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*Erasmus*

## **Supply, Demand and Affordability: How Does New Suburb Supply Affect Property Prices?**

A Research Paper presented by:

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***Disclaimer:***

This document represents part of the author's study programme while at the International Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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## **Dedication**

Thank you to my girlfriend, who has been endlessly patient with me during this process.

Thank you to my supervisor and all who assisted with this process.

Thanks to my friends who propped me up and made me smile.

I could not be here without the support of many people, to them, I say thank you.

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## List of Acronyms

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ISS	Institute of Social Studies
NHSAC	National Housing Supply and Affordability Council
NHFIC	National Housing Finance and Investment Corporation
SLA	Suburban Land Agency

## **Abstract**

The affordability of homes in Australia is an increasing problem, creating a growing housing crisis. This problem predominately affects low-income and middle-income households. Australia follows a growing trend of other countries post-1990s, where housing is unaffordable. Even when housing is affordable, it is stretching household budgets, increasing long-term debt and compromising retirement. This paper will discuss the social ramifications of increasing house prices, the policies that support their rise and other demographic trends. The existing economic literature is limited to infill development effects on rent prices in existing neighbourhoods and the mechanisms that create this effect. There are insufficient economic methods within housing economics, mostly focusing on instrumental variables and economic levers (e.g. central bank interest rates). I explore this through my case study of Canberra, Australia.

This paper applies a difference-in-difference method to understand greenfield developments. This method has never been before in new suburb supply. The method is applied to surrounding suburbs. The results are inconclusive and cannot suggest any causal effects on property prices.

Australian governments at all levels are heavily investing in new supply with little idea of how new supply affects property prices. This paper seeks to address this limited understanding. While this paper claims no causality due to a new method applied to a new topic, the paper represents the first economic exploration of new suburb supply.

## **Relevance to Development Studies**

The price of a home has many ramifications for ordinary Australians. Homes in Australia have grown into a national myth since the 1950s, supported by high ownership rates. Initially, high ownership was supported by high levels of government investment and investment in social housing. However, after government support in supply stopped, the property market is now increasingly unaffordable, especially for the lower income quintiles. The cornerstone of Australian policy and the enduring myth of home ownership no longer exists in its previous form. Housing policy must change in response to fewer people owning their own homes or dramatically shift the landscape that privileges demand side measures. Australia is “reflecting a growing focus on housing as an asset rather than as a human need” (AHURI 431, 2024, 3).

As of 2019-2020, one report found that  $\frac{1}{2}$  of all public housing tenants are in poverty,  $\frac{1}{5}$  in the private rental sector and  $\frac{1}{10}$  who have a mortgage or own their own homes (Australian Council of Social Service, 2023, 13). Safety and wealth historically have been embedded in owning your own home. However, this opportunity is available to fewer and fewer people. Australia must either come to terms with this change or radically shift policy to broaden the base of affordability and accommodate other forms of tenure.

## **Keywords**

Properties; difference-in-difference; new suburb supply.

# 1. Introduction

The housing market is the most important in Australia. However, access to it has become uneven and expensive. This has led to constrained choices for would-be homeowners and an Australia that must come to terms with lower homeownership rates. The housing market is worth more than the gross domestic product of Australia and the forced and voluntary retirement savings. Currently, the residential housing market is worth 10,911.8 billion dollars (ABS, 2024).

Previously, Australia had enough land within proximity of city centres and progressive government policy to make housing cheaper (Commonwealth-State Housing Agreement). The home is the “largest component of a householder’s asset portfolio and the principal mode of savings for Australian households (Intergeneration Report, 2023, 230).

Frustration and political inaction with demand-side policy measures have shaped perceptions of supply being the solution to the affordability crisis (Leishman, 2024, 129). Therefore, a basic understanding of demand size measures is necessary to understand the emphasis Australian governments are placing on supply being the solution to affordability. However, is new housing supply the solution to rising price dynamics? This neglects microeconomics and behavioural perspectives that find the impact of new supply is hard to detect. This is partly due to the second-hand housing consisting of most of the supply compared to the new property supply.

New housing supply is a “much under-researched niche of the housing economics literature” (Leishman, 2024, 131). Yet, the area has become the main hope of Australian governments through the National Housing Accord. The accord has “an aspirational target of building 1.2 million well-located new homes over the 5 years from mid-2024, and all states and territories are signatories with the Australian Government” (Ong & Leishman, 2024, 3). The Australian Federal government is encouraging new supply through the investment of 10 billion dollars (AUD) over five years (Housing Australia Future Fund).

This paper began with a simple question: does new housing supply decrease property prices? Two of the most prominent housing experts say this:

“Theoretically, holding all other factors constant, an increase in housing supply should reduce house prices and rents. However, there is insufficient empirical evidence on the extent to which house prices or rents actually respond to changes in housing supply in Australia” (Ong and Leishman, 2024, 5).

Housing policy in Australia is a contested space – providing homes and investments. Regardless, homes are a great source of debt and wealth. Homes represent the greatest asset Australians own at 57% (CoreLogic, 2022, 5). In Australia, these homes underpin retirement, decrease living costs and are a key assumption in government policies. However, home ownership is becoming more costly, exclusionary and **happening later in life**.

My study focuses on how new suburb supply affects prices in existing areas. Does new suburb supply mitigate and decrease prices in surrounding areas? Additionally, my dataset includes information on new suburb formation and wealth transfers. To explore this question and additional information, I focus on Canberra, with 33 years of sales history and 22 suburb creations.

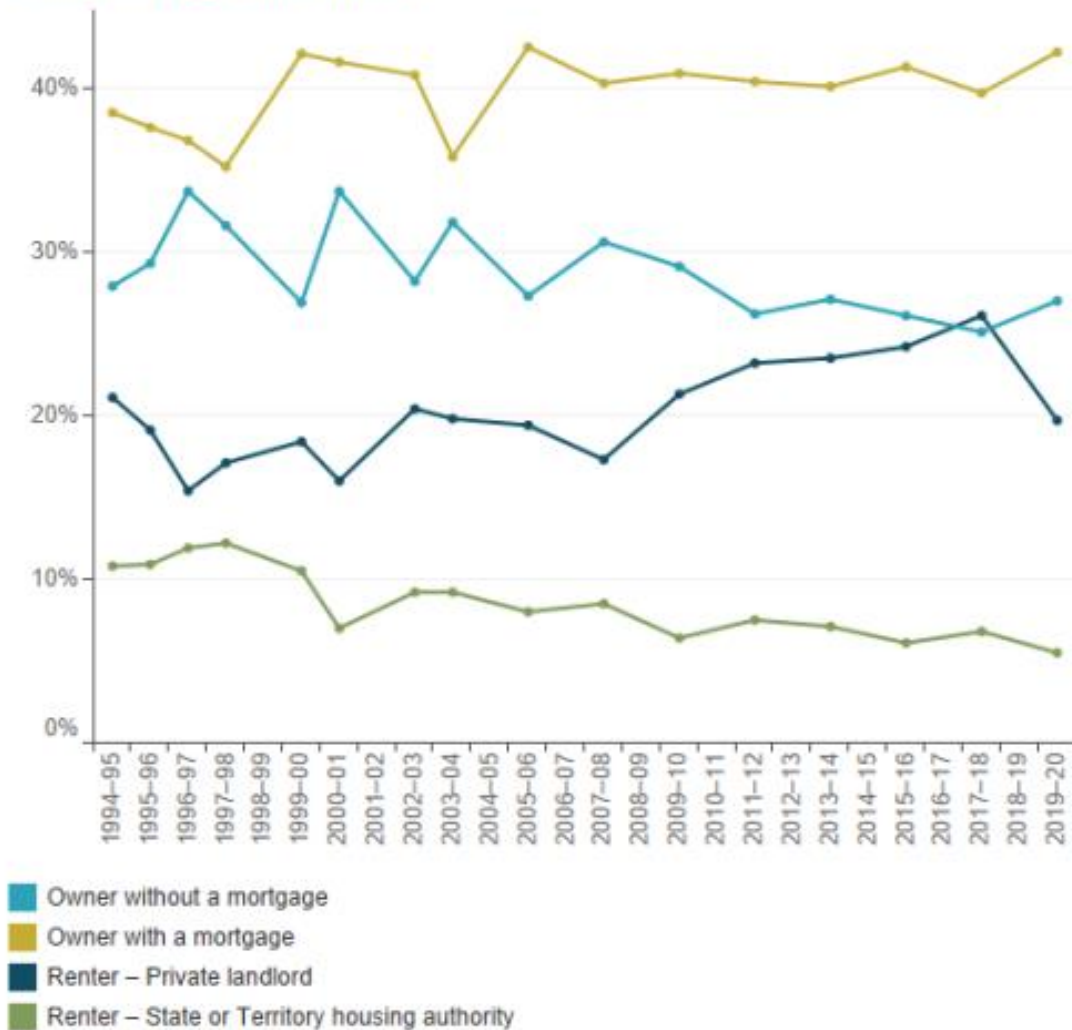
Ultimately, I seek to understand whether new supply initiated by the federal government will ultimately bring about price changes in Australia by looking at previous instances of supply.

## 1.1. Australian Property Market

The majority of the Australian market is build-to-sell properties, which are built in “anticipation of future demand” (The Treasury, 2024, 15). The property market is composed of five categories: private renters, public renters, mortgage holders, outright owners, and one overlapping category of investors. For example, someone can be both an outright owner and an investor or a renter and an investor. However, these definitions are crucial in considering the tax-advantaged policy and increasing levels of debt. Typically, the five categories are summarised into renters, mortgage holders and outright owners of homes. The percentage of renters, mortgage holders and outright owners in each segment is roughly equal (33%). However, price rises are changing when younger Australians enter the market and decreasing the percentage of outright owners. The change in outright ownership is gradual but may become permanent, stimulating a number of policy papers in response (). Two reasons exist for this: properties are becoming more expensive compared to average incomes, and rising property prices require more substantial deposits.

Australia’s stock mostly consists of detached dwellings (i.e. houses), with 70% and the remainder being townhouses and apartments (NHSAC, 2024, 16). “In 2023, 488,898 sales occurred nationally”, which is 4.4% of housing stock (NHSAC, 2024, 17). In contrast, there is a greater turnover of rental properties at 33% (NHSAC, 2024, 17).

### Households by tenure type (%), 1994–95 to 2019–20 Australian Capital Territory



Source: Adopted from the Housing Data Dashboard; ABS Housing Occupancy and Costs, 2019-2020

In Australia, there is an average of 10.3 years of saving time for the median income household for a 20% deposit, assuming a 15% saving rate (Corelogic, 2024, 14). However, the current saving rate for Australians is 3.2%, with recent rises in inflation (Corelogic, 2024, 14). For context, the 20% deposit is to avoid compulsory mortgage insurance. A large contributing factor to whether someone can enter the property market is the ability of parents to contribute to buying property or rather speed up their entry into the market (Productivity Commission, 2021).

The exact reasons for large price increases of homes is not entirely known, factors vary from period to period and depend on the model. However, some contributing factors are the increasing number of investors, dual-income couples and lower levels of childbirth (Cigdem & Melek, 2017, 229).

Underlying the current tenure system of homeownership are social norms that began after World War II. During the war effort, the lack of manpower and underinvestment led to an undersupply of housing. To rectify this situation, the federal government made a concerted effort to grow social housing and new housing supply (Cigdem & Whelan, 2017). The level of social housing was higher than today, though it never exceeded home ownership

or the private rental market. However, in the 1980s, social housing stock was rapidly sold off (Palm et al. 2021). Moreover, since the significant focus on housebuilding in the 50s and 60s, there has not been significant government investment in housing. Currently, the level of social housing is 4% in Australia. The private sector ultimately became the main driver of housing. This led to many idiosyncrasies – including housing typically being made in the higher cost brackets (AHURI 281, 17-18).

Australia is a country with a large landmass, yet it has a housing crisis. This is because half of Australia’s population is located in three cities: Sydney, Melbourne and Brisbane (in order of size). This creates scarcity and rapidly increases land prices. In Australia, housing has become a social construct and is supported by government policy at all levels.

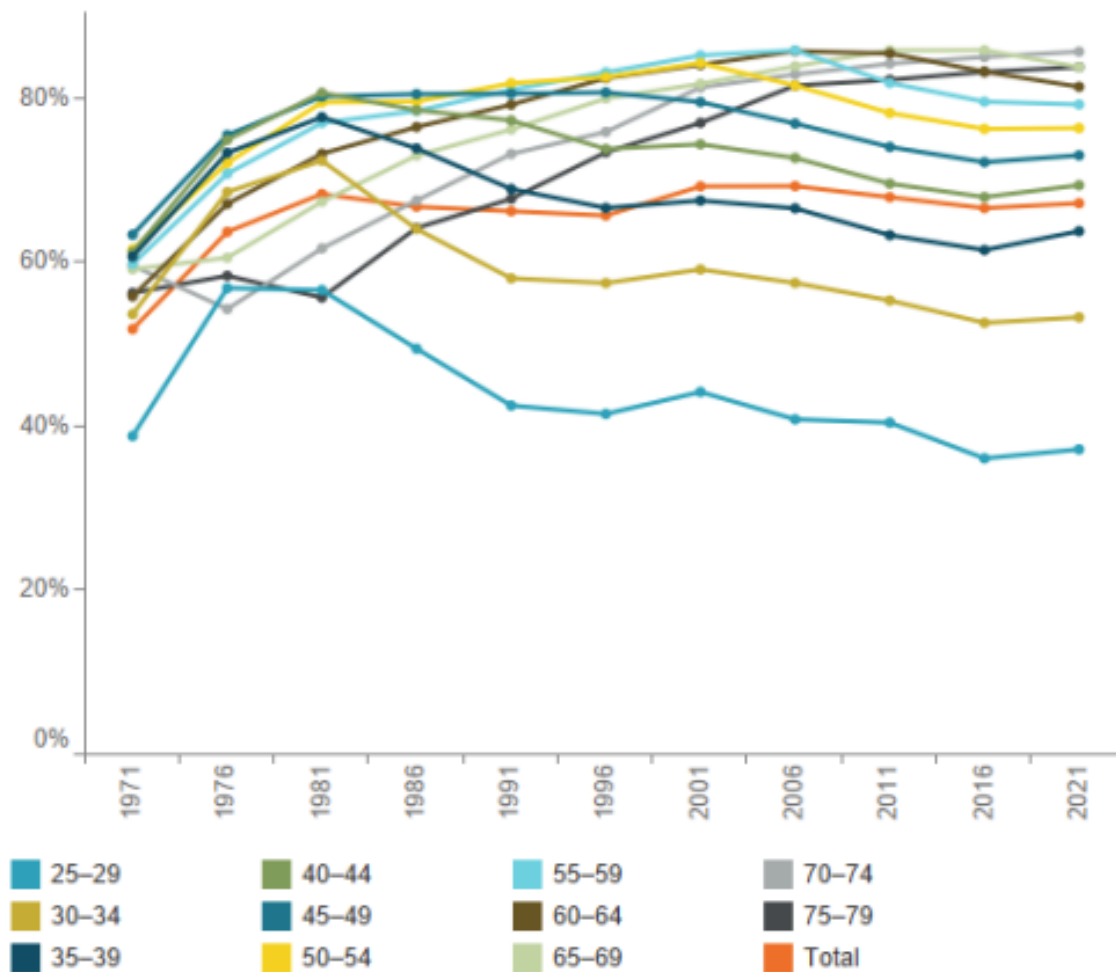
## **1.2. The Conceptualisation of a Home**

Economics considers a home as consumption, investment and production goods (Bhattacharjee et al. 2024, 27). The home is a consumptive asset because while the home provides shelter, it also deteriorates as the home is used. Homes’ strong increase in value has proven to be an investment vehicle for mortgage holders, owner-occupiers and investors. This has been encouraged by preferential government policies and preferential lending rates secured by property. The home also represents forced savings to service a mortgage or become an outright owner. The home’s production element stems from dictating to some extent where people can work (assuming office attendance) and any related costs with commuting.

The home is also spatially fixed with relationships to public goods like parks, transport and desirable neighbourhood qualities (Leishman & Goel, 2024, 123). The home, as a commodity, exhibits strong durability, allowing it to be consumed over long periods of time and potential by many different households (Leishman & Goel, 2024, 123). This does not mean the home does not deteriorate over time, rather its significance and value remain despite age.

Homeownership has both spread wealth and contributed to wealth inequality (MacLennan, Long and Leshman, 2021). However, growing trends of older property market entry, increasing indebtedness and rising house prices suggest that homes will now increase inequality.

## Home ownership rate (%), by age group, 1971–2021 Australian Capital Territory



Source: AIHW analysis of customised ABS Census data, 2022; Housing Data Dashboard

Previously, all income quintiles could access the property market, and thus a wealth equaliser however, this trend is decreasing (Maclennan, Long and Leshman, 2021). Similarly, Fuller et al. (2019) and Causa et al. (2020) found that home ownership positively correlated to wealth equality.

Per the graph above, housing access is decreasing for the younger generation. The 25-29, 30-34 and 35-39 age groups are the most affected. This suggests that the housing market changed post-1981 census.

Previously, everyone had an opportunity to own with their respective incomes. ABS data shows that most housing remains single-standing homes. However, there is a growing divide between houses, townhouses and apartments. This constrains the choices of Australians and limits the ability of lower-income families to own a house.

Further, increasing prices have also increased the disparity between owning and renting. As renting also increases, the process of saving a deposit becomes harder. The home remains central to household wealth.

### 1.3. Preferential Desires: Homeownership

Carr proposes that the right to buy a home is a “conditional promise” that no longer enriches but rather impoverishes (Carr, 2011, p. 519). Arundel and Ronald argue further that the policy of homeownership is “false” and hides increasing differences (2021, 1124). A “mask [of] unequal outcomes faced by individuals and households unable to access the norms that these narratives reflect” (James et al. 2025).

James et al.’s literature review found four types of typology in housing: as an outcome of a market society, a situation experienced unevenly across populations”, “a product of public policy” and as a “cultural construct” (2024, 1268).

As homes and properties increase in price, the corresponding debt of those who wish to live in them also increases. There are early signs that fewer are paying off debts by the time they retire (ABS, 2024).

AHURI report on Australia’s supply responsiveness shows the market has been creating properties in the upper price deciles, specifically the 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> deciles (281, 2017, 17-18). This is a worsening trend, with 2005-06 data showing that 79.3% of units go to high-income deciles, with 84.4% in 2013-14. This trend is less pronounced in housing, with only 48.1% in the top three quintiles in 2005-06 compared with 51.1% in 2013-14. However, the 7<sup>th</sup> quintile is also heavily represented in the house-buying data at 24.8% (2005-06) and 27.1% (2013-14). This suggests that while new property stock is being created, it is mainly for the richest segments of the population. However, as will be discussed in 2.2.2, filtering of properties may occur, though evidence of this phenomenon is limited in Australia. Furthermore, the evidence mostly exists for rental properties.

Additionally, there is a growing community of “precarious owners” who fell out of homeownership due to factors like marriage breakdowns, job losses or health crises (MacLennan, Long and Leshman, 2021). Unfortunately, this paper cannot explore this category but acknowledges the difficult circumstances that may occur even after buying your first home.

### 1.4. Case Study: Canberra, Australian Capital Territory

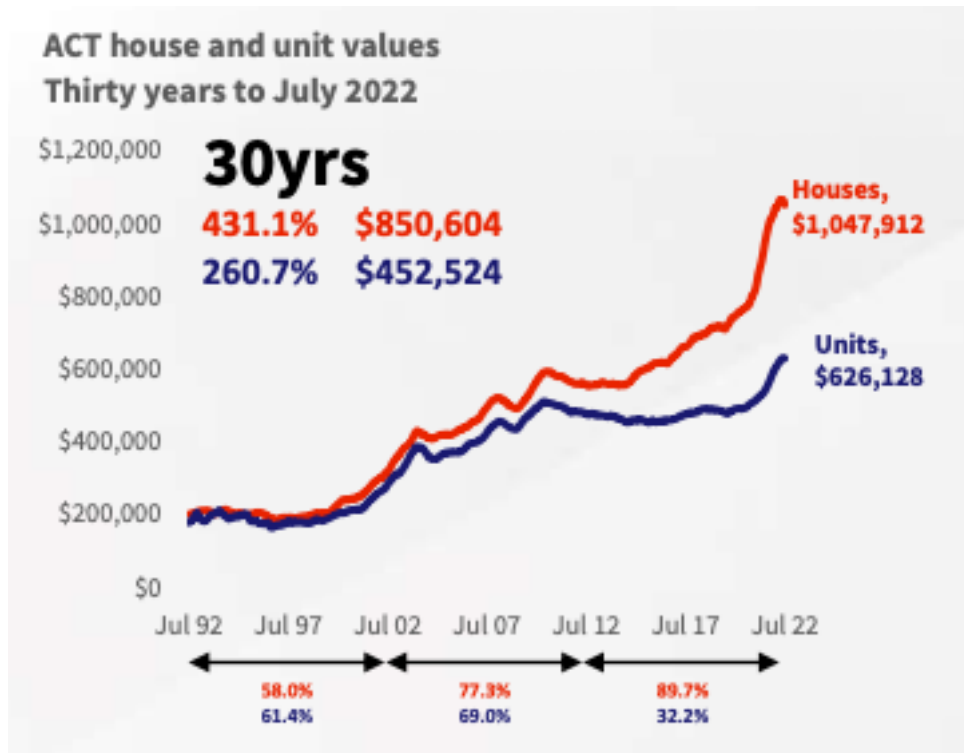
The research analyses how new suburb creation affects house prices. Canberra was chosen due to its planned nature (i.e. suburb expansion) and rapidly growing population. The most recent census in 2021 showed the territory contained 454,000 people on the night of the census, up from 397,000 in 2016 and 137,000 in 1971 (ABS, 2024). In 2016, Canberra was 372.6 kilometres squared, which provides sufficient spatial variation for analysis.

There would be some who would say Canberra is not a good test case because of its many unique characteristics. For instance, Canberra has higher average incomes for Australia and high levels of government employment (SGS Economic and Planning, 2024, 55). However, this privilege also hides disadvantage within the wealthy average, lower income earners are no better off despite the supposed affordability of Canberra for the average workers (SGS Economics and Planning, 2024).

Canberra is the 6<sup>th</sup> largest city in Australia after Sydney, Melbourne, Brisbane, Perth and Adelaide. The city is the only state or territory capital inland of Australia. This gives it ample opportunity to expand. Geographic constraints are limited to hills, creeks, wetlands, man-made lakes and designated parks. Canberra has the second-lowest residential density after Adelaide when compared to cities with higher populations (ACT Government, 2024). As of 2021, 61% of homes are detached homes, 18% are medium-density and 21% are high-density (ACT Government, 2024). Medium density here means townhouses, detached townhouses

or three-story high or less apartments. In 2021, the ACT's urban area was 24,990 hectares with 211,000 residential dwellings (ACT Government, 2024).

Nevertheless, I propose this area of study due to my familiarity with the city, the sufficient level of transactions each year and its exclusion from previous academic studies.



Source: Adopted from CoreLogic, 2022, 5.

The CoreLogic 30-year review from 1992-2022 also shows the largest difference between units and houses was in Canberra, excluding Sydney. Additionally, Canberra experienced the fourth-highest level of growth after Sydney, Melbourne and Hobart (2022, 3).

A study of Canberra also shows changing trends within Australia of houses, apartments and townhouses. For instance, in 1991, houses accounted for 81.65% of all supply, while in 2023 only contributed 53.3%. Moreover, despite the growing amounts of supply in Canberra, sale volumes are still similar. In 1991 and 1992, sales were 10,913 and 13,663. While in 2023, there were only 9,918 sales. Even the greatest year of sales was in 2021, which was only 15,800. The case study of Canberra, to some extent, represents the broader trends within Australia.

## 2. Contextualise

Housing represents an interconnected problem with the fabric of Australian society, to understand it, we need to dive into aspects of policy, economics, tenure, tax and demographics. These aspects all have an impact on price and the price of homes is integral to all these aspects. For instance, many policies directly or indirectly affect the price of homes through increased demand, subsidising wealth accumulation or actively supporting investors. Supply will also be discussed through how it affects and we will explore the limited literature there. The increasing cost of renting makes it harder to save for a deposit, increasing time in the rental market. Demographic trends like single-person homes, longer lifespans and smaller family units are also changing demand. Migration will also be discussed within demographic trends and contested findings of under and oversupply over the same time periods. Additionally, being able to afford a downpayment while paying rent. Unfortunately, this paper will not consider unequal Indigenous Australian housing outcomes or the insufficient supply of social housing.

### 2.1. Demand and Price

Separating supply and demand from price is very difficult because all other factors are not held constant. Modelling in the United States of America (USA) suggests that demand is responsible for the vast majority of price increases during COVID-19 and supply would have to adjust exponentially to match surging demand (Anenberg & Ringo, 2024). The researchers found that sale listings would need to increase by 30% to match the high demand, while new sale constructions, typically 15% of sale listings in the USA, would need to increase by 300% to match demand (Anenberg & Ringo, 2024). This modelling is concerning because Australian governments are focusing entirely on a supply solution, but demand is the main cause of price rises, and supply is ill-suited to solve that problem.

#### 2.1.1. Australian Policy Landscape

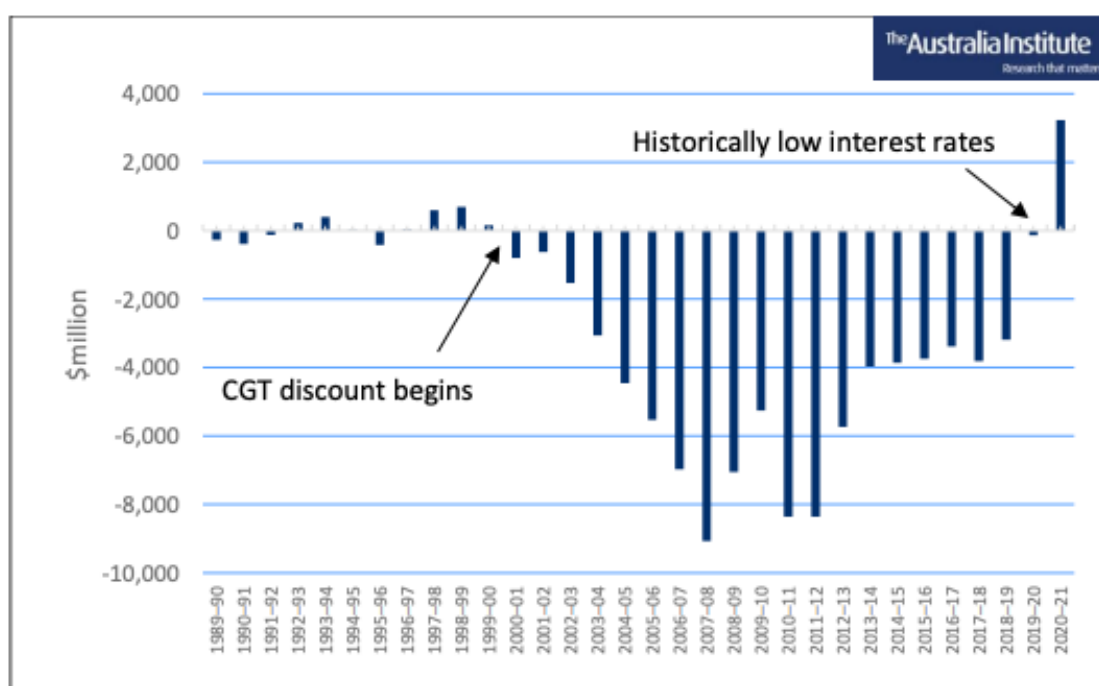
The federal tax system heavily favours homeowners and investors. This tax system has been subject to many reviews, including the Asprey Tax Review (1975) and the Henry Tax Review (2010). The four main policies are capital gains tax exemption, negative gearing, main house tax exemption and the first-home buyer grant. These are the four main federal government policies.

The only major tax I do not discuss at length is stamp duty, which is a state-based transfer tax on housing purchases. Stamp duty was found to decrease sale volumes, increase transaction costs and decrease mobility (Davidoff & Leigh, 2013; NHFIC, 2021). I have produced a table below to provide an overview of all current policies affecting housing. Finally, I focus on the contentious zoning argument, where some scholars attribute high prices to regulations while other scholars argue the zoning cost is overstated.

Australia provides “generous treatment of housing in the tax system” (Intergenerational Report, 2023, 231). However, this also means that those who cannot participate in housing or drop out of homeownership are not afforded these opportunities. Australia has a raft of policy measures, including exemptions, discounts, deductions and grants.

The four main policies increase demand by limiting taxation on the primary home, decreasing sales tax on additional homes, subsidising rental losses and encouraging first-home buyers with grants or exemptions.

First, capital gains discount began as a deduction to replace indexation. This is applied to all goods, including shares and housing. The tax is only applied after you sell the good. To give an example, if you buy a house for 1,000,000 dollars and then sell it one year later for 1,200,000 dollars, then your capital gains will be 200,000 dollars and because of the discount, the taxable component will only be 100,000 dollars. The Australian Institute argues that this increased house prices and lifted demand (2024, 5). The steadily increasing value of the discount to the Australian government also reflects the increasing house prices (NHSAC, 2024, 49). The Parliamentary Budget Office calculates that the Australian government forgoes 5.22 billion dollars in 2023-24, with the discount being applied to residential property (2024, 3). The Budget Office estimates that 79.6% of the discount is captured by the top income decile (2024, 4). This suggests that Australians are subsidising the highest-income earner and their asset. The Australian Institute argues that the CGT discount and negative gearing should be considered together because only after the discount was introduced did negative gearing become the norm (2024, 6).



Source: Adopted from the Australian Institute, 2024; Australian Taxation Office.

Second, negative gearing occurs when the expenses of an investment property exceed income; then, the remainder can be removed from the person's wage income, decreasing taxable liability. Negative gearing works in combination with mortgage interest deductions, capital works and depreciation to create this shortfall (AHURI 295, 2018, 17-19).

Both of these policies have encouraged Australians to become residential investors, with 15% of tax earners of 15.1 million total having an interest in investment properties, this is up from 6% in 1985 (NHSAC, 2024, 45). This is likely due to the tax-privileged status and low interest rate available when borrowing against a house. Increasing investor activity has increased competition for houses, which in turn increases prices, the graph below shows that investor activity reached a high of 46% and has led to limitations on the growth of investment lending and the rate of interest-only loans.



Main House Exemption		Exemption	Transaction	Federal
Help-to-Buy	2024	Loan (Equity Contribution)	One-Off	Federal
Home Guarantee Scheme	2022	Guarantee	One-Off	Federal
First Home Owner's Grant		Grant	One-Off	Federal
Indigenous Homeownership Program		Loan	One-Off	Federal
<b>Renters</b>				
Commonwealth Rent Assistnace		Grant	Annual	Federal
National Affordability Scheme	2008	Tax Deduction (Investors) Reduced Rent (Renters)	Annual (received by investors for offering below rent prices)	Federal
<b>Additional</b>				
Stamp Duty		Tax	Transaction	State
Rates		Tax	Quarterly or Annual	State
Stamp Duty Exemption/First-Home Buyers Grants		Exemption	One-Off	Increase
Goods and Services Tax	2001	Value Added Tax	All Transaction (relevant for new housing or significant renovations)	Federal

Source: Author, 2024; NHSAC 2024

### 2.1.2. The Zoning Argument

Upzoning has been lauded as the saviour of house prices. However, while there are strong proponents for it (see Peter Tulip), others argue that it has led to an “uneven geography of densification” (Gallagher, 2024, 2). There is a growing contested literature on zoning.

Kendall and Tulip (2016) found prices were significantly higher than marginal costs. The researchers call this the “zoning effect”, which imposes scarcity instead of scarce land availability. Zoning is mostly done at the council level or by the state or territory governments.

Previously, zoning was synonymous with price increases and red tape. More recently, however, a more nuanced approach has been taken, which suggests that upzoning does increase supply but not to all upzoned properties. This may be partly due to the limited stock turnover. This suggests limited improvement in the short term and some improvement in

the long-term market (Stacy et al. 2023). Some authors have suggested upzoning is captured by owners through renovations (Schuetz, 2020). Higher-valued properties and older houses are also more likely to have renovations and additions (Schuetz, 2020, 477). This also suggests improvement of properties is limited to houses, especially with the large price differential.

Zoning does serve a purpose; development allows for “enabling infrastructure” like “public transport systems, communal spaces, and other public amenities” (NHSAC, 2024, 34). Despite planning reforms, completions remain sluggish, this either suggests that demand remains too high or other mechanisms have not been discerned through macroeconomic modelling.

The most prolific city for upzoning, especially in Australian literature, is Auckland, New Zealand; where the relaxation of zoning was found to increase stock by 4% over five years (Greenaway-McGrevy, 2023). However, similar studies, not quite contrary, showed that upzoning in Brisbane only led to a 22% redevelopment in 20 years after upzoning. This suggests that reducing restrictions on zoning does increase supply, but not for all properties. There have been limited studies of upzoning in Australia in general, especially utilising microeconomics data.

Zoning privileges the voices of local stakeholders within the community, which may have anti-development views. This has often led to the centralisation of state and territory governments. In Canberra specifically, there have been areas of upzoning however, these have not been studied.

Lastly, the behaviour of developers is important to understand the uptake of upzoning. Land banking is a practice where developers keep land undeveloped. This may occur for a number of reasons: profit maximisation, outside the scope of the main business or the exclusion of other developers. One study found that eight big developers in Australia were sitting on 200,000 properties that were approved and ready to be sold (13 years of housing supply)(Murray, 2020). Similarly, a UK government report on builders found “[h]ousebuilders are not in business to serve the public interest, except incidentally. Their primary concern is to deliver profits for their investors, now and in the future” (The Calcutt Review 2007, 4).

### **2.1.3. Demographic Factors**

Demographic factors can increase demand but can also create supply through existing stock. Migration

The changing property preferences also affected internal migration within Australia to rural and regional areas (AHURI No. 421). This leads to further inequality due to an increase in property prices in areas with typically lower wages. There is growing evidence that Australia, among other countries, is experiencing high levels of overseas migration and increasing demand for housing.

The rental vacancy rate remains at 1.3,% which is the lowest since 2013 (ANZ CoreLogic, 2024). The lower vacancy rate is making the market harder for low-income and middle-income households (ANZ CoreLogic, 2024). Further restricting their ability to save a deposit for property.

Migration may not be the main driver of growth in house prices. Between 2005/6 and 2013/4, population growth matched supply, yet there were divergent price gains in Melbourne and Perth (AHURI 281, 23-24). This suggests other factors impact price too. Additionally, these deal with median price and averages, it is unclear whether new supply met needs (e.g. enough family homes). For instance, the composition of stock in Canberra was +80% in units (AHURI 281, 25).

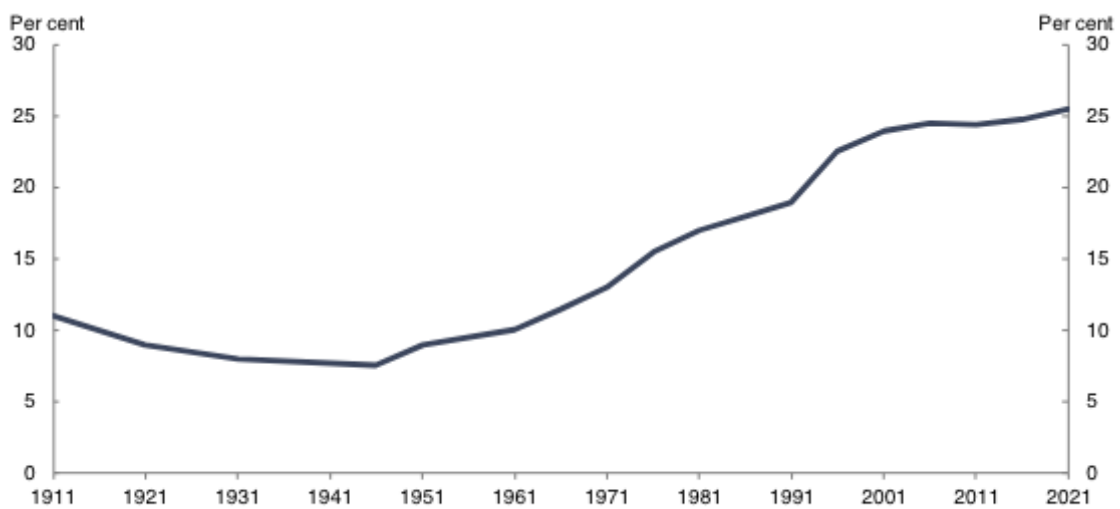
This suggests other dynamics are present in the housing market besides migration.

The average household size in Australia has been decreasing in Australia (Day, 2018, 4-5). This increased during COVID-19 when space became a premium due to lockdowns or working from home. Migration post-COVID rapidly increased and this has increased pressures on the current system (ABS, 2024).

Household sizes also hint at the preferences of Australians, showing the housing market is not perfect in allocation. Household size also depicts the under-utilisation of existing supply, with many homes without occupants on census night in 2021 and empty bedrooms (Ong & Leishman, 2024, 15-16). While this does not necessarily mean all those homes are empty all year, it certainly suggests some are.

This has also coincided with longer lifespans, with many people remaining in their homes for longer (Day, 2018, 7).

### Percentage of Single-Person Households in the Population, 1911-2021



Sources: de Vaus and Qu, 2015, ABS Census various years.

Source: Adopted from NHSAC; de Vaus & Qu, 2015; ABS.

## 2.2. Supply and Price

Economic theory suggests demand is more elastic while supply is more inelastic as a general principle. This is due to demand being more responsive to interest rates and other factors, while supply is more inelastic with labour shortages, material shortages and building times.

New supply may have a limited effect on price. The idea that new supply affected prices originated from the Barker Review, which was a highly influential review of housing post World War II (Leishman, 2024, 127). This review focused extensively on macroeconomics and ignored the microeconomics of supply and behavioural aspects (Leishman, 2024, 127). Affordability and newly built housing were initially thought to be highly connected. However, estimates in the 1990s dropped supply as a variable because it was insignificant (Leishman, 2024, 127). The subsequent view became new supply affects prices in the long term, though without definitive evidence (Leishman, 2024, 127).

The supply and demand of housing is unusual because most of the sold stock is mostly second-hand properties. There are two types of supply: second-hand supply and newly built housing. The public perception is that new supply is only newly built housing. However, the second-hand market vastly out dwarfs the newly built market. This second-hand market creates new supply through downsizing, trading up and dissolving of

households (Ong & Leishman, 2024). Each new supply on the second-hand market also contributes an equal amount of demand from owner-occupiers assuming another primary home purchase. In contrast, investors selling may indicate a new supply for owner-occupiers unless bought by another investor. Finally, the dissolution of households usually occurs after the last adult member of the household passes away, reintroducing the home into the supply market without additional demand.

Trading up and downsizing are phenomena within the housing market. Trading up consists of moving from a home with smaller attributes to a home with larger attributes. For example, moving from a two-bedroom dwelling to a three-bedroom dwelling. This trading up could also consist of moving to a more expensive area. Downsizing involves the opposite and typically consists of families downsizing after kids or when older people move into more suitable accommodations for later life stages.

In the area of supply, several papers focus on elasticity (see Liu & Otto, 2024; Melser et al. 2022). Simply put, if prices increase by 1%, what is the corresponding change in supply? If the change is greater than one, then the supply is elastic and if the supply is less than one, then it is inelastic. The speed of subsequent supply is not measured in elasticity equations however more elastic supply markets have less delay (Ong & Leishman, 2024, 8). Various papers equate Australia's supply to be 0.5, therefore inelastic (Ong & Leishman, 2024, 8).

There are different elasticities related for units and houses, though it is unclear where townhouses fit into these analyses (Liu & Otto, 2017). Further, the regressors related to houses are not related to apartments and this suggests some disconnect between the two markets (Liu & Otto, 2017).

Limited supply studies exist in Australia and are mostly limited to larger cities. One study of Australia, disaggregated by local government areas (341 total), found that houses were more responsive on the city outskirts while apartment supply grew faster in the city centre (Mesler et al. 2022). The study used data between 2001 and 2019. The study found large variability between areas and found the supply of houses and units was uncorrelated (Mesler et al. 2022). My data varies from theirs in that they use median property prices rather than individual variability.

A study in Sydney found that supply was unresponsive to changes in demand (i.e. inelastic supply). The paper categorised Sydney into three areas: inner, middle and outer rings. The study found that supply was mainly unresponsive in the inner and middle rings (Liu and Otto, 2024).

Knoll et al. (2017) in a cross-comparative study of 14 countries, found supply elasticity varied over time. This suggests that the elasticity of demand and supply changes. However, the paper suggested the strong growth in real house prices was mainly driven by land prices rather than construction costs (Knoll et al 2017). Since that study, construction costs have grown further post-COVID.

### **2.2.1. New Suburb Creation Literature**

There is extremely limited literature on new suburb creation on property prices. New suburb formation is understudied with its exact effects, beyond providing new properties are unknown. The exact reason for this is unclear despite the importance of the property market in Australia and elsewhere.

New supply can be segmented into three categories: the land market, the construction market and the housing market (Ong & Leishman, 2024, 13). For greenfield or large land plots, the market for developers is highly concentrated, while the sale of small plots to owners that then develop them has higher competition (Ong & Leishman, 2024, 13-

14). The initial development of these sites is in cooperation with local government for initial infrastructure. The construction market consists of labour and materials (Ong & Leishman, 2024, 13). Finally, the new supply market is the “pre or post-construction sale of dwellings to end users, who could be owner occupiers or investors” (Ong & Leishman, 2024, 13).

The existing economic literature on housing focuses on forecasting, hedonic valuation (why one chooses a certain property) and limited macro research on Australia. This limited research is mostly focused on monthly or quarterly data.

The existing literature focuses on three areas: upzoning, filtering and movement chains.

The closest to my study is rental property supply however, these do not focus on property prices and occur in established suburbs. However, there are some useful articles abroad that look at new apartments (50+ apartments) on rentals in the United States of America (Asquith et al 2023) and new apartment blocks effect on apartment prices in Uruguay (Gonzalex-Pampillion, 2022).

Gonzalex-Pampillion applies a continuous difference-in-difference with an IV, the IV originating from a policy change. The paper found that property effects were incredibly localised (200 metres). I use this boundary in my analysis to explore whether this distance also affects my results. The paper had some key differences, including looking at income changes, crime rates and taking place in a city of 1.38 million people.

Asquith’s paper deals with rental properties and has an indeterminate area (USA). The paper struggled to find casual effects due to unobserved development decisions that take place in the property market. The paper supported the idea of turnover in properties or movement chains. Whereby wealthier people move into the newer properties and decrease prices in existing stock. This trend is also prevalent in Australia, with lower-income renters more likely to reside in older property stock (Palm et al 2021). However, the effect is not as established within Australia.

In my literature, I have included non-academic sources which include research institutes, PEXA, CoreLogic and PSM: this is because they represent the three biggest private sources of property data in Australia. PEXA is the only legal method of digital property transactions in Australia, CoreLogic is the biggest property database in Australia and PSM is owned by the Domain group (the second biggest advertiser of properties after CoreLogic in Australia). This is also the company where I got my original data from. In addition, I rely on various government agencies.

### **2.2.2.Mechanism: How does New Suburb Supply decrease Prices?**

The dominant theory is that new supply encourages wealthier owners to move to nicer properties with better housing attributes. This then creates the “filtering” of older properties into lower-priced market segments (Leishman, 125, 2024). This is because houses depreciate through wear and tear, and may not be on trend with current design standards. However, while this theory is prominent in the USA, its application to the Australian market is contested (Ong & Leishman, 2024). The debate lies in certain attributes outweighing the wear and tear, like proximity to the city centre or can be mitigated through renovations. Additionally, demolition may change the characteristics of the property (Leishman, 2024, 125).

Macroeconomics presumes that new supply affects affordability in the long term after its short-term effects were disproven (Leishman, 2024, 127-28).

The Letwin Review in the United Kingdom suggests that the difficulty with decreasing prices relates to the ability of the market to absorb homogenous products in tenure and type (Letwin Review, 2017).

## **2.3. Social Ramifications of High Prices**

As stated in 1.1, access to homeownership is decreasing and debts are increasing to buy into the housing market. The social ramifications go beyond this, with increasing prices undermining the current retirement system, placing high costs upon those who rent, and higher prices not translating into better properties for homeowners and renters.

### **2.3.1. Retirement is reliant on Home Ownership**

In the 1990s, Australia shifted from an unfunded retirement to an “implicit asset-based policy based on home ownership” (Yates & Bradbury, 2010). The boost of high homeownership rates allowed Australia to forgo the higher costs of supporting its aging population to a higher degree. However, not all were so fortunate and not being a homeowner means higher costs. “[B]y the mid-2000s, Australia had a poverty rate amongst people of retirement age that was the fourth highest of the OECD countries” however when considering housing assets, Australia performed amongst the best (Yates & Bradbury, 2010, 194). Additionally, the social housing system is limited in Australia and many are on the waiting lists (ABS, 2024).

Australia’s retirement system is based on compulsory savings, voluntary savings and a means-tested pension. There are three types of rates: full pension, part-pension income and part-pension assets. Yates and Bradbury argue that there is an unacknowledged “fourth pillar” which is housing (2010). This problem is not a new one, with the Henderson report finding 5% of retiree homeowners were in poverty compared to 26% of private renters (1975, 240)

While there is an extensive compulsory superannuation scheme and the age pension, lower housing costs are associated with home ownership (The Treasury, 2023, 169). Use of the age pension has been dropping since the 1970s at 80% to 70% in 2022-2023 (The Treasury, 2023, 168). However, this may be more of a sign of significant voluntary savings rather than the success of the pension system.

Retirement comes in many forms, but a comfortable retirement is reliant on voluntary savings, which primarily consist of housing assets.

A submission by the peak senior organisation in Australia in 2020 found that the pension system was “inadequate” (National Senior Association, 2020, 45-49). One couple in 2016 reported having only “\$180 dollars per fortnight to live on” after paying major bills (National Senior Association, 2020, 46). Subsequently, the pension was raised by a small, fixed amount but not indexed with inflation.

### **2.3.2. Renting’s New Importance and Secure Renting**

Renting has become the norm for younger people who are struggling to save a deposit for a home. This paper does not suggest that homeownership is more important than renting, renting is a valid form of tenure and should provide a secure home. However, Australians still profess strong opinions about owning their own home; a repeated cross-section survey of 4,057 respondents found 65.8% “saying it matters a lot” (Biddle, Gray & Phillips, 2024, 4). The supply of housing and investment properties plays a key role in the adequate supply

of rentals. However, in Australia, renting has remained a stepping stone to ownership later in life. However, now, it might be the new norm.

Renting as a tenure system in Australia has relatively low protections when compared to other OECD countries. Historically, tenant-landlord protections have been fairly sparse, with limited protections for tenants, thus favouring landlords. A key component of this has been no-cause evictions; this was recently removed from state jurisdictions. Additionally, while the Property Council of Australia would argue differently, a recent paper found that strong tenancy protections were not the main reason landlords dispose of their investment properties (AHURI, 2022, 43; Property Council of Australia, 2023).

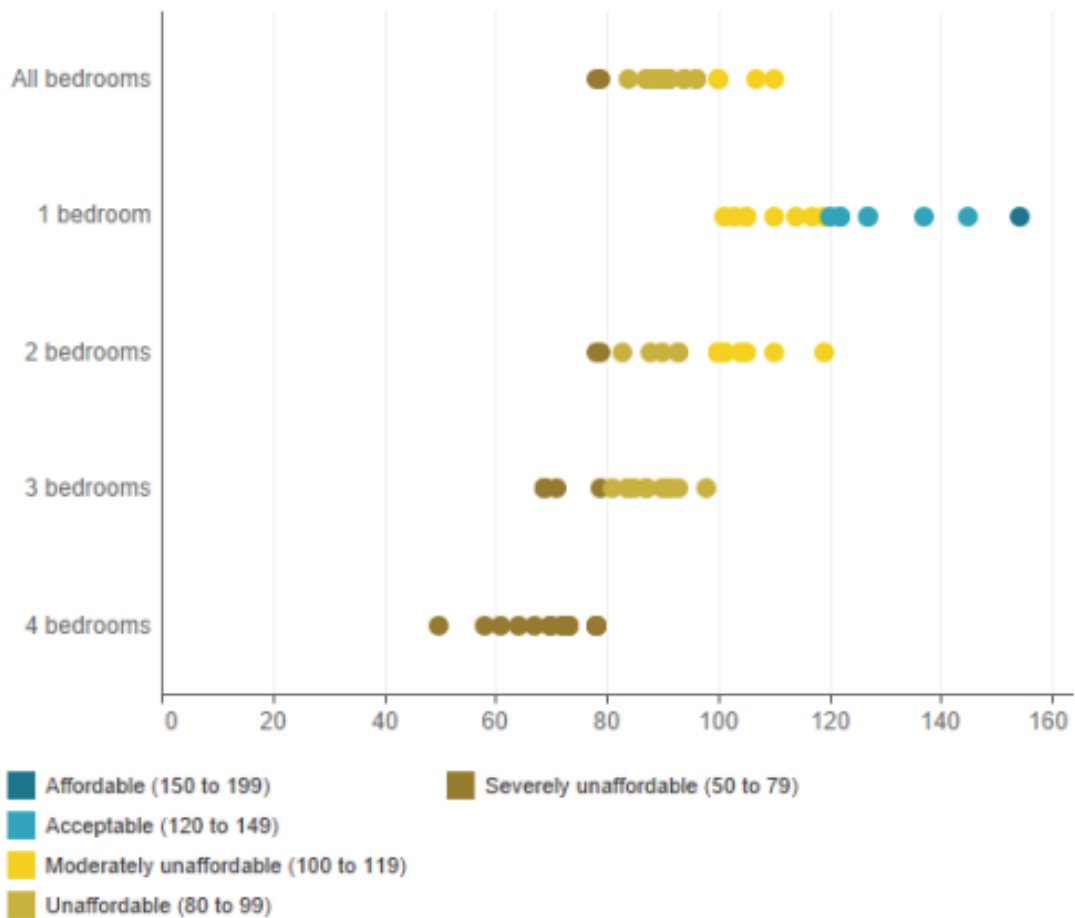
SGS Economics and Planning conducts annual rental affordability checks in Australia, they found affordability for the typical Canberran working to be affordable (2024). However, this affordability average hides lower-income earners. This crisis is reiterated by the recent Parliamentary inquiry called “The Worsening Rental Crisis in Australia” (2023). Using median wages for various income groups within Canberra, they found that income was unaffordable for all vulnerable income groups except for dual-income couples with children. The Rental Affordability Index (RAI) is calculated on 30% of income spent on housing, which is unaffordable for the 40<sup>th</sup> per cent of household income (SGS Economics and Planning, 2024, 8). Even when affordability is found (i.e. RAI score above 100), this can still symbolise high costs and need strong financial planning. For instance, for a score between 100-120, “rental households [are] less likely to meet and pay off unexpected costs or bills easily” (SGS Economics and Planning, 2024, 8). The calculations are based on median wages and make generous assumptions for hospitality workers working 38 hours a week. These calculations exclude “food, power and water, health services and medication, travel and transport, education, household goods and debt repayments” (SGS Economics and Planning, 2024, 7). The analysis also only includes rent by bedroom number rather than apartment, townhouse and house typology. This means that affordability may be propped up by lower-cost housing types that may have insufficient space. They find that the percentage of income spent on rent varied from 26% to 101% before other life costs. This suggests that disadvantage is hidden within Canberra and while affordability may present for the average income earner in Canberra and dual-income couples, for others, affordability is very challenging. These costs high costs, calculated on gross income, therefore not after tax, suggest that it would be very difficult to change tenure from renting to home ownership.

Household	RAI Score	Share of income spent on rent	Relative unaffordability
Single person on JobSeeker payment	30	101%	Critically Unaffordable
Single pensioner	47	63%	Extremely Unaffordable
Pensioner couple	63	48%	Severely Unaffordable
Single part-time worker parent on benefits	46	65%	Extremely Unaffordable
Single full-time working parent	117	26%	Moderately Unaffordable
Single income couple with children	104	29%	Moderately Unaffordable
Dual income couple with children	208	14%	Very Affordable
Student sharehouse	88	34%	Unaffordable
Minimum wage couple	96	31%	Unaffordable
Hospitality worker	76	40%	Severely Unaffordable

Source: Adopted from SGS Economics and Planning, 2024.

To further illustrate this point, the graph breaks down affordability for a certain income profile between April and June 2023 by bedrooms. The graph below shows that besides one-bedroom places in Canberra, the rest are moderately to severely unaffordable. For perspective, the median wage in Canberra is \$80,600 (ABS, 2024).

**Rental Affordability Index, by postcode and household income (\$95,000), 2023 Q2**  
**Australian Capital Territory**



Source: Adopted from Household Data Dashboard; Rental Affordability Index; SGS Economics & Planning.

### 2.3.3. Higher Properties Prices are not Better Homes

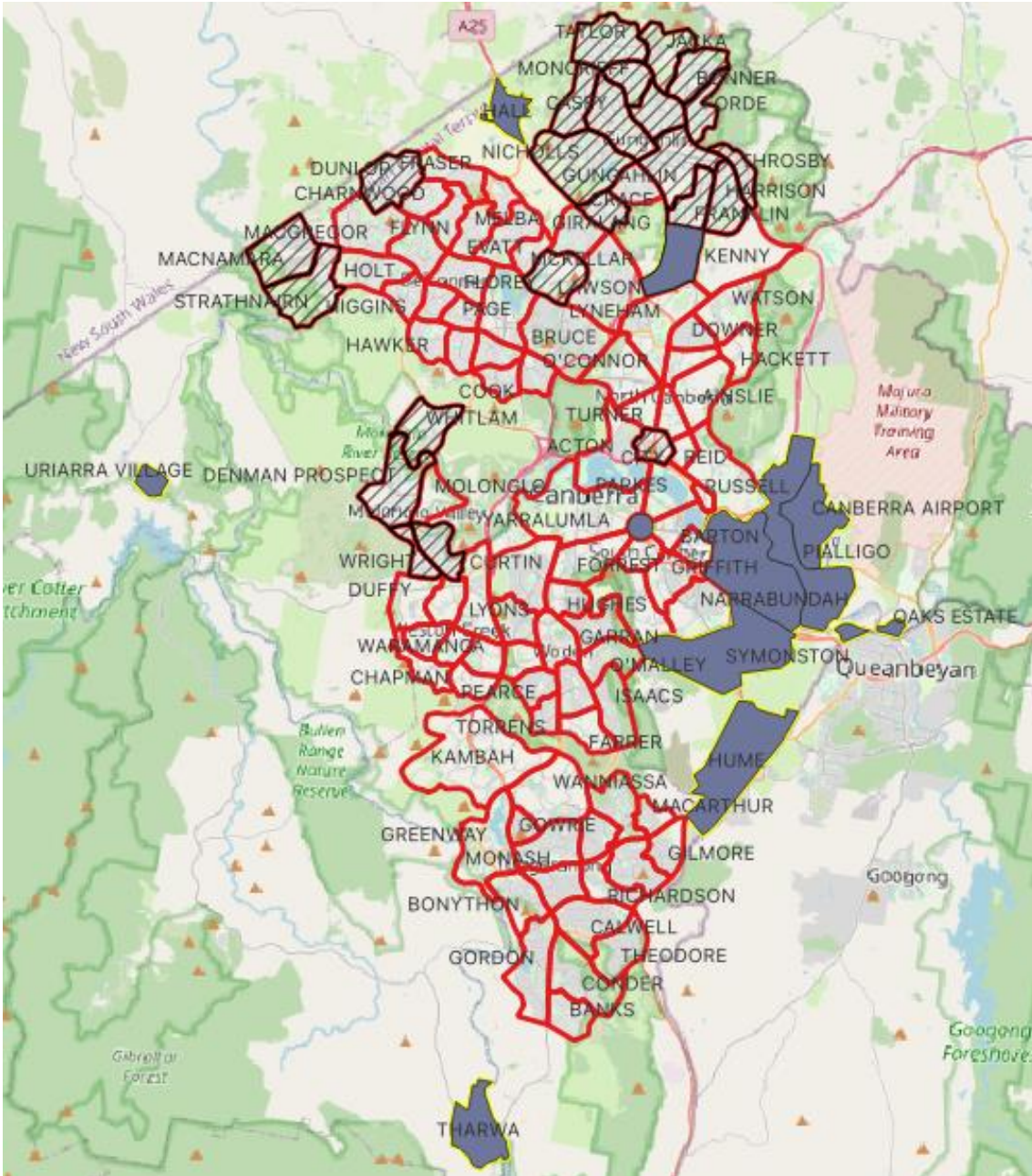
Higher property prices have not meant better homes. While there has been an increase in insulation standards post-2003 with thermal efficiency minimum standards, this has not cycled through to all housing stock. Half of the stock in Australia’s widest-ranging survey of 24,000 homes shows that half of them do not meet these minimum standards (Dinmore, 2023, *Our Housing Australia*, 34). Therefore, barring significant renovation, a large proportion of Australian homes are deficient by modern standards.

One study found that death rates during the winter increased by 20-30% (Barlow, Danie & Barker, 2023, 1). As mentioned in that paper, Australia is imagined to be a temperate climate but the temperature varies greatly, and research shows that the internal temperature of the home should maintain a constant 18 degrees for comfort and health (Barlow, Danie & Barker, 2023).

### **3. Research Data**

This is the first known study of new suburb supply, certainly of Canberra but also new suburb supply in economic literature. My paper relies upon individual sales data to create more variation than average monthly or quarterly changes. The map of Canberra below shows new suburb supply in hashed horizontal lines. The established suburbs are outlined in red. Established suburbs mean the first sales occurred in the dataset before 1992. The grey-blue colouring indicates suburbs that were excluded from analysis for either being industrial areas, rural or insufficient sales. As can be seen from the map, the majority of new suburbs were established in the north, north-west and west of Canberra from 1992-2024. An underlay of OpenStreet Maps from QGIS is retained to give an idea of geographical features like parks, lakes and streams.

#### **Map of Canberra**



Source: Author 2024; ACT Government Geospatial Database.

### 3.1. Contemporary Data

This paper represents the first academic dataset in Canberra with panel and cross-sectional data over 33 years. The dataset is a combination of individual property sales and matched with government housing data. The property sale data includes price, contract sale date, settlement date, some house attributes and sale type (e.g. normal transaction). The government housing data provides the type of house (i.e. townhouse), house identifier and geospatial information.

Property sales data was obtained from PriceFinder, which in turn obtains the data from the ACT government. PriceFinder is owned by Domain, the second-biggest lister of Australian properties online. Their online listings allow the company to collect data on

housing attributes including the number of rooms, bathrooms and car spots. The attribute information excludes living space size. The attribute information should be treated with caution and is not available for all properties. The housing attribute data is only included for properties listed on Domain’s website. This information is likely input by real estate agents.

The study period is from January 1991 to February 2024. Typically, the data settles within 90 days, however data from the government can change up to a year later. This is according to emails exchanged with a Domain employee.

The data was downloaded between 3-10 September 2024; it included 386,211 results. The results were downloaded using postcode; each postcode can include multiple suburbs. Two postcodes were excluded because they were administrative areas without residential sales. The final postcode was excluded due to too few sales over 33 years (150 total).

Additionally, all rural areas outside of Canberra were excluded due to their different attributes and limited transactions.

Area Type	Suburbs
Administrative Areas	134
Total Suburbs	121
Included Suburbs	107
New Suburbs	24

Source: Author, 2024; ACT Government.

Four property types exist within the dataset: apartments, townhouses, houses and vacant land. The built properties have three different price points with apartments typically being the lowest, townhouses and then houses. These different price points vary due to their exclusive or partial relationship with the underlying land. Scholars theorise that most of the price increases are due to the underlying land value. Economic scholars suggest this is due to land scarcity and proximity to city centres or amenities. Vacant land is included merely for summary statistics and to understand new suburb formation, it is excluded because it is not comparable to finished properties.

Houses have unrestricted rights, except by legislation, while townhouses and apartments must abide by their owner corporations’ rules. An apartment is defined by walls, ceilings and floors, with any shared walls, the responsibility is shared. Townhouses, like apartments, subdivide any shared walls; however, have their own roofs and restricted rights with the land associated with their title. Often in the Australian datasets, apartments and townhouses are grouped as ‘units’, however as the following will show they remain distinct from a price point. Within the data, these are classified as Class A (apartments) or Class B (townhouses)(Environment, 2023).

Wealth transfers are also represented within the database through \$0 dollars transactions. This means no monetary consideration was given in exchange for the property and this suggests the property was either a gift or an inheritance. There is limited data on this phenomenon in other research papers. However, policy papers have highlighted the coming wealth transfer of older generations (Productivity Commission, 2021). The Productivity Commission found that “wealth transfers do largely go to the rich, but on some measures wealth transfers actually reduce wealth inequality” (2021, 2).

The dataset mostly includes repeat sales: this allows me to see how a property was treated price-wise over different periods. This is the crucial dataset that property indexes rely upon because each property is unique (Battacharjee et al. 31). As I will later show, the house

identifier is has perfect collinearity with important controlling variables like suburb and house type (e.g. apartment).

The current data quality does not allow me to determine which and how many of these properties were renovated. There are two types of renovations: superficial and substantial renovations. Superficial renovations include redoing paintwork, replacing carpets and generally refreshing properties. Substantive renovations include more major changes like altering kitchens and bathrooms. More extensive renovations could include the addition of space or bedrooms. Renovations may go unnoticed from government datasets, where value has increased but did not meet this strict definition.

Nevertheless, renovations are cost-prohibitive, therefore only a limited number of properties are renovated each year. This reinforces my assumption that renovations will have a limited impact on my dataset. I would like to improve this in further iterations with government data.

The property transaction data was then merged with a current ACT government database with latitudes, longitudes and property types. This geographic information allows for distance calculations. Geographic distance markers were set around each suburb for 200 metres, 1 kilometre, 5 kilometres and 10 kilometres. The data was then date filtered sales before suburb creation. The date filtering is set by the first settlement date in a new suburb. Therefore, sales before these dates are excluded as being unaffected by the new supply. This does assume there is no anticipation which will be discussed in the method section.

<b>Locality</b>	<b>First Settlement Date</b>
NGUNNAWAL	3 May 1993
NICHOLLS	6 September 1993
AMAROO	6 September 1994
DUNLOP	13 October 1994
GUNGAHLIN	10 May 2001
CITY	26 March 2004 <sup>^</sup>
HARRISON	18 July 2005
FORDE	28 August 2005
FRANKLIN	11 December 2007
BONNER	5 November 2009
CASEY	24 July 2009
CRACE	14 March 2010
WRIGHT	2 May 2012
JACKA	25 Feb 2013
COOMBS	17 March 2014
LAWSON	17 November 2015
MONCRIEFF	12 May 2016
DENMAN PROSPECT	12 July 2016
THROSBY	14 August 2017
TAYLOR	8 January 2018
STRATHNAIRN	21 November 2019
WHITLAM	22 June 2021

PARKES	2022 <sup>^</sup>
MACNAMARA	2024*

Source: Author, 2024

<sup>^</sup>Parkes and City are inner city regions and are different from other greenfield sites. Parkes represents only one new apartment block. Therefore, Parkes is excluded from the analysis because it does not provide enough variation in new supply and is too different from other suburbs to allow its inclusion. The City suburb was retained.

\*Macnamara was excluded because the suburb is too new and has limited sales.

The primary interest variable is the sold price of each property. This is to determine the effect of new suburb supply on prices in surrounding areas.

### Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
addeduniqueidentif~r	371370	193725.8	110934.35	1	385331
saleprice	371370	356019.28	351118.5	0	9000000
addedyear	371370	2007.405	9.734	1991	2024
addedsettlementyear	371370	2007.817	9.927	1991	2024
addedsurbcreated	371370	1993.409	6.114	1991	2024
addednewsurb	371370	.213	.409	0	1
addedtimetosettlem~t	371370	142.261	362.848	-3547	12125
saletypeno	371370	.036	.186	0	2
area	371370	3461.435	7259	53	114795
bedrooms	304222	3.105	1.077	0	127
bathrooms	297196	1.489	.682	0	111
carparks	286758	1.704	1.116	0	254
propertytypeno	371370	.524	.629	0	2
valuationamount	249137	625323.15	1013778.4	0	26500000
objectid	371370	111113.35	80638.641	1	287035
unit classNo	371370	.467	.711	0	2
repeatsales	371370	.856	.351	0	1
acountrepeatedsales	371370	3.216	1.641	1	19
suburbref	371370	492.081	210.432	101	914
treated 200m	371370	.06	.238	0	1
treated 1km	371370	.226	.418	0	1
treated 5km	371370	.533	.499	0	1
treated 10km	371370	.672	.47	0	1

## 3.2. New Suburb Supply

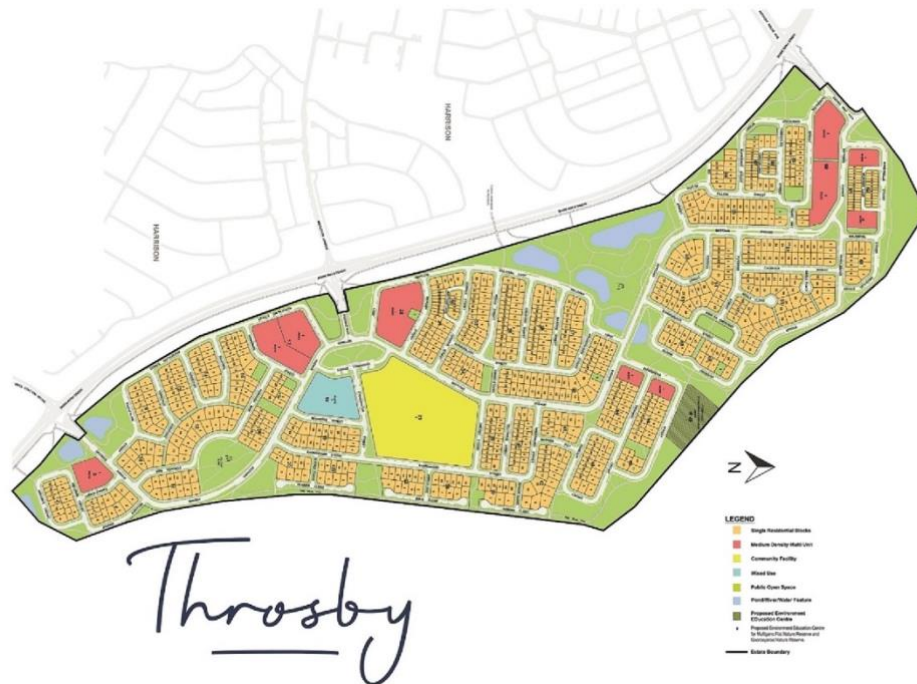
New suburb supply in Canberra is typically released in batches of three or four suburb releases (SLA, 2024). The land can be either sold to developers or sold individually to property buyers

Suburb	Year 1	Year 2	Year 3	Year 4
--------	--------	--------	--------	--------

BONNER	1 (2008)	88	153	290
CASEY	121 (2008)	630	335	474
COMBS	5 (2012)	26	162	341
CRACE	175 (2009)	258	343	496
DENMAN PROSPECT	1 (2014)	75	201	162
DUNLOP	315 (1993)	184	136	147
FORDE	29 (2006)	281	214	425
FRANKLIN	64 (2007)	155	468	267
GUNGAHLIN	252 (2000)	258	638	516
HARRISON	12 (2004)	206	650	429
JACKA	15 (2011)	53	58	49
LAWSON	7 (2014)	295	391	233
MACNAMARA	1 (2023)	6		
MONCRIEFF	1 (2014)	33	455	450
NGUNNAWAL	653 (1993)	1716	1036	905
NICHOLLS	168 (1993)	429	303	250
PARKES	7 (2019)	89	112	54
STRATHNAIRN	3 (2018)	42	174	174
TAYLOR	31 (2017)	146	93	243
THROSBY	1 (2016)	95	108	101
WHITLAM	23 (2020)	139	83	75
WRIGHT	35 (2010)	1	118	236

Source: Author, 2024

### 3.3. New Suburb Formation



Source: Adopted from the Suburban Land Agency, 2024.

The picture above depicts Throsby, a suburb in the north of Canberra completed in 2016-17 with approximately 1000 residences (SLA, 2024). The development of new suburbs happens in tranches, typically three to four tranches.

The majority of suburbs included in this dataset are greenfield sites, meaning they were in areas without prior buildings of any sort. Typically, this means turning rural land into residential and commercial properties. The exception to this is the City suburb where apartment supply was added long after the creation of the suburb. As the name implies, geographically, the area is very well situated.

The Suburb Land Agency (SLA) is the responsible government agency, previously the Land Development Agency (LDA)(2003-2017). The ACT government can either sell land to individual buyers or property developers when developing new suburbs. These can then be subsequently onsold as vacant land or completed properties. As will be discussed in the method section, these properties will be excluded from the DiD due to no comparison group.

When considering new suburb formation, pre-sales are a crucial component to satisfy financiers and provide some level of certainty to developers about interest. The settlement dates within the data are more indicative of new suburb formation (shown below). The settlement date is when the property transfers between the buyer and seller and effective ownership is transferred. Pre-sales for owners-occupiers would likely decrease demand. For pre-sales, depending on the contract, a fixed amount or percentage is provided. Nevertheless, the sale price is then fixed. Building timelines vary and dramatically change depending on the type of construction (ABS, 2024).

### Simple Hedonic Regression: House Sales

saleprice	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
bedroom	37076.88	1292.1	28	0	34544.	3960	*
s		32	.69		326	9.433	**
bathroom	127600.63	1576.6	80	0	12451	1306	*
s		25	.93		0.47	90.78	**
carparks	-9587.679	790.17	-	0	-	-	*
area	156.019	3.06	50	0	150.02	162.	*
			.98		1	017	**
Constant	57422.363	4056.5	14	0	49471.	6537	*
		01	.16		7	3.026	**
Mean dependent var		482774.029		SD dependent var		384496.710	
R-squared		0.116		Number of obs		143547	
F-test		4695.838		Prob > F		0.000	
Akaike crit. (AIC)		4081665.034		Bayesian crit. (BIC)		4081714.406	

\*\*\* $p < .01$ , \*\* $p < .05$ , \* $p < .1$

Source: Author, 2024.

## 3.4. Treated Zones

The treatment zones at the lower levels were identified by the literature, especially the 200-metre buffer zone. Extending rings were then applied to determine the extent of the spillover. Initial result panel data results suggest that there is some effect within 200 metres and 1 kilometre. This is discussed further in the results section. Below is a table of the treatment areas and subsequent exclusions from the zones. New suburbs were excluded due to them being the treatment. Vacant land and wealth transfers were also excluded because they are not comparable to regular sale transaction (i.e. the price paid).

### Treatment Areas

Treatment Area	Treated Properties	Excluding New Suburbs	Excluding Vacant Land	Excluding Wealth Transfers
200 metres	22,435	4,961	4,921	4,435
1 kilometre	83,862	23,444	22,828	19,678
5 kilometres	197,839	125,485	123,098	103,095
10 kilometres	249,426	170,651	167,996	139,289

## 3.5. Excluded data

Table: Excluded Results

	Dropped Observations	Remaining Observation	Program
Starting Property Sales		386,211	

No Geographic Information	13,618	372,513	Excel
Excluded Sales	1,151	371,442	Excel
Drop 1990	21	371,420	Stata
Rural Properties	27	371,393	Stata
Industrial Areas	3	371,390	Stata
Love and Affection Sales	50,787	320,603	Stata
Part Sales	2,727	317,876	Stata
Vacant Land	27,042	290,834	Stata
Repeated Transactions (Same Price, Same Day)	2,396	288,438	
Repeated Transaction (Same Price)	303	288,135	
Dropped to repeated transaction in same year	3,302	284,833	

Results were excluded due to no matching geographic data. The time commitment to find the latitude and longitudes for each property were beyond the limitation of this study but could be reincluded in further study. The excluded properties no longer exist within the contemporary ACT government geospatial database. These reasons include omissions, subdivisions and changed purpose. Without further research and government support, it is difficult to identify exactly when these properties changed.

The dataset included misidentified price sales – these were identified by being large outliers in terms of price. These were removed due to their interference with the main interest variable (sale price). Outliers were identified in five ways: commercial buildings, embassy buildings, whole building sales, being beyond the sale price of the most expensive house in Canberra, and far exceeding the recent government valuations. These exclusions were subsequently double-checked with competitor sites like RealEstate.com and AllHomes.com to verify the error. After this, 1,151 results were subsequently excluded.

Additionally, all categories that did not represent an at-arms-length sale transaction of a completed property were removed (love and affection, part sales and vacant land).

Subsequently, repetitive sales were removed from the database that had the same sale price and date. Then the same sale price. I am reasonably confident that these represent wrongly duplicated sale transactions within the data. However, the later dropping of transactions was to allow for the DiD formulas to work. For each house identifier, there is only allowed to be one transaction per time period. Due to the lengthy nature of the study already and the way DiD results are displayed, and the time to run them, I believe this was a fair approach. Alternatively, I could have separated the transaction by quarters to reduce the conflicting time period. I did not choose this approach due to the limited research on the effect this might have.

## 4. Methodology

This paper applies a difference-in-difference (DiD) method to new suburb formation. I apply DiD to surrounding suburbs rather than new suburbs to determine the impact of supply on price. The grouping is at the level of the house. New suburbs are excluded because they do not have adequate comparison groups and do not allow for pretend analysis. First, I discuss existing methodologies within housing economics. Second, I present the simple DiD composition. I then present the method I will use to accommodate staggered timing and heterogeneity. Third, I define how treatment will be defined by geographical distance and the literature that supports this. Finally, I discuss the assumptions that underpin the methodology.

In my extensive literature review of English housing journals, this is the first known study applying difference-in-difference to new suburb creation. Moreover, the first study to investigate the new suburb formation effect on price, especially in economics.

### 4.1. Existing Methodologies within Housing Economics

There are two significant methodologies within housing economics: hedonic price models and time series models (Leishman & Goel, 2024). The hedonic model proliferates in applied housing economics and stems from the belief that complex goods are made up of a variety of simple goods. These sub-goods are implicit in each home transaction without being visible and represent hidden sub-markets within the finalised good (Leishman & Goel, 2024). Hedonic modelling, a dominant form of modelling in housing economics, was adopted from automobile pricing (Leishman, 2024, 124). However, there are a few key differences between the fields; housing appreciates despite age (Leishman, 2024 124). Despite the field's prominence, there is debate about the functional form of the model with various amounts of specific structural features, locational features and neighbourhood characteristics (Leishman & Goel, 2024, 126-7). The variation also occurs in part due to the difference in data availability.

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n + e$$

The model applies ordinary least squares or alternately weighted least squares.

An extension of the hedonic model is to test the significance of newly introduced externalities (i.e. the presence of a new train station)(Leishman & Goel, 2024).

Finally, hedonic models can be used to identify sub-markets, whereby the “hedonic analysis should yield a set of coefficients which predicts a uniform level of housing services (not housing prices within a unitary housing market)”(Leishman & Goel, 2024, 126). This could include spatial boundaries like attractive school zoning. I utilise this strand of hedonic price models to apply varying levels of buffer zones to test the relationship between proximity and price.

I will utilise a simple hedonic method to provide some characteristics of the new suburb's supply (e.g. the cost of each additional bedroom).

Time series models can include demand and supply side features. These models are used for forecasting, testing volatility and regulation changes (Leishman & Goel, 2024, 128-136).

Demand side includes

The supply side includes: size, quality, and location. For new-build, the supply side includes “construction costs, interest rates and the supply of suitable land” (Leishman & Goel, 2024, 129).

## **4.2. Empirical strategy – Canonical Difference-in-Difference**

DiD has been deemed the “workhorse estimation approach for making casual inference”, especially in “empirical finance, accounting and legal studies” (Baker, Larcker & Wang, 2022, 370).

The original difference-in-difference method that was dominant until 2020 used two differences. The difference between treated and untreated groups (difference one) with before and after treatment (difference two)(Callaway, Goodman-Bacon and Sant’Anna, 2024, 1).

There are three groups in DiD: the never-treated, not-yet treated and the always-treated. In my data, however, I have a fourth group, the newly-created group. To make my analysis simpler and to stay true to DiD literature, I exclude them altogether due to the lack of a comparison group. In the typical DiD literature, the newly created group would indicate the dosage of the treatment.

An extension of the two groups and two time periods has been the staggered adoption of treatment which has become popular in the last 20 years (Baker, Larcker & Wang, 2022, 370).

## **4.3. Difference-in-difference in the presence of Heterogeneity**

The difference-in-difference field has undergone a revolution since 2020, with key papers critiquing two-way fixed effects in the presence of heterogeneity. This does not mean the old way is inadequate; rather, when heterogeneity is present, the two-way fixed effect (TWFE) approach does not represent an accurate estimation of the variable of interest. Sun and Abraham argue this occurs when treatment effects differ across cohorts or over time (2021). This was partly due to the use of so-called bad comparisons between already treated comparison groups (Ross, 2022). Woolridge and others have tried to reform TWFE to focus exclusively on never-treated and not-yet-treated comparisons (Woolridge, 2022). This also entails the dropping of single-group observations that introduce bias (Correia, 2015). See Goodman-Bacon (2021), Callaway and Sant’Anna (2021) and Sun and Abraham (2021) for further information.

First, housing is heterogeneous, therefore, the new methods of DiD must be used (Leishman & Goel, 2024, 123). The heterogeneity is evident in the ways similar units are listed for similar prices despite having different physical and spatial attributes (Leishman & Goel, 2024,123). Additionally, behavioural economics finds the interest of developers, real estate, sellers and real estate agents assist in dictating prices. This is especially important in new suburbs when stock is relatively similar and this can also be seen through the vast majority of stock being houses. Even in existing suburbs, many of the houses have many similar features.

The new DiD literature focuses on comparisons between the not-yet-treated group or the never-treated group to the treated group. The not-yet-treated group allows estimation

of the duration of treatment exposure, while the never-treated group provides an objective comparison. These assumptions may be undermined to some extent if there is spillover from treated groups. I use various Stata formulas including: `csdid`, `xthdidregress`, and `jwdid`. Before running the various treatment areas through these different formulas, I ran a simple regression to test for perfect collinearity. Using the housing identifier matched with the sales data, I tested suburb and housing typology. These all came back as perfect collinearity and, therefore were excluded from my covariates.

The key concept is multiple group-time ATT (Callaway & Sant’Anna, 2021)

$$ATT(g, t) = E[Y_t(g) - Y_t(0) | G_g = 1]$$

‘t’ denotes the time and ‘g’ denotes the group.

This allows different groups at different times to have varying treatment effects and then allows their analysis in a unified manner (Callaway & Sant’Anna, 2021, 204).

There are three methods the approach can apply: regression, doubly robust estimand and inverse probability weighted outcomes (Callaway & Sant-Anna, 2021).

#### 4.4. Treatment Specification

This section focuses on choosing treatment zones and using supporting literature to determine the zones. The economic literature on proximity suggests that property markets have sub-markets (Gibb et al. 2024). Sub-market theory argues that proximity is important when judging supply relationships. However, large amounts of supply growth in other submarkets may not dampen demand in another sub-market (Ong & Leishman, 2024, 9).

I exclude covariates due to perfect collinearity with the house identifier (i.e. `objectid`). These include suburb and house type (e.g. apartment).

The same property is compared over different periods. Acknowledging the dataset currently does not allow renovation information.

In applying this methodology, I crucially assume there is spillover from new suburbs that affect prices in surrounding areas. Phrased another way, local properties influence the suburbs around them and this has some relationship to proximity.

A key assumption of this paper is that there is some relationship between prices, proximity and new supply. This has been found in relation to new rental properties in Uruguay. I apply geographic distances of 200 metres and one kilometre to determine this relationship. The 200-metre distance is taken directly from the Uruguay paper that found close locality had a significant effect on prices.

#### 4.5. Underlying Assumptions

There are four DiD assumptions: treatment permanence, parallel trends, no-anticipation and stable unit treatment value assumption (SUTVA). First, treatment is assumed to be permanent according to canonical DiD literature (Delgado and Florax, 2015). Simply put, if a group is treated in time one then the group will be treated in the next period and all those following (Callaway & Sant’Anna, 2021, 223). This is stated in the data as a binary variable, either 0 for untreated or not-yet-treated. This dummy variable can also be shown by the first treatment year, depending on the Stata code.

The SUTVA assumption is not considered critical within the literature; however, it certainly affects the designation of not-yet-treated if this assumption does not hold. This

relates to the concept of spillover effects and whether these groups remain good comparison groups.

#### **4.5.1. Parallel Trends**

The difficulty with identifying parallel trends with this method is there are only two years before the staggered difference-in-difference begins, which leads to limited baseline covariates. New suburb creation does not allow parallel trend assumptions since comparing trees with new dwellings is not possible. Therefore, my model excludes these suburbs besides using their geographic boundaries to determine the treated and never-treated zones. I do use the new suburbs to provide basic summary statistics to understand the creation of new suburbs. The parallel trend in our scenario is before the new suburb is built and after the new suburb is built.

#### **4.5.2. No Anticipation**

There is anticipation in the strictest sense because of pre-sales in new suburbs. However, as stated above, these were excluded from the study to test the relationship within existing suburbs of new supply. There is also no evidence to suggest that pre-sales would count as anticipation since the housing market may only be affected when the new supply comes online to compete with existing properties. This assumption has more impact on the not-yet comparison group and its validity as a proper comparison group (Callaway & Sant'Anna, 2021, 205).

#### **4.5.3. Stable Unit Treatment Value Assumption**

This assumption assumes there is no spillover between units of treated, never-treated and not-yet-treated. Yet, the whole premise of this paper assumes that new supply should have some effect on sale prices, holding all other factors constant. Therefore, the paper expects spillover from the newly created supply but not between the other groups. Understandably, this may be a stretch however other papers rely upon this assumption.

I test the assumption of spillover from new suburbs by applying different treatment distances. Literature on amenities, schools and sub-markets suggests that there is some drive to live in similar areas. However, due to the limited nature of new suburb studies, this has not been empirically tested.

## 5. Results

Initial results applying panel regression (`xtset`) show there is a consistent decrease in prices in the 200 metre and 1 kilometre buffer zones, but not in the 5 kilometre and 10 kilometres. Further analysis with DiD proved mixed due to omitted ATET estimations. These omitted ATET results were due to not having enough information to identify the cohort-time ATET effect on specific years.

Nevertheless, the results demonstrate significant variability in the ATETs across different cohorts and years. Only some of the results are significant at the 1%, 5% and 10% levels of significance.

Post-COVID-19, prices rose by 30% in the Australian Capital Territory, and the magnitude can be seen in the results post-2020, particularly in 2021 (NHSAC, 2024, 63). The subsequent change in the results may be for many reasons, including the increased cost of construction post-COVID (40%), and this may have introduced a premium for new supply, especially compared to older homes (NHSAC, 2024, 68).

### 5.1.1. What does a new suburb creation look like?

There are 22,543 distinct houses, 9,942 apartments and 3,851 townhouses in the new suburbs of Canberra. Only 17,598 houses, 9,785 apartments and 3,832 townhouse sales were for a price. The mean for \$364,625

#### House Sales

Variable	Obs	Mean	Std. Dev.	Min	Max
objectid	55519	96428.35 2	68891.90 4	133	286892
saleprice	55519	364625.7 8	332015.1 6	0	6000000
addedyear	55519	2008.757	8.712	1991	2024

Source: Author, 2024

#### Apartment Sales

Variable	Obs	Mean	Std. Dev.	Min	Max
objectid	15414	249427.23	29026.40 6	155060	281088
saleprice	15414	438912.87	267991.3 4	0	7599000
addedyear	15414	2016.543	5.047	1994	2024

Source: Author, 2024

#### Townhouse Sales

Variable	Obs	Mean	Std. Dev.	Min	Max
objectid	8159	199729.5 3	57410.71	134173	282150
saleprice	8159	381806.5	241073.7	0	7250000

		2			
addedyear	8159	2011.349	8.703	1993	2024

Source: Author, 2024

### 5.1.2. Included Observations

When considering the various models, the ATET effects were the same but at different levels of the model of observation numbers. This may suggest that formulas like `xthdidregress` also drop the other observations.

#### Csdid Model Observations

	Model Observations
200m Treatment – Never-Treated	25,390
200m Treatment – Not-Yet	25,452
5km Treatment – Never-Treated	46,163
5km Treatment – Not-Yet	51,970

Source: Author, 2024

### 5.1.3. Vacant Land

#### Vacant Land Sales

Variable	Obs	Mean	Std. Dev.	Min	Max
objectid	18791	101041.1 5	71970.62 7	133	286892
saleprice	18791	203009.1 5	220442.3 1	0	5430000
addedyear	18791	2005.117	8.677	1991	2024

Source: Author, 2024

## 5.2. Different Proximity Treatments

My results are inconclusive. I assumed that there would be some change in prices in the surrounding suburbs around the new supply, and this would be evident in the data. Instead, there seems to be little relationship between new supply and price in the surrounding dwellings. This contrasts with rental data but may be explainable by the high transaction costs and **stickiness** of buying property. The slower turnover may make it difficult for new supply to affect surrounding neighbourhoods. This aligns with economic research whereby “econometric studies of the relationship between new-build housing supply and house price level change or affordability often find only a very weak relationship” (Leishman & Goel, 2024, 123).

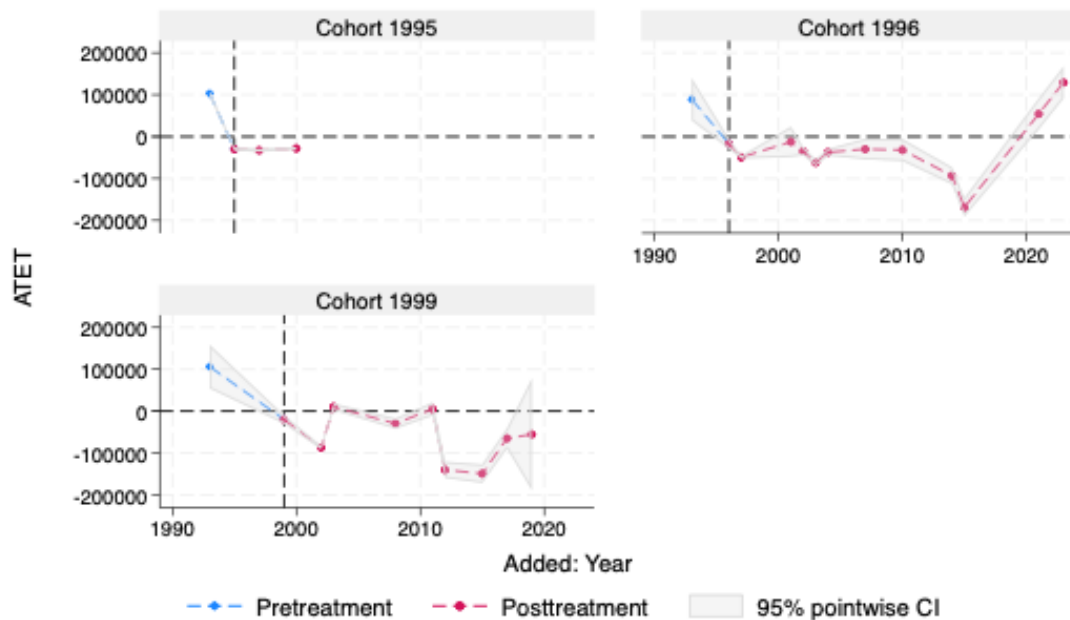
Additionally, my model, by its nature, does not take into account the new supply itself because it has no comparison group. Therefore, the analysis consists entirely of second-hand sales within surrounding neighbourhoods, which consist of most of the supply.

The final part of the model that can only be found by a deep analysis of the formula itself is that the csdid method drops all singleton observations from the model because of expected bias. This decreases the amount of additional information within the formula.

### 5.2.1. 200 Metres

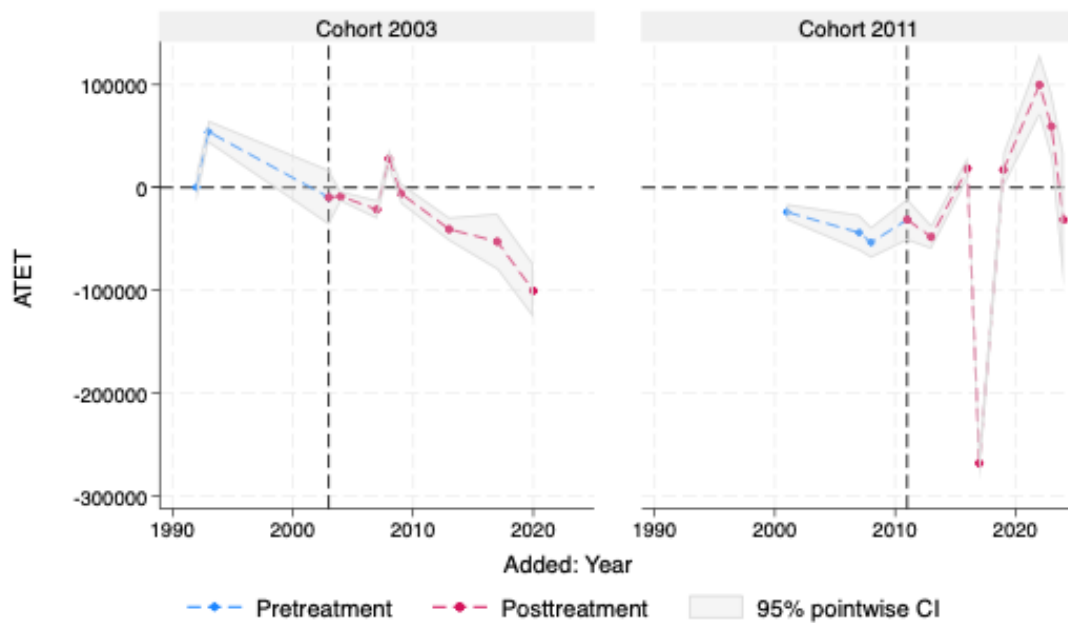
I used normal panel regression with fixed effects to focus on 200 metres and 1 kilometre for more extensive testing. There were limited differences between the ATET of the never-treated and not-yet-treated comparison groups. Additionally, little variance in their respective p-values and no change in significance levels of 1%, 5% or 10%.

There is limited evidence of changes after the introduction of new supply nearby, with cohorts from 1995, 1996, and 1999 showing decreased prices around the introduction of new supply. These cohorts have been highlighted due to the close comparison year before treatment. However, later years show different trends, though this could be due to the decreased impact of new supply or other market factors.



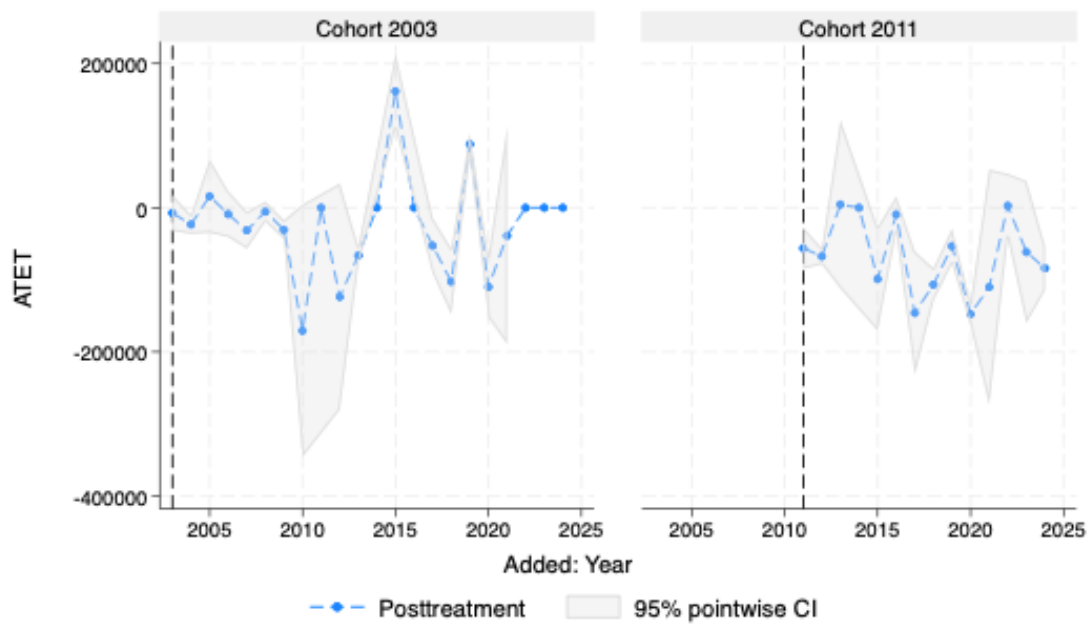
Source: Author, 2024.

The Stata method leads to many omitted variables, which makes interpretation difficult despite the strong significance found in many years. I graph cohorts 2003 and 2011 below to show the difficulties with interpretation (chosen due to their length of data).

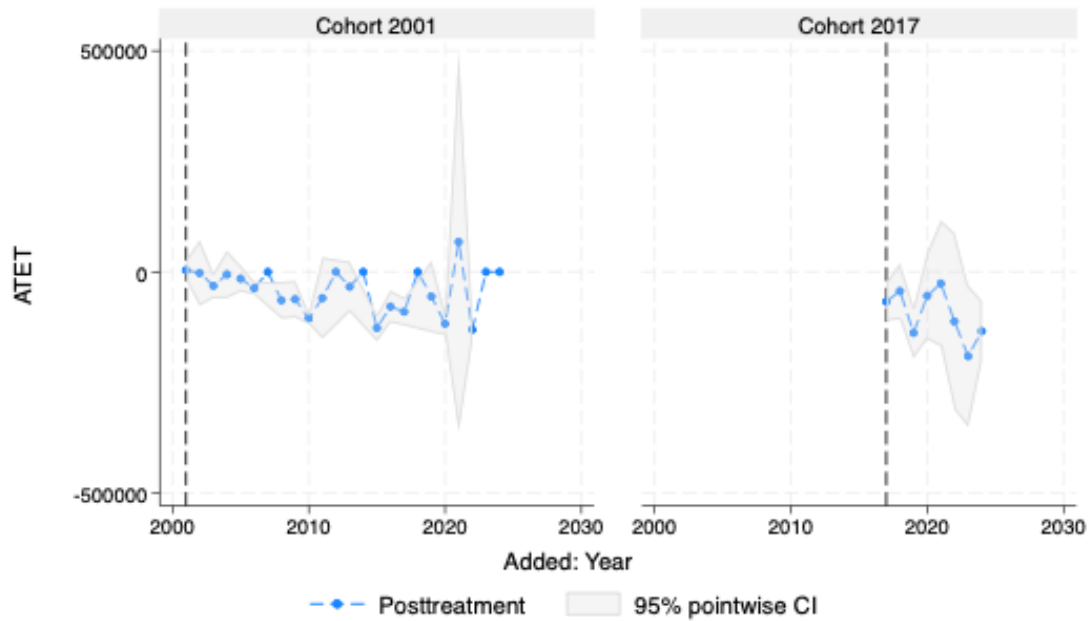


Source: Author, 2024.

In contrast, the two-way fixed effect method with `xthdidregress` provides nearly yearly estimates. The model has 231,715 observations and 100,156 panels. Again, I plot cohorts 2003 and 2011 for comparison. The cohort years depict a slight drop in price around suburb completion and then a price increase. However, prices are volatile in subsequent years. Further, cohort graphs appear to depict that any price drop is small, though the magnitude seems to grow greater in later years. All of the magnitudes in the TWFE model are consistently negative across most cohorts. Therefore, the alternative argument is that the model does not sufficiently control for suburb effects, even though this is contained within the static variable of the house identifier. Otherwise, there may be other confounding variables that would benefit the model; this is further discussed in the limitations of this paper.



Source: Author, 2024.



Source: Author, 2024.

Running the `xtdidregress` method found 86 results: 63 significant results at the 5% level, 4 at the 10% level and 19 non-significant results.

The never-treated comparison group has 231,715 observations and 94,904 panels.

The `csdid` results replicate the results from `xtdidregress` in their ATET effect and significance.

Table: 200 Metre Treatment Comparison between Never-Treated and Not-Yet Groups

<b>Cohort</b>	<b>Year</b>	<b>ATET Never (\$)</b>	<b>ATET (\$) Not Yet</b>	<b>P-value</b>	<b>Effect</b>
<b>1993</b>	1993	61,618	58,082	0	Positive
	1996	82,539	82,426	0	Positive
<b>1994</b>	1993	115,718	112,389	0	Positive
	2018	156,508	156,508	0	Positive
<b>1995</b>	1993	103,268	100,124	0	Positive
	1995	-29,866	-29,876	0	Negative
	1997	-32,708	-32,598	0	Negative
	2000	-28,227	-27,807	0	Negative
<b>1996</b>	1993	88,968	86,463	0.001	Positive
	1996	-17,115	-17,113	0.006	Negative
	1997	-49,208	-49,098	0	Negative
	2002	-35,160	-34,789	0	Negative
	2003	-62,068	-61,197	0	Negative
	2004	-37,452		0	Negative
	2007	-29,815		0.018	
	2010	-32,067		0.017	
	2014	-93,480		0	
	2015	-168,719		0	
	2021	54,299		0.004	
<b>1997</b>	1999	-11,668	-11,375	0	Negative
	2001	18,451	19,038	0	Positive
	2019	143,725	143,725	0	Positive
	2020	70,363	70,363	0	Positive
<b>1998</b>	1993	54,768	52,387	0	Positive
	1998	-27,106	-27,256	0	Negative
<b>1999</b>	1993	106,534	104,742	0	Positive
	1999	-19,497	-19,382	0	Negative

	2002	-86,585	-86,214	0	Negative
	2003	10,431	11,302	0.006	Positive
	2008	-29,455		0	
	2012	-139,926		0	
	2015	-149,019		0	
	2017	-64,912		0	
<b>2000</b>	1993	43,193	41,557	0	Positive
	2000	-21,861	-21,440	0	Negative
	2003	18,931	19,802	0	Positive
	2004	-45,852	-45,966	0	Negative
	2007	11,684	11684	0.012	Positive
	2008	95,494	95,494	0	Positive
	2012	-51,976		0	
	2014	-73,330		0	
	2017	235,937		0	
	2018	-173,991		0	
<b>2001</b>	1993	91,159	90,035	0	Positive
	2001	23,842	23,679	0.001	Positive
	2013	-37,367	-37,163	0.003	Negative
<b>2002</b>	1993	46,218	45,265	0	Positive
	2002	-23,102	-22,927	0.056	Negative
	2004	-19,562	-19,466	0	Negative
	2010	-44,490	-44,263	0	Negative
<b>2003</b>	1993	54,301	53,655	0	Positive
	2004	-8,612	-8,516	0.001	Negative
	2007	-21,344	-21,271	0	Negative
	2008	27,968	28,193	0	Positive
	2013	-40,504	-40,504	0	Negative
	2017	-52,528		0	Negative

	2020	-100,309		0	Negative
<b>2004</b>	1993	50,718	50,168	0	Positive
	2004	-43,573	-45,319	0	Negative
	2005	-21,096	-21,132	0	Negative
<b>2005</b>	2005	-29,559	-28,474	0	Negative
	2015	-24,264	-23,807	0.013	Negative
<b>2006</b>	2003	-115,430	-115,114	0.059	Negative
	2006	-21,111	-20,724	0.008	Negative
	2017	107,865	107,865	0	Positive
<b>2007</b>	1995	-12,940	-12,937	0.086	Negative
	2003	9,819	10,155	0.002	Positive
	2004	24,926	23,491	0.001	Positive
	2016	60,476	60,476	0	Positive
<b>2008</b>	2002	-19,627	-19,536	0	Negative
	2003	-47,180	-46,933	0	Negative
	2004	89,876	88,682	0	Positive
	2005	-199,509	-199,509	0	Negative
	2015	-52,382	-52,169	0	Negative
<b>2009</b>	1993	91,268	90,893	0	Positive
	1999	45,386	45,457	0	Positive
	2003	-38,180	-38,078	0	Negative
	2009	-63,692	-63,689	0.019	Negative
	2017	27,846		0	
<b>2010</b>	2007	-87,856	-87,725	0	Negative
	2014	-283,771	-283,712	0	Negative
	2016	38,733	38,733	0	Positive
	2017	34,831	34,831	0.001	Positive
<b>2011</b>	2001	-23,793	-23,864	0	Negative
	2007	-43,856	-43,886	0	Negative

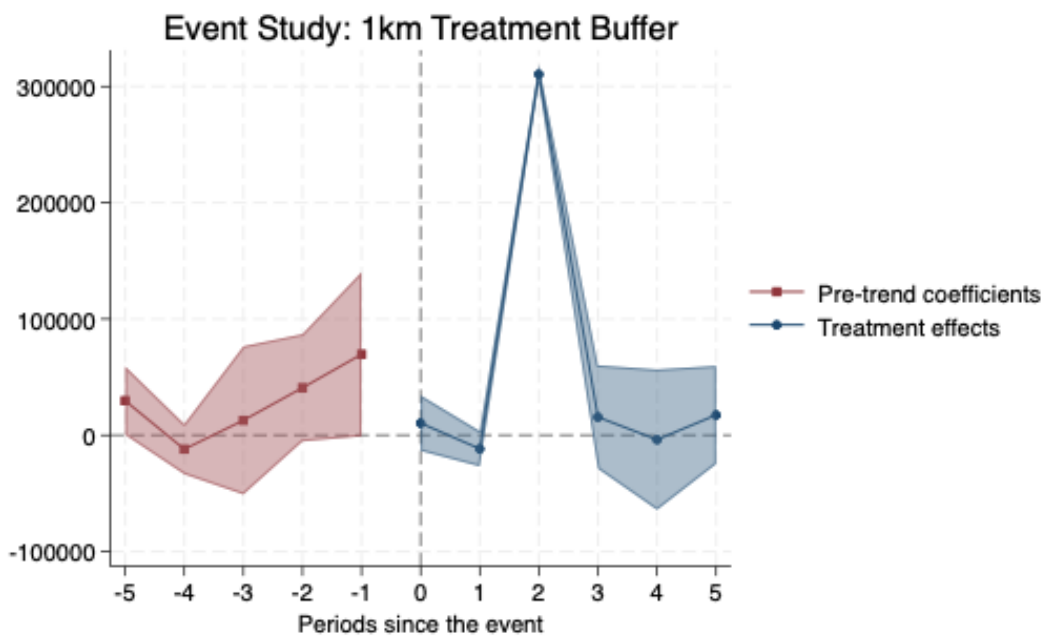
	2008	-53,404	-53,332	0	Negative
	2011	-31,232	-31,232	0.003	Negative
	2013	-48,082	-47,905	0	Negative
	2016	18,683	18,683	0.001	Positive
	2017	-268,003	-268,003	0	Negative
	2019	17,185	17,185	0.046	Positive
	2022	99,967	99,967	0	Positive
	2023	59,451	59,451	0	Positive
<b>2012</b>	2019	109,699	109,699	0	Positive
<b>2013</b>	2004	119,926	119,054	0	Positive
	2013	160,205	160,205	0	Positive
<b>2014</b>	2000	-12,273	-12,297.48	0.063	Negative
	2002	-34,127	-34,094	0	Negative
	2014	217,893	217,893	0.012	Positive
<b>2015</b>	1996	-20,968	-20,997	0	Negative
	2003	-37,680	-20,997	0	Negative
	2021	-152,738	-152,738	0	Negative
	2023	-250,134	-250,134	0	Negative
<b>2016</b>	1993	45,268	45,067	0	Positive
	1998	-14,811	-15,189	0	Negative
	2002	-13,377	-13,390	0	Negative
	2004	101,176	100,857	0	Positive
	2016	-56,905	-56,558	0.091	Negative
	2023	-106,719	-106,719	0	Negative
<b>2017</b>	1998	70,338	70,338	0	Positive
	2004	57,901	57,901	0.057	Positive
	2006	-38,111.23	-37,900	0	Negative
	2010	-62,760.	-63,183	0	Negative
	2021	-172,492	-172,492	0	Negative

<b>2018</b>	2003	85,819	86,014	0	Positive
	2010	51,239	51,239	0	Positive
	2018	-49,925	-49,925	0.048	Negative
<b>2019</b>	1994	-19,334	-19,362	0	Negative
	2006	-45,111	-45,111	0	Negative
	2008	-18,354	-18,354	0.017	Negative
<b>2020</b>	2001	31,256	31,256	0	Positive
<b>2021</b>	1999	-21,563	-21,563	0	Negative
	2003	-33,180	-33,049	0	Negative
	2021	-95,277	-95,277	0	Negative
<b>2022</b>	1993	103,768	103,768	0	Positive
	1994	7,615	7,615	0.017	Positive
	2003	-61,680	-61,667.68	0	Negative
	2017	-33,992	-33,992	0.059	Negative
<b>2023</b>	2002	24,372	24,401	0	Positive
<b>2024</b>	2002	-16,627	-16,627	0	Negative
	2003	-6,680	-6,680	0.044	Negative
	2005	-36,596	-36,596	0	Negative
	2024	-220,364	-220,364	0	Negative

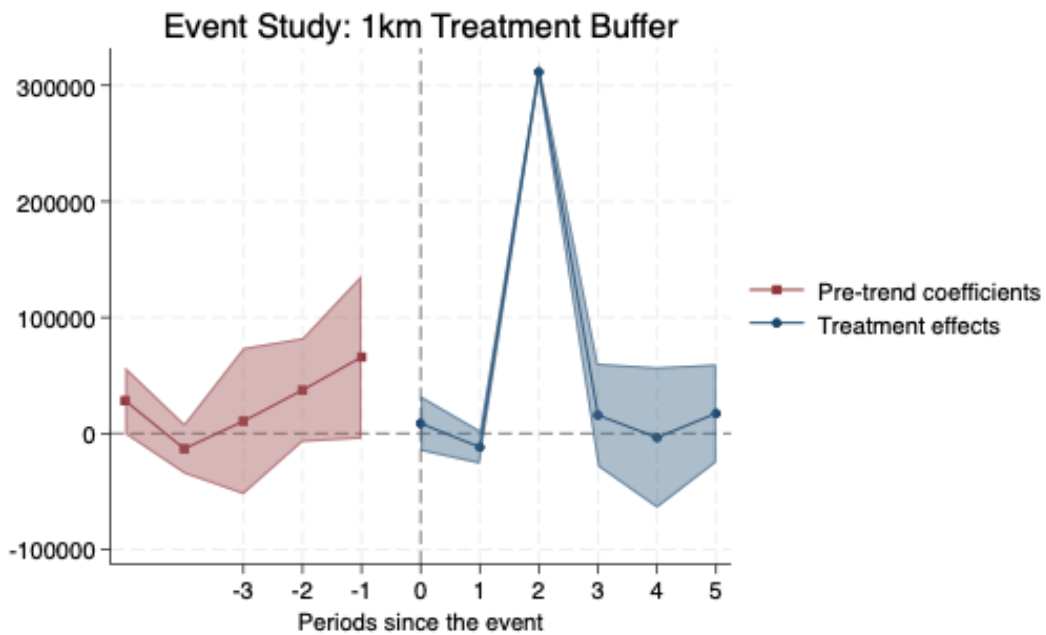
Source: Author, 2024; all decimal places on the ATET rounded down

### 5.2.2. 1km Treatment

There is some evidence in the event study of drops in prices. However, the significance level is low for pre and post-treatment. There is little visual change between the not-yet-treated and never-treated group and this suggests both are reasonable groups for comparison. There is some slight variation in their magnitude, however.



Source: Author, 2024; code csdid; reference category: never-treated; confidence level 1%.



Source: Author, 2024. Code csdid; reference category: not-yet-treated; confidence level 1%.

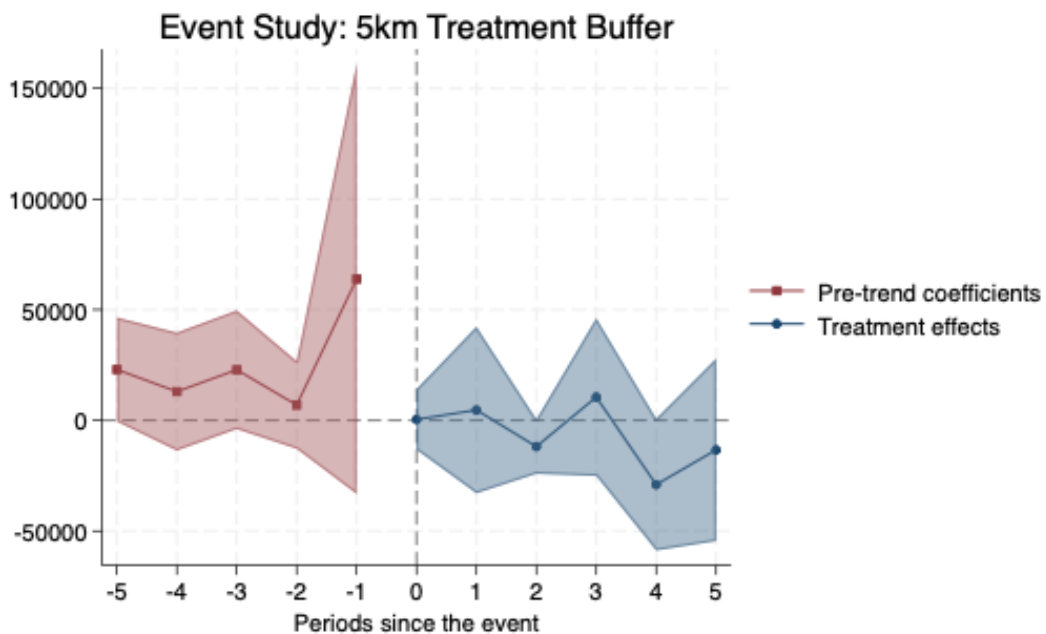
### 5.2.3. 5km Treatment

Again, the 5km treatment shows limited levels of significance. The pre-average does show positive results before and then a negative average post-treatment.

ATT by Periods Before and After Treatment; Event Study: Dynamic effects

Coefficient	Std. Errors	err.	z	P>z
-------------	-------------	------	---	-----

Pre Average	25,904.910	11103.500	2.330	0.020	4142.454
Post Average	-6,449.617	6522.746	-0.990	0.323	-1.92e+04
Lag 5	22,938.390	12008.780	1.910	0.056	-598.387
Lag 4	12,975.330	13613.350	0.950	0.341	-1.37e+04
Lag 3	22,851.820	13685.410	1.670	0.095	-3971.095
Lag 2	6,912.640	10104.080	0.680	0.494	-12891
Lag 1	63,846.340	49557.100	1.290	0.198	-3.33e+04
0	393.575	7007.408	0.060	0.955	-1.33e+04
Lead 1	4,661.073	19205.780	0.240	0.808	-3.30e+04
Lead 2	-1.18e+04	6284.546	-1.890	0.059	-2.42e+04
Lead 3	10,495.920	18184.430	0.580	0.564	-2.51e+04
Lead 4	-2.90e+04	15195.500	-1.910	0.056	-5.88e+04
Lead 5	-1.34e+04	21032.950	-0.640	0.525	-5.46e+04



Source: Author, 2024. Code csdid; reference category: not-yet treated; confidence level 1%.

### 5.3. Wealth Transfers

The majority of property transfers are housed at 99.79%. Apartments and townhouses only account for 0.05% and 0.16%, respectively.

The typical land valuation of property given in 2022 was a minimum of 154,000 and a maximum of 1,750,000 dollars. The mean was \$434,840. Remember, these valuations are before improvements (i.e. the property) and are typically lower than in older established suburbs.

Surprisingly, despite the concern of growing wealth transfer in recent times, the years with the largest transfers were 1992, 1993 and 1994. The most recent transfer of over 1,000 homes in any year is 2009 with 1,239.

This limited review suggests that wealth transfers have not increased in recent years, or at least not wealth transfers of residential housing. Nevertheless, further matching with

recipients' income would be necessary to understand who exactly is receiving these transfers and which income quintiles are benefiting the most.

## 5.4. Limitations

First, the use of buffer zones is a blunt instrument because it does not take into account geographical features like lakes and parks. This could mean that smaller buffer zones like 200 meters should be adjusted for geographic features between nearby properties.

Second, crucially, the model does not include infill development. I would need further government data to identify completed properties. This is due to the difficulty of identifying whether a sale is the first property sale or the first sale within my dataset.

Third, the method I use requires treatment to remain permanent, however there is an argument that, at some point, a new suburb becomes an established suburb. For instance, Ngunnawal was created in 1993 and after 31 years, the model still considers the effects. Additionally, this would change the number of houses excluded in buffer zones for being treated but being in a 'new suburb'. Treatment is permanent within DiD literature, but how applicable is this to suburb creation? After all, when does a new suburb become an established suburb?

Fourth, there is little consideration of anticipation within this paper and this contradicts the literature around new train stations and an increase in rental prices before the station is complete. While caution needs to be taken with the applicability of rental literature to property sales and the unique characteristics of Asian cities, the eventual completion of a home would likely have some impact on demand for similar properties.

Further work could look at the characteristics of properties that respond to new supply. Adapting to behavioural ideas of trading up and trading down. The exclusion of older new supply suburbs may also have a limited impact; perhaps they are more responsive to new supply. This may be especially the case post-2001 when energy efficiency standards were brought in.

## 6. Conclusion

The paper presents an examination of the Australian property market, focusing on the dynamics of supply, demand, and the socio-economic implications of housing affordability. Housing affordability is explored through rising home prices and the changes it is having on the fabric of Australian society. Ultimately, the evidence around new suburb supply (greenfield development) remains inconclusive. While this is disappointing, this should not demean the fact that understanding the effects of new supply is important to understand whether supply changes alone will fix housing affordability.

To explore these dynamics, I explore some of the most prominent federal government policies, which include the capital gains exemption, negative gearing, main house exemption, and first-home buyers grant. Additionally, I explore the divisive debate on zoning regulation to ultimately find that restrictive zoning may impact supply but is certainly not entirely responsible for limited supply.

The findings also stress the social ramifications of escalating property prices. These include the reliance on homeownership for retirement security, the rising prominence of renting, and the realisation that higher property prices do not address deficiencies in-home quality.

In exploring supply through the case study of Canberra, I apply the difference-in-difference approach to investigate a new avenue of exploring the effects of new supply. The exploration also allows for a short discussion of wealth transfers and new suburb creation. The method applies varying levels of buffer zones to try and establish a spatial relationship with the new supply. The DiD also uses the new formulas built since 2020 to accommodate homogeneity in the data. Ultimately, no causal conclusions can be drawn due to the infrequency of sale transactions of the same house and the limited data for each year that does not allow ATET effects to be calculated.

Hopefully, this research and exploration of housing in Australia will contribute to the discourse on housing economics. The paper reinforces the need for targeted interventions that address the high prices of Australian homes to enhance affordability and mitigate negative outcomes.

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## Notes