



WORKING PAPER

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**The spatial distribution of
parking policy and usage:
A case study of Melbourne,
Australia.**

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ABSTRACT: Few cities have a Metropolitan wide parking policy. More often than not the planning of parking is undertaken by decentralised urban local governments with broad central guideline on parking supply rates. The provision of parking is thus generally opportunistic, aimed at facilitating and encouraging the decentralisation of travel and urban development. This paper documents the spatial distribution of policy and demand for parking in Melbourne, Australia, in order to obtain an indication of the spatial variations in parking policy and usage. It briefly reviews parking policy literature. It then reviews the spatial pattern of existing parking policy in Melbourne showing the increase in quality with distance from the central city. Parking usage is then studied, again showing a tendency towards greater parking activity as one moves away from the city centre and the relationship to activity levels in suburban areas. The paper reinforces the view that the focus on central city parking policy and the lack of a co-ordinated parking policy for outer suburbs encourages travel and urban development in outer suburbs. The paper calls for further research in other cities to confirm these trends.

KEY WORDS: *Parking; spatial distribution; supply policy.*

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1. Introduction

Parking policy relates to the management of the price, supply and location of parking to enhance the urban environment. Parking pricing and supply policy often focuses on the central city and areas of high levels of employment and retail activity. However the supply, location and price of parking influence all locations in a city. The spatial distribution of the price, supply and demand for parking needs to be understood. This paper investigates some of these variations for Melbourne, Australia.

The paper looks at the spatial distribution of the supply and usage of parking in three parts. The first briefly outlines existing approaches to parking policy. The second examines and analyses the existing parking policy across metropolitan Melbourne. It will cover the Metropolitan Planning Scheme and variations to this scheme. The third section looks at the distribution of parking usage across Melbourne. This overview points to variations in parking demand across the urban area and the relationship to parking policy. The paper closes with a call for similar research to be carried out in other urban areas to confirm the relationship between parking, land-use and transport policies.

2. Literature review

Parking policy tends to fall into two camps. The first looks at the supply of parking and the second its price. These aspects will be discussed. Parking policy focuses almost entirely on passenger vehicles. Parking for people with disabilities gets some mention due to legislation on discrimination, but multi-use and high occupancy parking along with motorbikes, bicycles and freight vehicles parking are rarely considered in policy statements. This paper therefore focuses primarily of parking for passenger vehicles.

Urban planners and parking policy formulators generally focus on setting of a rate (parking spaces per activity level) at which parking should be provided (Shoup, 1999). A surrogate measure of activity (eg floor area, number of beds, student numbers etc.) which is relatively easily measured is used to form a base for calculating the number of required parking spaces. Willson (1996) surveyed a number of planners in the United States and found that most surveyed a nearby city and consulted the ITE (2004) handbooks in order to gain an indication of parking requirements. Such approaches are still used, however, the data base upon which parking decisions can be made are broader and the inclusions of multi-use parking has been investigated. Recent parking policy research (Litman 1996, Cuddy, 2007, VTPI, 2008) suggest the proposition that the relationship between parking rates and the land-use they service is not always constant. Such factors as geographic location, demographics, economic factors, land use planning, transport planning, and parking access design may influence them. The parking rate can be specified as a minimum (Wendt and Levinson, 1990), required (Victorian Planning Scheme 2009) or maximum (Adam Millard Ball, 2007) rate depending on the jurisdiction. Whatever the parking rate specified there is still a negotiation process between developers, planning institutions and local residents which influences the final decision.

Policy on the choice of parking duration and location are generally subsets of the general supply policy. Parking duration and location policies tend to be local-level policies focusing on particular regions as distinct from metropolitan policies. The exception to this is the integration of parking and public transport policies through the provision of park and ride facilities.

Another approach to control parking is through its price (Willson and Shoup, 1999). This has received more consideration in the literature than supply policy, however, its application generally relates only a small section of the city, primarily the central city (Shoup 2005; VCEC 2006; Litman 2006; Verhoef, Nijkamp & Rietveld 1995). Parking pricing policy has been introduced through a parking levy (*Parking Space Levy Act (NSW) 1992; Perth Parking Management Act (WA) 1999; Hamer et al 2009*), workplace parking levy (*Transport Act (UK)*

2000; Parking Forum 2005; Enoch & Ison 2006), commercial parking tax (Litman 2006), fringe benefit for income tax purposes (*Fringe Benefits Tax Assessment Act (Australia) 1986; Income Tax Act (NZ) 2004*), ‘cashing out’ of parking policy (Morris, 2005; Shoup 1997; Shoup 2005).

There has been considerable research into the relationship between parking policy and travel. Parking policy in city centres can have a strong influence on travel behaviour. Data shows that providing an abundant supply of relatively cheap parking makes it difficult to persuade drivers to leave their cars and use public transport (Pourbaix 2005). Indeed, some studies suggest that levels of parking price can be more significant than levels of public transport provision in determining means of travel (particularly for the journey to work) even for trips that are very well served by public transport (Department of Communities and Local Government 2001). While governments at all levels can continue to expand infrastructure to meet actual and perceived access needs, Brown *et al.* (1999, p371) suggest that parking controls (both supply and cost) are ‘the single most effective local tool to manage and limit traffic’.

Rarely do researchers look at the spatial distribution of parking policy nor the usage of provided parking. This study does just that, it looks at parking over Melbourne, Australia, and investigates how parking policy is implemented and the consequent result of this on parking usage.

3. Parking policy in Melbourne

The previous section has shown that parking policy tends to focus on the supply of parking across urban regions and pricing of parking in the central city. This section looks at Melbourne in order to confirm this view. As stated above parking policy can relate to four dimensions: Supply, Location, Duration and Price. This section will look at the spatial distribution of these policies in Melbourne.

3.1 *Parking supply*

Parking supply policy is possibly the most firmly planned spatial policy in Melbourne. The Victorian Planning Scheme (2009) was developed in order to provide a consistent planning basis across all of Victoria. Within the Planning Scheme, Clause 52.06 governs the parking standards in terms of rates, dimensions and related considerations. Specifically, Clause 52.06’s purpose is to ensure that car parking facilities are provided in accordance with the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local policies such as a Local Parking Precinct Plan (Melbourne 2030, 2000). Clause 52.06 aims to ensure that the design and location of car parking areas does not adversely affect the amenity of the locality; achieves a high standard of urban design; enables easy and efficient use; and protects the role and function of nearby roads.

Generally speaking, new developments must provide parking based on Clause 52.06-5. Table 1 below provides some of the standardized land uses that have a predetermined parking standard as set out in the Victorian Planning Scheme (2009). The parking rates specified in the Scheme is that required for development. Rarely do developers in the inner suburb provide more parking than that required by the Scheme due to the cost of providing a parking space. In outer suburbs where the cost of land is lower some developers may exceed that required by the Scheme.

Table 1: Victorian car parking requirements, clause 52.06 Victorian Planning Scheme (2009)

Land Use	Car Space Measure	Parking Rate
Shop, other than specified in this table	Car spaces to each 100m ² of leasable floor area	8
Office other than specified in this table	Car spaces to each 100 m ² of net floor area	3.5
Restaurant	Car spaces to each seat available to the public	0.6
Hotel or Tavern	Car spaces to each 100 m ² of bar floor area available to the public	60
	Car spaces to each 100 m ² of lounge floor area available to the public	30
Post Office	Car spaces to each 100 m ² of net floor area	3.5

When a dispensation from the Scheme is sought, Clause 52.06-1 provides a number of decision guidelines, which provide guidance in ascertaining a reduced parking provision. In order for the development to gain a reduction or complete waiver in the car parking requirement, one, or a number of the decision guidelines must be explained and adhered to. Developers who require traffic impact reports to be submitted to local governments in order to gain a permit, often sub-contract out the task to traffic engineering company. Traffic engineers assess and analyse the parking, along with other traffic and transport related aspects within the area and specific to the development site, to try and achieve a parking dispensation or complete waiver for their respective client. The application involves submitting a report to council as well as advertising the proposed development to the local community, including directly notifying people in the area that may be directly affected by the development. A report is submitted to council at the Town Planning Stage. Council's traffic department examines this report and a decision is made. The development, based on parking maybe accepted, declined or accepted subject to specific conditions. If any party objects to the decision made by Council in regard to granting a permit for a proposed development, they can appeal the decision to the Victorian Civil and Administrative Tribunal (V.C.A.T.).

In regards to parking, Clause 52.06 of the Victorian Planning Scheme (2009) governs the typical rates required for different land uses. Many municipalities across Metropolitan Melbourne have their own governing parking rates, whether it be Schedule Clause 52.06-6 to Clause 52.06, an individual Clause within the Municipalities Planning Scheme that differs to the general Victorian Scheme or a Planning Document produced by council. All these documents provide alternate rates to the Victorian Planning Scheme's (2009) Clause 52.06.

The metropolitan Melbourne Municipalities that are solely governed by Clause 52.06 and have no other parking policy documents or Schedule 52.06-6 are shown on Figure 1. There are 24 councils that use the Scheme as the basis for specifying parking requirements. There are 32 Municipalities in Melbourne. Within metropolitan Melbourne, there are currently 8 Local Government areas that incorporate alternate parking rates to those specified within Clause 52.06 of the Victorian Planning Scheme (2009) (See Figure 1). These rates are provided in the form of a Schedule to Clause 52.06-6, Clause 22.03, a Town Planning Policy or some form of alternate Parking Management Plan.

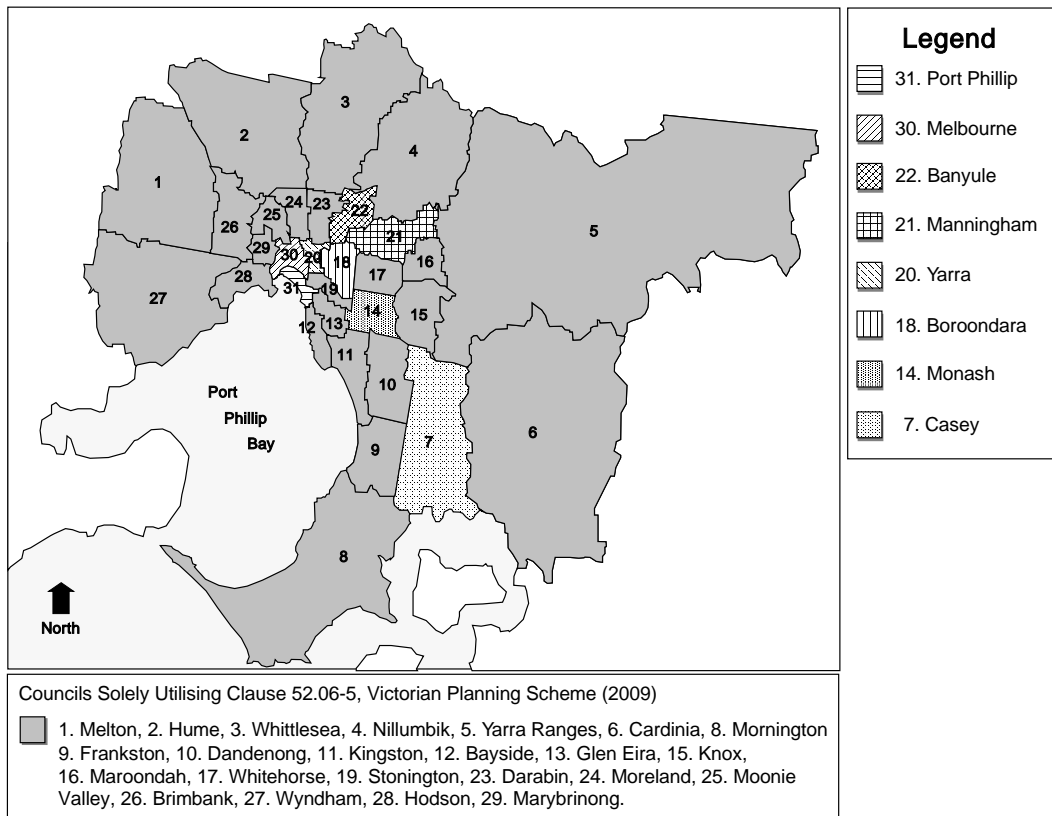


Figure 1: Local governments that differ from general parking requirements

The overall distribution of parking rates is shown in Figures 2 and 3. It can be seen that the rate reductions are more common in the inner to middle suburbs with the consequent provision of more parking in outer suburban areas. The impact of this on decentralisation of cities was explored by Young and Currie (2006).

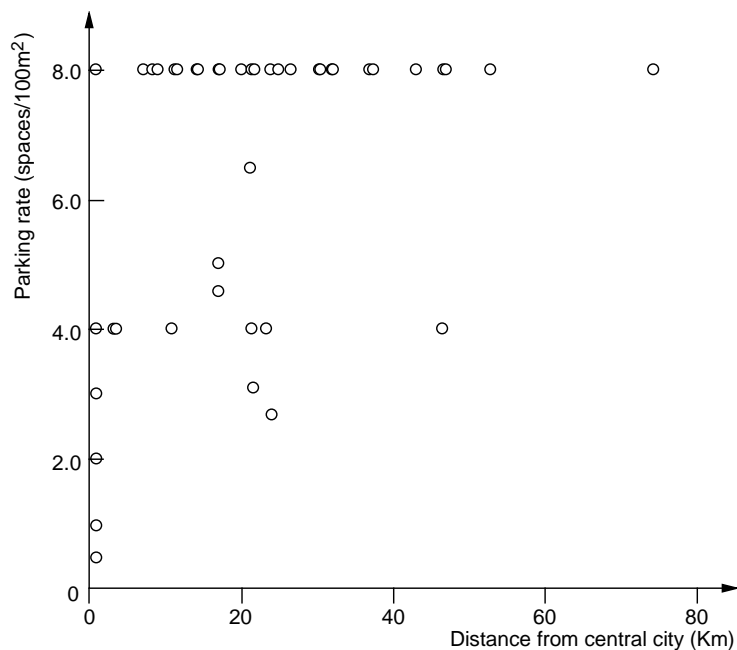


Figure 2: Parking rates for shopping

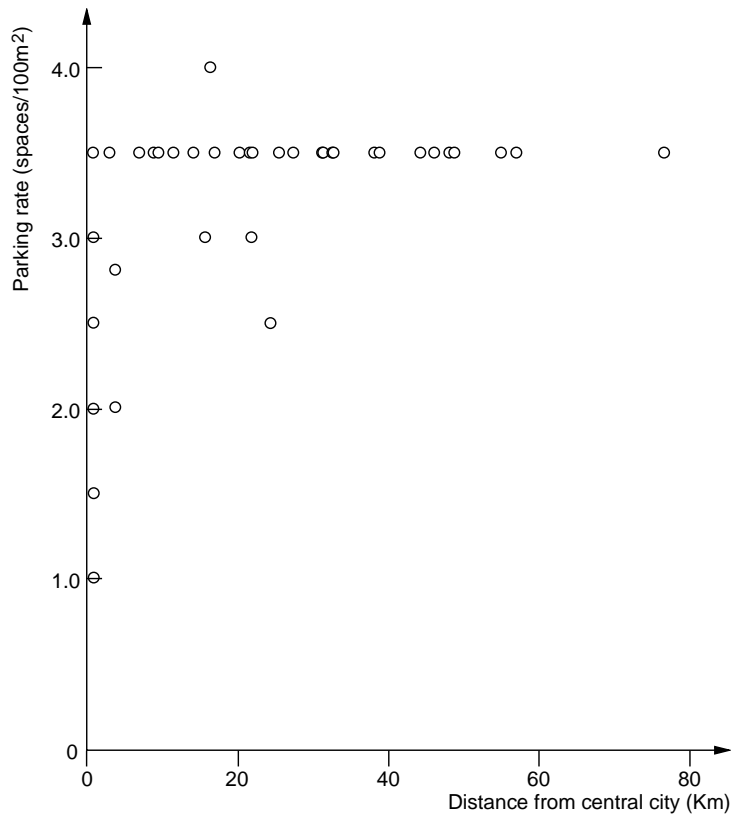


Figure 3: Parking rates for office

In the previous discussion, parking rates from the Victorian Planning Scheme (2009) and alternate documents or Clauses have been introduced. There is a need to compare the statutory requirement with what is actually provided. In many cases, developments are granted a reduction or complete waiver of on-site parking provision. This is especially evident in areas with large amounts of existing parking and in areas of high public transport accessibility. There is for this reason a need to identify what parking provisions are actually provided in a pre-determined precinct in order to gauge if the amount of parking matches the land-use in the area. To gain some indication of the implementation of parking rates the distribution of parking at shopping centres is studied. Figure 4 shows the distribution of parking in relation to the size of the shopping centre. It can be seen that the actual parking rate is considerably lower than that in the parking scheme for medium to large shopping centres (ie above 30,000 m²). For small shopping centres there is more agreement between the parking scheme and the parking provided.

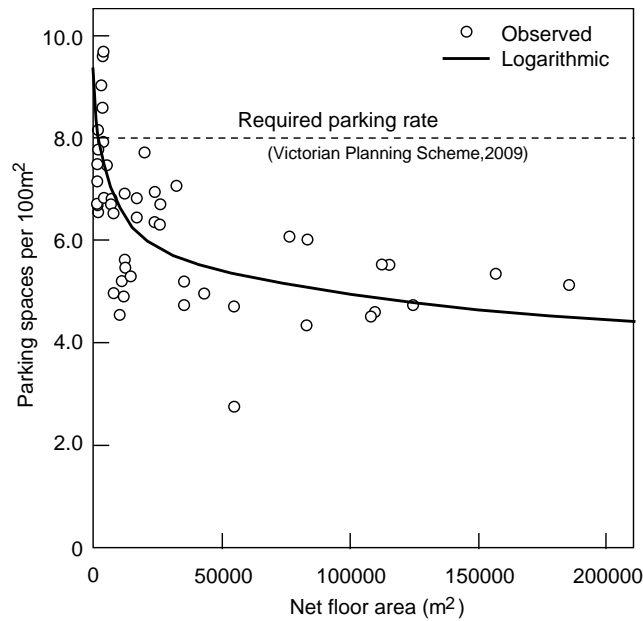


Figure 4: Relationship between parking lot size and parking rate

The trend is quite clear (see Table 2). There is a decrease in parking rate with increasing size of land use. There is a slight trend towards increasing parking provision with distance from the centre of city but this is not statistically significant.

3.2 Parking location policy

Parking supply is generally related to building development and it is only in the inner city and some suburban areas of high development, stand alone parking facilities are operated. Figure 5 shows the average walking time between parking place and final destination. It can be seen that there is

Table 2: Trends in parking provision

Relationship	Mathematical relationship	T-Statistic		Standardised R ²
		Constant	Independent variable	
Parking rate and net floor area (Figure 4)	Parking rate = 12.8 – 0.70 * Ln(Net floor area)	12.93 (sig 0.00)	-6.78 (sig 0.00)	0.48 (sig 0.00)
Average walking time and distance from Central city (Figure 5)	Average walking time = 0.77 + 1.21 / (Distance from central city)	39.115 (sig 0.00)	14.29 (sig = 0.00)	0.87 (sig 0.00)
Average duration of parking and distance from central city (Figure 9)	Average duration of parking = 132.83 + 103.75 / Distance from Central city)	34.94 (sig 0.00)	6.42 (sig 0.00)	0.57 (Sig 0.00)
Proportion not paying for parking and distance from the central city (Figure 10)	Proportion not paying for parking = 99.98 – 28.07 / Distance from central city)	314.87 (sig 0.00)	-20.78 (sig = 0.00)	0.93 (sig 0.00)

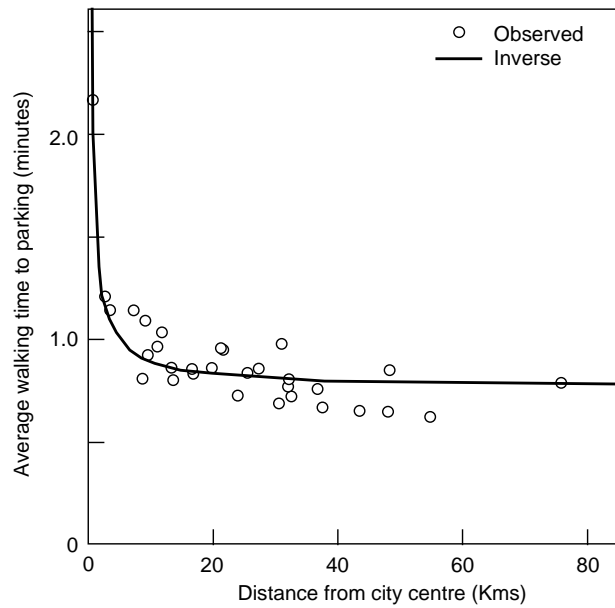


Figure 5: The relationship between average walking time and distance from the central city

a general decrease as one gets further from the central city. The general trend line is shown in Table 2. It can be seen that access to final destination from a parking place is generally higher in the middle and outer suburbs than in the central city.

Parking is often located near major rail, tram and bus interchanges. These are aimed at facilitating the use of public transport. Such parking is not covered in the Metropolitan parking scheme. Hamer (2009) stated that park and ride plays an important role in Melbourne’s public transport system. In 2008, approximately 31,500 park and ride spaces were available for use at railway stations throughout the metropolitan network (DoT 2008). While there is spare capacity at some station car parks, weekday use far exceeds supply at the majority of locations. A recent audit (Hamer, 2009) of parking use at metropolitan stations in Melbourne revealed that the total number of parked cars exceeded the number of parking spaces by approximately 50% (DoT 2008), with overflow parking occurring on local residential streets. Figure 6 shows that these are generally located between 20 and 50 minutes travel time from the central city in the middle and outer suburban public transport interchanges.

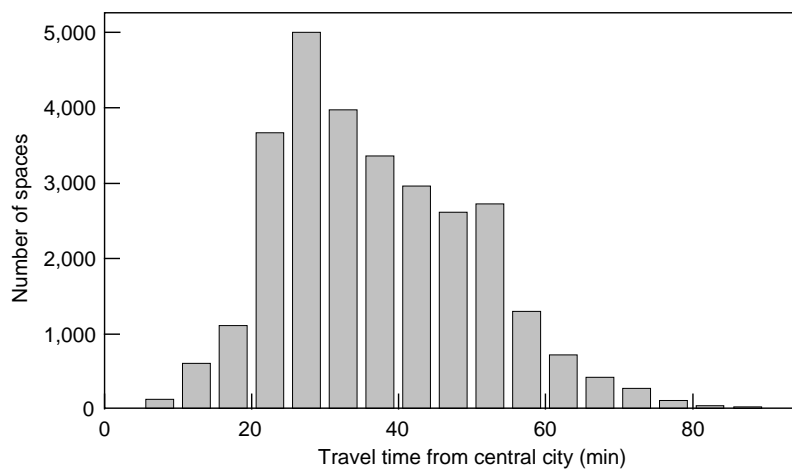


Figure 6: Distribution of park and ride facilities for rail by distance from central city

3.3 *Parking duration policy*

Parking duration tends to be related to the activity undertaken in an area. The distribution tends to vary for different activities. The data used in to measure parking use in this paper was collected by the Department of Transport in Victoria and is called the VISTA-07 (2008) data base. It represents a sample of household travel in Melbourne and provides information on the stops taken by travellers and the characteristics at those stops. Figure 7 was developed from the Vista-07 (2008) data base and shows the distribution for work durations for the entire urban area of Melbourne. It peaks at less than 29 minutes duration, decreasing thereafter, followed by a strong peak at 510-529 minutes (8.5-9.0 hours). The average parking duration, across the day, for all work related parking demand is 315 minutes (5:15 hours).

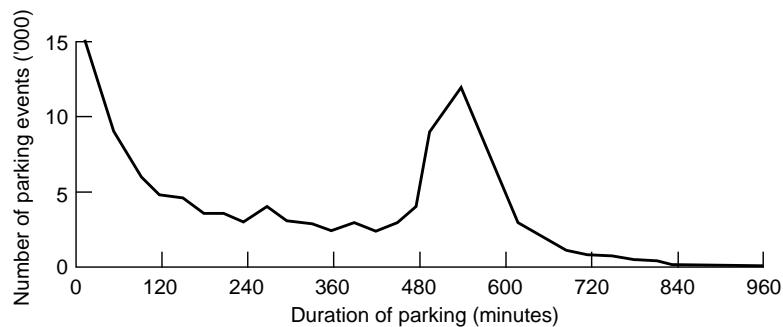


Figure 7: Work related parking duration

Retail parking duration has a distinctive distribution as illustrated in Figure 8 below, with a peak demand at less than 14 minutes duration, steadily decreasing thereafter. The average parking duration, across the day, for all retail parking demand is 50 minutes. It is noted that only 0.18% of all retail parking events have a duration of greater than 300 minutes (5.0 hours). Table 3 outlines the average parking duration for the different retail establishments. It can be seen that there is quite a variation across different shopping establishments.

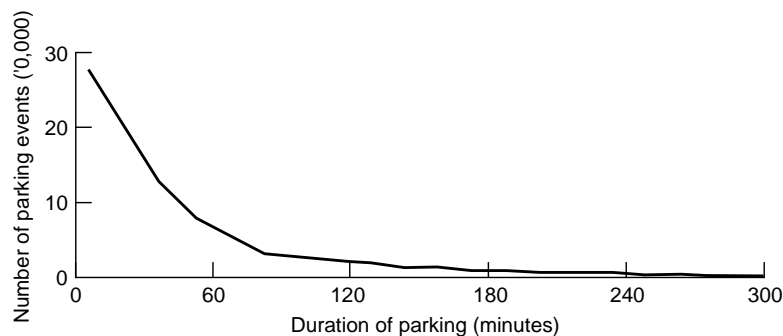


Figure 8: Retail parking duration

No general policy guidelines tend to relate parking duration to land use in an area. Policy is rather developed at a local government level using a general approach of short term parking provided neared the development and longer term commuter parking located at a greater distance from activities. There is no relationship between one local government and another.

Table 3: Retail trip purpose - average parking duration

Variable Code	Variable Meaning (order of magnitude parking minutes)	Average Parking Duration (All Day Stop Weight)	
		Minutes	Hours : minutes
601	Shopping Centre	70	0:10
602	Supermarket	31	0:31
698	Retail NEC	34	0:34
632	Market	66	1:06
615	Hardware	30	0:30
608	Petrol Station	8	0:08
603	Food Store	18	0:18
612	Department or Discount Store	43	0:43
614	Clothes & Shoes	44	0:44
611	Newsagency & Bookstore	13	0:13
613	Chemist	16	0:16
617	Homeware	39	0:39
620	Garden Centre	35	0:35
Average		39 minutes	0:39

Another dimension of parking duration is its spatial distribution. Figure 9 and Table 2 show the distribution of parking duration with distance from the central city. It can be seen that this decreases in the duration of parking with distance from the central city and that there is a relatively strong relationship ($R^2 = 0.572$). The longer parking in the central city may be due to the larger employment in that area and their longer parking durations.

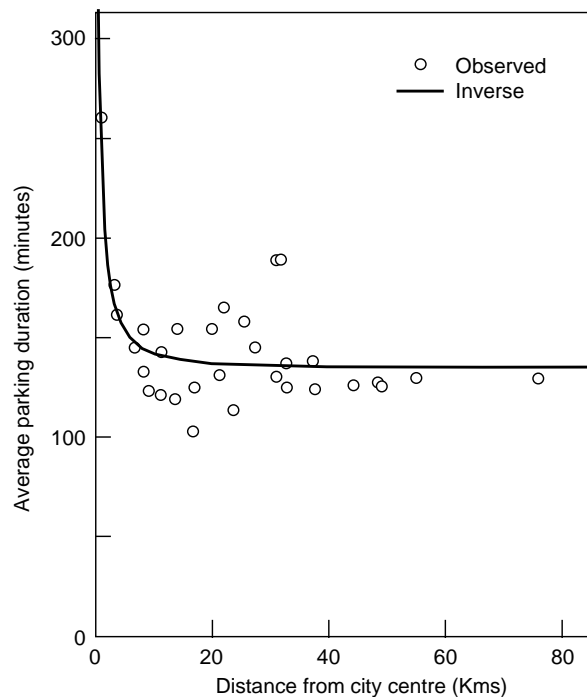


Figure 9: Spatial distribution of duration with distance from the central city

3.4 Pricing policy

Pricing policy in Melbourne is firmly focused on the central city. Figure 9 shows the proportion of people paying for parking. It can be seen that it is primarily in the inner suburbs. The strength of the relationship is shown in Table 2.

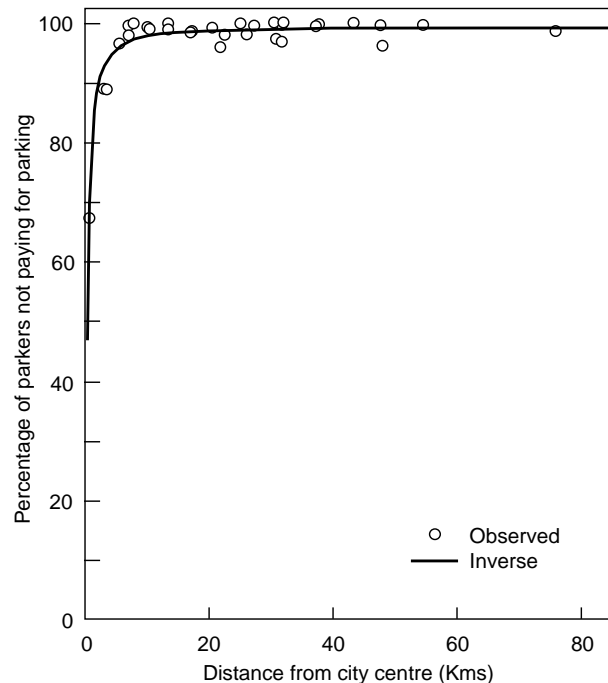


Figure 10: Proportion of non-paid parking by distance from the central city

Parking pricing policy is rather ad hoc in most parts of Melbourne. Only in the central city of Melbourne has a parking levy been introduced. The *Congestion Levy Act 2005* (Vic) applies a levy on all long-stay parking spaces in the Melbourne CBD and adjacent inner city area. The congestion levy covers an area of approximately 14.6 km² of inner Melbourne. The total area of Greater Melbourne is 8806 km². Under the Act, a long stay parking space is defined as a parking space in a private car park and a parking space in a public car park that is set aside or used for ongoing parking by the owner of the space (or another person under lease or licence), or used for the parking of a motor vehicle for a period of at least 4 hours on a working day, commencing at or before 9.30a.m. and ending at or after 9.30a.m. Under the definition provided in the legislation, a private car park simply refers to any car park that is not a public car park. Subject to the levy exemptions and concessions set out in the legislation, all parking spaces in a private car park attract the congestion levy. Many car park operators within the levy area offer patrons a discounted 'early bird' rate (McGuigan 2009), provided that they arrive prior to 9:30 a.m. and stay for a minimum time period. All of the parking spaces used for 'early bird' parking are considered to be long stay parking spaces (State Revenue Office 2007). Where parking is charged by the hour but the fee is capped at a set multiple of the hourly rate, an operator must include all parking spaces occupied for the maximum fee as long stay parking spaces, unless the operator can distinguish between those used for no more than four hours and the rest (State Revenue Office 2007). If parking is charged as a fixed fee with no restrictions on the length of stay and no ability to determine the time of departure, the parking space must be treated as a long stay parking space (State Revenue Office 2007).

4. Parking usage

Consequent on the distribution of the four parking policies there is an outcome of parking choice. The previous sections have outlined parking policy and its spatial distribution. This section investigates the distribution of parking use in Melbourne. Parking use is the consequence of the interaction between parking demand and supply and is what is usually used as a surrogate for parking demand.

VISTA-07 (2008) indicates that approximately 16.2% of vehicles do not make a trip on an average day. Of those vehicles that make a trip, the average vehicle spends about 71 minutes travelling each day. It is parked on average 351 minutes per at the end of periods of travel. The remainder the day, 1018 minutes, it is parking at its home residence. These are relatively 4.9%, 24.4% and 70.7% of the day. On average, vehicles are parked 95.1% of the day.

For those household vehicles that travel, there are approximately 4.24 million parking events in the city of Melbourne per day. Given that there are approximately 2.05 million passenger vehicles registered in the city, this represents about 1.82 parking events per vehicle, or if only vehicles that travel are included 2.43 parking events per day.

This section will look at the relationship between parking and activity levels. Figure 11 and Table 4 shows the distribution of parking events in the city. The highest concentration of parking events is in the middle suburbs. The trend with distance from the central city is not significant ($R^2 = 0.034$), with the variation in the suburbs due to different levels of activity.

One measure of the level of activity in an area is the number of jobs. Figure 12 and Table 4 show the relationship between the number of parking events and the number of jobs in each local government. It is still a relatively strong trend ($R^2 = 0.541$) indicating a good relationship between level of activity and parking. An extreme value to the right of the graph is the central city where there is a large number of jobs but a lower number of parking events.

Dividing the number of parking events by number of jobs results in the distribution shown in Figure 13 and Table 4. The trend in parking rate is clear showing a general increase with distance from the central city ($R^2 = 0.365$). The rate of parking per job increases rapidly from the central city and is relatively even across the middle and outer suburbs.

Dividing the number of parking events by the area of the local government provides an indication of the concentration of parking. The relationship between this concentration and distance for the central city is shown in Figure 14 and Table 4. The trend in parking density is a relatively strong showing a general decrease with distance from the central city.

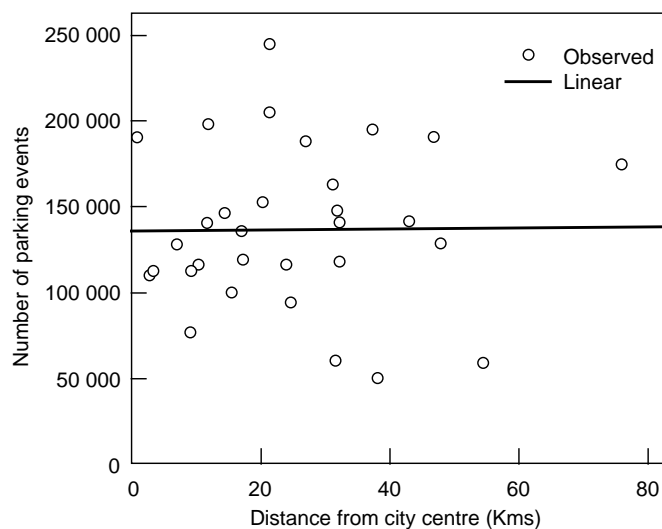


Figure 11: Spatial distribution of parking events by LGA

The duration and number of parking events can be combined into the total time vehicles are parked. It is the sum of the durations of each parked vehicle and is termed space minutes. It does not measure the maximum accumulation of parking directly but provides an estimate of parking utilisation. The average number of space minutes vehicles are parked in each of the local governments in Melbourne for non-home activities are shown in Figure 15 and Table 4. It is clear that the largest parking demand is in the central city but there is no real trend in the other local government areas. The introduction of space minutes does however increase the level of fit of the relationship from parking events, showing parking space minutes or parking utilisation is a better measure of parking usage.

The space minutes related to the number of jobs is shown in Figure 15 and Table 4. It can be seen there is a strong relationship ($R^2 = 0.893$). This is again an improvement on the fit of the relationship from parking events. The space minutes increases with increased number of jobs, then levels out for areas with a large number of jobs, that is the central city.

Table 4: Usage of parking

Relationship	Mathematical relationship	T-Statistic		Standardised R ²
		Constant	Independent variable	
Parking events and distance from the central city (Figure 11)	Parking events = 135297.5 + 63.10 * Distance from the central city	9.03 (sig 0.00)	0.13 (sig 0.90)	0.04 (sig 0.90)
Parking events and number of jobs (Figure 12)	Parking events = -439657.6 + 54446.3*Ln(Number of jobs)	-4.58 (sig 0.00)	6.03 (sig = 0.00)	0.54 (sig 0.00)
Parking events per job and distance from central city (Figure 13)	Parking events per job = 1.41 + 0.71*Distance from central city	2.80 (sig 0.00)	4.27 (sig 0.00)	0.37 (Sig 0.00)
Parking events per square kilometre and distance from central city (Figure 14)	Parking events per square kilometre = 6506.7 – 1530.2*Ln(Distance from the central city)	11.67 (sig 0.00)	-8.38 (sig 0.00)	0.70 (sig 0.00)
Parking space minutes and distance from central city (Figure 15)	Parking space minutes = 17.60 +22.55 / Distance from central city	11.57 (sig 0.00)	3.48 (sig = 0.00)	0.27 (sig 0.00)
Parking space minutes and number of jobs (Figure 16)	Parking space minutes = - 119.99 + 13.21*Ln(X)	-11.78 (sig 0.00)	13.76 (sig = 0.00)	0.89 (sig 0.00)
Parking space minutes per job and distance from the central city (Figure 17)	Parking space minutes per job = 253.80 + 74.65*Ln(X)	42.70 (sig 0.00)	13.99 (sig 0.00)	0.48 (sig 0.00)
Parking space minutes per square kilometre and distance from central city (Figure 18)	Parking space minutes per square kilometre = 1190744.35 – 302254.34*Ln(Distance from the central city)	15.57 (sig 0.00)	-12.07 (sig 0.00)	0.82 (sig 0.00)

The average space minutes per job in each local government is presented in Figure 17 and Table 3. It shows that there is an increase in parking demand per job as the distance from the central city increases. This is expected given the guidelines used in the Victorian Parking Scheme (2009), lower levels of public transport provision in outer suburbs and the greater land available for parking provision.

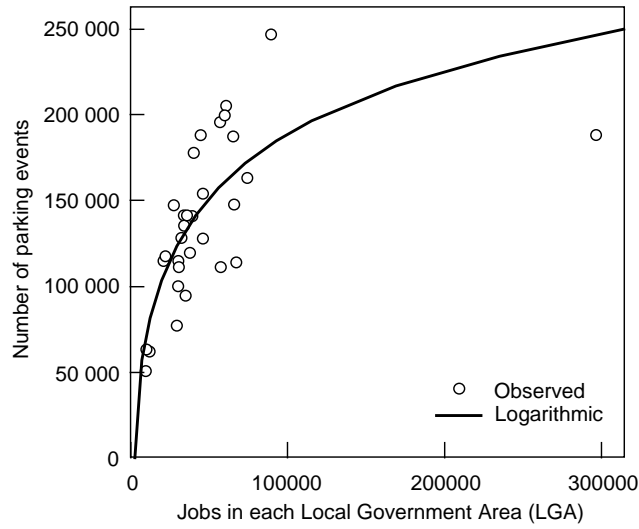


Figure 12: Number of jobs and parking events

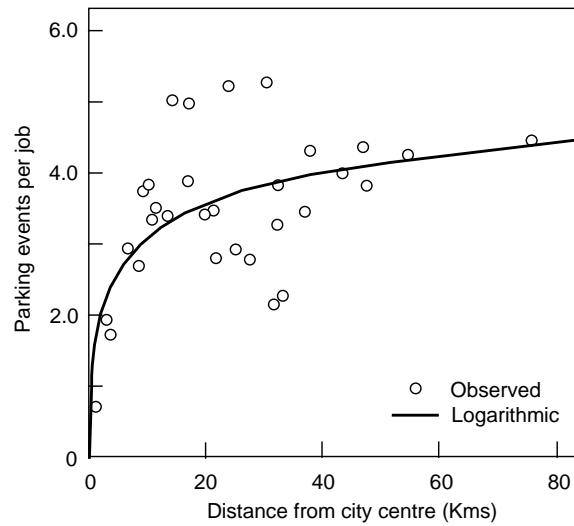


Figure 13: Spatial distribution of parking events per job

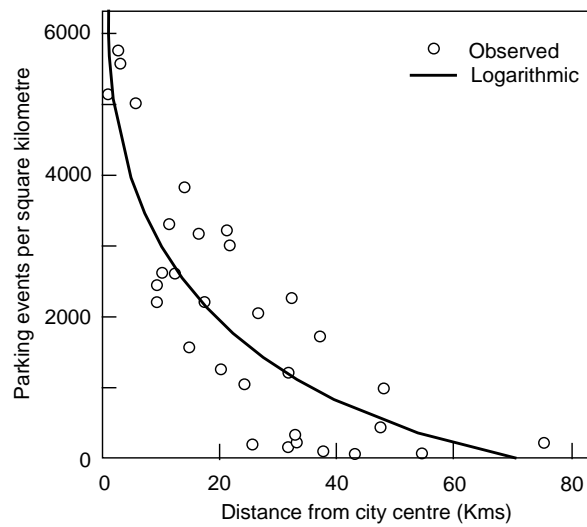


Figure 14: Spatial distribution of parking events per area

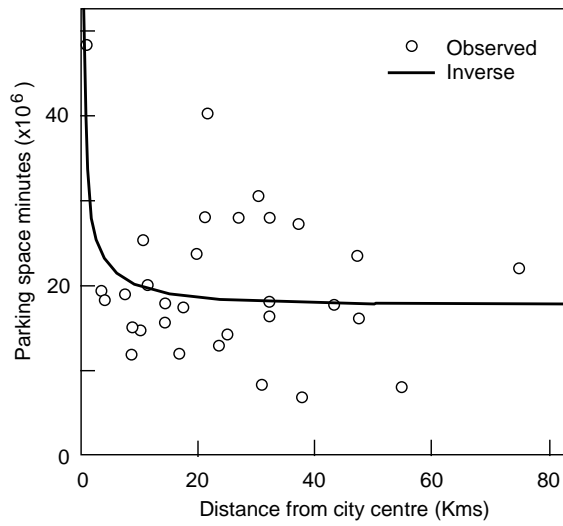


Figure 15: Average number of space hours parked in each Local Government in Melbourne

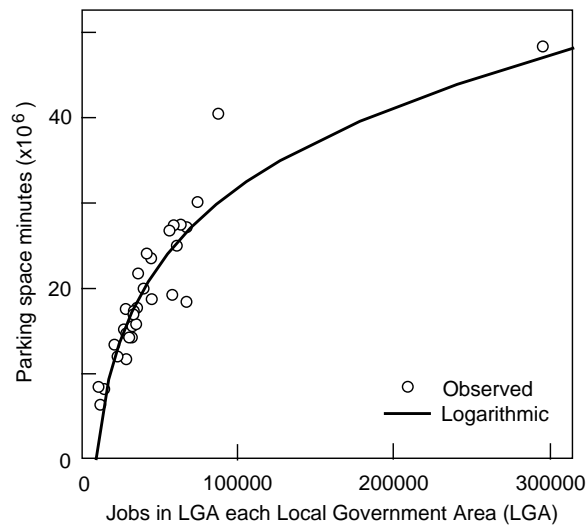


Figure 16: Space hours by number of jobs

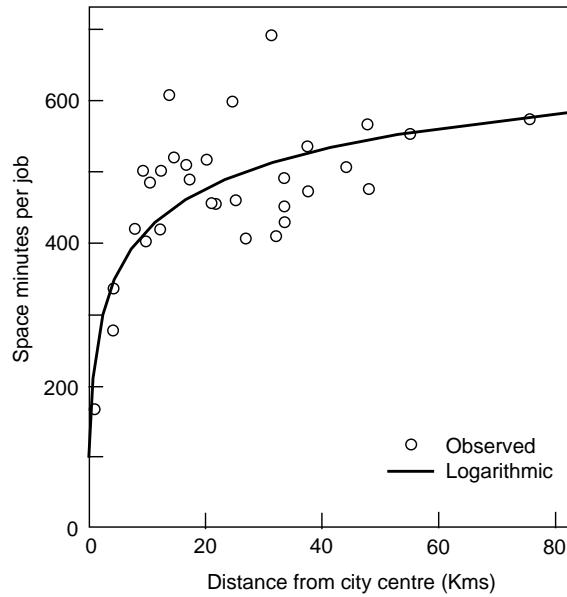


Figure 17: Average number of space hours of parking per job in each local government in Melbourne by distance from central city

The average space minutes per square kilometre in each local government area is provided in Figure 18 and Table 4. It can be seen that there is a progressive decrease as the distance from the central city increases. This indicates the parking demand per unit area, or parking concentration, is lower in the outer suburbs.

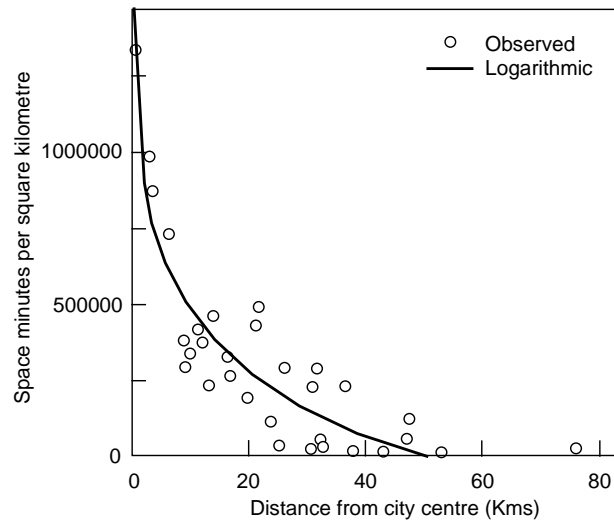


Figure 18: Average number of space hours per square kilometre in each Local Government in Melbourne

5. Conclusion

This paper has looked at two related perspectives of parking in Melbourne: parking policy and use. It points to the need to consider parking at a metropolitan level, rather than focusing parking policy in particular parts of a city.

A review of the literature shows that most recent studies of parking focus on pricing and its relationship to travel demand. Parking supply is however a major policy tool and relates very much to development. It is still the major parking policy tool used in many urban areas.

The initial investigation of parking in Melbourne covered the four parking policies of supply, location duration and pricing. The majority of municipalities are governed by Clause 52.06 of the Planning Scheme with further rates and definitions provided within Clause 52.06-6 and Clause 22.03. Aside from specific Clause' within the Planning Scheme's, some municipalities have produced rates within Town Planning Policies or specific Car Parking Guides. A study of the application of these guidelines showed that parking was generally supplied at a lower rate than specified and in the case of retail parking it was strongly related to the size of developments. This is expected to be the case due to the reduction or complete waiver of parking often granted to developers, by council in regions where there are large developments. Parking duration and location policy are left to the local government. Pricing policy is focused on the central city region with the primary tool a parking levy.

The second aspect reviewed was the distribution of parking usage. It showed that parking provision for areas outside the central region are strongly related to the level of activity, as measured by the number of jobs. There is some variation with distance from the central city. The use of parking space minutes, or parking utilisation, as a measure of usage provided stronger relationships than parking events. The form of the relationship between, parking space minutes and events, and the number of jobs, distance from the central city and concentration were similar. The concentration of parking appeared to decrease by distance from the central city but the parking rate per number of jobs increased, showing a higher provision of parking with distance from the central city.

This study has shown the general trends in parking policy and parking use. It showed a link between parking policy and usage with the amount of activity and distance from the central city. The relationship between parking policy and usage is strong since parking provision is related to the development of land use which is clearly showing decentralisation trends in Melbourne.

Clearly the findings in this study relate primarily to one city, Melbourne. There is a need to generalise them by undertaking similar studies in other cities to obtain a clearer indication of the link between parking, land use development and decentralisation of urban activities.

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