uses ABS data on Canberra's residential property price index (RPPI) (ABS, 2019, Residential Property Price Indexes). The index numbers for financial years are calculated as the simple average of the four quarterly index numbers for the financial years. The percentage change in the RPPI for each financial year is then calculated and presented in figure 1. These numbers denote the percentage change in Canberra's RPPI from the previous financial year. The figure shows strong property price growth in Canberra in 2015-16, 2016-17 and 2017-18, which would result in an increase in residential stamp duty. The increase in residential stamp duty in the counterfactual would be greater than the increase in the actual due to higher stamp duty rates in the counterfactual. Therefore, the difference between actual and counterfactual residential stamp duty would increase in absolute value (i.e. more negative), and this would drive the larger differences in absolute value (i.e. more negative differences) in the residential sector for these years. Note, the large difference in the residential sector in 2017-18 is offset by the large difference in the commercial sector in 2017 18, resulting in a small difference for all sectors for this year.

The large difference in the commercial sector in 2018-19 may also be the result of similar changes in Canberra's commercial property market. However, this cannot be verified using the same method due to the lack of publicly available data on commercial property price indices.[18] Therefore, the paper provides anecdotal evidence by calculating the percentage change in the average dutiable value of commercial properties, using unit record commercial stamp duty data. The percentage change in average dutiable value from the previous financial year is presented in figure 2. The figure shows weak commercial property price growth in the ACT in 2014-15, 2017-18 and 2018-19, which would result in a decrease in commercial stamp duty. The decrease in commercial stamp duty in the counterfactual would be greater than the decrease in the actual due to higher stamp duty rates in the counterfactual. Therefore, the difference between actual and counterfactual commercial stamp duty would decrease in absolute value (i.e. less negative), and this would drive the larger differences in the commercial sector for these years. Note, the large differences in the commercial sector in 2014-15 and 2017-18 are offset by large differences in the residential sector, resulting in a small difference for all sectors for these years.

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[18] Commercial stamp duty data contains the dutiable value of property transactions; however, this cannot be used to infer a commercial property price index. The reasoning behind this is the standard approach for constructing a price index is to select a representative sample of items, and to re-price the **same** items over time. This approach is not viable in the case of commercial properties, as dutiable value in consecutive years relates to a different set of properties. Therefore, differences in dutiable value over consecutive years would also reflect the different characteristics of the properties, and therefore, would not be a pure price index.

Figure 1: Percentage change in Canberra's Residential Property Price Index
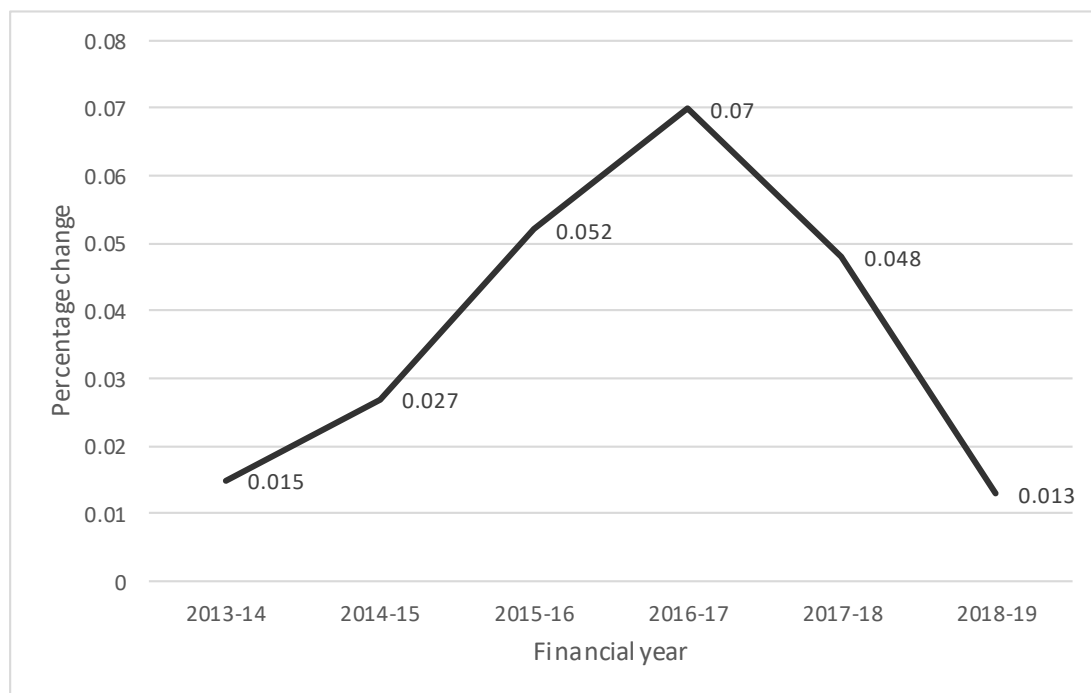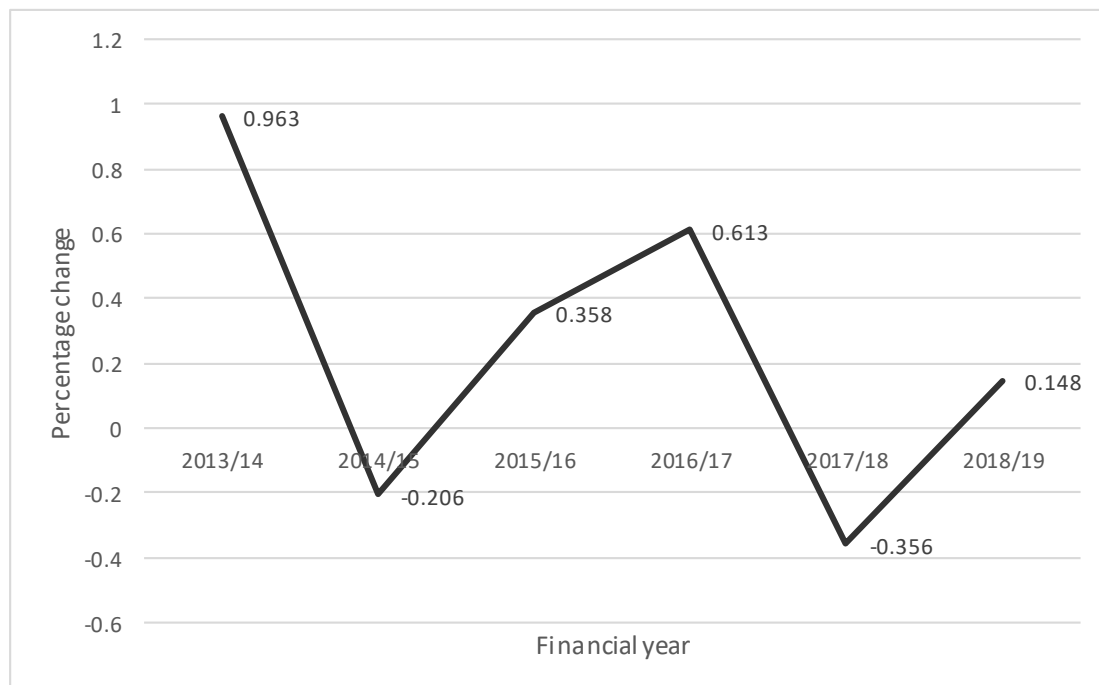

Figure 2: Percentage change in the average dutiable value of commercial properties

A note on the cyclicality of the property market

It is also important to test whether the conclusion that the tax reform program has been broadly revenue neutral to date is a result of stronger property price growth over the reform period rather than the reforms themselves. Stronger property price over the reform period to date would result in higher stamp duty in both the actual and counterfactual, however, the increase in stamp duty in the counterfactual would be greater than the increase in the actual due to higher stamp duty rates in the counterfactual. Therefore, the difference between actual and counterfactual stamp duty would increase in absolute value (i.e. more negative), and this would result in the changes to stamp duty resulting in more forgone tax revenue, and could in turn drive the result that the program has been broadly revenue neutral to date.

To test whether the ACT has experienced stronger property price growth in the residential sector over the reform period, Canberra's percentage change in the RPPI from the corresponding quarter of the previous year is examined from June 2005 to June 2019 (ABS, 2019, Residential Property Price Indexes). The annual growth rates pre-tax reform (from June 2005 to June 2012) are not significantly different from those post-tax reform.[19] However, comparing RPPI annual growth rates post reform to those from June 2005 to June 2012, may not sufficient to conclude that the residential sector was not undergoing stronger property price growth during the reform period, since since June 2005 to June 2012 is a short period of time and may not provide long-term average annual growth rates in RPPI. Therefore, Canberra's percentage change in the Established House Price Index (EHPI) from the corresponding quarter of the previous year is examined from June 1987 to June 2019, since RPPI is not available pre-June 2005 (ABS, 2019, Residential Property Price Indexes). Again, the annual growth rates pre-tax reform are not significantly different from those post-tax reform.[20] This provides evidence that the ACT residential sector has not experienced stronger property price growth over the reform period and that the reforms themselves have been revenue neutral.

The lack of publicly available data on commercial property price indices mean the same analysis cannot be carried out to determine whether commercial property price growth has been stronger post reform in comparison to long-term commercial property price growth.

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[19] To test for significant differences, the null hypothesis is annual growth rates in RRPI from June 2005 to June 2012 are equal to those from June 2013 to June 2019. The p-value from a two-sample t-test assuming equal variances is 0.60 and assuming unequal variances is 0.58. In both cases the p-value is greater than 0.1, so even at a 10 per cent level, there is a failure to reject the null hypothesis that the annual growth rates in RRPI from June 2005 to June 2012 are equal to those from June 2013 to June 2018.

[20] To test for significant differences, the null hypothesis is annual growth rates in EHPI from June 1987 to June 2012 are equal to those from June 2013 to June 2019. The p-value from a two-sample t-test assuming equal variances is 0.48 and assuming unequal variances is 0.29. In both cases the p-value is greater than 0.1, so even at a 10 per cent level, there is a failure to reject the null hypothesis that the annual growth rates in EHPI from June 1987 to June 2012 are equal to those from June 2013 to June 2018.

SENSITIVITY ANALYSIS
Change in Calculation Methodology

From 1 July 2017, the Government changed the general rates calculation for residential units to base it on the AUV of the parcel proportionate to the number of residential units in the parcel (AUVRP) rather than the individual AUV of the unit. This change is commonly referred to as the change in calculation methodology (CCM). CCM changes the method for calculating the valuation charge for residential units. It starts by applying a rating factor to the AUVRP. This product is then multiplied by the unit entitlement (UE) to generate the valuation charge for an individual residential unit.

To provide assistance with the higher increase in general rates for units as a result of CCM, the Government provided a one-off $100 rates rebate to all units in 2017-18.

CCM was introduced to address the disproportionate share of general rates revenue collected from non-unit and units. This issue had been identified as needing to be addressed around the time tax reform commenced and the change is likely to have occurred even in the absence of tax reform. The issue has also been identified in other jurisdictions (e.g. Sutherland Shire Council) where similar taxation reforms have not occurred.

Given this, it has been assumed CCM would have been implemented in the counterfactual as well. For the CCM unit rebate, it is not appropriate to assume that the $100 rebate would have applied in the counterfactual, since CCM would have caused a different increase in general rates for units in the counterfactual. The 'unit record ratio' method was used earlier to calculate other general rates rebates in the counterfactual, and this method keeps the proportion of assistance constant in the actual and counterfactual by rateable property. This means that the dollar amount of rebate provided in the counterfactual varies by rateable property. However, the CCM unit rebate was a fixed $100 rebate that applied equally to all rateable units, and therefore the 'unit record ratio' method is not appropriate in this case. For the CCM unit rebate, this paper assumes that the same proportion of assistance for CCM would have applied at the aggregate level for all rateable units, with and without tax reform. This allows the dollar amount of unit rebate to vary in the actual ($100) and counterfactual, but fixes the unit rebate in the counterfactual to a dollar amount that is applied equally to all rateable units. To apply this method, the total CCM unit rebate in the actual is divided by the total increase in rates revenue due to CCM in the actual.[21]   This ratio is then multiplied by the total increase in rates revenue due to CCM in the counterfactual to infer the total CCM unit rebate in the counterfactual. Dividing this by the number of residential units provides the counterfactual CCM unit rebate. This counterfactual rebate is applied to each rateable residential unit in 2017-18 to determine the general rates liable after all rebates in the counterfactual for each rateable property.

By assuming CCM and the same proportion of assistance for CCM at the aggregate level in the counterfactual, the paper can isolate the impacts of tax reform and not introduce the impacts of other policy changes into the estimates.

If by contrast, it was assumed CCM would not have been implemented in the counterfactual, counterfactual general rates revenue would be $4.877 million less over 2017-18 and 2018-19. Therefore, CCM has little impact on counterfactual general rates revenue.

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[21] The total increase in rates revenue due to CCM is the total rates revenue with CCM minus the total rates revenue without CCM.

The following example demonstrates why CCM has a small impact in the counterfactual, with a proportional rating factor as opposed to progressive rating factors: a proportional rating factor of 0.28% applied to the AUV of residential properties, a residential block with ten equal sized units that has an AUVRP of $5 million. Table 4 below illustrates the steps used to calculate the valuation charge for these units with and without CCM in two cases: 1) when a rate free threshold of $16,500 applies; and 2) when a rate free threshold of $16,500 does not apply.

The table shows that in the second case, when the rate free threshold does not apply, CCM does not have an effect on the valuation charge for residential units, because of the proportional rating factor that applies in the counterfactual.

In the first case, when the rate free threshold does apply, CCM has a small effect on the valuation charge. The difference arises from applying the rate free threshold to the individual AUV of the unit without CCM, whereas with CCM the rate free threshold applies to the AUVRP. Given the estimates of counterfactual general rates revenue above applies the $16,500 rate free threshold, the counterfactual general rates revenue would be $4.877 million less over 2017-18 and 2018-19 without CCM.

In summary, CCM does not have a significant effect on general rates revenue with a proportional rating factor but would have a significant effect on general rates revenue with progressive rating factors.

Table 4: Example of steps used for calculating the valuation charge in the counterfactual

$16,500 AUV rate free threshold applies			
Without CCM	Step 1 – AUVRP x UE	Step 2 – apply $16,500 rate free threshold	Step 3 – apply rating factor
	$5 million x 0.1 = $500,000	$500,000 - $16,500 = $483,500	$483,500 x 0.0028 = $1,353.80
With CCM	Step 1 – apply $16,500 rate free threshold to AUVRP	Step 2 – apply rating factor	Step 3 – apply UE
	$5 million - $16,500 = $4,983,500	$4,983,500 x 0.0028 = $13,953.80	$13,953.80 X 0.1 = $1,395.38
$16,500 AUV rate free threshold does not apply			
Without CCM	Step 1 – AUVRP x UE	Step 2 – apply $16,500 rate free threshold	Step 3 – apply rating factor
	$5 million x 0.1 = $500,000	N/A	$500,000 x 0.0028 = $1,400
With CCM	Step 1 – apply $16,500 rate free threshold to AUVRP	Step 2 – apply rating factor	Step 3 – apply UE
	N/A	$5 million x 0.0028 = $14,000	$14,000 x 0.1 = $1,400

Data issues relating to the barrier free model

From September 2017, the ACT Government changed the system for collecting stamp duty on property transactions to the new Barrier Free Model. For off the plan and land only transactions, stamp duty is payable upon completion, as opposed to pre-barrier free when it was payable 12 months after the transaction/execution date. This has resulted in some property transactions not being included in the current extraction of stamp duty data, since these transactions will only be logged once duty has been paid.

This would result in stamp duty revenue being underestimated in 2017-18 and 2018-19. If the underestimation of stamp duty revenue is equal in the actual and counterfactual, this would not make a difference to the revenue neutrality results. However, given the stamp duty rates are higher in the counterfactual than in the actual, stamp duty revenue would be underestimated more in the counterfactual than the actual. Therefore, the difference (actual stamp duty revenue minus counterfactual stamp duty revenue) should be greater in absolute value (i.e. more negative). In summary, the results should show a larger decrease in stamp duty revenue for 2017-18 and 2018 19.

ABS data for the ACT and NSW shows that new apartments are the only dwelling type with average approval to completion times and average commencement to completion times greater than 12 months (ABS, 2019, Building Activity Australia).[22] Average approval to completion times for apartments in 2017-18 and 2018-19 is 27 months and average commencement to completion times for apartments in 2017-18 and 2018-19 is 21 months.[23] Therefore, the underestimation of stamp duty revenue would mainly rise from the time lag between transaction/execution date (i.e. contract date) and settlement date (which would occur upon or shortly after completion) for new apartments.

The analysis above does not take into account any stamp duty revenue in 2017-18 and 2018-19 from new apartments that have been sold but to date have not been completed, and therefore it provides a lower bound estimate for residential stamp duty revenue in both the actual and the counterfactual.

To provide an upper bound estimate for residential stamp duty revenue in 2017-18 and 2018-19, it is assumed: all new apartment completions between June 2019 and March 2020 sold upon commencement 21 months prior between September 2017 and June 2018; and all new apartment completions between April 2020 and March 2021 sold upon commencement 21 months prior between July 2018 and June 2019. Assuming all apartments sold upon commencement provides an upper bound estimate for residential stamp duty in 2017-18 and 2018-19.

Given that data on apartment completions is not available for December 2019 onwards, completions are estimated using ABS data on apartment approvals in the ACT and the average approval to completion time of 27 months (ABS, 2019, Building Approvals Australia). Using approvals data, 1,851 apartment completions are estimated between June 2019 and March 2020 and 4,491 apartment completions are estimated between April 2020 and March 2021.

Table 5 attributes the estimates of apartment completions to 2017-18 and 2018-19 and calculates actual and counterfactual total stamp revenue for off the plan apartments sold, by multiplying the stamp duty for an apartment with the average dutiable value with the number of off the plan apartment sold.

Table 5 shows that the changes to stamp duty have resulted in a further decrease in tax revenue by approximately $48 million over 2017-18 and 2018-19.

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[22] Data on average times for new apartments is only available for NSW, VIC, QLD and Australia as a whole. This paper uses the average times for new apartments in NSW as a proxy for the ACT.

[23] Rounding up to the nearest integer.

Table 5: Estimates of stamp duty revenue for off the plan apartments

Financial Year	Off the plan apartments sold	Average dutiable value for an apartment	Actual stamp duty for an apartment with the average dutiable value	Counterfactual stamp duty for an apartment with the average dutiable value	Actual total stamp duty revenue for off the plan apartments sold ('000)	Counterfactual total stamp duty revenue for off the plan apartments sold ('000)	Difference in total stamp duty revenue for off the plan apartments sold (actual minus counterfactual)
2017-18	1,851	$462,452	$11,375.00	$18,437.50	$21,055	$34,128	-$13,073
2018-19	4,491	$468,203	$10,958.80	$18,756.50	$49,216	$84,235	-$35,019

DISCUSSION ON ECONOMIC ACTIVITY

As explained in the methodology section above, for simplicity of analysis, this paper begins by assuming that tax reform has not had an effect on economic activity. This means variables such as property turnover, property prices and AUVs etc are held constant at their observed values to estimate both actual and counterfactual revenue. This allows the effect of other variables to be removed in order to isolate the impacts of tax reform.

However, economic theory recognises that a decrease in a transaction tax such as stamp duty will lead to an increase in property turnover and property prices, with the quantum of the increases depending on the elasticities of supply and demand. Therefore, the property turnover and prices in the counterfactual would be lower than the observed property turnover and prices that are used to estimate counterfactual revenue. This in turn, would reduce counterfactual stamp duty revenue in table 1, and result in the differences between actual and counterfactual stamp duty revenue in table 1 being lower in absolute value (i.e. less negative). The result would be that the changes to stamp duty would have resulted in a lower decrease in tax revenue over the first 7 years of tax reform, and therefore, the Government would have forgone less revenue due to tax reform or could have raised additional revenue due to tax reform, depending on the magnitude of the behavioural effects.

Therefore, to comprehensively examine whether the Government's tax reform program has been revenue neutral to date, counterfactual stamp duty revenue should be estimated using property turnover and prices that would have occurred in the counterfactual in the absence of tax reform. However, counterfactual property prices and turnover are not known and difficult to estimate.

It is not appropriate to use pre-reform property prices and turnover as a proxy for counterfactual property prices and turnover. Figure 3 and 4 below show that pre-reform (before 2012/13) property prices and turnover exhibited an upward trend (with some cyclicality in turnover).[24] Therefore, it is appropriate to assume that counterfactual property prices and turnover would have also exhibited an upward trend post-reform, with this upward trend being different from the actual upward trend observed post-reform. This means using pre-reform property prices and turnover as a proxy for counterfactual property prices and turnover would underestimate counterfactual stamp duty revenue and an inappropriate conclusion that the Government has forgone less or raised additional revenue due to tax reform.

In addition, pre-reform trends in property prices and turnover should also not be extrapolated to determine post-reform counterfactual property prices and turnover. To demonstrate this, figure 5 below shows that property prices trends in Sydney and Brisbane between 2005 2011 differed from trends between 2012-2019. While differing trends between these two time periods would partly be driven by state/city specific factors in Sydney and Brisbane that would not lead to differing trends between the two time periods in the ACT, the differing trends would also be driven by national factors which would lead to differing trends between the two periods in the ACT. Further, there would be state specific factors in the ACT other than tax reform, that would lead to differing trends between the two time periods in the ACT. Therefore, extrapolating ACT pre-tax reform trends would not provide counterfactual property prices and turnover.

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[24] Figure 4 uses ACT Government unit record stamp duty data, whereas figure 3 uses ABS's residential property price index. ABS's residential property price index is used for figure 3 instead of generating price indexes from ACT Government unit record stamp duty data, since price index should re-price identical items over time (not different set of properties over time). The ABS uses various methods to create price indexes for residential properties that reflect a pure price index.

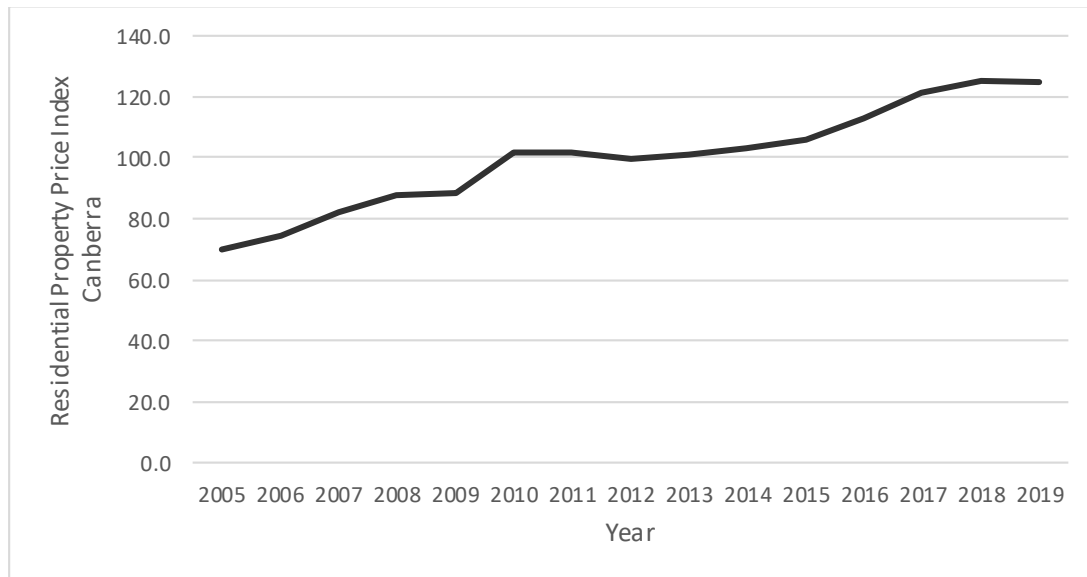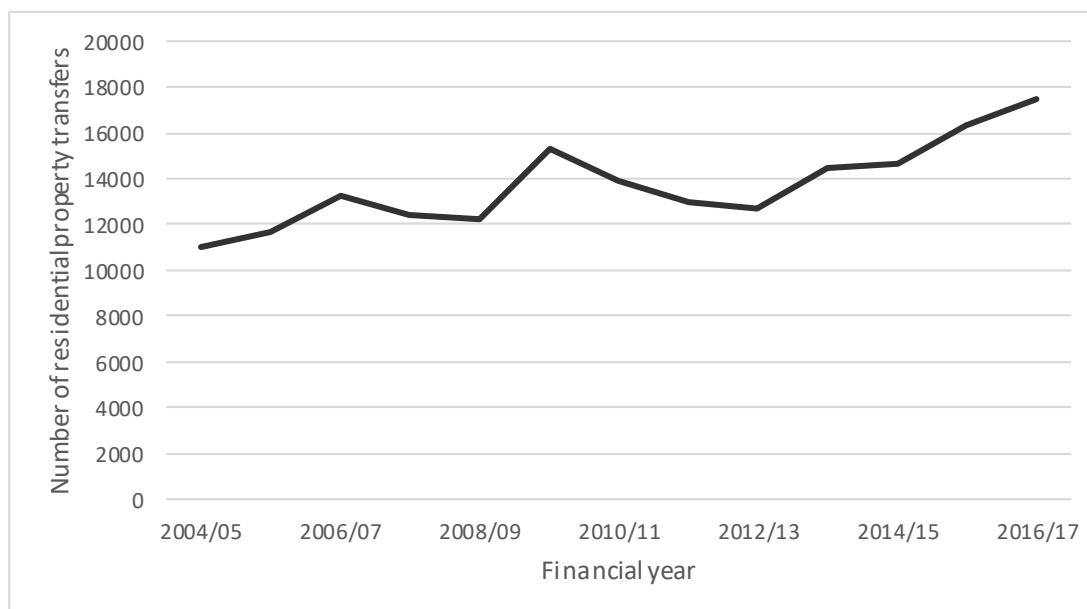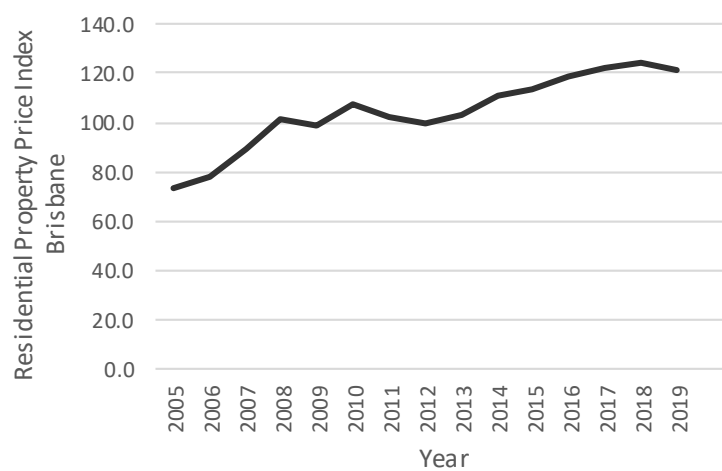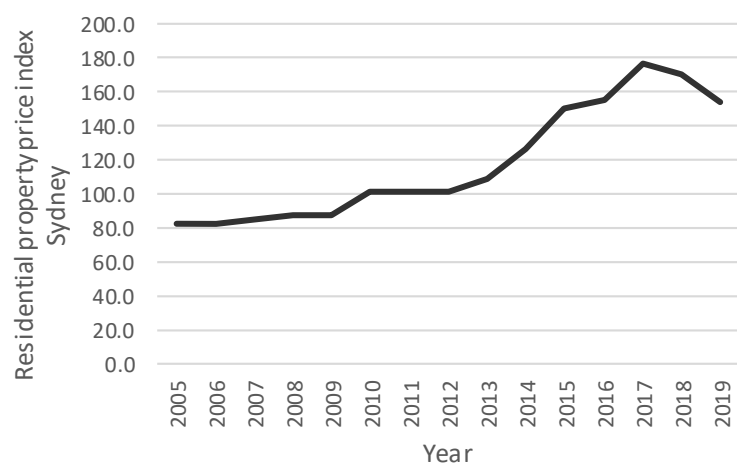*Figure 3: Residential Property Price Index Canberra for June Quarter*[25]

Figure 4: Number of residential property transfers in the ACT

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[25] Using ABS, 2019, Residential Property Price Indexes.

Figure 5: Residential Property Price Index Sydney and Brisbane for June Quarter[26]

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[26] Using ABS, 2019, Residential Property Price Indexes.

THE EFFECT ON ECONOMIC ACTIVITY

As mentioned in the methodology section above, the ACT Government commissioned a detailed analysis of the impacts of the tax reform program on the economy, the community's revenue base and Canberrans across the income distribution. One of the key issues examined is the impact of tax reform on economic activity and efficiency, which has been conducted by two different consultants using differing methodologies. This analysis has sought to identify the impact of tax reform on residential property prices and turnover. While this analysis provides an understanding of the impact of tax reform, as with non-experimental empirical analysis, the analysis may have limitations. This section first discusses some of these limitations, and based on these limitations, and uses findings from one that can more appropriately determine some counterfactual variables. The results are then summarised, used to determine some counterfactual variables, and re-estimates the difference between total actual and counterfactual revenue.

Limitations

The National Centre for Social and Economic Modelling (NATSEM) and the Tax and Transfer Policy Institute (TTPI)

TTPI's analysis uses the difference-in-difference (DiD) methodology to estimate the causal effect of tax reform on residential property prices and turnover. To estimate the causal effect of tax reform the DiD methodology makes two key assumptions. The first assumption is the trend in the outcomes (property prices and turnover) for the control group would have applied in the ACT in the counterfactual (NATSEM and TTPI, 2020, p.9-10). This assumption identifies the ACT's counterfactual. This is illustrated in a graphical representation of the DiD in figure 7, where the ACT's counterfactual (dashed green line) is identified by assuming that the trend in outcomes for the control group (blue line) would have applied in the ACT in the absence of reform (i.e. post tax-reform, the blue line and dashed green line are parallel). The second assumption is that time varying factors that have not been controlled have the same effect on the outcomes of the control group and the ACT (NATSEM and TTPI, 2020, p.9-10). Again, this to identify the ACT's counterfactual (dashed green line), by assuming any shifts in the control group trends (blue line) would have shifted the counterfactual trend in the ACT equally (i.e. post tax-reform, the blue line and dashed green line are parallel). If these assumptions hold, the DiD methodology can correctly identify the causal effect of tax reform as the difference between the observed outcome trend in the ACT (bold orange line) and the unobserved counterfactual outcome trend in the ACT (dashed green line).

However, when one of these assumptions does not hold, the DiD methodology cannot correctly identify the causal effect of tax reform. To understand this, figure 8 presents a graphical representation of the DiD when one of the assumptions fails. Figure 8 shows that the trend in the outcomes for the control group (arrowed black line) would not have applied in the ACT in the counterfactual (dashed green line), but the DiD assumes it would have (solid green line). Therefore, the DiD identifies the causal effect of tax reform as the difference between the observed outcome trend in the ACT (bold orange line) and the unobserved counterfactual outcome trend in the ACT assumed by the DiD (solid green line). However, due to the failure of one of the assumptions the DiD methodology does not correctly identify the actual causal effect of tax reform, which is the difference between the observed outcome trend in the ACT (bold orange line) and the actual unobserved counterfactual outcome trend in the ACT (dashed green line).

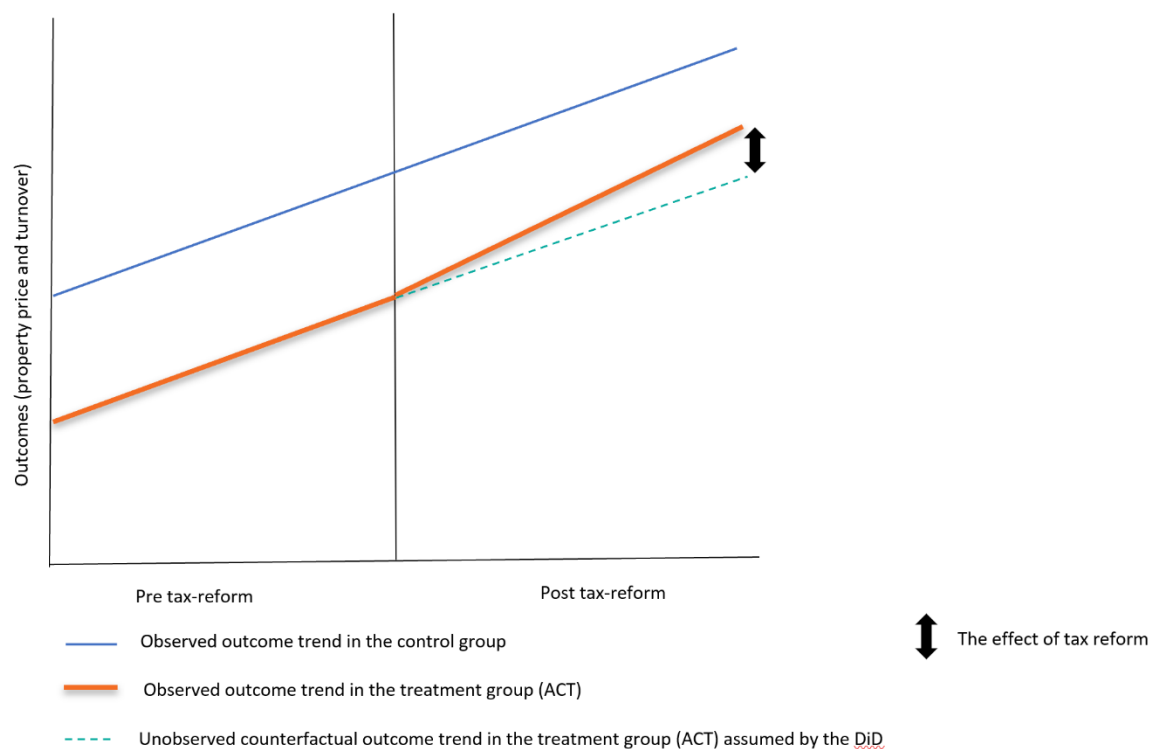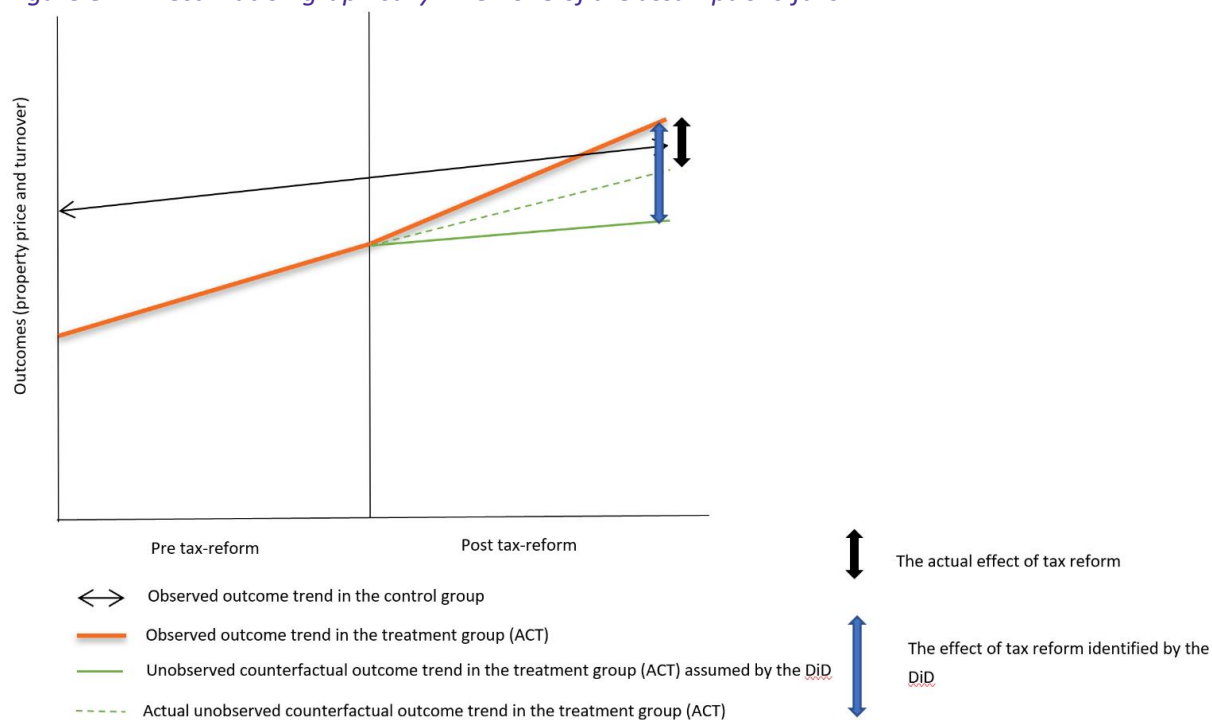*Figure 7: DiD estimation graphically*

Figure 8: DiD estimation graphically when one of the assumptions fails

TTPI questions the validity of the two DiD assumptions and "encourages readers to interpret and apply these results cautiously" (NATSEM and TTPI , 2020, p.33-35). TTPI explains the effect on residential turnover "varies considerably across specification and controls groups", which leads them to conclude that the "point estimates (on turnover) are unreliable" (NATSEM and the TTPI , 2020, p.37). This means that the turnover estimates cannot be used to realistically determine counterfactual residential turnover.

However, TTPI's conclusions suggests a price increase to use as a scenario input for the microsimulation study conducted by NATSEM earlier in the report, since the suggested price increase is from a specification that uses a reasonable control group and is a plausible estimate (NATSEM and the TTPI, 2020, p.37). This, in combination with the DiD methodology identifying a causal effect and being able to apply NATSEM's method to determine a profile of commercial property price increases, means that these results can be used determine counterfactual residential and commercial property prices.

Centre of Policy Studies (COPS)

COPS' analysis uses panel regression analysis with Statistical Area Level 2 (SA2) fixed-effects to estimate the impact of stamp duty decreases or general rates increases on outcomes (property prices and turnover).[27]

To identify a causal effect, the stamp duty decreases or general rates increases must not be correlated with any omitted variables that influence the outcomes. If this assumption does not hold, then the estimates represent associations (i.e. correlations) and not the causal effect of tax reform, and therefore the estimates cannot be used to realistically determine residential property prices and turnover that would have occurred in the absence of tax reform.

In this case, there are two reasons the assumption would not hold. First, an omitted variable that is correlated with stamp duty decreases/general rates increases and separately affects the outcome variables (i.e. omitted variable bias). Second, the outcomes variable, for example property price, affects stamp duty decreases/general rates increases (i.e. reverse causality/simultaneity).

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[27] With SA2 fixed effects the regression includes an indicator variable for each SA2 except one, and this indicator variable is equal to 1 if the observation is for that SA2 and is equal to 0 otherwise. SA2 fixed effects controls for all factors that vary across SA2 but are constant for each SA2 over time; for example, houses in particular SA2s could have more established populations, and therefore, could have a relatively lower turnover (Centre of Policy Studies, 2020, p.17).

Without the use of time fixed-effects, the underlying assumption may be violated by omitted variable bias. COPS' analysis cannot used time fixed effects in their regression since doing so would "capture practically all the variation" in stamp duty decreases (COPS, 2020, p.17). With time fixed effects the regression would include an indicator variable for each financial year except one, and this indicator variable would be equal to 1 if the observation is for that financial year and would be equal to 0 otherwise. Time fixed effects would control for all factors that vary across financial year but are constant across SA2; for example, changes in the ACT economy and the property market. Instead, COPS' analysis uses controls for the property market in neighbouring NSW to proxy for overall changes in the economy and the property market (COPS, 2020, p.17). While these controls would capture changes in the economy and the property market that occur in both neighbouring NSW and the ACT, they would not capture any changes specific to the ACT economy and property market. Therefore, if there were changes specific to the ACT economy and property market during this time (other than tax reform), this would result in omitted variable bias. COPS' report provides one example of this; the report explain that changes in the composition of the housing stock over time, such as more smaller properties (e.g. townhouses/apartments) being sold in later years when stamp duty decreases are largest, would result in the estimated effect on property price being biased downwards, since on average these types of properties have lower prices (COPS, 2020, p.22 and p.23). The report explains that while the controls for the property market in neighbouring NSW "are intended to capture such dynamics, a bias could remain if the changes in the housing stock in the ACT differ from those in (neighbouring) NSW" (COPS, 2020, p.22). Other examples of omitted variables are changes in disposable income and population growth over time that are not the same in the ACT and as in neighbouring NSW.

The underlying assumption may also be violated by reverse causality/simultaneity. From economic theory, decreases in transaction taxes, such as stamp duty decreases, would affect property prices. However, property prices would also affect stamp duty decreases, since stamp duty is a function of property prices. Therefore, if stamp duty decreases/general rates increases and property prices codetermined, this would result in reverse causality/simultaneity.

For these reasons, it is appropriate to assume that the assumption above does not hold, and therefore the estimates would not represent the causal effect of tax reform. Therefore, these estimates cannot be used to determine residential property prices and turnover in the absence of tax reform for the revenue neutrality analysis. Nevertheless, COPS' analysis is useful in understanding the associations between stamp duty decreases/rates increases and residential property prices and turnover, which are in line with economic theory and differ to TTPI's findings on residential turnover.

Incorporate some changes in economic activity into the revenue neutrality analysis

Based on the limitations discussed above, NATSEM's and TTPI's findings can more appropriately determine counterfactual residential and commercial property prices, and their results are used to incorporate some changes in economic activity into the revenue neutrality analysis.

Counterfactual residential property prices

When studying the effect of tax reform on residential property prices, TTPI finds "a wide range of estimated house prices increases" and "the effect of the reform on unit prices are also mixed" (NATSEM and the TTPI, 2020, p.37). The report suggests "the use of a two per cent house price increase" as a scenario input for the microsimulation study earlier in the report, since the two per cent increase is from a specification that uses a reasonable control group and is a plausible estimate (NATSEM and the TTPI, 2020, p.37).

Therefore, this analysis follows NATSEM's microsimulation study and assumes tax reform has resulted in two different profiles of average residential property price increases. The first profile assumes that the reduction in residential stamp duty have been fully absorbed by higher residential property prices. Therefore, table 6 presents the first profile of average residential property price increases as the average reduction in residential stamp duty in a year divided by the average residential property price in a year (NATSEM and the TTPI , 2020, p.7). The second profile takes TTPI's findings from the specification that uses a reasonable control group but for all properties instead of houses, where the tax reform is estimated to have increased property prices by 1.7 per cent on average over the reform period (NATSEM and the TTPI , 2020, p.7). NATSEM then apply the trend from the first profile to the 1.7 per cent average to determine the average yearly property price increases in the second profile presented in table 6 (NATSEM and the TTPI , 2020, p.7).

Table 6: NATSEM's profiles of average residential property price increases

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
First profile	0.35%	0.50%	0.61%	0.77%	0.98%	1.15%	1.30%
Second profile	1.24%	1.39%	1.50%	1.66%	1.87%	2.04%	2.19%

To determine counterfactual residential property prices, observed residential property prices are reduced by the profiles in table 6.

Counterfactual residential property turnover

TTPI's findings suggest that tax reform "did not lead to an increase in the overall number of house sales and most likely led to some decrease" and inconsistent results for units means that they cannot draw conclusions on turnover for units (NATSEM and the TTPI , 2020, p.37). This finding "does not support the theoretical argument that a reduction in transaction costs (i.e. stamp duty) will eliminate efficiencies in the market and lead to increased activity" and this "warrants further investigation" (NATSEM and the TTPI , 2020, p.32). Furthermore, TTPI explain that the "estimate of the reduction in the number of house sales varies considerably across specification and controls groups", which leads them to conclude that these "point estimates are unreliable" (NATSEM and the TTPI , 2020, p.37).

Unreliable point estimates mean that TTPI's estimates cannot be used to determine counterfactual residential property turnover. Therefore, analysis assumes that tax reform has not had an effect on residential turnover. If TTPI's finding on residential turnover is correct (i.e. tax reform has decreased residential turnover), this would mean that counterfactual residential property turnover would be higher than the observed turnover used to estimate counterfactual stamp duty revenue. This in turn would lead to an underestimate of counterfactual stamp duty revenue, and therefore an underestimate of the revenue forgone due to tax reform. However, if tax reform has led to an increase in residential turnover, in line with economic theory, then revenue forgone will be overestimated.

Counterfactual commercial property prices and turnover

As mentioned above, the commissioned analysis has identified the impact of tax reform on residential property prices and turnover but not on commercial property prices and turnover. Therefore, counterfactual commercial property turnover cannot be determined.

However, this analysis can determine counterfactual commercial property prices by following NATSEM's microsimulation study and assuming that reductions in commercial stamp duty have been fully absorbed by higher commercial property prices. Therefore, table 7 presents a profile of average commercial property price increases as the average reduction in commercial stamp duty in a year divided by the average commercial property price in a year. To determine counterfactual commercial property prices, observed commercial property prices are reduced by the profile in table 7.

Given that counterfactual commercial property turnover cannot be determined, analysis assumes that tax reform has not had an effect on commercial property turnover. If the results for commercial property turnover are similar to TTPI's result on residential property turnover (i.e. tax reform has reduced commercial turnover), this would lead to an underestimate of revenue forgone. Alternatively, economic theory predicts that tax reform would have increased commercial turnover, and this would lead to an overestimate of revenue forgone.

Table 7: Profiles of average commercial property price increases

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
Commercial profile	0.10%	0.53%	0.83%	1.07%	1.10%	1.55%	1.58%

Difference between total actual and counterfactual revenue assuming tax reform has resulted in higher residential and commercial property prices

The determined counterfactual property prices are used to re-estimate counterfactual stamp duty and the difference between total actual and counterfactual revenue. As discussed in the results section above, assuming no changes in economic activity, table 8 shows that the Government has forgone approximately $62 million in revenue due to tax reform. Assuming that tax reform has resulted in property price increases by the first or second profile for residential properties and by the commercial profile for commercial properties, table 8 shows that the Government has forgone approximately $35 million or $14 million in revenue respectively due to tax reform.[28]

As discussed above, if TTPI's results are correct and tax reform has resulted in lower turnover, these estimates are underestimating revenue forgone. Alternatively, if tax reform has resulted in higher turnover, as predicted by economic theory, these estimates are overestimating revenue forgone. While counterfactual property turnover cannot be determined using the commissioned analysis, incorporating changes in other counterfactual variables (i.e. residential and commercial property prices) provides an understanding of how robust the conclusion is to changes in economic activity. The results in table 8 show that incorporating some changes in economic activity does not change the overall conclusion: tax reform has resulted in the Government forgoing a small amount of revenue, but given that the revenue forgone is a small proportion of total revenue generated from the relevant tax lines, the Government's tax reform program has been broadly revenue neutral to date.

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[28] The estimates for property price increases take into account concessions on stamp duty by applying the method used for the scenario with no change in economic activity. This method is detailed in the analysis section earlier in the report.

Table 8: Estimated difference between total actual and counterfactual revenue under three scenarios from NATSEM's and TTPI's results on economic activity ($'000)

Year	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	**Total**
No change in economic activity	-1,437	-4,449	575	-21,489	-56,989	-5,129	26,768	**-62,150**
Tax reform has resulted in property price increases by the first profile for residential properties and by the commercial profile for commercial properties	-507	-2,692	2,872	-17,308	-50,897	649	32,412	**-35,471**
Tax reform has resulted in property price increases by the second profile for residential properties and by the commercial profile for commercial properties	1,803	-208	5,502	-14,047	-46,815	4,074	35,228	**-14,465**

CONCLUSION

This paper evaluates whether the tax reform program has been revenue neutral to date. To isolate the effects of tax reform, the effect of other variables has been removed. To remove the effect of other variables, the paper first assumes that tax reform has not had a significant effect on economic activity. Therefore, it assumes that all variables except rates for stamp duty, general rates, commercial land tax and insurance duty would have been the same in the absence of tax reform (e.g. property prices and turnover).

The analysis commissioned by the ACT Government provides an understanding of the impact tax reform on economic activity and efficiency, which has been conducted by two different consultants using differing methodologies. One of commissioned works tries to identify the causal effect of tax reform on residential property prices and turnover. The findings from this report are used to determine some counterfactual variables, and therefore provides an understanding of how robust the conclusion is to some changes in economic activity.

The main findings show that over the first 7 years of tax reform, the Government has raised approximately $62 million less in revenue due to tax reform. This difference in revenue is small in comparison to the total revenue generated from the relevant tax lines over the reform period to date (1.3 per cent).

The main results also show that during the first 7 years of tax reform the Government has forgone revenue from the residential sector and has raised additional revenue from the commercial sector. However, this does not take into account the progressive increases in the payroll tax-free threshold, which have reduced the payroll tax burden on the commercial sector. To evaluate how the total tax burden for the commercial sector has changed as a result of reform, analysis would need to incorporate the changes made to payroll tax. This further analysis will be done as part of the broader analysis of the tax reform program.

The figures are sensitive to the assumptions made about the change in CCM and data issues relating to the Barrier Free Model. By taking these into consideration, the paper finds that the Government has forgone between $57 million to $110 million in revenue due to tax reform. The lower bound estimate is 1.2 per cent of total revenue generated from the relevant tax lines over the reform period to date, and the upper bound estimate is 2.3 per cent.

Using the commissioned analysis, the paper incorporates changes in some counterfactual variables (i.e. residential and commercial property prices) to check the robustness of the conclusion to some changes in economic activity. The findings are that the Government has forgone between $14 million to $35 million in revenue due to tax reform. Therefore, incorporating some changes on economic activity does not change the overall conclusion: tax reform has resulted in the Government forgoing a small amount of revenue (0.3 per cent to 0.7 per cent of total revenue generated from the relevant tax lines over the reform period to date).

In conclusion, the paper finds that the tax reform program has resulted in the Government forgoing revenue. The revenue forgone is a small proportion of the total revenue generated from stamp duty, general rates, commercial land tax and insurance duty over the reform period. On this basis, the paper concludes that the Government's tax reform program has been broadly revenue neutral to date.

APPENDIX

Rates of stamp duty under tax reform

Historical rates and current rates of stamp duty can be found on the ACT Revenue Office website at the following URLs:

https://www.revenue.act.gov.au/duties/conveyance-duty?result_1060955_result_page=2

https://www.revenue.act.gov.au/duties/conveyance-duty?result_1060955_result_page=3

https://www.revenue.act.gov.au/duties/conveyance-duty?result_1060955_result_page=6

General rate settings under tax reform

Table 9: General rates and commercial land tax settings under tax reform[29] [30]

Year	General rates fixed charge, AUV thresholds, marginal rating factors and other information on general rates
2011-12	- a fixed charge of: $555 for residential properties; and $1,258 for commercial properties. - rating factors applied to the AUV of: 0.2727 per cent for residential properties; and 0.7711 per cent for commercial properties. - a rate-free threshold of $16,500 applied to the AUV of each property.
2012-13	- commercial properties not subject to land tax from 1 July 2012. - a fixed charge of: $555 for residential properties; and $1,213 for commercial properties. - marginal rating factors residential: AUV $1 to $150,000 0.2236% $150,001 up to $300,000 0.3136% $300,001 up to $450,000 0.3736% $450,001 and above 0.4136% - marginal rating factors commercial: AUV $1 to $150,000 1.9070% $150,001 up to $275,000 2.2670% $275,001 and above 2.6070%
2013-14	- a fixed charge of: $626 for residential properties; and

[29] From ACT Budget Papers.

[30] Tax reform does not include rural properties, so the fixed charge and rating factors for rural properties have not been included

- $1,749 for commercial properties.

• marginal rating factors residential:

AUV

$1 to $150,000	0.2306%
$150,001 up to $300,000	0.3241%
$300,001 up to $450,000	0.3876%
$450,001 and above	0.4312%

• marginal rating factors commercial:

AUV

$1 to $150,000	2.2069%
$150,001 up to $275,000	2.6429%
$275,001 and above	3.5369%

2014-15

• a fixed charge of:
  o $675 for residential properties; and
  o $1,915 for commercial properties.
• marginal rating factors residential:

AUV

0 to $150,000	0.2547%
$150,001 to $300,000	0.3571%
$300,001 to $450,000	0.4287%
$450,001 and above	0.4873%

• marginal rating factors commercial:

AUV

0 to $150,000	2.4134%
$150,001 to $275,000	2.7957%
$275,001 and above	4.0245%

2015-16

• a fixed charge of:
  o $730 for residential properties; and
  o $2,130 for commercial properties.
• marginal rating factors residential:

AUV

0 to $150,000	0.2746%
$150,001 to $300,000	0.3857%
$300,001 to $450,000	0.4629%
$450,001 and above	0.5339%

• marginal rating factors commercial

AUV

0 to $150,000	2.6274%
$150,001 to $275,000	3.0467%
$275,001 and above	4.4339%

2016-17

• a fixed charge of:
  o $765 for residential properties; and
  o $2,235 for commercial properties.
• marginal rating factors residential:

AUV

0 to $150,000	0.2746%
$150,001 to $300,000	0.3900%
$300,001 to $450,000	0.4800%
$450,001 to $600,000	0.5400%
$600,001 and above	0.5750%

	• marginal rating factors commercial: AUV 0 to $150,000 2.8000% $150,001 to $275,000 3.3000% $275,001 to $600,000 4.6600% $600,001 and above 4.7700%

2017-18	• from 1 July 2017, the Government changed the general rates calculation for residential units to base it on the total AUV of the land rather than the individual AUV of the unit. A $100 rebate applied to residential units in 2017-18.
	• a fixed charge of:
	    o $765 for residential properties; and
	    o $2,380 for commercial properties.
	• marginal rating factors residential:
	AUV
	0 to $150,000 0.2960%
	$150,001 to $300,000 0.4088%
	$300,001 to $450,000 0.5130%
	$450,001 to $600,000 0.5603%
	$600,001 and above 0.6013%
	• marginal rating factors commercial:
	AUV
	0 to $150,000 2.9760%
	$150,001 to $275,000 3.4940%
	$275,001 to $600,000 4.9350%
	$600,001 and above 4.9930%

2018-19	• a fixed charge of:
	    o $815 for residential properties; and
	    o $2,463 for commercial properties.
	• marginal rating factors residential:
	AUV
	0 to $150,000 0.3130%
	$150,001 to $300,000 0.4088%
	$300,001 to $450,000 0.5130%
	$450,001 to $600,000 0.5603%
	$600,001 and above 0.5700%
	• marginal rating factors commercial:
	AUV
	0 to $150,000 3.0800%
	$150,001 to $275,000 3.6161%
	$275,001 to $600,000 5.1074%
	$600,001 and above 5.1675%

General rate settings in the absence of tax reform

Table 10: General rates settings in the absence of tax reform

Year	General rates fixed charge and rating factors
2012-13	- a fixed charge of: $647 for residential properties; and $2,845 for commercial properties. - rating factors applied to the AUV of: 0.233 per cent for residential properties; and 0.536 per cent for commercial properties.
2013-14	- a fixed charge of: $669 for residential properties; and $2,954 for commercial properties. - rating factors applied to the AUV of: 0.235 per cent for residential properties; and 0.585 per cent for commercial properties.
2014-15	- a fixed charge of: $681 for residential properties; and $3,037 for commercial properties. - rating factors applied to the AUV of: 0.241 per cent for residential properties; and 0.61 per cent for commercial properties.
2015-16	- a fixed charge of: $687 for residential properties; and $3,123 for commercial properties. - rating factors applied to the AUV of: 0.244 per cent for residential properties; and 0.618 per cent for commercial properties.
2016-17	- a fixed charge of: $695 for residential properties; and $3,189 for commercial properties. - rating factors applied to the AUV of: 0.244 per cent for residential properties; and 0.621 per cent for commercial properties.
2017-18	- a fixed charge of: $704 for residential properties; and $3,261 for commercial properties. - rating factors applied to the AUV of: 0.241 per cent for residential properties; and 0.614 per cent for commercial properties.
2018-19	- a fixed charge of: $719 for residential properties; and $3,391 for commercial properties. - rating factors applied to the AUV of:

- o   0.237 per cent for residential properties; and
- o   0.599 per cent for commercial properties.

Commercial land tax settings without tax reform

Table 11: Marginal rates for commercial land tax

AUV	Marginal rates
0 to $75,000	0.89%
$75,001 to $150,000	0.89%
$150,001 to $275,000	1.25%
$275,001 and above	1.59%

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