

## **Shaping Modern Cities: Structural Continuity and Change in Carlton, Melbourne 1870-1970**

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### **Abstract:**

This paper examines the nature of urban change at the micro-scale in Melbourne from 1870 to 1970. The research forms part of an ongoing international collaboration on the shaping of modern cities. The focus of the broader research programme is the extent of persistence and path dependence in city structures. The central hypothesis is that city structures change slowly, because of inertia, increasing returns and transactions costs, but there are defining periods that produce major changes. These changes may flow from deliberative institutional interventions (such as infrastructure investment and policy change) or exogenous shocks (such as natural disaster, war, and macro-economic shifts). The research will test the hypothesis by collating and examining long-term primary data on urban evolution in London, Birmingham, Glasgow and Melbourne.

This paper presents the conceptual and theoretical framing of this programme of research, along with findings from the second phase of our empirical work conducted in the suburb of Carlton, Melbourne. The empirical data enables comparison of the evolution of two locations within Carlton. The paper provides a detailed long run account of land use and land value based on rate records, census data, and planning schemes; and documents continuity and change in urban characteristics over a 100 year period. The findings and discussion focus on the role of land ownership patterns and built materials in determining rates of urban structural change. The paper argues that understanding long run continuity and change in city structure provides valuable insight into contemporary urban trends and city futures.

### **Introduction**

This paper examines the nature of urban change at the micro-scale in Melbourne from 1870 to 1970. The research forms part of an ongoing international collaboration on the shaping of modern cities. The focus of the broader research programme is the extent of persistence and path dependence in city structures. This involves collating and examining long-term primary data on urban evolution in London, Birmingham, Glasgow and Melbourne. The research has two aims. The first is to establish a detailed long run account of urban characteristics to track the evolution of cities. The second is to use this data to analyse change in these characteristics over time, attempting to correlate patterns of change with factors that may be influencing such change. With the assembled data we will be able to track a variety of urban characteristics over time, including the built form; land value; ownership/tenancy, and land use. Changes in these urban characteristics will reflect both major institutional interventions, such as urban infrastructure and planning policy changes; as well as exogenous influences such as periods of economic boom and bust. In doing so we hope to better understand how cities change and the drivers of change.

Urban research has a long tradition of asking how and why cities change. It is not possible to cover the broad scope of scholarship in this field here, and the following is only a brief summary. Examples of research that has covered long run urban change includes Meen and Nygaard's 2011 examination of planning restrictions in London from the 19<sup>th</sup> century. They find some relationship with contemporary property prices. Also in London, Clark (2002) undertook a long run (1700-1911) examination of average rents, showing a dramatic increase in property value in the late 19<sup>th</sup> century, while Meen (2009) measured rental affordability between the 19<sup>th</sup> and early 20<sup>th</sup> century, finding that wages had risen in line with rents. Another strand of research has focused on whether urban poverty and wealth are spatially persistent over time. In relative terms, this research has found continuity between the most affluent and the poorest neighbourhoods of many major cities over decades. This is more evident in European and North American cities (Wyly 2008; Nygaard and Meen 2013) than Australian cities, where gentrification in inner city areas is prevalent (Badcock 2001; Baum et al 2005; Forster 2006). This body of research gives rise to questions of the drivers of such continuity and change.

The hypothesis of our research is that urban structures typically change slowly due to structural persistence and path dependence that reflects inertia, increasing returns and transactions costs, but there are periods that produce major changes. These flow from institutional interventions (such as infrastructure investment and policy change) or exogenous shocks (natural disasters, new technologies or war). Given this, the research examines the significance of long-term pathways of urban evolution over a century, and shows how history can contribute to an explanation of current urban problems through processes of path dependence.

This paper describes a pilot study designed to test the feasibility of our research method, and reports the findings from our first phase of empirical research, conducted in the suburb of Carlton in Melbourne, Australia. Melbourne provides a suitable case study because its history is well documented from European settlement in the 1830s (Davison, 1978). Furthermore, Melbourne was included in Asa Briggs seminal work on Victorian Cities, in which he recorded that Melbourne had by 1891 the second highest rateable value (after London) of any city in the British Empire (Briggs 1963, page 278). The remainder of the paper is set out as follows. In the next section we outline the methodology. This is followed by a description of the case study location along with an overview of documented historical socio-economic changes. The results of the pilot study are presented for the period 1870 to 1970, including analysis of changing land use patterns. The paper concludes by considering the next stages in the research program.

## **Research Approach**

The main data source used for the analysis is municipal council rate records (Melbourne City Council 1870 to 1970). These are held by the Victorian Public Records Office for a number of local government areas in Victoria, including the City of Melbourne. The original hard copy rate books have been transferred to microfiche and microfilm, and for the City of Melbourne cover each year from 1845 to 1975. The rate books include every rateable property in the municipality, and therefore offer a highly detailed, lot level record of the urban environment. However, given this level of detail, the rate records are resource intensive to translate into an analysable digital form.

The analysis of rate books was supplemented with 'ground truthing' using historical maps. Spatial maps of inner Melbourne are available over the study time period from the State Library of Victoria. Early maps from the 1850s were produced by the Surveyor Generals Office, and later the Department of Lands and Survey, recording subdivision and land grants for the extension of Melbourne known as Carlton. With the establishment of the Melbourne Metropolitan Board of Works (MMBW) in 1891 additional detailed land use maps became available. In particular, the detailed MMBW '40 feet to 1 inch' maps of inner Melbourne show lot level data on built form, land use and infrastructure provision at the end of the 19th century.

The research focused on testing the feasibility of using rate book data to establish a record of long term urban change at a fine grained spatial scale in Melbourne. The pilot study reported here created a digital database of lot level urban characteristics (built form and economic) based on the rate books. This was then interrogated using statistical techniques to examine changes to the urban environment. The pilot study focuses on two streets; Bouverie St and Cardigan St, in Carlton, Melbourne, on the northern fringe of Melbourne's CBD (see Figure 1). Bouverie St runs from the edge of Melbourne's CBD to Grattan St, the site of the University of Melbourne. It was selected because it is relatively short compared to many Melbourne streets (approximately 700 meters in length), which made the collection of sufficient rates data feasible, and because it has been established since the 1840s. Cardigan St runs parallel to Bouverie St, two blocks to the east. It was selected as a comparator because – based on contemporary observations - it has a more preserved 19<sup>th</sup> century built form than Bouverie St. Cardigan St extends further to the north than Bouverie St, and only the section up to Grattan St was analysed.

**Figure 1: Study Area**



We analysed eleven individual rate books spread between 1870 and 1970, with up to 288 individual property records in each year and a total of 2,474 over the 100 year study timeframe. Table 1 lists the sample numbers in each of the eleven rate book years – the declining number reflects some consolidation of land lots over the timeframe. For each property in the rate books we recorded land owner; land use (residential, industrial, commercial, other and vacant) and property type (house, factory, shop, licensed premises, warehouse); annual rateable value in pounds; and where possible occupier; street number; building material; and number of rooms.

**Table 1: Number of rateable properties in Bouverie and Cardigan streets for each year analysed**

Year	1870	1879	1890	1900	1910	1920	1930	1940	1950	1960	1970
Number of properties	280	289	288	262	257	241	195	182	176	159	145

The rate book data was supplemented with examination of land use maps from the MMBW, along with photographs and illustrations of Bouverie and Cardigan streets from the study period. This enabled the rate records to be matched with individual land plots, and historic and contemporary urban form to be compared. The rate records, when digitised, provide the opportunity to track a number of urban characteristics over time. One of the consistent elements of the rate books is the recording of property type. There are fifteen different identifiers of property type present in the data set. These types were coded into five groups to represent land use (see Table 2).

**Table 2: Land use coding from property types**

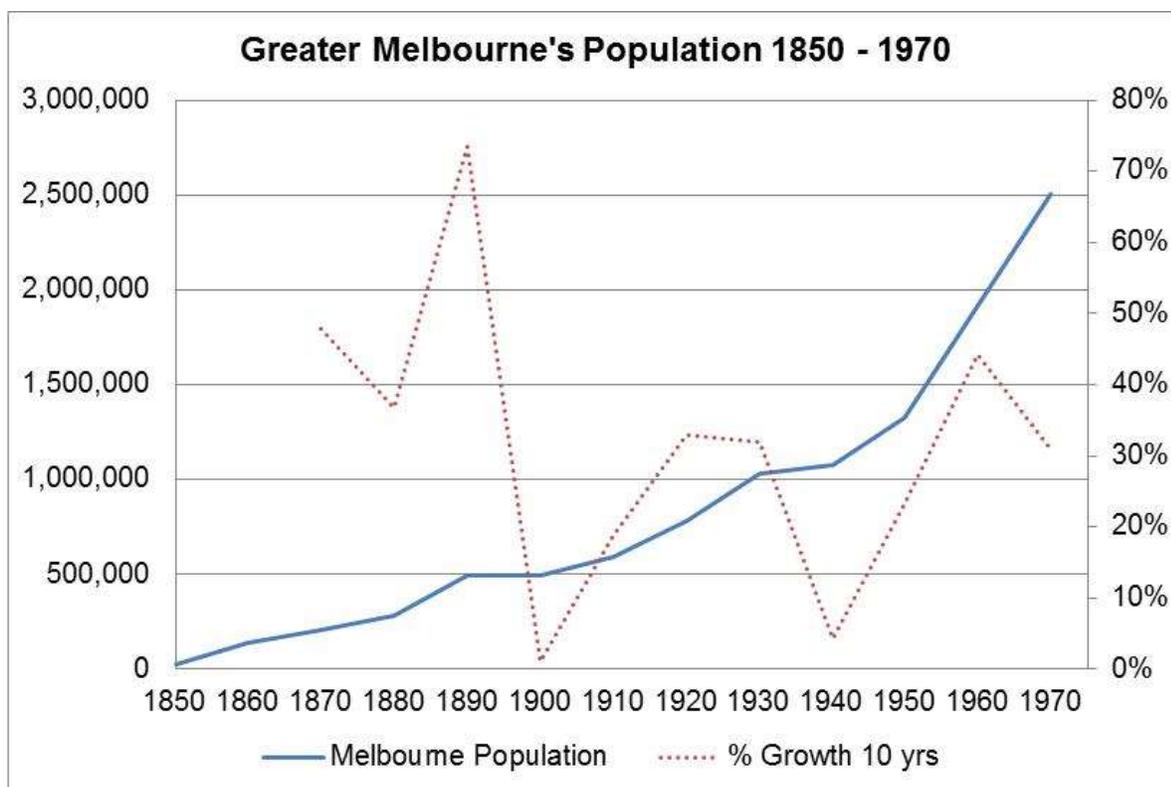
Land use code	Property types
Residential	House, Flat
Commercial	Shop, Hotel, Office
Industrial	Factory, Workshop, Brewery, Warehouse, Store
Land	Land
Other	Stable, Fire Station, Mission Hall, Garage, Hospital, College, Kindergarten, Substation, Illegible

### Historical Context

In order to test the hypothesis of urban change set out above, it is necessary to understand the social, economic and policy context of the case study location. The following discussion outlines the major socio-economic changes over the period 1870-1970 influencing Melbourne in general and Carlton in particular. Key policy interventions that may have shaped Carlton’s development are then summarised.

#### *Socio-economic History – Melbourne*

**Figure 2: Greater Melbourne Population 1850 - 1970**



Source: Victorian Yearbooks (Office of the Government Statist, 1903-1970).

In the 100 years from 1870 to 1970, Melbourne’s population increased ten-fold, from 200,000 to 2.5 million people (Figure 2). There were three long ‘booms’ of growth in the Victorian economy over this period, from the 1850s to 1890, from the 1900s through to 1930, and the 1950s through to the early 1970s. As Figure 2 shows, these were also periods of population growth in Melbourne. In Victoria, the gold rush of 1851 marked the start of a period of sustained population growth, capital inflow and urban development (Davison, 2004, p. 15). According to Berry (1984), capital has switched into residential

investment immediately preceding the end of each boom. Berry's argument is substantiated by Davison, who found that in 1888 and 1889, the last years of the first boom, 70 % of private capital in Melbourne fuelled investment in real estate construction (p. 14). In a parallel development prices for land in the Central Business District (CBD) soared, and warehouses and factories were pushed from the CBD to the inner suburbs (*ibid*).

The first economic boom ended in 1890, precipitated by a collapse in the international wool price. Melbourne's population was stable over the following decade, even declining temporarily between 1892 and 1895 (Davison, 2004, p. 15). By 1901, economic recovery and population growth was again underway, with population increase sustained throughout the First World War, the influenza epidemic that followed, and the 1920s. The global economic depression of the 1930s slowed the development of Melbourne, as evidenced by an increase in population of roughly 40,000 people between 1930 and 1940, a sharp deceleration from the 'roaring 20s' that witnessed a 30 % population increase.

The economic geography of Melbourne during this period featured a concentration of jobs at the centre, but sharply segmented with white collar jobs in the CBD and factories, rail yards and docks in the surrounding inner city, where they were commonly thought to be an important source of urbanisation economies (Hoover, 1937; Chinitz, 1961). The working class population resided in the inner suburbs, close to their jobs, however middle and upper class workers commuted to their CBD office jobs from more distant suburbs (O'Connor, Stimson, & Daly, 2001). Following conclusion of the Second World War a baby boom and overseas immigration drove population growth (see Figure 2), and stimulated housing demand through into the 1970s. These population pressures were accompanied by a long-term shift in Melbourne's economic geography. Factories moved from the inner city to larger premises in new outer suburbs, and the working class moved with them, renting or buying new lower-cost suburban housing (O'Connor et al., 2001).

#### *Socio-economic History - Carlton*

These broad trends had a particular manifestation in the case study locations in Carlton. Until the late 1850s, the area that would become Carlton was lightly forested bushland forming part of the ancestral lands of the Wurundjeri clan of the Woi-worung (Chambers, 2005, p. 10). European occupation of this land began in 1852 when Carlton first appeared on City of Melbourne maps as 'City Extension', with Crown land sales following throughout the decade (Chambers & Mayne, 2005). Carlton's early development put it among the more highly desirable residential suburbs, and between 1852 and the 1880s it was a wealthy area compared to neighbouring Collingwood and Fitzroy (Chambers & Mayne, 2005).

The 1890s saw Carlton – along with much of Melbourne - sink into economic depression. The suburb came to be characterised by slum housing, criminal gangs, and prostitution. In that decade, one property owner applied to change the name of Bouverie St because he claimed the area has 'lost caste' and undesirable classes inhabited the street (Anderson, Coney, & Nelson, 2005). By the end of the nineteenth century the upper-middle classes left Carlton for the eastern suburbs and working class residents took their place (Anderson et al., 2005). In the first decade of the twentieth century, 'larrikin pushes' (gangs) congregated in the Bouverie - Queensbury St area (Swain, 2005, p. 151). Small-scale textile and clothing workshops were scattered throughout Carlton, and along with hotels, breweries and building work provided the bulk of employment for Carlton residents.

The Carlton Brewery is of special significance in our study area as it was located at the city end of Bouverie St. It started trading in 1858 at 24 Bouverie St as the 'North Melbourne Brewery', but failed after only 12 months. In 1864 John Bellman reopened the site as the 'Carlton Brewery' and sold it in 1865 to Edward Latham, who developed it into a thriving business. By the late 1860s, the brewery covered 1,022 square metres and was a double storey bluestone structure. In 1907 Carlton Brewery was the largest of seven companies that merged to form Carlton and United Breweries. Brewing on the site ceased in 1987 (Mahar, 2005).

Migration also shaped the development of Carlton in the 20<sup>th</sup> century. A significant Eastern European Jewish community was established in the 1910s and 1920s (Chambers & Mayne, 2005). A post Second World War wave of Italian migrants left a lasting mark on the suburb, with Italians accounting for a quarter of Carlton's population by 1960. The persistent influence of Melbourne University – located at the northern end of Bouverie St - added to the literary and cosmopolitan nature of the suburb. During the 1960s many working-class residents and new migrants moved to the outer suburbs following relocated industrial employment, but the low cost housing they left behind in the inner suburbs came to be newly appreciated. Australians returning from overseas chose to buy and renovate inner city housing in Carlton, Richmond and Fitzroy, and the gentrification of these suburbs began (O'Connor et al., 2001), helped along by younger professional singles and childless couples with an appetite for the services of leisure and cultural industries concentrated in and around the central city.

### *Policy Intervention*

The first significant built form policy intervention was the Melbourne Building Act (1849), requiring all buildings in the central area of the city to have a building permit. This increased costs and precipitated a boom in 'jerry building' in the inner suburbs surrounding the city such as Carlton, Fitzroy, Collingwood and Richmond, which were not covered by the Act (Lewis 1999). These are the suburbs that become identified as slum housing areas in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries (Howe 1988). By the 1880s, similar building regulations extended to the Melbourne suburbs, although some municipalities had already implemented bans on non-brick structures, such as Fitzroy (O'Hanlon, 2002, p. 14).

The 20<sup>th</sup> century saw greater intervention by governments in housing, with the introduction of legislation enabling Local Government to construct housing and demolish and rehouse tenants (*Workers Dwelling Act* (1914); *Housing Reclamation Bill* (1920)) (Harris 1988; O'Hanlon, 2002). In the City of Melbourne, more than 2,500 houses were condemned between 1920 and 1923, with most of the demolished houses replaced by factories or workshops (Harris 1988).

Coordinated State Government-led housing policy in Victoria began in the 1930s, with the creation of the Housing Commission of Victoria (HCV) in 1938. The HCV had the power to declare houses unfit and order their demolition or repair, declare whole areas for reclamation, determine standards for new housing, and recommend new building regulations (Hayward 1996). It initiated large scale inner city slum clearance and public housing projects in the 1950s and 60s, which resulted in significant change to the inner City of Melbourne, including Carlton. The 1954 MMBW Metropolitan Planning Scheme introduced metropolitan wide land-use zoning for the first time in Victoria. Inspection of the scheme confirms our study area as primarily industrial in the 1950s, and zones it accordingly.

Carlton presents a microcosm of the long run impact of policy decision and external 'shocks' on the urban and social fabric of the city.

## Results and Discussion

We begin by describing the changing pattern of land lots and ownership over the 100 year study period. Each individual property record in our sample represents a lot that is either vacant, or (more commonly) has capital improvements in the form of a physical structure(s)/building(s) occupying the lot. An increasing number of records will reflect subdivision of large land lots into smaller lots. A single lot and property record is then replaced by multiple land lots and multiple property records. Fragmentation of land holdings can signal change in land use, as when agricultural land ceases to be farmed and it is subdivided for residential housing.

A decline in the number of land lots will reflect the consolidation of contiguous land lots - that is merging of adjoining lots under a single lot. Land consolidation is important because it is commonly associated with a change in land use (e.g. from residential to industrial), and/or change in the physical structures occupying the lots; for example, a row of terraced housing is demolished and replaced by a multistorey apartment block. The land use remains residential but the built form exhibits a radical change.

The changing pattern of land lots has a potentially important story to tell. But it needs to be complemented by knowledge of the geography of land ownership. Land consolidation can come about when separate but adjacent land lots are owned by a single entity who consolidates multiple land lots into one new lot and re-develops the merged site, or 'sells out' to a developer, firm or landlord who then consolidates multiple land lots into one new lot, and redevelops the merged site. Alternatively, the separate land lots may have belonged to different owners who agree to sell out to a developer, firm or landlord who then consolidates the contiguous land lots into one new lot. Transaction costs associated with the second ownership pattern are likely to be higher and this is central to a key hypothesis – fragmented ownership will feature slower development because higher transaction costs impede the merger of adjoining land lots that is often a vital prerequisite for changing land use (Evans, 2004, p204).

### *Ownership and Land Record Trends*

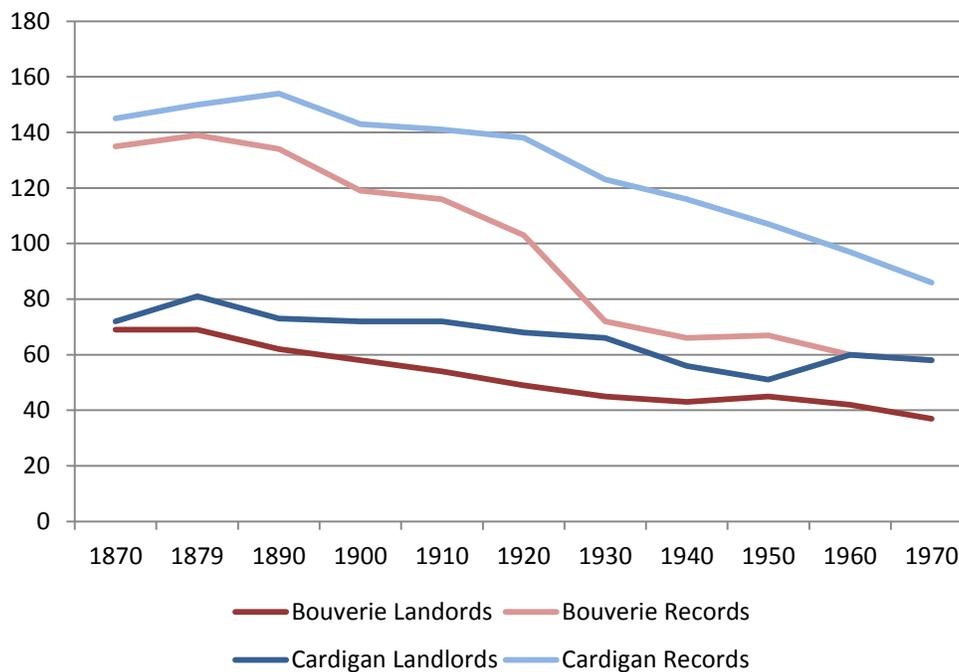
Figure 3 profiles the number of property records (land lots) and owners along Bouverie and Cardigan streets over the 100 year study period. In Bouverie St there is a very short period of subdivision that runs out of steam by 1879; from a peak of nearly 140 land lots in that year, there is an almost monotonic decline through to 1970. The early increase in land lots might well reflect the final years of the 'jerry building' boom that was brought to an end by the extension of building regulations to the inner suburbs by the 1880s (see page 6). Over the 91 year period 1879 - 1970 the number of property records declines to roughly 60 land lots, or less than half the number in 1879. There has clearly been considerable merging of contiguous land lots to achieve this consolidation, but it is intriguing to note that there is a marked acceleration in the rate of consolidation during the 1890s and 1920s. These two decades alone account for nearly two thirds of the 91 year decline in land lots. The correlation with boom and bust economic cycles is striking with the 'roaring 1920s' featuring boom conditions, and the 1890s characterised by a deep economic depression.

In Cardigan St, Figure 3 shows that the initial subdivision phase lasts longer (through to 1890) and then land consolidation proceeds at a more sedate pace. The longer subdivision phase suggests that new residential building construction was sustained through until the onset of the 1890s depression, and was not a product of the 'jerry building' boom. After peaking at more than 150 land lots, the number of property records declines to around 85 in 1970. There are bursts of consolidation in the 1890s and again in the 1920s, but the decline in land lots is less pronounced.

Ownership patterns are flatter in both streets over the study period. After peaking at just over 80 owners in 1879, there was decline in the number of Cardigan St owners, but it is gradual, with almost 60 owners of land lots remaining nearly 100 years later. Moreover the boom and bust pattern evident in land lot trends is not a strong feature of ownership profiles. And the decline is not monotonic; in the early post-World War II years there is a sudden reversal of trend with the number of owners increasing during the 1950s. The relative stability in overall numbers of owners could obscure considerable decade - on - decade change in the identity of owners. But it seems that any turnover in ownership is not accompanied

by the bigger land owners expanding their share of land lots. If 'empire building' was an important influence, a sharper drop in the number of owners could be anticipated.

**Figure 3: Number of Landlords and Number of Properties**



Similar conclusions can be advanced on examining Bouverie St. In 1870 there were approximately 70 owners, each on average having claims on two land lots. But 100 years later the number of owners has fallen to just under 40, a steeper rate of decline than in Cardigan, and a bigger reduction in the number of owners. Each of this smaller number of owners on average has claims to roughly 1.5 land lots. So the shrinking ownership base does not match the more pronounced plunge in land lots along Bouverie St. Once again these patterns do not signal 'empire building' by the largest owners. It seems that land consolidation is more likely to be coming about because owners of contiguous land lots are merging them under one lot, or selling on to a developer who then merges them under one lot.

*The Built Form; Materials*

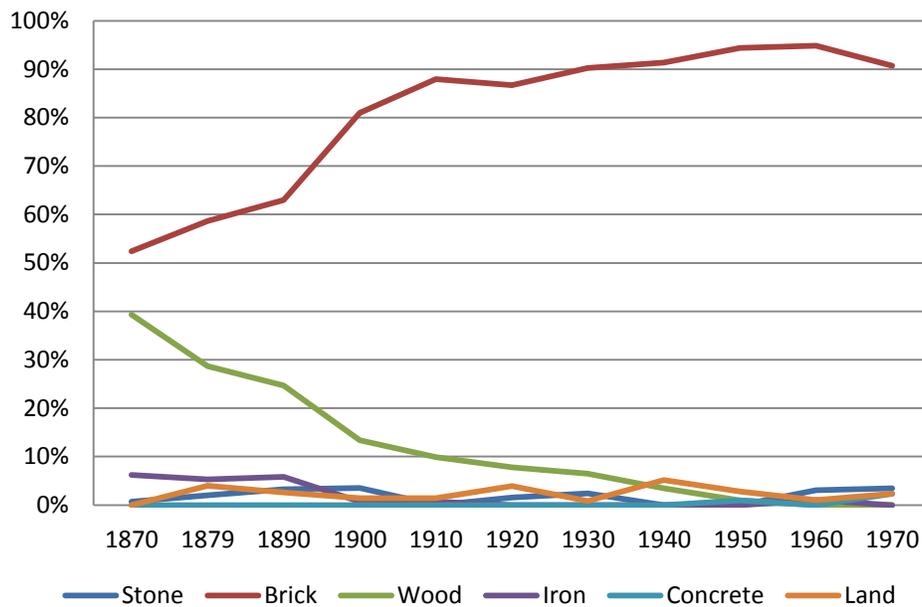
Positive shocks that increase the demand for space within an existing built-up area will raise the value of land in its most profitable use, subject to statutory controls. Pressure to redevelop will grow if current land use is devoted to alternative less profitable uses, and in already built-up areas the demolition of existing buildings and the erection of new buildings will commonly feature as land uses change. The lower the cost of clearing a site (as a proportion of the total value of the site), the more worthwhile (and likely) is redevelopment (Needleman, 1965). Land lots with capital improvements will differ in terms of demolition and clearance costs; those with iron, concrete, brick or stone structures will typically cost more to knock down than ones built of wood. Clearance of the former materials is also costlier as recycling of wood materials is more feasible, and if unfit for reuse, wood can be readily cleared from the site (by burning, for example).

Figures 4 and 5 compare the use of different materials in the built forms along Cardigan and Bouverie streets, once again over the 1870 – 1970 timeframe. Even back in 1870 over half the built structures along Cardigan St were brick buildings, in contrast to Bouverie St where brick buildings accounted for only a quarter of the built structures. Brick is the more expensive material and since both streets were predominantly residential at this stage (see Figures 6 and 7), Cardigan would have been the more prestigious address, and likely housed a more affluent segment of the Melbournian population. The prominence of brick buildings along the Cardigan streetscape is further evidence that it escaped the 'jerry

building' sparked by the 1849 Melbourne Building Regulation Act. Despite depression during the 1890s brick buildings leapt from roughly 60% to 80% of all physical structures along Cardigan; from 1900 onwards brick was the main material in 80% or more of the buildings fronting Cardigan, and while the roaring 20s left their mark on the number of land lots, the use of brick as the main material survived unscathed.

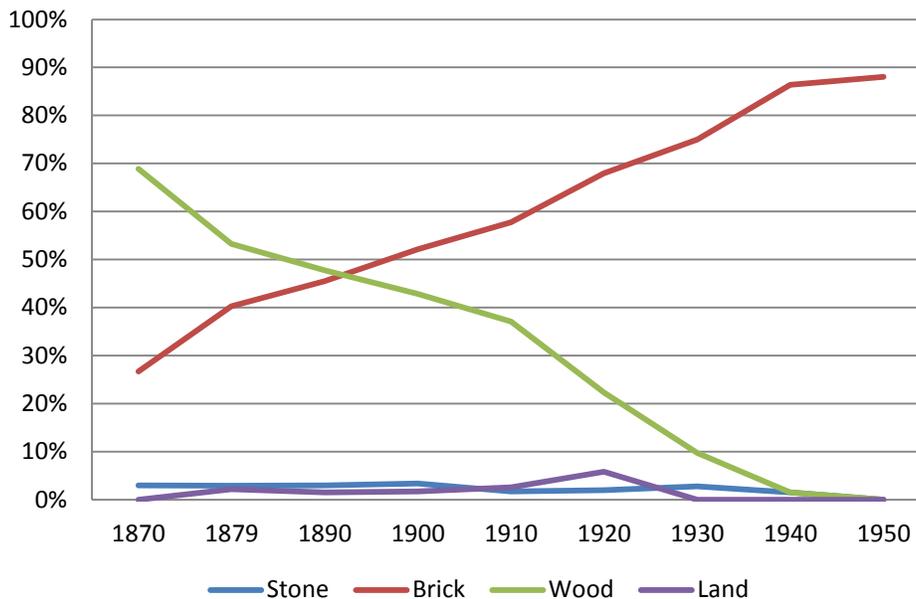
Back in 1870, wood was the main material used in the built form along Bouverie with nearly 70% of the physical structures having been constructed using wood. But this changed rather quickly with an almost 20 percentage point drop in the incidence of wooden buildings in the 1870s. The pace of change slackened somewhat over the three decades to 1910, before another sharp decline of nearly 20 percentage points between 1910 and 1920. Wooden buildings accounted for only 20% of all structures along Bouverie by 1920, and now brick dominated with almost 70% of all buildings constructed using it as the main material. So the built form was transformed in that 50 year time span with two bursts of redevelopment conspicuous within the period. Over the next 20 years wood all but disappeared from the Bouverie streetscape, while brick buildings continued to spring up, reaching nearly 90% of all buildings in 1950.

**Figure 4: Cardigan St materials % 1870 – 1970<sup>1</sup>**



*Note:* The figure identifies the percentage of built structures along Cardigan St with either stone, brick, wood, iron, concrete or land as the principal material.

**Figure 5: Bouverie St materials % 1870 – 1970<sup>1</sup>**



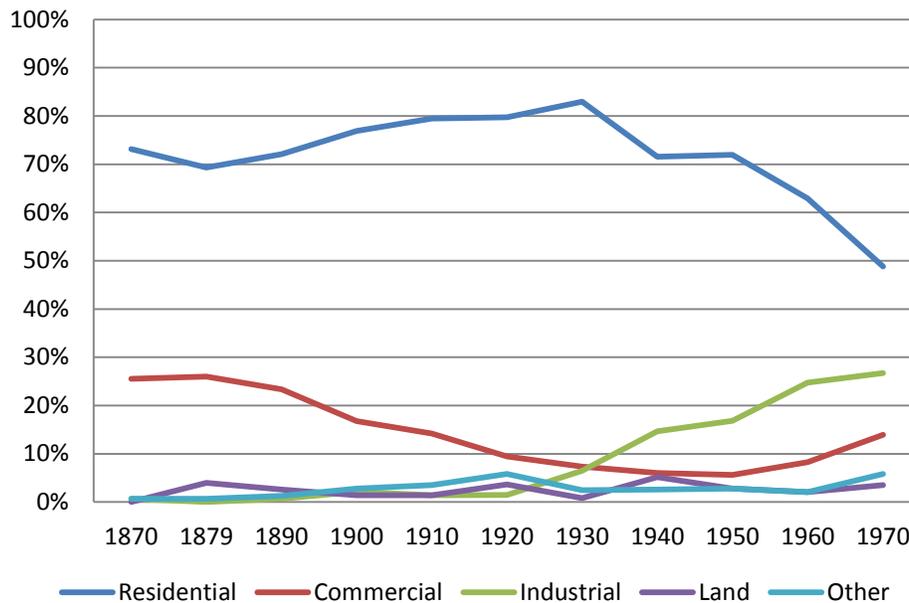
*Note:* The figure identifies the percentage of built structures along Bouverie St with either stone, brick, wood, iron, concrete or land as the principal material

#### *Land Use*

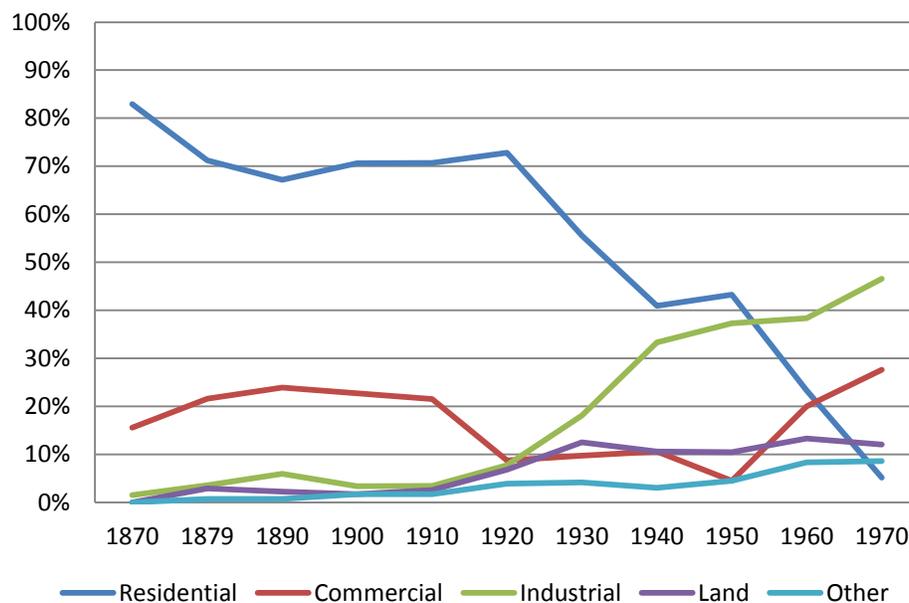
Cardigan St resolutely retains a residential character in all but the final decade of our one hundred year timeframe (see Figure 6). Yet again Bouverie offers a distinctive profile (see Figure 7); it ‘begins life’ as a largely residential street with inhabitants typically occupying wooden cottages. The late 1800s witness some reduction in residential land use, but the trend is not sustained through into the first two decades of the 1900s. Thus over the first 50 years (1870 – 1920) of the study period residential housing remains dominant, accounting for 70% or more of the built form. However, a marked change in land use occurs through the next two decades (1920 – 1940); the Bouverie streetscape is transformed from a largely residential built form, to one in which industrial land use is just as prominent. The Second World War interrupts this transformation, but once concluded residential land use once again slumps and by the 1970s it has almost disappeared. In the first burst of change in land use (1920 – 1940) the shrinking presence of residential housing is due to the rise of industrial buildings; the later post-War surge in land conversion also features the emergence of commercial land use as well as continued expansion of industrial land use.

Looking back over a century of development the character of Bouverie St’s built environment has been radically changed. A residential street comprising wooden cottages with the odd workshop and hotel, had 100 years later become a streetscape dominated by commercial and industrial brick buildings. Urban development along Cardigan St offers a vivid contrast, despite its proximity. Residential land use accounts for over 70% of all land lots through to 1950, and is still roughly 50% of all land lots by the end of the timeframe. It is also a streetscape dominated by brick buildings, and since the number of land lots and owners exhibits only moderate decline, the data conveys the impression of a relatively ‘well heeled’ stable residential community for all but the final two decades of the study timeframe.

**Figure 6: Cardigan St land use % 1870 – 1970**



**Figure 7: Bouverie St land use % 1870 – 1970**



*Land Values*

Average land values at 2012 prices are presented in Table 3. They are calculated by summing the assessed land values as reported on each property record and then dividing by the number of land lots. The RBA pre-decimal inflation calculator has been used to convert current price values into a constant price series; but since this only becomes available in 1910, the time series reported in this section are truncated. They nevertheless clearly show that typical land values along Bouverie St were much higher over the 60 year time span 1910 – 1970. The margin is 69% in 1910 but widens to over 200% in 1940, before shrinking back to 90% in 1970. However the average land value measure is not a per

hectare/acre/square metre measure, but is instead the average assessed value of property land lots. Bouverie and Cardigan streets are the same length, but since there are more land land lots along the latter, part if not most of the difference is likely due to the larger size of land plots along Bouverie.

The periods containing both world wars are associated with a slump in real land values along both streets. The post Second World War slump lasts longer in Bouverie; on the other hand the post First World War recovery in land values during the 1920s is much weaker along Cardigan. There is an important caveat here since there was a marked acceleration in the rate of land consolidation along Bouverie during the '20s. A corresponding increase in the average size of land plots might then be responsible for the surge in average land values along Bouverie in the 1920s. Both streets witness considerable volatility, but the booms and busts in real estate cycles are more pronounced in Bouverie St.

**Table 3: Land Values (Constant Prices 2012)<sup>1</sup>**

	Bouverie St			Cardigan St		
	Average Land Value \$	Average Annual Change	Number of Property Records	Average Land Value \$	Average Annual Change	Number of Property Records
1910	6,637		116	3,932		141
1920	4,760	- 2.8%	103	2,674	-3.2%	138
1930	12,274	15.8%	72	5,561	10.8%	123
1940	18,571	5.1%	66	5,000	-1.0%	116
1950	17,977	- 0.3%	67	4,413	-1.2%	107
1960	10,597	- 4.1%	60	8,894	10.2%	97
1970	26,003	14.5%	58	13,693	5.4%	86

*Note:* 1 The constant price series use the Reserve Bank of Australia's pre-decimal inflation calculator (<http://www.rba.gov.au/calculator/annualPreDecimal.html>). The calculator is available from 1900 onwards and is used here to compute land values at 2012 prices.

## Conclusion

Our central hypothesis is that city structures change slowly, because of initial land ownership and built form patterns as well as transactions costs that are a source of inertia and path dependency in urban development. However, there are defining periods that transform the built environment and are accelerated by increasing returns. These changes may flow from deliberate institutional interventions (such as infrastructure investment and policy change) or exogenous shocks (such as natural disaster, war, and macro-economic shifts). The analysis focuses on two streets– Bouverie and Cardigan streets – that are of equal length. We have accessed the property records contained in eleven individual rate books spread between 1870 and 1970, with up to 288 property land lots in each year, and a total of 2,474 over the 100 year study timeframe.

We find that if significant change in the built environment occurs along these two streets it comes in bursts rather than continuous incremental change. For example, in Bouverie St abrupt change in land use and built form erupts in the 1890s and 1920s as the streetscape is converted from one dominated by wooden cottages to a mix of industrial and commercial brick buildings. The correlation with bust (1890s) and boom (1920s) phases of the economic cycle is marked and appears to support the idea that exogenous 'shocks' act as a catalyst activating urban transformations. This feature of urban change is more pronounced along Bouverie than Cardigan, where along the latter there has been more stability with the predominantly residential character of the street sustained through to the post Second World War era.

The differences in urban development along these two streets are interesting as both have the same inner suburban location on the fringe of the city centre. They therefore share the economic opportunities that might be attributable to a location offering ready access to employment opportunities in the CBD, and infrastructure such as rail heads and port facilities that are also in close proximity. It is likely that path dependency ideas have a bearing on our findings. Inspection of the building materials data reveals a

widespread use of wood to construct buildings along Bouverie St in the early years of the study period. Redevelopment in already built up areas is (all else equal) more profitable the lower the costs of demolition and clearance; the prevalence of brick along Cardigan St and wood along Bouverie would favour redevelopment along Bouverie. The brick residential streetscape also suggests that Cardigan always housed a more affluent segment of the Melbournian population who are better able to resist change in land use that could adversely impact residential land values.

The 1849 Melbourne Building Regulations Act makes a potentially important contribution to path dependency. It triggered a jerry building boom in the inner suburbs as builders sought to escape regulatory requirements in the city centre. This boom petered out in the 1870s by which time similar regulations had been extended to the inner suburbs. Bouverie St shows signs of being impacted by this boom. Subdivision and hence a growth in the number of land lots continued through until the late 1870s, and residential building featured cheaper wooden materials that would form a malleable built environment less resistant to change. On the other hand subdivision along Cardigan St continued after the end of the jerry building boom using more expensive brick to construct residential housing, a built form that is more costly to adapt.

Finally it is difficult to ignore the importance of the Carlton Brewery site as a factor driving change in land use along Bouverie St. Though initially a business failure its revival under the ownership of Edward Latham was such that by the late 1860s the site covered 1,022 square metres on which a double storey bluestone structure was located. As a source of effluent, noise and air pollution its prominent presence would likely cause more affluent Carlton residents to rent and buy housing elsewhere. The disappearance of residential land use along Bouverie St and the contrasting persistence of residential housing as an important feature of the Cardigan St built form likely reflect the negative externalities associated with Carlton Brewery. On the other hand the Brewery offers important business opportunities for firms whose activities are closely linked upstream and downstream from the main brewing activity. The site could therefore have acted as a magnet attracting such firms who could benefit from co-location. The conversion of Bouverie streetscape to one dominated by industrial and commercial land use is consistent with this hypothesis.

The next steps for the research are to test the robustness of these preliminary findings using statistical techniques. This will include land use as the dependant variable, with ownership concentration and materials as key independent variables. The research will ultimately look to contribute to understandings of contemporary urban change and policy interventions.

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