A comprehensive look at the interaction of heritage, zoning and housing values

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Abstract

Heritage overlays are commonly employed across cities as a way to maintain the "character" of a neighbourhood. Heritage overlays in Melbourne vary in scope, but typically require additional permitting requirements in order to alter the existing structure. Qualitative household surveys are mixed on whether a heritage overlay benefits households. On the one hand, heritage may preserve the character of a neighbourhood, yet on the other, it limits redevelopment. Recent theoretical models generally suggest that while property prices fall, the overall welfare falls. Empirically, we find that heritage overlays are associated with a 7-13% increase in property values, yet the results vary by zone, the restrictions present within the heritage overlay as well whether the property is in the middle or outskirts of a heritage overlay. We find the presence of heritage overlays are nearly offset if the overlay maintains internal alteration controls. Moreover, properties that are surrounded by heritage overlays, but are not under a heritage overlay themselves benefit from the protection. Lastly, we find that the benefit of heritage overlays is strongest in lower density neighbourhoods and that residential properties in industrial and commercial zoning do not benefit from heritage protections.

Keywords: zoning, housing values, hedonic regression

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1. Introduction

The beginning of the historic building preservation movement is often cited as the 1963 demolition of Penn Station in New York (Wood, 2007). Advocates for preservation argue that historic buildings and neighborhoods provide cultural amenities to cities that, if destroyed, cannot be recreated. To that end, high-amenity cities are strongly correlated with economic growth (Glaeser et al., 2001). Empirical evidence in the United States and Europe have found positive price effects of historical neighborhoods and is in alignment with the view that heritage is viewed as a positve amenity. (see Ford (1989), Lazrak, Nijkamp, Rietveld and Rouwendal (2014), and Ahlfeldt and Maennig (2010) as examples). Similar findings in Australia have yielded positive relationships, but have thus far been restricted to case studies of particular historical areas (Penfold, 1994; Deodhar, 2004) .

Yet an increase in housing prices in these historical areas is not necessarily a pareto improvement. While there is a benefit to the neighbourhood in preserving the characteristics, it nonetheless reduces the supply of housing within a city. While Armitage and Irons (2005) finds evidence of the net benefit of heritage listings, recent work by Ahlfeldt, Moeller, Waights and Wendland (2017) and Waights (2018) suggest that the welfare effects of historic districts is negative, particularly as the share within a city or metropolitan area increase.

As Schaeffer and Millerick (1991) points out, it is likely the precise nature of the restrictions that will determine the net effect of a building falling under certain heritage protections. In particular, restrictions in a residential part of the city that is low-density may be viewed differently than similar restrictions in a neighborhood experiencing densification or fill-in development. Likewise, heritage protection may negatively impact non-residential neighborhoods to a greater extent than residential neighborhoods.

Using Melbourne as a case study, we explore the relationship between heritage protections and residential housing prices. We further analyze the impact of heritage through the individual restrictions that are placed within the planning overlay. Lastly, we test whether heritage protections price effects are homogenous under various zoning regulations.

To accomplish this, we use a dataset containing nearly 840,000 dwelling and land transactions in the Great Metropolitan Region of Melbourne, Australia between 2001 and 2014. These transactions are geocoded and combined with the zoning and heritage overlays from the Victorian State Government's Department of Environment, Land, Water and Planning that was in effect at the time of the transaction.[1]

Our main findings show that heritage overlays are associated with a 7-13% increase in property values, yet the results vary by zone, the restrictions present within the heritage overlay as well whether the property is in the middle or outskirts of a heritage overlay. We find the presence of heritage overlays are nearly

[1] We exclude transactions of apartments and units from our analysis.

offset if the overlay maintains internal alteration controls. Moreover, properties that are surrounded by heritage overlays, but are not under a heritage overlay themselves benefit from the protection. Lastly, we find that the benefit of heritage overlays is strongest in lower density neighbourhoods and that residential properties in industrial and commercial zoning do not benefit from heritage protections.

2. Land-Use Regulations and Heritage Protections

Zoning or land-use regulations place limits on the types of development by stating the appropriate land uses. They can also limit development by specifying requirements on the height of a building, the floor-to-area ratio (FAR), or the density of housing in a development. The permitting process can also be used to hinder development if there are excessive permits or reviews required before a project may begin (Duranton and Puga, 2015). We discuss the two primary reasons posited for the existance of zoning that was discussed by Clingermayer (1993).

Stull (1974) first developed the argument that comprehensive zoning occurs to maximize aggregate land value in the presence of negative exernalities. For low-density residential areas, manufacturing or arterial roads are not desirable neighbours. Yet, their source as employment or easy access to other parts of the metropolitan area is quite valuable to those same residents. Therefore, an intermediate zone that does not have the same negative externalities to manufacturing or arterial roads may more appropriate. In addition, zoning may be used to manage the "character" of a neighbourhood, by limiting the size of residential dwellings relative to the existing structures.

Alternatively, zoning can be considered a type of regulation where local legislators are elected and target benefits to their constituencies while offsetting costs through the city. Tiebout (1956) originally developed a model in which consumer-voters choose a community that best matches their preferences for public expenditures. Yet once a community is chosen by the household, in the absence of zoning, it may be difficult to discourage free-riding of lower-income households. Therefore, exclusionary zoning is used as a mechanism to guarantee households that the local services that they receive are roughly proportional to the taxes that they pay in the form of property taxes. Calabrese et al. (2007) develop a theoretical model in which households in a local community collectively choose a minimum housing quality and property tax to fund local public goods. Their results suggest that higher-income households will sort to neighbourhoods and set minimum quality that effectively prohibit lower-income households from entering. While the economic welfare gains may improve in aggregate, they find that this is due to large welfare transfers from low-income to high-income households.

Taylor (2013) finds evidence for exclusionary zoning in Melbourne. She finds a strong correlation between households with higher housing values (and higher incomes) and objections lodged against planning permits. In addition, permits for multi-family dwellings in higher income neighbourhoods face more objections

than single-family dwellings both in absolute terms and relative to their share of permits.

While these effects are important in housing affordability and welfare calculations, we are not directly concerned with measuring the value of any potential negative externalities or the costs of exclusionary zoning. Instead, our focus is on understanding the differences in prices for zoning designations. Consider a scenario where we have identical parcels of land within a suburb that initially have no restrictions to develop housing. In equilibrium, we expect that the price per unit of land to be equal. Yet if a local council imposes binding building restrictions on one piece of land (ie. more restrictive than those being developed under no restrictions), we would expect that prices would begin to rise due to the supply shift on the restricted land. Yet we would also see demand begin to substitute towards the unrestricted land.

However, as discussed in Taylor (2013), land that allows for less-restricted uses also faces more permitting requirements and reviews. This could lead to higher costs faced by developers who may then be less willing to pay for land. Thus we have two distinct directions that we expect to influence housing prices in higher-density zoning. The first is that prices may rise to the development potential on the properties, yet they may be offset by the higher development costs that these parcels require. It is unclear which effect would be stronger, thus there is no clear theoretical prediction on what the net price would be in relation to the more restricted, lower-density residential zones.

Heritage designations can be viewed as another form of zoning and land-use restrictions. In Victoria, heritage overlays are designed to identify a "site, area, building, group of buildings, structure, archaeological site, tree, garden, geological formation, fossil site or other place of natural or cultural significance and its associated land" (Victoria Department of the Environment, Land, Water and Planning, 2016a). Locations are identified through a heritage study conducted by a heritage consultant. These studies are typically nominated through community and local historical societies. While heritage overlays cover 355.59 square km of 8,825 square km, or 4%, of the metropolitan area of Melbourne, they represent 5% of all residential and land transactions between 2001 and 2014. Within 5 kilometers of the CBD, the share of property transactions under heritage overlays exceeds 56 percent.

With a heritage overlay, planning permits are required from the local council to subdivide, demolish, or externally alter a building or structure. Additional controls that stipulate paint colors or internal alterations may also apply with these overlays. The full list can be found in Table 2. These controls are in addition to the base protections that the heritage overlay provides. While the schedules published by the LGA may specify that they apply to specific types of buildings or trees, we code the restrictions as "1" if there are any restrictions and "0" otherwise due to data limitations.

These additional controls vary in their frequency. Nearly three in 10 structures in our data feature external paint controls, while 9% have additional controls on trees on the properties. Around 4% of structures may allow uses that would typically be prohibited by the underlying zoning designation if that

use would help protect the heritage of the buildings. However, only 0.41% of the transactions with heritage overlays feature properties that have interior alteration controls, suggesting that heritage protections are designed to protect neighbourhood appeal rather than protecting the entire properties in their original state. Likewise, only 15 transactions were noted to have Aboriginal significance within our dataset.

It is not implicitly clear on how heritage protections influence housing prices. Households may appreciate living in a historic neighbourhood and the amenities that it provides. While heritage overlays are unsurprisingly found in neighbourhoods that exemplify unique Victorian era architecture, protections also exist in neighbourhoods with post-war housing commission neighbourhoods. While it is unlikely uniformly distributed, some neighbourhoods may benefit from additional tourism or entertainment values that may be generated in these historic neighbourhoods. Yet many households appear to value heritage in their neighbourhood. A 2005 survey by the Allen Consulting group suggests that 70% of Melbournians believe that historic houses in their local area are an important part of the character and identity of their neighbourhood. The survey also noted that these same households believed that heritage need not be exclusive to larger and archetcually distinct housing Allen Consulting Group (2005). Thus there is a reasonable argument that heritage protection would be positively capitalized into the price of housing. Yet, there are costs associated with older housing stock including increased maintenance. Moreover, heritage protection may limit development opportunities for households either through restricting the types of development that may occur or increasing the time frame of the planning process to redevelop properties.

For residential neighbourhoods, the net benefits of heritage protections appear to outweigh the costs. This is the general finding from Armitage and Irons (2005) which conducts a survey of Australian and international studies. The benefits are less clear for higher density residential and non-residential properties as the value of these properties may rely more on their development potential than on the amenity value of neighbourhood character. Likewise, it is predicted that the value of heritage protection is largely dependent on the surrounding structures. For example, a building on the historical register may not benefit from its status if the surrounding neighbourhood is not protected. As an example, Asabere et al. (1994) found that small historic apartment buildings were 24% lower than similar apartments with no protections. Inversely, we would expect that a property that has no protections would benefit more if the surrounding neighbourhood has heritage protections. The owners in this case can develop a property with little concern that the development would be adversely affected by any surrounding properties, such as obstructed views, in the future.

3. Background and Data

Melbourne, located along the south-east coast of Australia, was founded in 1835. By 1901, Melbourne had a population of nearly 500,000. Yet while cities in both the United States and the United Kingdom were beginning to develop

planning documents that laid out land-use regulations, Melbourne did not begin to construct planning documents until 1929 and did not implement any planning schemes until 1954 (http://www.dtpli.vic.gov.au/planning/plans-and-policies/planning-for-melbourne/melbournes-strategic-planning-history). Through the Planning and Environmental Act 1987, the state of Victoria develops planning models that are implemented at the local council area. As of 2016, the Metropolitan Melbourne region is comprised of 31 separate councils known as Local Government Areas (LGAs). While local councils are responsible for making rulings on developments, the state civil & administrative tribunal (VCAT) is responsible for hearing appeals of permit applicants.

Housing and land transaction data was obtained from two primary sources. The first source was the Victoria Valuers General dataset which contains 366,013 transactions from 2001 through 2005. Another 653,290 transactions from 2006 through 2014 were obtained from the Australian Property Monitors (APM) Property Transaction Dataset via the Australian Urban Research Infrastructure Network Portal (AURIN) (Austrlian Property Monitors, 2014). We have excluded any apartment or unit sales from the analysis as they generally are not combined with the right of ownership of land with the sale. The Valuers General data was geocoded using the G-NAF address database, which is published by PSMA Australia, from February 2016.

Of the 1,019,303 baseline transactions, we removed transactions with obvious coding errors and those outside the geographical scope of this paper. We dropped observations that had incompatible zoning overlays such as public roads or parks, indicating a geocoding error. In addition, transactions not within the Greater Metropolitan Melbourne region were omitted. We further removed outliers that included homes that had one these characteristics: more than nine bedrooms, more than eight bathrooms, land area was either less than 50 square metres, or exceeded greater than 20,234 square metres. Transactions that, inflation-adjusted, sold for less than A$20,000 or exceeded A$10,000,000 were removed. This resulted in a sample size of 838,755 transactions.

Annual snapshots of planning schemes were provided by the Victorian State Government's Department of Environment, Land, Water and Planning (Victoria Department of the Environment, Land, Water and Planning, 2016b). A zoning of a transaction is based on the zone it intersected with at the beginning of the year of the transaction. While the framework for planning schemes are developed by the state government, local government areas (LGAs) are responsible for the development and enforcement of planning schemes. Each LGA assigns a zoning overlay to each parcel of land under their jurisdiction with the possibility of a schedule that allows variance in the underlying zoning overlay such as additional permit requirements or height restrictions. In addition, a new planning scheme in 2014 resulted in the reclassification of the urban residential zones and simplification of the commercial zones. This resulted in a 151 zone and schedule categories across the 31 LGAs in the metropolitan region.

A new planning scheme in 2014 resulted in the reclassification of the urban residential zones and the simplification of the commercial zones. The planning schemes allow LGAs to develop variances in the zones, known as schedules. This

resulted in approximately 150 zone and schedule combinations categories across the 31 LGAs in the metropolitan region. To simplify the analysis we consolidated the zoning and schedules into 12 zones which can be found in Table 1. As our analysis focuses on heritage zoning, which is generally found closer to the CBD, we aggregated zone designations near or on the urban growth boundary of Melbourne into a catch-all "Green Wedge" zone.[2] We similarly aggregated zones requiring special development plants into "Comprehensive Development."

The distribution across transaction types can be found in Table 3. Over 85% of homes were zoned general residential in the dataset, whereas only 75.6% of land transactions were zoned general residential. Several differences emerge across transactoins. The most striking is the difference in transactions zoned as Comprehensive Development (CD). While CD sales represented only 1.6% of home sales, over 11% of land transactions were zoned as CD. Likewise, land was more likely to be zoned as mixed use and much less likely to be zoned as neighbourhood residential (ie. low-density residential with height restrictions). In both cases, we see few home and land transactions in the highest density zoning allowed: Capital City and Docklands. This is due to the high density of the CBD in Melbourne combined with our exclusion of units from the analysis.

The summary statistics, split by home and land transactions, are found in Table 4. The average inflation-adjusted value for housing (2014 $), was slightly over $593,000, while land was sold on average for nearly $199,000. Of property transactions, we see that 6% of property transactions and 1% of land transactions were in a heritage overlay. On average, 6% of the surrounding 200 meter radius of a dwelling falls within a heritage overlay, but less than 1% for land. This is largely due to the majority of heritage overlays are within established neighborhoods that often do not have vacant land. While it is not reported in the table, The mean share of the surrounding areas for homes that are within an overlay is 66%, while the mean share for homes not within an overlay is 2%.

We also obtained shapefiles of the Melbourne road and public transportation network from VicRoads via AURIN. We used this data to construct distance measures to the nearest arterial road as well as the distance to the nearest train or tram stop (PSMA, 2014). We see that vacant land was typically smaller and was typically further from an arterial road and public transportation.

We have also included the age of the structure from the Valuers General dataset, which was not available in the APM dataset. The average age of structures in the data is 30 years, but ranges from 0 to 162 years. If we break down between whether a property is a heritage overlay, we see that homes within a heritage overlay averages 71 years old, while homes not in an overlay average 28 years. There are some quality issues with this variable, so it is important to exercise caution when relying on the age variable.

[2]While the effects of the various green wedge and other zones are likely to influence housing and land prices differently, these are not the focus of our study.

4. Empirical Specification

To empirically explore the relationship between zones, heritage protection and prices, we develop a hedonic pricing model based on the work of Rosen (1974). We begin with the following model:

$$ln(p) = \beta_0 + Heritage \cdot \beta_1 + \\ + \sum_r Restrictions \cdot \beta_2 + \sum_a Amenities \cdot \beta_3 \\ + \sum_y Year \cdot \beta_4 + \sum_p Post \cdot \beta_5 + \varepsilon$$

where p is the real sale price per square meter in 2014$; $Heritage$ is a dummy variable that represents whether the transaction had heritage protection at the time of the transaction; *Restrictions* is a set of dummy variables that represent the restrictions that may be in place on top of heritage protection such as exterior paint controls or whether prohibited uses are permitted; *Amenities* is a set of variables that represnt the characteristics of a dwelling such as the number of bedrooms as well as neighborhood characteristics such as the log distances to arterial roads, nearest rail station, and tram station; $Year$ is a set of dummy variables to capture and annual trends in housing prices across Melbourne on top of the cost of living adjustment; *Post* is a set of postcode dummy variables that capture and fixed suburb-level characteristics that may influence prices such as access to local amenities or the efficiency of local councils in granting permits; and ε is the random error term.

A follow-up regression adds in a quartic polynomial of the share of the surrounding 200 meter area that falls within a heritage overlay. This is to control for not only whether a property is within an overlay, but how much the immediate neighborhood is as well. We would predict that a larger share of the surrounding neighborhood with be increasingly beneficial to properties, regardless of whether they are within that heritage overlay. However, the benefit would likely be greater for properties outside the overlay as that would allow those properties the opportunity to be redeveloped, while simultaneously being protected from future development that may alter the neighborhood characteristics.

$$ln(p) = \beta_0 + Heritage \cdot \beta_1 + \sum_{Sh} ShareArea \cdot \beta_2 + Heritage \cdot \beta_3 \times \sum_{Sh} ShareArea \cdot \beta_4 + \\ + \sum_r Restrictions \cdot \beta_5 + \sum_a Amenities \cdot \beta_6 \\ + \sum_y Year \cdot \beta_7 + \sum_p Post \cdot \beta_8 + \varepsilon$$

where *ShareArea* is a quartic polynomial of the share of the 200 meter radius of the property centroid that falls within a heritage overlay. The share has been scaled between 0 and 100.

Lastly, we argue that heritage overlays are not likely to have the same impact acrossing zoning regulations. To control for this, we add a series of aggregated zones, discussed in the previous section that are interacted with the heritage overlay.

$$ln(p) = \beta_0 + Heritage \cdot \beta_1 + \sum_{Sh} ShareArea \cdot \beta_2 + Heritage \cdot \beta_3 \times \sum_{Sh} ShareArea \cdot \beta_4 + \sum_{z} Zone \cdot \beta_5 + Zone \times Heritage \cdot \beta_6 + \sum_{r} Restrictions \cdot \beta_7 + \sum_{a} Amenities \cdot \beta_8 + \sum_{y} Year \cdot \beta_9 + \sum_{p} Post \cdot \beta_{10} + \varepsilon$$

where *Zone* is a set of dummy variables that represent the zoning of the transaction. In all models, we control for unspecified heteroskedasticity by clustering at the postcode level.

5. Results

The main results can be found in Table 5. We have run a series of hedonic regressions to explore the relationship between heritage overlays and log housing prices. As we predicted and consistent with previous findings, there is a postive effect of heritage and housing prices. Using the full dataset, we find a 11.5 to 12.0 percent increase in real prices for properties within a heritage area, with the coefficient estimates being statistically significant at the 1% level. These results are very robust across the various specifications. Heritage overlays in Melbourne contain not only exclusively "prestige" housing, they include commission (ie. public) housing as well. Yet, those examples are in the minority. To control, in part for the prestige, we also ran a set of regressions on the subset of observations in which we have data on the age of the housing. When controlling for that, we find that the magnitude of the impact of being in a heritage overlay falls to around 6.8 to 8.8 percent, with all estimates being at least statically significant at the 5% level of significance.

The coefficient estimates that break down the restrictions in place in a given heritage overlay generally had the expected signs, but the coefficient estimates were not generally statistically significant. While having exterior paint controls are likely to help control the visual aesthetics of a neighborhood, only in one model was the coefficient estimate statistically different than zero at the 10% level of significance. No coefficient estimates were statistically significant for historic trees on the property, being on the heritage register or if prohibited uses were allowed. We omitted properties of aboriginal significance from the analysis due to the small number of observations that fell into that category.

Only in the case of interior alterations did we find a negative relationship. As one might expect, having a restricted ability to renovate an interior is predicted to have between a 5 and 14.5% decline in the real transaction price of the dwelling. However, the coefficient estimates were statistically significant only in the cases where we did not control for the age of the structure.

Our second hypothesis was that the value of a heritage overlay would depend on the share of the surrounding neighborhood that is also contained in a heritage overlay. Empirically, we interacted the heritage overlay dummy with a quartic polynomial of the share of the area within 200 meters radius of the property centroid that is also within a heritage overlay. Due to the complexity, we do not report the table, but instead have plotted the average marginal effects of the share of the area in a heritage overlay on real housing prices for both properties within a heritage overlay and those outside a heritage overlay. The results for the full set of observations can be found in Figure 1 and are based on the coefficient estimates in Equation 7 in Table 5. The restricted set which includes the age variable can be found in Figure 2 and is based on the coefficient estimates in Equation 8.

Figure 1 largely confirms the expectation that for properties in a heritage overlay, there is an increasing benefit to be surrounded by other housing in the heritage overlay, rather than on the outskirts. We can see that there are negative point estimates for low shares, although they are not statistically significant at the 5% level. We find a postive and statistically significant marginal effect for an additional one percent share, once the share of the surrounding neighborhood exceeds a 40% threshold. For housing outside of a heritage overlay, we generally see a positive marginal effect, outside a range of the share of 15-40 percent neighborhing share. Moreover, the point estimates of the marginal effect for an increasing share of neighborhing properties in a heritage overlay exceeds that of the properties within a heritage overlay in areas between 40 and 85%, suggesting that housing benefits more when it is able to be re-developed, but the overall neighborhood aesthetic is likely to remain untouched.

The third hypothesis is that heritage overlays are less beneficial in non-residential areas or in high-density high residential areas. Table 6 presents the coefficient estimates of those interactions of Equations 7 and 8 found in Table 5. The excluded category is General Residential, which accounts for 80% of transactions in the dataset. The results again largely conform to our expectations. When compared to general residential, coefficient point estimates for dwellings in commercial, industrial, mixed use, capital city and residential growth zoning are negative. The coefficient estimates are stiatically significant for capital city and industrial zoning. Interestingly, we see a large 38% decline in housing prices in comprehensive development zones with a heritage overlay. We believe that the two, potentially conflicting planning processes are likely a significant hindrance for developers. However, we also see negative and statistically significant estimates on the interaction of green wedge and neighbourhood residential, areas that are less dense than general residential. While the signs remain largely the same, the statistical significance disappears if we use the Valuers General subset. The lack of statistical signficance on comprenehsive development and

missing estimates for the Docklands and Neighbourhood residential are an artifact that these zoning overlays existed largely after the time period that overlaps with the Valuers General data subset.

5.1. Robustness Check

While there is a strong theoretical justification for heritage overlays to effect housing prices, that justification is not as strong for land sales. A land transaction within a heritage overlay should not impede development to the same degree as an existing dwelling, although there may be additional planning processes that need to be adhered to. This could suggest that ceteris paribus, land sales could be lower under heritage overlays, than otherwise. To test whether land sales are associated with heritage overlays, we ran the same specification as above, excluding the number of bedrooms and the age of the structure. The results of the coefficient estimates can by found in Table 7. As we can see from the coefficient estimates, the magnitude of the point estimates on the heritage overlay are smaller than for property sales, and is statistically significant at the 10% level only in Model (3). In regards to property restrictions, only the tree restriction coefficient estimate is statistically significant at the 10% level in Model (3).

6. Discussion

Overall, the results of paper have shown that there are positive price effects from heritage protections and that these results correspond roughly to previous findings in the United States, Europe and in the case studies for Australia. Yet we build on those results to see how robust the premium is across the spatial extent of the heritage overlay and across zonings. While we have not conducted a welfare analysis similar to Waights (2018), we would hypothesize that the economic welfare would be negative. The growth of housing prices in Australia since 2000 have risen significantly faster than real income and coupling that with increased building restrictions conveyed with heritage protection that has impacted nearly 5% of the dwelling stock, this will likely have a impact on the supply of housing. If if those findings were to be confirmed, that does not suggest that we recommend the elimination of heritage overlays, but rather that in the presence of substantial issues of housing affordability, further applications for heritage protection should be scrutinized. Regardless, future research is likely required in this area.

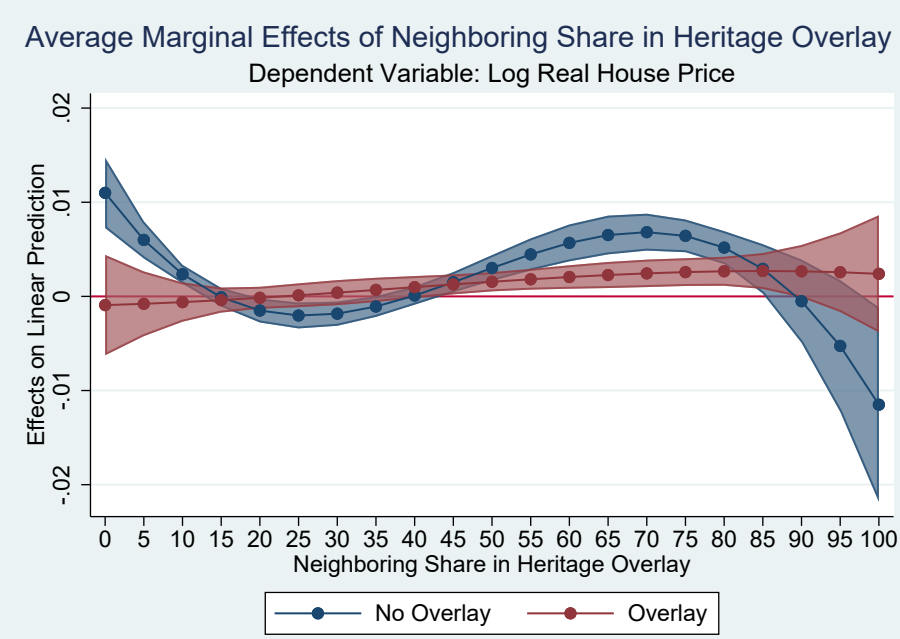

Figure 1: Average Marginal Effects of the Share of Area within a Heritage Overlay

Note. Results based on Equation 7 of Table 5.

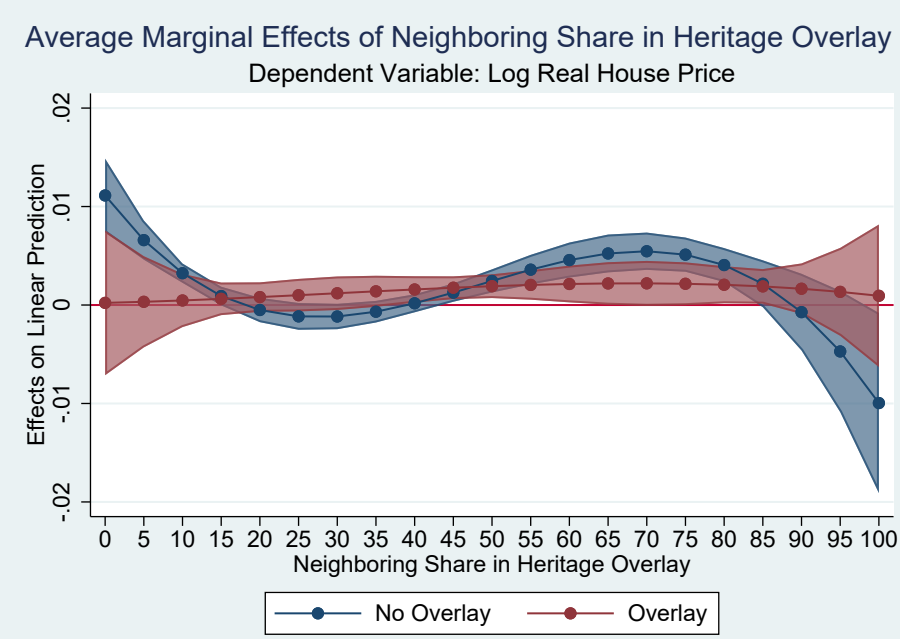

Figure 2: Average Marginal Effects of the Share of Area within a Heritage Overlay

Note. Results based on Equation 8 of Table 5.

Zone	Definition
Green Wedge	To provide for the use of land for agriculture. To protect, conserve and enhance the biodiversity, natural resources, scenic landscapes and heritage values of the area.
Urban Floodway	To identify waterways, major floodpaths, drainage depressions and high hazard areas within urban areas which have the greatest risk and frequency of being affected by flooding.
Neighbourhood Residential	To recognise areas of predominantly single and double storey residential development. To limit opportunities for increased residential development. To manage and ensure that development respects the identified neighbourhood character, heritage, environmental or landscape characteristics.
General Residential	To encourage development that respects the neighbourhood character of the area. To implement neighbourhood character policy and adopted neighbourhood character guidelines. To provide a diversity of housing types and moderate housing growth in locations offering good access to services and transport.
Residential Growth	To provide housing at increased densities in buildings up to and including four storey buildings. To encourage a diversity of housing types in locations offering good access to services and transport including activities areas. To encourage a scale of development that provides a transition between areas of more intensive use and development and areas of restricted housing growth.
Mixed Use	To provide for a range of residential, commercial, industrial and other uses which complement the mixed-use function of the locality.
Comprehensive Development	To provide for a range of uses and the development of land in accordance with a comprehensive development plan incorporated in this scheme.
Commercial 1	To create vibrant mixed use commercial centres for retail, office, business, entertainment and community uses. To provide for residential uses at densities complementary to the role and scale of the commercial centre.
Commercial 2	To encourage commercial areas for offices, appropriate manufacturing and industries, bulky goods retailing, other retail uses, and associated business and commercial services. To ensure that uses do not affect the safety and amenity of adjacent, more sensitive uses.
Industrial	To provide for manufacturing industry, the storage and distribution of goods and associated uses in a manner which does not affect the safety and amenity of local communities.
Docklands	To ensure that use and development take account of the unique nature of the water environment. To encourage a variety of dwelling types within the Melbourne Docklands area to suit a diversity of needs.
Capital City	To enhance the role of Melbourne's central city as the capital of Victoria and as an area of national and international importance.

Table 1: Consolidated Zoning

Note. Zoning definitions sorted by approximate land intensity.
Source.

Controls	Definition
External Paint	Controls the exterior colours of structures.
Interior Alterations	Applied to restrict alterations of interiors in selective cases where the interiors are of high significance.
Tree	An individual or group of trees may have historic value to a structure or neighbourhood. It is not intended to protect trees for their intrinsic value.
Heritage Register	Places included in the Victorian Heritage Register
Prohibited Uses Allowed	Prohibited uses for a structure may be allowed for a specific place, such as a church or warehouse, if permissible uses in current zoning overlay are unable to provide for the future conservation of the building.
Aboriginal	Scarred trees, stone arrangements and other places significant for their Aboriginal associations are identified as an Aboriginal Heritage place. Does not include all Aboriginal significant places.

Table 2: Heritage Overlay Restrictions

Zone	Transaction Type					
	House		Land		Total	
	No.	%	No.	%	No.	%
Commercial 1	6,242	0.95%	1,407	0.77%	7,649	0.91%
Commercial 2	1,305	0.20%	265	0.14%	1,570	0.19%
Capital City	304	0.05%	37	0.02%	341	0.04%
Comprehensive Development	10,344	1.58%	20,340	11.12%	30,684	3.66%
Docklands	107	0.02%	20	0.01%	127	0.02%
General Residential	560,970	85.51%	138,265	75.62%	699,235	83.36%
Green Wedge	28,675	4.37%	12,399	6.78%	41,074	4.90%
Industrial 1	4,182	0.64%	1,601	0.88%	5,783	0.69%
Mixed Use	4,161	0.63%	5,261	2.88%	9,422	1.12%
Neighbourhood Residential	35,467	5.41%	1,427	0.78%	36,894	4.40%
Residential Growth	3,166	0.48%	1,015	0.56%	4,181	0.50%
Urban Floodway	1,094	0.17%	800	0.44%	1,894	0.23%
Total	656,017	100.00%	182,837	100.00%	838,854	100.00%

Table 3: Zones by Transaction Type

Table 4: Summary Statistics

Variable	mean	sd	min	max	count
House					
Real Value	593,246.36	468,819.63	21,241.00	10,000,000.00	655,947
Heritage Overlay	0.06	0.24	0.00	1.00	655,947
Share Area in Overlay	6.71	19.21	0.00	100.00	655,947
Number of Bedrooms	3.04	1.03	0.00	9.00	655,947
Land Area	783.09	1,179.24	50.00	20,234.00	655,947
Distance to Road	0.54	0.56	0.00	7.52	655,947
Distance to Rail	2.68	3.31	0.02	30.62	655,947
Distance to Tram	12.23	12.90	0.00	64.20	655,947
Age Housing	30.30	27.81	0.00	162.00	217,165
Land					
Real Value	198,931.20	171,352.94	20,886.00	9,947,720.00	182,808
Heritage Overlay	0.01	0.08	0.00	1.00	182,808
Share Area in Overlay	0.85	5.21	0.00	100.00	182,808
Land Area	671.96	917.65	50.00	20,230.00	182,808
Distance to Road	0.65	0.64	0.00	7.50	182,808
Distance to Rail	3.29	4.09	0.02	30.45	182,808
Distance to Tram	17.52	14.10	0.01	64.20	182,808

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Homes	Homes	Homes	Homes	Homes	Homes	Homes	Homes
Heritage Overlay=1	0.120***	0.080***	0.125***	0.088***	0.115***	0.066**	0.120***	0.068**
	(0.014)	(0.012)	(0.014)	(0.015)	(0.024)	(0.028)	(0.024)	(0.028)
ExtPaint			0.003	-0.010	0.024	0.018	0.035*	0.020
			(0.020)	(0.018)	(0.019)	(0.016)	(0.018)	(0.017)
IntAlter			-0.145***	-0.051	-0.129**	-0.048	-0.117**	-0.050
			(0.052)	(0.044)	(0.051)	(0.044)	(0.048)	(0.045)
Tree			-0.021	-0.020	-0.024	-0.021	-0.018	-0.019
			(0.026)	(0.022)	(0.024)	(0.022)	(0.023)	(0.022)
HeritageRegister			-0.078	-0.007	-0.062	0.007	-0.000	-0.000
			(0.057)	(0.030)	(0.053)	(0.030)	(0.034)	(0.031)
ProhibitedPermitted			0.001	-0.017	0.008	-0.011	0.012	-0.005
			(0.046)	(0.024)	(0.044)	(0.024)	(0.034)	(0.024)
Constant	11.856***	11.187***	11.854***	11.186***	11.837***	11.169***	11.873***	11.155***
	(0.059)	(0.077)	(0.059)	(0.077)	(0.059)	(0.077)	(0.058)	(0.079)
Zones	N	N	N	N	N	N	Y	Y
Share Area	N	N	N	N	Y	Y	Y	Y
Housing Age	N	Y	N	Y	N	Y	N	Y
Amenities	Y	Y	Y	Y	Y	Y	Y	Y
Year Effects	Y	Y	Y	Y	Y	Y	Y	Y
Postcode	Y	Y	Y	Y	Y	Y	Y	Y
Adj. R-squared	0.739	0.712	0.739	0.712	0.741	0.714	0.743	0.714
N	655,947	217,165	655,947	217,165	655,947	217,165	655,947	217,165

* p<0.10, ** p<0.05, *** p<0.01

Table 5: Main Results

	(1) Homes	(2) Homes
Heritage Overlay=1	0.120***	0.068**
	(0.024)	(0.028)
Commercial 1 × Heritage Overlay=1	-0.030	-0.005
	(0.028)	(0.028)
Commercial 2 × Heritage Overlay=1	-0.026	0.012
	(0.043)	(0.055)
Capital City × Heritage Overlay=1	-0.240***	
	(0.039)	
Comprehensive Development × Heritage Overlay=1	-0.388***	0.003
	(0.120)	(0.061)
Docklands × Heritage Overlay=1	1.458***	
	(0.040)	
Green Wedge × Heritage Overlay=1	-0.082***	-0.023
	(0.028)	(0.032)
Industrial 1 × Heritage Overlay=1	-0.064**	-0.025
	(0.025)	(0.027)
Mixed Use × Heritage Overlay=1	-0.071	0.053
	(0.049)	(0.048)
Neighbourhood Residential × Heritage Overlay=1	-0.077*	
	(0.046)	
Residential Growth × Heritage Overlay=1	-0.092	-0.041
	(0.059)	(0.056)
Urban Floodway × Heritage Overlay=1	0.319**	0.273*
	(0.153)	(0.163)
Commercial 1	-0.075***	0.027**
	(0.017)	(0.013)
Commercial 2	-0.033**	-0.036**
	(0.015)	(0.017)
Capital City	-0.096*	0.167
	(0.050)	(0.194)
Comprehensive Development	0.111***	0.068**
	(0.039)	(0.028)
Docklands	0.296***	
	(0.055)	
Green Wedge	0.122***	-0.006
	(0.020)	(0.015)
Industrial 1	-0.035**	-0.034**
	(0.016)	(0.015)
Mixed Use	-0.062***	-0.068**
	(0.024)	(0.033)
Neighbourhood Residential	-0.011	
	(0.018)	
Residential Growth	0.030	0.009
	(0.044)	(0.028)
Urban Floodway	-0.020	-0.038**
	(0.023)	(0.018)
Observations	655947	217165

* p<0.10, ** p<0.05, *** p<0.01

Table 6: Interaction of Heritage with Zoning

	(1)	(2)	(3)	(4)
	Land	Land	Land	Land
Heritage Overlay=1	0.029	0.041	0.099*	0.090
	(0.028)	(0.039)	(0.060)	(0.067)
ExtPaint		-0.091	-0.063	0.031
		(0.096)	(0.090)	(0.076)
IntAlter		-0.059	-0.082	-0.118
		(0.139)	(0.137)	(0.116)
Tree		0.110	0.116*	0.072
		(0.067)	(0.069)	(0.061)
HeritageRegister		0.007	0.019	0.041
		(0.094)	(0.097)	(0.115)
ProhibitedPermitted		-0.062	-0.074	-0.066
		(0.066)	(0.062)	(0.059)
Constant	9.759***	9.757***	9.754***	9.737***
	(0.091)	(0.091)	(0.091)	(0.093)
Zones	N	N	N	Y
Share Area	N	N	Y	Y
Amenities	Y	Y	Y	Y
Year Effects	Y	Y	Y	Y
Postcode	Y	Y	Y	Y
Adj. R-squared	0.626	0.626	0.807	0.808
N	182,808	182,808	182,808	182,808

* p<0.10, ** p<0.05, *** p<0.01

Table 7: Land Prices

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