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Analysis of the impacts and outcomes of the ACT tax reform

Tax and Transfer Policy Institute

National Centre for Social and Economic Modelling
(NATSEM), University of Canberra

5 May 2020

Robert Breunig, Hai Anh La, Ralf Steinhauser, Robert Tanton, Yogi Vidyattama

Tax and Transfer Policy Institute
Crawford School of Public Policy

The Australian National University

Canberra ACT 0200 Australia

www.anu.edu.au

CRICOS Provider No. 00120C

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1. Introduction

In 2012, the ACT Government began a 20-year program to modernise the Territory's taxation system. This reform program has broadened the tax base by moving towards replacing inefficient taxes, such as stamp duty and insurance duty, with a broad-based land tax through the general rates system. Importantly, the program was designed not to raise the overall tax burden on the ACT community, with the forgone revenues resulting from reductions in stamp duty being replaced by an efficient and more equitable rates system.

Since 2012, the ACT Government has significantly cut conveyance duties. Decreases in residential conveyance duties every year have led the ACT to be among states with the lowest stamp duty rates in Australia. The first stage of this reform program includes: (i) abolishing duty on insurance policies over five years; (ii) phasing out conveyance duty over 20 years; (iii) abolishing commercial land tax, with a portion of the commercial general rate settings providing revenue replacement for commercial land tax; (iv) increasing the tax-free threshold for payroll tax; and (v) making residential land tax and the general rate system more progressive.

This report examines the distributional, economic and affordability impacts of the ACT Government tax reform.

1.1 – Part 1: Distributional impacts of the ACT Government tax reform

To support the ACT government in its process of reviewing this tax modernisation program, in this first part of the analysis, we will answer two research questions:

1. What has been the impact of tax reform on different household types and cohorts, taking into account available concessions and deferral programs? This analysis is undertaken with respect to household income and wealth levels and takes into account the wealth effects of property.
2. What has been the impact of tax reform on the progressivity and equity of the ACT tax system, considering the incidence of property purchases by households with different levels of income and wealth? How has tax reform affected the alignment of residential property taxation with respect to ability to pay, taking account of relevant related factors including changes in land values and land use by household income level and household wealth level? Is there any evidence that higher annual general rates (in place of higher stamp duty) have impacted welfare or behaviour?

To answer these questions, we have adopted a microsimulation model to create a baseline, where the current and complex ACT rules are applied, to compare with a counterfactual case where the regulations without the tax reform are employed. We use the 2009-10 and 2011-12 Surveys of Income and Housing (SIHs) and the 2011 Census to generate a synthetic population for the ACT before the reform and then use data from the ACT government to determine what the ACT would have looked like now without the reforms. We also use other data from the Australian Bureau of Statistics (ABS) and other sources to derive these projections of what the ACT would have looked like if reform hadn't happened.

1.2 – Part 2: Economic and affordability impacts of the ACT Government tax reform

In this second part of the analysis, we will answer three research questions:

3. Are the impacts of tax reform on the ACT economy to date able to be measured? Are the marginal impacts from each dollar of stamp duty reduction expected to increase or decrease as tax reform progresses? Is there any evidence that ACT residential property prices are higher or lower than they would have been in the absence of tax reform? Is residential property turnover in the ACT higher or lower than it would have been in the absence of tax reform?
4. To what extent is the upfront cost of residential property in the ACT (i.e. purchase price and stamp duty) less than it would have been in the absence of tax reform? As a result of paying lower stamp duty than they would have in the absence of tax reform, are home buyers spending less overall on property purchases or buying higher priced properties (i.e. adding the stamp duty saved to their purchasing budget)?
5. Is rental housing more or less affordable than it would have been in the absence of tax reform? Is the increased rates charge being passed through to renters? If so, how much? Are the impacts different at different rental price levels (i.e. rent quintiles)? Has tax reform impacted the supply of rental properties?

To answer these questions, we use a data-intensive econometric approach, where we employ nationwide suburb level data, in order to identify the effects of the ACT tax reform by using the other states and the Northern Territory as control group. For this difference-in-difference analysis we use Corelogic monthly suburb level data from 2009-2019. We also use data from the ABS and the Australian Public Service Commission to control for time-varying state-specific effects. In a separate analysis we use property price data sourced directly from the ACT and NSW governments as an alternative source of information.

1.3 – Structure of this report

This report is structured as follows. In chapter 2, the different methods applied to the first and second part of the report are described in greater detail. Chapter 3 describes and discusses the results from part 1 of the report, which considers the distributional impacts of the ACT Government tax reform. Chapter 4 presents the results and discusses the second part of the report, which focuses on the economic and affordability impacts of the reform. Chapter 5 discusses the overall conclusions from the entire report.

2. Methods

2.1 - Distributional impacts of the ACT Government tax reform (Part 1): A microsimulation model

A full description of the method is in our technical paper, so this paper only outlines the method, data and assumptions; those requiring the technical details are referred to the associated technical paper.

In our analysis, we separate families¹ into low, middle and high-income groups based on the household income per capita. Low-income families have an income in the lowest 40% of

¹ The technical term on the survey we use is “income units”. More than one family can form a household.

incomes in the ACT. Middle-income families are families with incomes in the middle 41-60% income group in the ACT.

Pensioners and fixed-income retirees are families who have at least one person aged from 65 years old or receiving age pension. Female-headed income units include those where the reference person (or the oldest person in the income unit) is female.

We also classify income units by net wealth level, and use net wealth for the deposit constraint (10% of the value of the house is available in liquid assets or net house value for homeowners). This includes financial assets (savings, offset, and superannuation accounts; value of shares and trusts; business value, loans to other people), non-financial assets (property values, value of vehicles) net of liabilities (mortgage, investment, personal and study loans; loan from other people; credit card debt).

For calculating stamp duty, we need to identify families that can buy a house based on their savings and income. We then allocate a suitable house to them based on the family characteristics, and affordability, from the ACT Government's list of sales each year.

We assume that renters will decide to buy an appropriate dwelling instead of renting if all borrowing constraints are met. We assume that all renters purchasing are first home buyers, and that some of these will be purchasing new houses and will be eligible for reduced stamp duty and the First Home Owners Grant (FHOG)². To identify those who may buy a new house, we randomly assign a probability to them based on their age and the probabilities in SIH.

Testing this assumption, we found that about 39% of buyers in our model are first home buyers. This proportion is similar to the proportion of first home buyers amongst recent buyers found in the ABS Survey of Income and Housing (SIH).

For homeowners, we model those who can afford to buy properties for investment (again based on wealth and income levels) or change their residential home (downsizing or upsizing). We randomly assign a probability on the decision of purchasing a property to all eligible homeowners based on the borrowing constraints until the total number of residential properties purchased in each year is reached, and the proportion of homebuyers who are investors across the territory is reached. This is a complex process, and is described further with a flowchart in the technical paper.

Not all home buyers purchase a newly constructed home. The chances of buying a new property are randomly assigned to the group of potential home buyers based on the probability of recent home buyers buying a new house.

Home buyers who meet the borrowing constraints may also benefit from the home buyer concession scheme (HBCS) or pensioner duty concession scheme (PDCS) if they meet eligibility requirements, and these are incorporated in our modelling. There is also a pensioner duty deferral scheme, which we have not taken into account in our modelling due to the low take up of this scheme.

² Other requirements for reduced stamp duty and FHOG were also applied, including income, house value, etc. Stamp duty concession and FHOG for first home buyers was also only available for new houses from 2013 to June 2019, and this has also been incorporated into our modelling. These criteria are described in the technical paper.

For any expenditure data, we have inflated the values using the Consumer Price Index (CPI); and for incomes we have inflated the values using average weekly earnings. We have also inflated house prices for the new policy scenario by using the house price index (HPI), and have provided three sets of results for the old policy scenario.

For modelling what would have happened under the old policy, we consider three scenarios for the effect of the reform on house prices: no change in house prices relative to house price inflation (HPI); an increase of 0.8% per year above HPI; and an increase of 2.1% per year above what it would have been under the old policy (HPI). For the new policy, the base house price increase was the ABS House Price Index (HPI); and the adjustments were made by reducing the price increases for the old policy, so the price increases for the old policy were $HPI \times (1 - 0.008)$ and $HPI \times (1 - 0.021)$. 0.8% is the average reduction in stamp duty as a ratio of the average house price--this price change assumes that the reduction in stamp duty was absorbed in house prices. The 2.1% increase comes from the estimates of part II of this analysis where all other capital cities are the comparator group.

Rates are easier to calculate, as everyone who owns a house pays them and the rates are based on the land value. We have assumed that the value of the land is 46.4 per cent of the house value. We have also calculated land tax and rebates for those with an investment property, based on the land value. Land value was calculated from data on rate payments on the survey.

The steps followed for the model were:

Step 1: Create the synthetic population for the ACT from 2012-13 to 2018-19.

Step 2: Calculate rates, stamp duties and land taxes, including FHOG, HBCS, PDCS and rebates, for the baseline (the tax reform) and the counterfactual (no-tax reform);

Step 3: Identify whether renters and/or homeowners can afford to purchase a property and assign them to home buyers if they can meet borrowing requirements or can afford to buy without a loan. The Federal government regulations on income tax, medicare levy, low-income tax offset (LITO) and low- and middle-income tax offset (LMITO) are also incorporated into our model.

Step 4: Inflate income, savings, land and house values to the next year and repeat Steps 1 to 3 until the financial year of 2018-19 is reached.

Step 5: Calculate what would have happened without tax reform using the pre-tax reform stamp duty and rates.

2.2 - Economic and affordability impacts of the ACT Government tax reform (Part 2): A difference-in-difference econometric analysis

This main report outlines the method, data and assumptions, but is intentionally kept brief. Those requiring more detail on the data or the assumptions and our attempts to verify the validity of the assumptions are referred to the associated technical appendix.

The main challenge when empirically evaluating a given policy is to establish what the outcomes would have looked like in the absence of the new policy. In other words, we would like to observe a counterfactual to measure changes caused by the reform. A parallel universe where we observe the evolution of the housing market in the ACT without the reform, but keeping everything else the same would be perfect. Obviously, we have no such parallel universe that we can observe.

Another option would be another urban area exactly like the ACT where the housing market evolves similarly to the market in the ACT. Unfortunately this is also not available. The large government presence in the ACT and its geographic position make it unlike any other city in Australia. A cursory glance at the housing market over the past 20 years suggests that the ACT does not really behave like other jurisdictions. It has lower volatility in house prices and a noticeably different cycle in property price increases and decreases.

It is thus quite difficult to find a convincing counter-factual/comparison group for the analysis which we undertake. As we are not sure about the best counterfactual for the ACT we use a number of different subsets of the rest of Australia as controls.

Conditional on finding a reasonable counter-factual, a well established method to overcome the issue of not observing a world without the reform is the difference-in-difference estimation approach. The idea behind difference-in-difference estimation is to use another group or geographical area which is not affected by the policy change as the counterfactual to identify the causal impact. The method compares the outcomes for a treatment group (affected by the policy) to the outcomes for a control group (the counterfactual, not affected by the policy).

The difference-in-difference methodology can only be implemented using data where we observe both the treatment and control groups for some time before the policy is implemented, as well as after. The estimation method will then be able to control for specific, persistent differences in the treatment and control groups and any external events that affect both groups over time.

Difference-in-difference estimation works well when the trend over time in the outcomes of the control group would have applied to the treatment group in the absence of the policy.³ Any deviation from that expected outcome is attributed to the policy. Therefore, the second identifying assumption of the difference-in-difference method, is that there are no other policy changes that affect outcomes differently for the treatment and control groups. We will verify in our analysis if these assumptions hold. See the technical appendix.

Applying this methodology to the evaluation of the ACT tax reform we will use the general regression model shown in the following equation:

Equation 1

$$\log(Y)_{s,t} = \beta(\text{reform_dummy})_{s,t} + a_s + b_t + \log(X)_{s,t} \delta + \varepsilon_{s,t}$$

Where Y is the outcome variable of interest. In our analysis Y will be total sales value, property price, property turnover or rental price. On the left hand side, we capture the effect of the

³ This is the so called “common trends” assumption and key to the identification strategy.

ACT reform as β , the coefficient on the treatment dummy. A suburb fixed effect a_s , captures all time-invariant characteristics in a given suburb. The fixed effect variable is 1 for a specific suburb s over all periods and zero otherwise. A time-specific effect, b_t , controls for common shocks to the across jurisdictions affecting both treated and untreated groups. This could be business cycle effects or common changes to federal regulation. The time fixed effects variable is 1 for a specific month t across all suburbs and zero otherwise.

While this generalised difference-in-difference specification can control for group specific effects and common effects over time, it does not control for group specific effect which vary over time. For example, if the ACT experienced disproportionately large immigration, compared to all other states, this might in turn affect the housing market. In order to control for such effects, we might want to use extra state level controls. The variables X_{st} represent such extra controls in the specification.

We use quarterly population data from the ABS⁴ as well as data on States' average annual disposable income from the ABS⁵. We also source annual federal public service employee data by location from the Australian Public Service (APS).⁶ The advantage of adding extra control variables into the regression is two-fold. First, we explain more of the variation in house prices which leads to a more precise estimate of the policy effect. Secondly, if there are differences in the housing markets in different areas which are captured by the control variables, we are less likely to erroneously attribute other changes to the policy. Of course, this would not be true if the evolution of those control variables happened in coincidence with the policy changes. In this latter case, we would not be able to separate the effects of the policy from the effects of the changes in the control variables.

We check for this problem of co-movement between the reform and important control variables with a post-regression analysis of the correlation matrix. The more correlation between the reform variable and any of the added controls, the more difficult it will be to estimate the impact of the reform. Correlation values in excess of 0.55 should give great concern. In the results section we therefore report, for each specification, a measure of the severity of multicollinearity. Since reporting the whole correlation matrix is impractical, we report the largest correlation value from the correlation matrix as an indicator for each regression.

To verify the first assumption of the difference-in-difference specification, the common trends assumption, we test if the pre-treatment trends in the treatment and control groups are similar. A typical way to test this assumption is to estimate a regression for the period before the policy implementation with a time trend specific to the treatment group. If the coefficient on the trend variable is significant it means that there is significant variation between treatment and control groups. In this case, the common trends assumption fails. If we fail to reject that the time trend coefficient is significantly different from zero, we take this

⁴ The population data are taken from ABS Table 3101, accessed via the ABS.Stat Metadata, and contain quarterly estimates of residential population by States. For monthly data analysis, we use the estimated population for a quarter for the three months covering that quarter.

⁵ The disposable income data are taken from ABS Tables 6523.0, which contains annual State level data for the Financial Years 1994-95 through 2018-19 (latest release), although with some gaps. The gaps in the disposable income data are linearly interpolated using the Stata command *ipolate*.

⁶ This data taken from the APS webpage: <https://www.apsc.gov.au/aps-data-release-and-statistical-bulletins>

as support for our assumption of common trends. We discuss test results and limitations in the technical appendix.

Data

The main data we use for the analysis are monthly, suburb-level property sales data from Corelogic. The data capture 3 years before the ACT reform and 7 years after the reform from 2009-2019 thus allowing us to implement a difference-in-difference methodology.

We observe over 10,000 suburbs⁷ across all states and territories in the data for a total of 770,000 suburb-month observations where there was at least one sold property.⁸ The Corelogic data contain, for each property type (Houses or Units), the number of properties sold in the suburb each month and the median sale price for the suburb. The data also contain the median value of advertised weekly rent in each suburb. More details on the Corelogic data and visualizations of the outcome variables over time can be found in the technical appendix.

All suburbs in the ACT belong to the treatment group, which had the tax reform introduced in 2012, all other states and territories are part of the control group. While this approach uses the maximum quantity of available data, it is not clear if the entirety of suburbs Australia-wide outside of the ACT is the appropriate control group. Recall that the control group should be formed from those areas whose property markets evolve similarly to that in the ACT.

Therefore, we also use different subsets of the rest of Australia as alternative control groups in our robustness tests. We use three regional subgroups to form alternative control groups: Australian States and Territories capital cities only; suburbs in the states of New South Wales (NSW) and Victoria (VIC) only; Melbourne and Sydney only. Each of these sets of counterfactuals has fewer and fewer observations, which reduces the precision of the estimates and may negatively impact on our ability to find an effect. Smaller samples also have the potential to worsen the problem of collinearity from the inclusion of other control variables.

We find that the alternative of only including capital city suburbs as a control group is probably best from an a priori, intuitive point of view. The ACT has more in common with these important urban centres than with regional areas in some of Australia's vast states. In the main report we thus present specifications using two control groups: all of Australia and the capital city suburbs only. The technical appendix presents the full set of results for all of the alternative counterfactuals mentioned above.

We also present an overview of the test results of the common trends assumption for the Corelogic data in the technical appendix. Using a statistical test, we are unable to reject common trends. This holds true when we constrain the control group to only capital cities, to only NSW & VIC or a combination of the two and when we include population and income controls. We test this for total sales value, property price, property turnover or rental price. We cannot reject common trends for all three variables.

⁷ Suburb is the smallest geography region in the Australian Standard Geographical Classification (ASGC) geography hierarchy.

⁸ About 2/3 of these are observations on housing sales and 1/3 are unit sales.

There is one further policy change we have to take into account when analysing the data. In September 2017, the ACT Government introduced a new “Barrier Free model”, making the purchase of a home faster and simpler. Prior to the change in policy, stamp duty was payable 12 months after the execution/transaction date. For off-the-plan and land-only transactions, this new policy allowed individuals to defer payment of stamp duty until construction is completed. This has resulted in some property transactions not yet being included in the current extract of stamp duty data. These transactions will only appear in the data once stamp duty is paid.

Because sales are recorded in the official data upon payment of stamp duty, this administrative change produces a one-time drop in the number of currently observed transactions. Readers should keep this in mind when interpreting the results. We also estimate models using only the pre-September 2017 data to check whether this administrative change impacts our estimates. For details see the discussion on differences in data and the extended result tables in the technical appendix.

To answer the question of the effect of the reforms on the supply of rental property, we undertake a time series analysis of ACT rental bond records. While we will not have a control group to identify changes, this approach allows us to look at how the reform affected the number of new rental contracts in the ACT. This type of Before-After (BA) analysis is valid to estimate a treatment effect under certain circumstances. The most important of these is that the trend in rental contracts would have been unchanged in the absence of the change to stamp duty—in other words, there is no other confounding effect on the outcome over the course of the treatment period. More detail can be found in the technical appendix.

We find some inconsistencies in the CoreLogic data which we were unable to resolve after exploration of the data and communication with the CoreLogic team. The ACT administrative data show an increase in sales during the first five years of the reform. The CoreLogic data show no change in sales for the five years after 2012.⁹ This has the potential to impact our results. In particular, we would expect to find a smaller impact on both the number of property sales and the overall sales value using the CoreLogic data.

We thus undertook additional analysis using property price data sourced directly from the ACT and NSW governments. The results is that we find similar results with the administrative data and the Corelogic data. Hence, we do not think the reported differences in the data are driving the results presented below.

3. Results for distributional impacts of the ACT Government tax reform (Part 1)

This section shows the results from the modelling of the tax reform package. The microsimulation method used means that we can simulate the expected impact of the reforms on different groups in the ACT, for example, low and high income families; first home buyers; etc.

⁹ See Figure 6 in the technical appendix.

Table 1 shows the impact of the reform on the number of properties purchased excluding the impact of any price changes (which would impact on the number of properties purchased). It can be seen that the impact is an additional 2,263 properties purchased over the period 2012 – 2018.

Table 1 - The impact of tax reform on the number of residential properties purchased with no price increase, 2012 - 2018

	2012	2013	2014	2015	2016	2017	2018	Total
New tax policy								
Meet income and deposit constraints	11,494	12,569	13,317	14,509	15,822	12,423	9,634	89,768
Old tax policy								
Meet income and deposit constraints	11,163	12,413	13,162	14,220	15,315	11,853	9,379	87,505
Difference (impact of new policy)	331	156	155	289	507	570	255	2,263

Source: Calculations from NATSEM microsimulation model.

However, the change in stamp duty may also have had an impact on the price of houses in the ACT, and as outlined in the method section above, we have taken house price increases of 0.8 per cent and 2.1 per cent per year due to the reform. After taking these price increases into account, the income and deposit constraints will mean that fewer houses will be purchased under the reform. This is shown in Table 2. It can be seen that because of the price increases incorporated in the new policy, the number of properties purchased is slightly higher assuming a 0.8% price increase, although lower than when the price increase for the old policy was the same as the new policy. It was slightly lower with a 2.1% price increase. Overall, incorporating the price increase has increased the number of properties purchased under the old policy, which is consistent with economic theory – the prices would have been lower under the old policy.

Table 2 The impact of tax reform on the number of residential properties purchased, 2012 – 2018

0.8% price effect								
	2012	2013	2014	2015	2016	2017	2018	Total
New tax policy								
Meet income and deposit constraints	11,494	12,569	13,317	14,509	15,822	12,423	9,634	89,768
Old tax policy								
Meet income and deposit constraints	11,364	12,507	13,290	14,322	15,588	12,180	9,503	88,754
Difference (impact of new policy)	130	62	27	187	234	243	131	1,014
2.1% price effect								
	2012	2013	2014	2015	2016	2017	2018	Total
New tax policy								

Meet income and deposit constraints	11,494	12,569	13,317	14,509	15,822	12,423	9,634	89,768
Old tax policy								
Meet income and deposit constraints	11,505	12,803	13,621	14,817	15,840	12,244	9,647	90,477
Difference (impact of new policy)	-11	-234	-304	-308	-18	179	-13	-709

Source: Calculations from NATSEM microsimulation model.

Results for sub-groups of the population

This section shows the results for some sub-groups of the population: first home buyers; low income families; middle income families; pensioners; and families with a female head of household. Other groups are considered in the technical paper, including results for high income groups.

All the groups are not exclusive – ie, a low income renter can also be a pensioner renter. Further, in the tables, a renter is a renter to whom a purchase of a new house has been assigned in the modelling sometime over the period 2012 – 2018.

In our analysis, there was a large difference between the impact on renters who become purchasers; and homeowners who were upsizing or downsizing, or buying an investment property. We have therefore separated these two groups of people.

The results in Table 3 show that the number of residential properties purchased by first home buyers increased by 5.4 per cent due to the new tax system, and more detailed results produced in the technical report show that this was mainly due to the stamp duty changes. Reducing stamp duty has worked in terms of a policy to increase purchases for first home buyers. However, this doesn't take into account any price increases modelled, as outlined in the method section.

For the groups assessed in this report, before the price increase, the group that gained the most in absolute terms over the period 2012 – 2018 was first home buyers, with an increase of 1,758 houses purchased. In terms of percentages, the group that gained the most in terms of percentages were renters where a woman was the head of the household (as reported in the survey). These are usually single parent families, a group with lower incomes, who would benefit from the reduced stamp duty. This group also has low wealth on average.

Once the price changes are taken into account, assuming a 0.8% price increase, the number of purchases under the new tax policy doesn't change (as the HPI is used), and the number of purchases under the old policy increases (as the price increase under the old policy is lower). For the 0.8% price increase scenario, the increase in number of purchasers goes down from 5.4% to 0.1% for first home buyers. For most groups, the increase in number of purchasers between the old and new policies is small.

Under a 2.1% price increase assumption, the number of purchases under the old policy is greater than the number of purchases under the new policy for all groups. This means the price increase has more than offset any increase in purchasers as a result of reduced stamp duty

Table 3 - The impact of tax reform on the number of residential properties purchased by sub-groups, 2012 – 2018

	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
First home buyers	34,601	32,843	1,758	5.4
Low-income homeowner	9,491	9,423	68	0.7
Low-income renter	4,629	4,500	129	2.9
Middle-income homeowner	11,726	11,638	88	0.8
Middle-income renter	11,169	10,830	339	3.1
Pensioner homeowner	5,952	5,887	65	1.1
Pensioner renter	2,397	2,355	42	1.8
Female-headed homeowner	20,246	20,060	186	0.9
Female-headed renter	12,309	11,708	601	5.1
	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
0.8% price change				
First home buyers	34,601	33,794	807	0.1
Low-income homeowner	9,491	9,498	-7	0.0
Low-income renter	4,629	4,554	75	0.0
Middle-income homeowner	11,726	11,687	39	0.2
Middle-income renter	11,169	11,066	103	0.1
Pensioner homeowner	5,952	5,958	-6	0.0
Pensioner renter	2,397	2,397	0	0.0
Female-headed homeowner	20,246	20,193	53	0.1
Female-headed renter	12,309	12,058	251	0.1
	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
2.1% price change				
First home buyers	34,601	35,010	-409	-0.1
Low-income homeowner	9,491	9,658	-167	-0.4
Low-income renter	4,629	4,944	-315	-0.1
Middle-income homeowner	11,726	11,859	-133	-0.5
Middle-income renter	11,169	11,472	-303	-0.2
Pensioner homeowner	5,952	6,059	-107	-0.3

Pensioner renter	2,397	2,397	0	0.0
Female-headed homeowner	20,246	20,426	-180	-0.4
Female-headed renter	12,309	12,746	-437	-0.2

Source: Calculations from NATSEM microsimulation model.

In terms of the change in income, Table 4 shows the amount paid under the new and old policies for stamp duty and rates in the first two columns. So under the new tax policy, a first home buyer will pay on average \$12,137 per year; whereas under the old tax policy without the price increase they were paying \$15,031. For a first home buyer, this will be dominated by stamp duty.

The “Difference” column is the difference between the old and new tax system. If this is negative, then on average families are better off (they are paying less in stamp duty and rates under the new policy). If it is positive, they are worse off.

For homeowners in the table, the number includes any stamp duty if they have purchased a new property; and rates. The impact of stamp duty and rates separately on these sub-groups can be seen in the technical report.

The final 2 columns in Table 4 show the proportion of income spent on stamp duty and rates. For first home buyers, this is 14.13% for the new tax policy, and 18.07% for the old tax policy, so this has decreased under the new tax policy by 3.94 percentage points, mainly due to the reduction in stamp duty.

Introducing price increases means that the stamp duty and rates under the old tax policy decrease, as the house prices are lower compared to the assumption that the house price increases matched the HPI of the new policy. All of the gains and losses are in the same direction, and first home buyers still benefit the most under all the house price increase assumptions. The different house price increase assumptions had little impact on the percentage of income spent on stamp duty and rates – it continues to be highest for pensioner renters at around 22% of income under the new policy, and 28% under the old policy.

**Table 4 - The impact of tax reform on rates and stamp duty paid by sub-group, average
2012 - 2018**

	New Tax Policy \$	Old tax policy \$	Difference \$	New tax policy - % of income spent	Old tax policy - % of income spent	Difference % Points
First home buyers	12,137	15,031	-2,894	14.13	18.07	-3.94
Low-income homeowner	1,741	1,626	115	4.06	3.79	0.27
Low-income renter	6,736	7,930	-1,194	13.76	16.42	-2.66
Middle-income homeowner	3,329	3,387	-58	4.00	4.07	-0.07
Middle-income renter	10,475	13,240	-2,765	15.84	20.22	-4.38
Pensioner homeowner	2,047	1,752	295	3.48	2.98	0.50
Pensioner renter	11,274	14,193	-2,919	22.46	28.02	-5.56
Female-head homeowner	3,093	3,029	64	3.77	3.69	0.08
Female head renter	12,805	16,050	-3,245	15.05	19.42	-4.37
	New Tax Policy \$	Old tax policy \$	Difference \$	New tax policy - % of income spent	Old tax policy - % of income spent	Difference % Points
0.8% price effect						
First home buyers	12,137	15,087	-2,950	14.13	17.96	-3.83
Low-income homeowner	1,741	1,624	117	4.06	3.78	0.27
Low-income renter	6,736	8,081	-1,345	13.76	16.77	-3.01
Middle-income homeowner	3,329	3,370	-41	4.00	4.05	-0.05
Middle-income renter	10,475	13,334	-2,859	15.84	20.31	-4.47
Pensioner homeowner	2,047	1,754	293	3.48	2.98	0.50
Pensioner renter	11,274	14,176	-2,902	22.46	28.24	-5.78
Female-head homeowner	3,093	3,020	73	3.77	3.68	0.09
Female head renter	12,805	16,219	-3,414	15.05	19.33	-4.28
	New Tax Policy \$	Old tax policy \$	Difference \$	New tax policy - % of income spent	Old tax policy - % of income spent	Difference % Points
2.1% price effect						
First home buyers	12,137	14,735	-2,599	14.13	17.52	-3.39
Low-income homeowner	1,741	1,623	118	4.06	3.78	0.28
Low-income renter	6,736	7,566	-830	13.76	15.88	-2.12
Middle-income homeowner	3,329	3,360	-31	4.00	4.04	-0.04
Middle-income renter	10,475	13,240	-2,765	15.84	20.13	-4.29
Pensioner homeowner	2,047	1,749	298	3.48	2.97	0.51
Pensioner renter	11,274	13,944	-2,670	22.46	27.78	-5.32
Female-head homeowner	3,093	3,006	87	3.77	3.66	0.11
Female head renter	12,805	15,739	-2,934	15.05	19.01	-3.96

Source: Calculations from NATSEM microsimulation model.

Results by income quintile

This section provides the results from our modelling by income quintile. The results for the impact on the distribution of rates are shown in Table 5; the stamp duty distribution in Table 6; the number of properties purchased in Table 7; and for the change in terms of incomes is shown in Table 8.

Table 5 shows the distribution of the total rates paid by each income quintile. The figure of 7.95% means that income quintile 1 pays 7.95 per cent of the total rates collected by the ACT Government. This will partly be because rates are only paid by owners, and many families in quintile 1 will be renters, either public or private.

Assuming an equal distribution, the amount in each income quintile would be 20%. It can be seen that the rates are progressive – as incomes increase, the proportion of the total rates paid by each income quintile increases. The new tax policy is more progressive – Q5 has increased their proportion by 2.35 percentage points, while all the other income quintiles have reduced their contribution.

There is also not much difference between the results without the house price increases; and the results with the house price increases.

Table 5 - The impact of tax reform on the general rate distribution (net of rebate) by income quintile, average 2012 – 2018

	New Tax Policy (%)	Old Tax Policy (%)	Difference (% points)
Q1	7.95	8.26	-0.30
Q2	11.66	12.18	-0.52
Q3	18.1	18.86	-0.77
Q4	22.46	23.21	-0.76
Q5	39.83	37.48	2.35
	New Tax Policy (%)	Old Tax Policy (%)	Difference (% points)
			0.8% price effect
Q1	7.95	8.26	-0.30
Q2	11.66	12.18	-0.52
Q3	18.1	18.88	-0.78
Q4	22.46	23.24	-0.78
Q5	39.83	37.46	2.38
	New Tax Policy (%)	Old Tax Policy (%)	Difference (% points)
			2.1% price effect
Q1	7.95	8.25	-0.30
Q2	11.66	12.21	-0.55
Q3	18.1	18.91	-0.81
Q4	22.46	23.22	-0.76
Q5	39.83	37.41	2.43

Source: Calculations from NATSEM microsimulation model.

Table 6 shows the impact of the stamp duty change on different income quintiles. Similar to rates, the stamp duty is progressive – high income people pay proportionately more than low income people. Because stamp duty is only paid when a household sells, the impact on Q1 is very low – they pay only 1.44 per cent of the total stamp duty collected under the new policy, whereas Q5 pays 40 per cent. There is not much difference in the distribution between the old and the new tax policies; and increasing the house price did not have a large impact on the distribution.

Table 6 - The impact of tax reform on the stamp duty distribution (including concession) by income quintile, average 2012 – 2018

	New Tax Policy (%)	Old Tax Policy (%)	Difference (% point)
Q1	1.44	1.48	-0.05
Q2	7.46	7.73	-0.27
Q3	21.36	21.9	-0.53
Q4	29.22	28.83	0.39
Q5	40.52	40.07	0.46
	New Tax Policy (%)	Old Tax Policy (%)	Difference (% point)
			0.8% price effect
Q1	1.44	1.56	-0.13
Q2	7.46	7.68	-0.22
Q3	21.36	21.93	-0.57
Q4	29.22	28.91	0.31
Q5	40.52	39.92	0.61
	New Tax Policy (%)	Old Tax Policy (%)	Difference (% point)
			2.1% price effect
Q1	1.44	1.61	-0.17
Q2	7.46	7.7	-0.25
Q3	21.36	22.2	-0.83
Q4	29.22	28.71	0.51
Q5	40.52	39.77	0.75

Source: Calculations from NATSEM microsimulation model.

It can be seen from Table 7 that with no price increase, middle and high income earners increased their number of purchasers the most, although even low income families increased their purchases of housing by 1.5 per cent.

Once price increases were taken into account, the group most affected were, not surprisingly, the low income groups. House price increases mean that they are excluded from buying housing due to affordability issues, and not meeting the deposit and repayment tests in the model. An increase of 0.8% meant that the number of houses purchased by the low income group decreased by 0.3%, and an increase of 2.1% meant that the lowest 3 income quintiles reduces their purchases, with Q2 reducing the most by 4.1%. High income earners were not as affected, with a reduction in houses purchased of 0.2.

Table 7 - The impact of tax reform on the number of residential properties purchased by income quintile, 2012 – 2018

	New Tax Policy – Number of purchases	Old Tax Policy – Number of purchases	Difference	Difference %
Q1	4,376	4,312	64	1.5
Q2	9,744	9,611	133	1.4
Q3	22,895	22,468	427	1.9
Q4	25,668	24,766	902	3.6
Q5	27,085	26,348	737	2.8
	New Tax Policy – Number of purchases	Old Tax Policy – Number of purchases	Difference	Difference %
			0.8% price effect	
Q1	4,376	4,387	-11	-0.3
Q2	9,744	9,665	79	0.8
Q3	22,895	22,753	142	0.6
Q4	25,668	25,268	400	1.6
Q5	27,085	26,681	404	1.5
	New Tax Policy – Number of purchases	Old Tax Policy – Number of purchases	Difference	Difference %
			2.1% price effect	
Q1	4,376	4,442	-66	-1.5
Q2	9,744	10,160	-416	-4.1
Q3	22,895	23,331	-436	-1.9
Q4	25,668	25,410	258	1.0
Q5	27,085	27,134	-49	-0.2

Source: Calculations from NATSEM microsimulation model.

The amount spent on duty and rates in absolute terms and as a percent of income, by income quintile, is shown in Table 8. It can be seen that low income families spend the least on stamp duty and rates, as identified in Table 5 and Table 6 above, and Table 8 reinforces the progressivity of stamp duty and rates – higher income families are paying more. However, Table 8 also shows that lower income families are spending more on stamp duty and rates as a proportion of their income, and that this is higher under the new tax policy. Under the new tax policy, they are paying 4.69 per cent of their income on rates and stamp duty; whereas under the old system this was 4.08 per cent before including the price effect.

Those in income quintile Q3 and Q4 benefit from the new tax system, paying \$209 (Q3) and \$195 (Q4) less in rates and stamp duty.

The impact of house price changes on the rates and stamp duty paid by income quintile is not large.

Table 8 - The impact of tax reform on rates and stamp duty paid by income quintile, average 2012 – 2018

	New Tax Policy \$	Old Tax Policy \$	Difference \$	New Tax Policy - % of income spent	Old Tax Policy - % of income spent	Difference % Points
Q1	1,224	1,066	158	4.69	4.08	0.61
Q2	2,434	2,405	29	4.07	4.03	0.05
Q3	3,807	4,016	-209	4.64	4.9	-0.25
Q4	4,860	5,055	-195	4.37	4.55	-0.18
Q5	6,222	6,069	153	3.86	3.77	0.09
0.8% price effect						
Q1	1,224	1,075	149	4.69	4.12	0.57
Q2	2,434	2,398	36	4.07	4.02	0.06
Q3	3,807	4,021	-213	4.64	4.9	-0.26
Q4	4,860	5,062	-202	4.37	4.55	-0.18
Q5	6,222	6,055	167	3.86	3.76	0.10
2.1% price effect						
Q1	1,224	1,077	148	4.69	4.13	0.57
Q2	2,434	2,387	46	4.07	4.00	0.07
Q3	3,807	4,025	-218	4.64	4.91	-0.27
Q4	4,860	5,011	-151	4.37	4.51	-0.14
Q5	6,222	6,002	220	3.86	3.72	0.13

Source: Calculations from NATSEM microsimulation model.

Results by wealth quintile

This section provides the results from our modelling by wealth quintile. The results for the change in the number of properties purchased is shown in Table 9; and the result on change in incomes is shown in Table 10.

It can be seen that there are very few transactions for low wealth households, possibly due to the wealth test applied in the model. Most of the transactions are in wealth quintile 5, and the number of transactions under the new tax policy has increased for all wealth levels, probably due to the lower stamp duty.

The increase in house prices due to the new policy had a large impact on the number of properties purchased in all wealth quintiles except the first, where there was no difference, probably due to the small number of purchasers in this group. Across all the other wealth quintiles, the number of purchases was higher under the old policy, and increasing as the

price increased. At the highest house price increase, the number of purchases under the old policy was more than under the new policy for Q2 wealth and Q5 wealth, suggesting that the benefit of the reduction in stamp duty in increasing purchases for these groups had been more than offset by the reduction in purchases as a result of the price increase.

Table 9 - The impact of tax reform on the number of residential properties purchased by wealth quintile, 2012 – 2018

	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
Q1	92	92	0	0
Q2	20,849	19,486	1,363	7
Q3	21,697	21,318	379	1.8
Q4	22,840	22,450	390	1.7
Q5	24,290	24,159	131	0.5
	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
			0.8% price effect	
Q1	92	92	0	0.0
Q2	20,849	20,083	766	3.8
Q3	21,697	21,488	209	1.0
Q4	22,840	22,680	160	0.7
Q5	24,290	24,411	-121	-0.5
	New Tax Policy – Number of purchases	Old tax policy – Number of purchases	Difference	Difference %
			2.1% price effect	
Q1	92	185	-93	-50.3
Q2	20,849	21,058	-209	-1.0
Q3	21,697	21,650	47	0.2
Q4	22,840	22,788	52	0.2
Q5	24,290	24,796	-506	-2.0

Source: Calculations from NATSEM microsimulation model.

Table 10 shows the impact of tax reform on rates and stamp duty paid by wealth quintile. Low wealth families are worse off by \$155, possibly due to higher rates. High wealth families are also worse off by \$326 a year on average, possibly due higher rates paid on more expensive houses. The change in house prices had little impact on this indicator.

Table 10 - The impact of tax reform on rates and stamp duty paid by wealth quintile, average 2012 – 2018

	New Tax Policy \$	Old Tax Policy \$	Difference \$	New Tax Policy - % Change in income	Old Tax Policy - % Change in income	Difference
Q1	1,249	1,094	155	1.64	1.44	0.20
Q2	3,965	4,255	-290	4.91	5.32	-0.41
Q3	3,282	3,536	-254	3.51	3.78	-0.27
Q4	3,597	3,759	-162	3.89	4.07	-0.18
Q5	4,951	4,625	326	4.69	4.38	0.31
	New Tax Policy \$	Old Tax Policy \$	Difference \$	New Tax Policy - % Change in income	Old Tax Policy - % Change in income	Difference
0.8% price effect						
Q1	1,249	1,090	160	1.64	1.43	0.21
Q2	3,965	4,373	-408	4.91	5.45	-0.53
Q3	3,282	3,522	-240	3.51	3.77	-0.26
Q4	3,597	3,752	-155	3.89	4.06	-0.17
Q5	4,951	4,618	334	4.69	4.38	0.31
	New Tax Policy \$	Old Tax Policy \$	Difference \$	New Tax Policy - % Change in income	Old Tax Policy - % Change in income	Difference
2.1% price effect						
Q1	1,249	1,087	162	1.64	1.44	0.20
Q2	3,965	4,340	-375	4.91	5.42	-0.51
Q3	3,282	3,496	-214	3.51	3.74	-0.23
Q4	3,597	3,717	-120	3.89	4.02	-0.13
Q5	4,951	4,602	349	4.69	4.36	0.33

Source: Calculations from NATSEM microsimulation model.

Discussion

This work has shown that the new tax system in the ACT, before taking into account house price increases, can be expected to benefit all the groups we looked at by increasing the number of sales; and for most of the disadvantaged sub-groups of the population we looked at, a lower proportion of their income was being spent on stamp duty and rates over the period 2012 – 2018. Exceptions to this were some of the homeowners, who wouldn't benefit from the reduced stamp duty; but the increase in all cases was less than 0.5 percentage points of their income.

Both before and after taking into account house price increases, the new tax system shows greater progressivity than the old system, in that low income families were paying less on stamp duty and rates as a proportion of the total stamp duty and rates paid under the new system compared to the old system. For rates, the highest income quintile was the only quintile paying more as a proportion of their income; and for stamp duty, the second two highest income quintiles were paying more, while the lowest three income quintiles were paying less. Generally under the new system, lower income (Q1 and Q2) families and high income families (Q5) are slightly worse off; while middle income families, who are probably benefitting from the stamp duty decreases, are better off.

When looking at wealth quintiles, the lowest wealth (Q1) and the highest wealth (Q5) are worse off after tax reform; and the middle three wealth quintiles are better off. This is probably because the lowest wealth quintile will not be benefitting from the lower stamp duties under the new system when they sell; and the highest wealth quintile will experience the greatest impact from the rates changes.

After taking into account house price increases due to the new tax system, a slightly different picture emerges. If house prices increase by 0.8% due to the new policy, the number of total purchases halves while under a 2.1% price increase the number of purchases goes down rather than up – so the reduced demand due to the increased price has more than offset any benefit of the stamp duty reduction. The price increase of 0.8% reduced the purchases of the lowest quintile by 0.3%, while the 2.1% price increase will reduce the purchases of the second lowest quintile the most by 4.1%. Essentially a higher house price increase means that fewer low income families can afford to buy under the new system, and the old system would have been better for them.

Given the calculated house price increase under the new system, our analysis finds that there are nearly 409 first home buyers who aren't buying a home under a 2.1% price increase, and 437 female headed renters. However, the first home buyers still increase purchases by 807 houses if the price increase is 0.8%. This result for first home buyers is mainly driven by the deposit and income requirements we have used in the model. While these two groups were the most affected by the price increase, all other sub-groups also experienced decreased sales; and most of the income quintiles and wealth quintiles. This is consistent with the analysis of part two where we find that the reform is associated with lower sales numbers.

With the house price change, all homeowners have more spending on housing, possibly because of higher rates, and the stamp duty being paid on a much more expensive house if they are upsizing or downsizing; and all renters are better off, probably because they are not paying rates (unless they purchase that year). However, their house values are also increased.

4. Results for economic and affordability impacts of the ACT tax reform (Part 2)

This section provides the results from the econometric analysis of the effect of the tax reform on several different outcome variables. The difference-in-difference method used, if all assumptions hold, gives us an estimate of the impact of the reform on economic effects and

housing affordability in the ACT, for example, how house prices change; if rental prices go up; etc.

Results for the effect on the economy

Here we provide our findings for the effects on the economy. We use the overall sales value, the sum of all property sales, as a measure for the part of the economy which is most likely going to be affected by the ACT reform. Table 11 shows the results for the overall sales of both houses and units. In Table 12 and Table 13 we explore whether there is any trend in the effects of the reform—we ask whether the effects are growing or shrinking over time.

Table 11 - Effect of the tax reform on the housing market - estimations in logs

Log(Sales Value)	(1)	(2)	(3)	(4)	(5)	(6)
	Houses			Units		
	Full Sample	Full Sample	Capital Cities	Full Sample	Full Sample	Capital Cities
Reform Dummy	-0.103 [0.021]**	0.031 [0.022]	-0.055 [0.022]*	-0.396 [0.028]**	-0.222 [0.031]**	-0.274 [0.031]**
Log(Income)		3.102 [0.080]**	3.053 [0.108]**		3.414 [0.160]**	3.351 [0.185]**
Log(Population)		3.129 [0.128]**	3.961 [0.184]**		2.479 [0.222]**	3.216 [0.276]**
Time & Suburb FE	YES	YES	YES	YES	YES	YES
Observations	543,443	515,524	234,695	219,559	208,943	137,577
Number of Suburbs	10,116	10,045	2,806	3,799	3,781	2,112
Adj. R-squared	0.78	0.79	0.74	0.76	0.77	0.77
Max in Cor. Matrix	.	0.25	0.26	.	0.34	0.35

* $p < 0.05$; ** $p < 0.01$

Table 11 shows the effect on the ACT property market. The first 3 columns show the results for houses; the last 3 columns the results for units. In column 1 we see the results of a regression of the sales value on time and suburb fixed effect and the reform dummy. We find a coefficient on the reform of -0.1 which is equivalent to a 10% decrease.

Once we add the controls for population and income in column 2 the effect becomes small and insignificant. Adding in extra controls for income and population lowers the reform dummy coefficient but leads only to moderate correlation between the covariates and the reform variable

In column 3 we reduced the sample to the states and territories capital cities, effectively using an alternative control group as a robustness check. The coefficient suggests a reform effect of -5%.

The results for units in the second half of Table 11 show a larger effect. Similar to the housing market, when we include controls in column 5 and 6 we see a reduction in the size of the

effect. Columns 5 and 6 suggest a reduction of the unit sales value due to the reform of 20% to 24%¹⁰.

Table 12 and Table 13 each contain two different approaches to see how the effect of the reform on the volume of sales changes over time. The first 3 columns are equivalent to Table 11 but with a time trend added to measure if there is a reform trend. In the second half of the tables we look at shorter reform periods to see how the effect treks over time.

Table 12 - Trend in the effect of the tax reform on the housing market - estimations in logs

Log(Sales Volume)	(1) Reform Trend	(2) Trend & Controls	(3) Trend & Capital Cities	(4) Sample till 2015	(5) Sample till 2017	(6) Full Sample
Reform Dummy	-0.125 [0.025]**	-0.013 [0.025]	-0.078 [0.026]**	0.013 [0.020]	0.019 [0.021]	0.031 [0.022]
Reform Trend	0.005 [0.006]	0.010 [0.006]*	0.005 [0.006]			
Log(Income)		3.108 [0.080]**	3.059 [0.108]**	2.606 [0.081]**	2.928 [0.080]**	3.102 [0.080]**
Log(Population)		3.115 [0.129]**	3.945 [0.185]**	1.022 [0.174]**	2.878 [0.140]**	3.129 [0.128]**
Time & Suburb FE	YES	YES	YES	YES	YES	YES
Observations	543,443	515,524	234,695	339,387	457,063	515,524
Number of Suburbs	10,116	10,045	2,806	9,343	9,848	10,045
Adj. R-squared	0.78	0.79	0.74	0.79	0.79	0.79
Max in Cor. Matrix	0.64	0.63	0.63	0.41	0.26	0.25

* $p < 0.05$; ** $p < 0.01$

When introducing a reform time trend in Table 12 to the basic specifications from Table 11 we observe strong multicollinearity with the maximum of the correlation matrix going up to 0.64. This is expected as the dummy and time trend are very similar, both covering the reform period. This collinearity is less of a concern since we are not interested in the magnitude of the reform dummy coefficient as much as in the direction of the trend. But it does mean that the trend coefficient and the reform impact coefficient cannot be interpreted individually. The results in Table 12 suggest a positive, and in column (2), a significant effect.

Supporting these findings, the second half of Table 12 shows an increasing reform dummy coefficient over time.

¹⁰ The exact elasticity of a dummy variable coefficient in a log-log specification can be calculated as $e^{-0.274} - 1 = -0.24$ which for small coefficients is close to the original value but with larger absolute coefficients this the difference will not be negligible.

Table 13. Trend in the effect of the tax reform on the unit market - estimations in logs

Log(Sales Volume)	(1)	(2)	(3)	(4)	(5)	(6)
	Reform Trend	Trend & Controls	Trend & Capital Cities	Sample till 2015	Sample till 2017	Full Sample
Reform Dummy	-0.333 [0.049]**	-0.174 [0.050]**	-0.245 [0.050]**	-0.269 [0.036]**	-0.270 [0.031]**	-0.222 [0.031]**
Reform Trend	-0.014 [0.008]	-0.012 [0.009]	-0.007 [0.009]			
Log(Income)		3.399 [0.161]**	3.337 [0.187]**	2.369 [0.171]**	3.181 [0.161]**	3.414 [0.160]**
Log(Population)		2.504 [0.223]**	3.238 [0.278]**	2.252 [0.343]**	3.673 [0.258]**	2.479 [0.222]**
Time & Suburb FE	YES	YES	YES	YES	YES	.
Observations	219,559	208,943	137,577	139,698	186,907	208,943
Number of Suburbs	3,799	3,781	2,112	3,601	3,740	3,781
Adj. R-squared	0.76	0.77	0.77	0.77	0.77	0.77
Max in Cor. Matrix	0.81	0.78	0.77	0.41	0.33	0.34

* $p < 0.05$; ** $p < 0.01$

Table 13 shows no significance on the reform trend. The second half of the table shows a suggestive decrease in the negative reform coefficient over time.

Tables 12 and 13 use all of Australia as the control group. If instead we use capital cities as the control group we find results similar to columns (3) and (6) with a statistically insignificant trend variable. There is no clear trend over time when we estimate over shorter time periods.

Results for the effect on property prices

This section provides the results for the reform effects on property prices. Table 14 shows the results for both houses and unit prices.

There is no significant effect of the reform on house prices in column 1 of Table 14. When we add the population and income controls we find a 9% house price increase as a result of the reform. Moving to capital cities as our control group in column 3 the effect goes down to 2% and becomes just statistically insignificant. Multicollinearity is not a problem.

Table 14 - Effect of the tax reform on property prices - estimations in logs

Log(House Price)	(1)	(2)	(3)	(4)	(5)	(6)
		Houses			Units	
	Full Sample	Full Sample	Capital Cities	Full Sample	Full Sample	Capital Cities
Reform Dummy	-0.008 [0.013]	0.094 [0.013]**	0.021 [0.013]	-0.110 [0.008]**	0.044 [0.010]**	0.002 [0.009]
Log(Population)		1.910 [0.067]**	2.568 [0.086]**		0.965 [0.112]**	1.041 [0.143]**
Log(Income)		2.267	2.324		2.608	2.508

		[0.050]**	[0.047]**		[0.092]**	[0.076]**
Time & Suburb FE	YES	YES	YES	YES	YES	YES
Observations	543,443	515,524	234,695	219,559	208,943	137,577
Number of Suburbs	10,116	10,045	2,806	3,799	3,781	2,112
Adj. R-squared	0.75	0.76	0.81	0.67	0.68	0.69
Max in Cor. Matrix	.	0.21	0.11	.	0.19	0.44

* $p < 0.05$; ** $p < 0.01$

When looking at unit prices in the second half of Table 14, we observe in the most basic regression of column 1 a negative effect, this turns into a positive effect of 4% once we add controls to the specification. The effect is eliminated in column 6 when we restrict the sample to capital cities; we do however, observe an increase in our collinearity measure.

Results for the effect on the numbers of properties sold

This section presents the results for the sales volume for houses and units in Table 15.

Table 15 - Effect of the tax reform on the number of property sales - estimations in logs

Log(Number Sold)	(1)	(2)	(3)	(4)	(5)	(6)
		Houses		Units		
	Full Sample	Full Sample	Capital Cities	Full Sample	Full Sample	Capital Cities
Reform Dummy	-0.096 [0.029]**	-0.062 [0.028]*	-0.075 [0.028]**	-0.285 [0.027]**	-0.265 [0.029]**	-0.275 [0.030]**
Log(Population)		1.225 [0.108]**	1.414 [0.168]**		1.516 [0.185]**	2.174 [0.238]**
Log(Income)		0.854 [0.069]**	0.769 [0.105]**		0.810 [0.138]**	0.848 [0.172]**
Time & Suburb FE	YES	YES	YES	YES	YES	YES
Observations	550,554	522,180	241,061	220,220	209,572	138,177
Number of Suburbs	10,117	10,046	2,806	3,799	3,781	2,112
Adj. R-squared	0.76	0.77	0.74	0.74	0.74	0.75
Max in Cor. Matrix	.	0.11	0.15	.	0.29	0.33

* $p < 0.05$; ** $p < 0.01$

We find a consistently negative and significant effect of the reform on the number of house sales in columns 1 through 3 of Table 15. Adding extra controls reduces the effect to -6% while the control group of capital cities shows a treatment effect of -7%. Multicollinearity is not a problem.

The effect on unit sales is larger, with controls added in columns 5 and only capital cities as controls in column 6 the effect is between -23% and -24%.

Results for housing affordability

The section considers how affordable rental properties are after the reform. Table 16 shows the effect on rental prices; Table 17 and Table 18 look at the distributional effect on rental prices; Table 19 analyses the number of new rental contracts.

In the basic regression in column 1 of Table 16 we find an effect of the reform on rental prices of -7%. In column 2, after adding in population and income controls, the effect reduces to -1% and becomes statistically insignificant. In column 3 with the sample reduced to capital cities the we find an effect of -2.5%.

A similar picture emerges for unit rental prices. The reform reduces prices, by around 8% according to columns 5 and 6 of Table 16.

Table 16 - Tax reform effect on rental prices - estimations in logs

Log(Median Rent)	(1)	(2)	(3)	(4)	(5)	(6)
	Houses			Units		
	Full Sample	Full Sample	Capital Cities	Full Sample	Full Sample	Capital Cities
Reform Dummy	-0.077 [0.006]**	-0.014 [0.008]	-0.026 [0.007]**	-0.166 [0.011]**	-0.082 [0.013]**	-0.084 [0.012]**
Log(Income)		1.505 [0.057]**	1.471 [0.029]**		1.516 [0.074]**	1.464 [0.048]**
Log(Population)		1.121 [0.061]**	1.344 [0.070]**		1.231 [0.099]**	1.227 [0.110]**
Time & Suburb FE	YES	YES	YES	YES	YES	YES
Observations	263,249	248,629	153,750	134,234	126,901	90,643
Number of Suburbs	3,435	3,420	1,988	2,012	1,998	1,297
Adj. R-squared	0.91	0.92	0.95	0.90	0.91	0.93
Max in Cor. Matrix	.	0.52	0.23	.	0.41	0.26

* $p < 0.05$; ** $p < 0.01$

For the regressions in Table 17 and Table 18 we have split the sample for each state and territory into quintiles according to the suburb's rental prices at the start of the reform. We then split the sample according to those quintiles and run individual regression for each rent quintile to see how the effects of the reform differ across the rental market.

The results suggest that the reform led to a reduction of up to 7% in house rental prices for the first 4 rental quintiles. By contrast, the reform led to an increase in house rental prices at the upper end of the distribution (the 5th quintile) by close to 9%.

Table 17 - Tax reform effect on house rental prices - quantile estimations in logs

Log(Median Rent)	(1)	(2)	(3)	(4)	(5)
	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile

Reform Dummy	-0.060 [0.014]**	-0.011 [0.013]	-0.039 [0.010]**	-0.065 [0.023]**	0.087 [0.021]**
Log(Income)	0.680 [0.085]**	1.202 [0.061]**	1.308 [0.064]**	1.328 [0.073]**	2.841 [0.214]**
Log(Population)	0.782 [0.147]**	0.855 [0.115]**	1.011 [0.118]**	1.365 [0.151]**	1.022 [0.161]**
Time & Suburb FE	YES	YES	YES	YES	YES
Observations	40,308	42,221	42,534	41,947	45,438
Number of Suburbs	438	434	445	441	499
Adj. R-squared	0.82	0.81	0.82	0.87	0.87

* $p < 0.05$; ** $p < 0.01$

The unit rental prices distribution in Table 18 show a very similar picture. There is a large reduction in rental prices at the lower end of the distribution (13%), narrowing to about 5% in the 4th quintile. However, there is no significant effect of the reform on unit rental prices in the highest quintile.

Table 18. Tax reform effect on unit rental prices - quintile estimations in logs

Log(Median Rent)	(1) 1st Quintile	(2) 2nd Quintile	(3) 3rd Quintile	(4) 4th Quintile	(5) 5th Quintile
Reform Dummy	-0.130 [0.037]**	-0.119 [0.023]**	-0.118 [0.017]**	-0.047 [0.018]**	0.026 [0.017]
Log(Income)	1.048 [0.140]**	1.118 [0.105]**	1.423 [0.128]**	1.405 [0.126]**	2.242 [0.205]**
Log(Population)	1.289 [0.237]**	1.222 [0.233]**	0.741 [0.236]**	0.766 [0.218]**	1.117 [0.241]**
Time & Suburb FE	YES	YES	YES	YES	YES
Observations	18,335	21,124	19,485	20,262	21,355
Number of Suburbs	216	228	203	212	218
Adj. R-squared	0.85	0.80	0.86	0.89	0.85

* $p < 0.05$; ** $p < 0.01$

It may seem counter-intuitive that rental prices have gone down while rates have been going up. One might expect at least some of the rates increase to be passed on to tenants in the form of higher rents. One possible scenario relating to the reform is that people may have chosen to rent their properties rather than sell them in response to the stamp duty reform. They could, reasonably, believe that they will get a better price for their house once stamp duty is completely eliminated and while they wait for this, they may rent their property.

We think a more likely explanation is some other factor which is affecting supply in the ACT differently than elsewhere in Australia. While we can not reject the failure of common trends, Figure 3 in the Technical Appendix suggests that the patterns of unit rental prices in 2012-2016 was very different in the ACT than in other parts of Australia (with the possible exception of Tasmania). The difference-in-difference approach may not be well suited to this question.

Table 19 presents the results of a time series analysis with the number of registered rental bonds as the dependent variable. We use monthly fixed effects and a linear trend as basic controls for an existing trend and seasonality.

In column 1 we only include the reform dummy to measure the effect.¹¹ It will capture a general shift in the number of new rentals after the reform commenced. In column 2 and 3 we add a number of extra controls and in column 4 we introduce a reform trend.¹² It captures any change in trend after the reform.

Throughout the specifications, the reform dummy coefficient remains large and significant. The reform's variance inflation factor (VIF) indicates that we do not have to be overly concerned with multicollinearity. The reform coefficient suggests that more than 200 additional rental properties are available on the market each month due to the reform.

Note that this time series analysis is only looking at how the supply of rental properties changes over this time period and attributing any change in the trend to the stamp duty reform. Any other confounding factors could cause a spurious association and would lead to an erroneous conclusion. This methodology is subject to strong caveats than the difference-in-difference estimation used previously in this section of the report. See the discussion in the methods section above and in the technical appendix.

Table 19 - Effect of the tax reform on number of new rentals - time series analysis

VARIABLES	(1) Number of Bonds	(2) Number of Bonds	(3) Number of Bonds	(4) Number of Bonds
Reform Dummy	238.243*** [81.560]	208.141*** [78.420]	225.237*** [60.706]	223.037*** [63.084]
Reform Trend				2.755 [10.287]
APS Employment		0.010* [0.006]	0.023** [0.009]	0.032 [0.038]
Income			-1.328 [1.986]	-1.570 [2.510]
Population			-0.069 [0.052]	-0.074 [0.047]
Linear Trend	0.184 [1.318]	0.771 [1.231]	39.659 [31.580]	41.008 [29.857]
Month FX	YES	YES	YES	YES
Observations	143	143	132	132
R-squared	0.366	0.371	0.517	0.517
Reform VIF	3.4	3.7	4.3	4.4

Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, Constant not reported

¹¹ The reform dummy is a variable which is one for all months after the start of the reform and zero before.

¹² The reform trend is a trend variable that starts with the introduction of the reform and is zero in the months prior to the reform.

Discussion

Taking these results at face value, they show that the new tax system in the ACT has modestly increased property prices and reduced overall sale numbers. Consequently, this has reduced the economic size of the housing market slightly. We will discuss the limitations and caveats of these results in this section. We start by summarizing the findings of the previous section in more detail.

Looking at the economic effect of the reform on the housing market, we find evidence of a small reduction in the value of total sales (the sum of the value of all sales) ranging from no effect to about 5% (depending on the specification). In the unit market total sales decreased by about 20% to 24%. We find similar effects for the number of sales. The number of house sales declined by 6 to 7% and unit sales decreased by 23% to 24%. The factors driving the reduction in the number of sales also influence the effects on the overall property market.

Our results suggest that property prices have not decreased due to the reform. House prices increased by up to 9% due to the reform, unit prices increased by up to 4%. This suggests that the increase in property prices has likely not improved housing affordability for prospective property owners, despite the reductions in stamp duty.

We would expect the elimination of stamp duty to lift prices for purely mechanical reasons. Pre-reform prices are not inclusive of stamp duty. When stamp duty is removed, the removal of the tax wedge would lead buyers to pay a higher ex-tax price and sellers to receive a higher ex-tax price. This mechanical effect is probably around 0.8 per cent at median house prices given the reduction in stamp duties for those houses and the fact that most, if not all, of the tax incidence in Australia lies with the seller¹³.

We may expect additional house price increases if buyers take the entire savings from stamp duty and use it to spend more money on a property. This would have the effect of buyers purchasing more expensive houses and could also push prices up for all buyers.

The even higher increase in prices, observed in some specifications, might make sense when we think about credit constraints in the property market. If some banks treat the cost for the house differently and separately to the cost of the stamp duty, then these amounts are not fully fungible. A prospective property buyer will only need to come up with the minimum deposit proportion of a higher house price and therefore, with the stamp duty reductions, has now the opportunity to use the saved tax amount to buy a proportionally much more expensive house. While this could lead to house price increases of 9 per cent, that number seems to be at the very upper limit of what is conceivable. In the modelling of Part I above, we use the 2.1 per cent increase which we estimate when comparing Canberra to the control group of capital cities. These cities have more in common with Canberra than regional Australia. We also model the effect of the 0.8 per cent mechanical effect.

Rental affordability however, has improved with the reform. For both units and houses, rental prices have decreased with the introduction of the reform. The effect is smaller for houses than for units, but the overall results suggests that increased rates (due to the reform) are not being passed through to renters. Furthermore, we find evidence for a progressive

¹³ See Davidoff and Leigh (2013) *Economic Record*, 89(286): 396-410. For the purely mechanical effect, free of any behavioural adjustments, we assume that at least 80% of the tax incidence lies with the sellers.

reduction in rental prices across the rental market distribution. There is a larger reduction in rental property prices in the lower quintiles relative to the upper end of the rental market.

We also checked to see whether the reforms created a large, one-off impact that has gradually diminished over time or whether the impact of the reforms is increasing over time. For the time period that we can observe, it appears that the effect of the reform has been gradually increasing over time.

These results should be interpreted with caution. Whenever a difference-in-difference analysis is applied to the real world, as opposed to an experimental setting, we have to question the validity of our two assumptions.

While we test for the common trends assumption in our data, failing to reject the parallel trends test in the pre-treatment period is not the same as confirming parallel trends in the counterfactual. In this case, we merely fail to reject the null hypothesis of parallel trends. In other words, while we check the assumption, it is still possible that neither of our four proposed controls groups is suitable. This is a possible limitation for all empirical analyses of this kind.

Of equal importance is the second assumption of our methodology: that no other changes or policies were introduced which would affect the outcomes of the treatment and control groups differently. There are many ways this could be violated in the seven-year treatment period. We control for some likely candidates specific to the ACT : a special immigration trend, a unique income development, or changes in federal government employment. However, other ACT specific factors, which vary over time, but have nothing to do with the reform, could also influence the outcome variables. If such factors exist they are not accounted for in the results. As such, we cannot exclude the possibility that the reform dummy is also capturing some other omitted factors which would influence the results. This is a typical limitation for any kind of empirical analysis.

A further concern were differences in the trends of property sale data available through Corelogic and the ACT's administrative data. The ACT unit record data shows a gradual increase in sales following the first 5 years of the reform, before the introduction of the "Barrier Free" administrative changes discussed in the data section above leads to a one time drop in recorded sales numbers. By contrast to the administrative data, our Corelogic data does not show an increase in sales after 2012 but rather a flat trend over the same period. This could have contributed to our finding of a reduction effect in number of sales and overall sales value¹⁴. As a consequence, in additional analysis, we use ACT administrative data and similar administrative data from NSW and re-estimate the effect of the reforms on sales values, sales volumes and prices separately for houses and units.

The results from the NSW and ACT administrative data show that observed difference in the Corelogic data are not driving the results. In particular we find similar negative effects on sales value and sales volume, with even larger coefficient estimates. Similar to the Corelogic regressions above, the results are not stable and the impact estimate changes substantially as we add additional control variables. These results are thus unreliable for identifying the exact effect. However, we can make similar broad conclusions with respect to the number of

¹⁴ The overall sales value is calculated on the basis of number of sales times price.

sales and sales value, which have not gone up as a result of the reform. For prices we either get implausibly large negative values or values close to zero, depending upon the specification. The fact that the results vary so extremely from one specification to another could be caused by multicollinearity between the reform variable and the added controls. This confirms and strengthens our concern about the reliability of our price effect estimates we have found with the Corelogic data. We can only conclude that our estimates vary too much to be reliable. See the technical appendix for all details on the administrative data estimates.

Finally, when looking at new rental contracts we find that the reform led to a large increase of available rental properties, but relying on a time series analysis means we no longer have a counterfactual and cannot control for common shocks the way we have done in the rest of the analysis. Specifically, any changes to the trend in the supply of rental properties caused by any other factors that changed since 2012-2013 will be incorporated in this estimate. The change in the number of rental properties may well have been driven by some other factor and not by the reform of stamp duty. This should caution us from relying too heavily on these results.

Overall, the difference-in-difference approach to estimate the effect of the reform was problematic. The difficulty in finding a convincing control group appears to be a substantial one. The fact that the impact estimates change substantially when we use different control groups or different sets of covariates hint that the estimates are not robust to alternative control groups or alternative data source. The estimates seem to be driven more by the control group choice than by the territory's tax reform. We thus strongly encourage readers to interpret and apply these results cautiously.

5. Conclusions

The questions that we set out to answer were:

1. What has been the impact of tax reform on different household types and cohorts, taking into account available concessions and deferral programs?

After taking into account all concessions and deferral programs available, and ignoring the estimated price increase due to the reform, tax reform can be expected to increase property turnover; and can be expected to reduce the amount paid for stamp duty and rates for most groups of vulnerable families in the ACT. Both the rates and stamp duty have been shown to be more progressive under the new tax system, in that low income families are paying slightly less of the total rates and stamp duty; and high income families are paying slightly more (Table 5 and Table 6).

In terms of income groups, before the modelled house price increases were incorporated, low income families can be expected to pay slightly more of their incomes on rate and stamp duty, while middle income groups are paying less, possibly because these groups are benefitting from the lower stamp duty, which the lower income groups aren't. Similarly, low wealth families experience slightly lower incomes under the new tax system, possibly because they aren't benefitting from the lower stamp duty, while middle wealth families benefit from it.

Once the modelled house price increases are incorporated into the model, first home buyers and renters can still be expected to benefit from the new tax system. The progressivity of the new rates and stamp duty is still apparent with the house price increase.

2. What has been the impact of tax reform on the progressivity and equity of the ACT tax system, considering the incidence of property purchases by households at different income and wealth?

Looking at the results by income quintiles, we show that both the rates and stamp duty in the new tax system are more progressive (Table 5 and Table 6), with lower income families paying less of the tax take under the new system compared to the old. This was the same before and after the house price increases were incorporated.

In terms of access to housing, the best case scenario is that the new tax system has meant greater access and increased sales for low to middle income and mid wealth families, although it hasn't had an impact on low wealth families getting into housing.

However, the worst-case scenario is that the price increase modelled under the new tax system has meant that there has been inequitable access to housing for first home buyers, and middle income earners (Q2 – Q3) and middle wealth (Q2 – Q3) families.

3. How has tax reform affected the alignment of residential property taxation with ability to pay, taking account relevant related factors including changes in land values and land use by household income level and household wealth level?

This question can be answered in expectation through the model because the ability to pay for a house (both the income and wealth test) is modelled. The overall results suggest that tax reform can be expected to result in improved ability to pay for a house for low income and mid wealth families, as a greater number of them have been modelled as being able to buy. Low wealth families are still negatively affected by the deposit requirement to buy a house.

The above results are for a “no housing price change” scenario. Assuming house price increases results in a reduction in the number of houses purchased by all income and wealth families.

4. Is there any evidence that higher annual general rates (in place of higher stamp duty) have impacted welfare or behaviour?

When considering welfare, the impact of rates on the incomes of low income families has reduced under the new tax system, suggesting an increase in welfare of these families. This impact was greater than the impact of stamp duty on low income families. Reducing stamp duty under the new tax policy has meant that some of the stamp duty paid under the original tax system can now be used for a deposit. Our modelling showed that this has had a positive impact on purchasing ability, particularly for first home buyers. This was before the house price increase was incorporated.

It is difficult to identify an impact on behaviour, and the simulation model used to address this question does not include behavioural effects, but we can say that the house price increase led to a large change in our model, as a large number of families could no longer

purchase a higher priced house due to the income and deposit requirements. So the income and deposit rules applied by banks to provide loans are highly sensitive to house prices, and this may impact behaviour in terms of families not purchasing; or purchasing elsewhere.

We would suggest that while the lower stamp duty has increased the number of houses purchased by 2,263 houses, and thus has influenced behaviour, there was also an impact of increasing house prices by 2.1% – a total reduction of 2,972 houses – so one of the factors affecting behaviour is house prices, and higher house prices can somewhat offset the benefit of lower stamp duty in terms of the number of houses sold.

Scenario modelling

While the results outlined in this paper are useful in hindsight, one of the great advantages of microsimulation modelling is what-if scenarios – so being able to say what would be the impact on low income groups in the future if we changed rates in this way; or added this concession. Because the bank's financial criteria for buying a house are also incorporated into the modelling, policies to enhance the availability and take up of affordable housing can also be modelled – for example, what would happen if the ACT Government provided a low rate loan to first home buyers – how much would it cost, how much would it benefit first home buyers, etc.

Reliability

Questions one through four are addressed through a micro-simulation mode. Within the context of the model, the results are reliable. They are affected by parameter estimates which are incorporated in the model using the best available estimates. The actual values of these parameters are unknown. The model also does not take into account any other changes that might be happening in the economy nor the actual reactions of people to the actual policy change. It tries to model what those reactions might be based upon what we know about peoples' behaviour from other studies.

Questions five through fifteen look at what actually happened in the data and are thus subject to the caveats discussed above when we try and infer causal impacts from observable data.

5. Are the impacts of tax reform on the ACT economy to date able to be measured?

We measure the effects on the economy by studying the overall value of the house and unit markets. We find that the effects of the reform on the economy in the market for houses are small or non-existent; the findings range from statistically insignificant to -5 per cent (and even larger negative effects using the administrative data). While the findings are not robust across variations in counterfactuals and the point estimates are unreliable they are consistently non-positive, which, if anything, lets us conclude that the reform did not lead to an increase in the overall value of the house market economy.

When looking at the market for units we find a strong decrease of 20% to 24% (and negative but insignificant for the administrative data). This is a sizeable amount and raises questions about whether the identifying assumptions have been met or if some other factors contribute to the unusual trend in the ACT. These results are not robust to changes in control group or specification (or data) and should be used cautiously. While the point estimates are

unreliable, we find consistently non-positive estimates, which, if anything, lets us conclude that the reform did not lead to an increase in prices for units in the ACT.

6. Are the marginal impacts from each dollar of stamp duty reduction expected to increase or decrease as tax reform progresses?

Studying the trend of reform on the economy over time, we find a number of weak indications that the effect of the reform increases over the short time period observed. These measures are small and taking into account the limitations of the data and identifying assumptions discussed above, we would not draw any conclusion on the basis of these results. We can rule out the effect of the reform declining over time.

7. Is there any evidence that ACT residential property prices are higher or lower than they would have been in the absence of tax reform?

Studying the effect of the reform on house prices, we find a wide range of estimated house prices increases from zero up to 9 per cent and even significantly negative house price effects in the administrative data. Estimates are not robust across variations in the control group or data set. The results should be treated as unreliable. As input for the microsimulation study above, we use the estimate of a two per cent house price increase due to the stamp duty reforms. This was the estimate we found when using the CoreLogic data and other capital cities as the counterfactual. Notwithstanding the variability of results discussed above, this seems like a reasonable control group and a plausible estimate.

Estimates of the effect of the reform on unit prices are also mixed, from increases up to 4% to no effect and even, in some cases, significant negative effects. These estimates are not robust across variations in the control group or data set. The results are sensitive and should be treated as unreliable.

8. Is residential property turnover in the ACT higher or lower than it would have been in the absence of tax reform?

When looking at property turnover we find overall estimates that suggest a reduction due to the reform. The estimate of the reduction in the number of house sales varies considerably across specifications and control groups from 6% to over 10% (and even bigger for the administrative data). These results are not robust to changes in control group or specification (or data) and should be used cautiously. While the point estimates are unreliable, we find consistently non-positive estimates, which, lets us conclude that the reform did not lead to an increase in the overall number of house sales and most likely led to some decrease.

The effect on number of unit sales also varies across specification. They are typically three times as strong as house sale declines (but we find even positive effects in one case with the administrative data). These results are not robust to changes in control group or specification (or data) and should be used very cautiously. While the point estimates are unreliable, we mostly find non-positive estimates, which leads us to conclude that the reform did not lead to an increase in the overall numbers of unit sales and probably led to some decrease.

9. To what extent is the upfront cost of residential property in the ACT (i.e. purchase price + stamp duty) less than it would have been in the absence of tax reform?

Our analysis provides some evidence that it is likely that prices have not gone down due to the ACT tax reform. While this increase is hard to measure and likely to be small it can be up to 9 per cent for the housing market and up to 4 per cent on the market for units.

The overall reduction in stamp duty since the start of the reform, when expressed relative to the price of the house is naturally small. A house price increase of only one to two per cent would outweigh the tax reduction. Therefore, the results in this report suggest that the upfront cost of housing has likely gone up with the introduction of the reform. Again, the exact numbers are not robust to changes in control group and control variables. This overall result is reliable even while the exact point estimate is unreliable.

10. As a result of paying lower stamp duty than they would have in the absence of tax reform, are home buyers spending less overall on property purchases; or buying higher priced properties (i.e. adding the stamp duty saved to their purchasing budget)?

Continuing on from the last question we find evidence in this study that people don't spend less on properties and are possibly buying higher priced properties. Prices have likely gone up with the introduction of the reform, and if so, by more than the equivalent of the reduction in stamp duty.

One reason for the higher spending on property purchases we observe might be that buyers use the saved tax to raise the maximum deposit they can afford. They are then able to buy a more expensive house given the same credit constraints.

11. Is tax reform making it easier for people to move to properties more suited to their needs, such as downsizing?

The tax reform makes it easier for people to move to different properties, as long as prices do not increase. Holding prices constant, the reduction of stamp duty means that it is more affordable for families to buy a different property because they spend less on stamp duty.

However, when house prices increase by an amount greater than the tax savings, the microsimulation modeling shows that the number of families who can be expected to move to a new house decreases after the tax reform. In addition, the number of families that move to a new house is expected to decrease, even though the value of the house the family previously lived in also increased.

12. Is rental housing more or less affordable than it would have been in the absence of tax reform?

In our analysis we find evidence that rental property prices have decreased with the introduction of the ACT tax reform.

For rental house prices, we find evidence of a small reduction of about 2 per cent, though point estimates vary between a reduction of 7 per cent and no changes across different specifications and data sets. The point estimates are thus unreliable. However, we find consistently non-positive estimates, which leads us to conclude that rental prices for houses have not increased due to the reform.

Rental prices for units show a decrease from 5 per cent to 16 per cent (depending upon specification and data) due to the reform. These negative effects is statistically significant and

robust across specifications and control groups. While the point estimates are unreliable, the results suggest that rental prices for units have decreased due to the reform. The same limitations discussed above have to be taken into account.

13. Is the increased rates charge is being passed through to renters? If so, how much?

Following on from the last question, since we find that rental prices have possibly decreased and almost certainly have not increased we can conclude that the increase in rates charges are not being passed onto renters. This is true for both house and unit rentals. This may not be a result of the reform, but rather of other confounding factors related to changing supply of rental properties.

14. Are the impacts different at different rental price levels (i.e. rent quintiles)?

Our evidence suggests that the reform led to bigger (percentage) decreases in the lower quintiles of the rental market than in the more expensive part of the market. We find significant decreases in house rental prices for three of the four lower quintiles but a positive effect for the highest quintile.

The unit rental prices show similar results. The strongest effect is estimated for the lowest quintile. Effects becomes smaller as we move up the income distribution from lower incomes to higher incomes until it is no longer significant for the top income quintile.

15. Has tax reform impacted the supply of rental properties?

Considering the flow of new properties being rented out, we find a significant increase in the numbers of new rentals resulting from the reform. While we don't want to rely too heavily on the time series analysis in this part of the study, we take these findings as evidence that the tax reform has not reduced the availability of rental properties in the ACT, but likely increased the number of properties available for rent by 200 per month.