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Alarming Trends in the Growth of Forced Car Ownership in Melbourne

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Abstract

'Forced Car Ownership' (FCO) describes low income households with high car ownership, resulting in a high proportion of their income going to their cars. The cost of running multiple cars, combined with housing costs, puts considerable stress on low income households. Contemporary research has identified that FCO is one of the most prevalent social and economic problems in Australian major cities. The aim of this paper is to explore whether trends in FCO have continued or even accelerated over time. The recent 2016 census provides the opportunity to explore whether this concerning trend is continuing. The results of this paper suggest a growing problem is getting much worse. Between 2011 and 2016 FCO households in Outer Melbourne increased by 36%. Alarmingly the rate of growth of fringe urban FCO households is accelerating; there was a 25% growth between 2006 and 2011 but this has increased to 36% between 2011 and 2016. Furthermore, FCO households now outnumber low-income households with no cars, particularly in Middle and Outer Melbourne. The paper discusses the policy failures that have caused these outcomes, suggests solutions and identifies areas for future research to better understand the problem and its impacts.

1. Introduction

The car is firmly entrenched in Australian society, with over 92% of households owning at least one motor vehicle (Australian Bureau of Statistics, 2016). Although cars provide considerable mobility they also impose significant financial costs on households, particularly low-income households. 'Forced Car Ownership' (FCO) is a term originally developed in the UK to describe low income households who have little choice but to own and use cars for mobility because there are few alternatives available:

> "'Voluntary' car ownership means that there are adequate substitutes for gaining access to facilities, and that the car is not a necessity. Conversely, 'forced' car ownership means that there are no alternatives… cars are seen to be one of the items of household expenditure that cannot be foregone" (Banister, 1994).

In the Australian context, FCO has been strongly associated with low income households on the urban fringe of major cities (Currie and Senbergs, 2007, Dodson and Sipe, 2006). Evidence has shown that FCO is associated with 'Transport Poverty':

> "Transport poverty occurs when a household is forced to consume more travel costs than it can reasonably afford, especially costs relating to motor car ownership and usage" (Gleeson and Randolph, 2002).

Forced Car Ownership is a significant and growing problem. In Melbourne, among low income households you are more likely to live in a Forced Car Ownership household than in a household without a car (Currie, 2009). Furthermore, FCO households are growing in number; in the 10 years between 2001 and 2011 there was a 93% increase in FCO households (Currie and Delbosc, 2013). Perhaps more significantly, the *share* of low income households experiencing FCO increased from 22% in 2001 to 28% in 2011 (Currie and Delbosc, 2013). Most of these increases were in Outer Melbourne, where walk distances are longer and where the provision of public transport is much poorer or non-existent (Currie and Delbosc, 2009, Currie, 2004).

The recent 2016 census provides the opportunity to explore whether this concerning trend is continuing. The aim of this paper is to explore whether trends in FCO have continued or even accelerated relative to previous years. It starts with a discussion of the research context. Research method is then outlined and results described. The paper finishes with a discussion of the implications of the results and conclusion including suggestions for future research.

2. Research Context

There is a long history of exploring how the *lack* of car-based transport influences economic and social outcomes. Only more recently has there been a focus on how car ownership can put its own strains on low-income households. The earliest work in this area referred to the financial burdens of car ownership in rural UK areas (Banister, 1994, Jones, 1987). After a gap of some years, this theme was picked up in Australia where a significant portion of lower-income households live on the urban fringe of cities (38% in 2016 Melbourne, based on authors' analysis (Australian Bureau of Statistics, 2016)). In these locations, where public transport and walk access are usually quite poor, owning one or more cars provides essential mobility to work, schooling and social opportunities. However, the cost of running a car, combined with housing costs, put considerable stress on lower-income households (Dodson

and Sipe, 2006, Dodson et al., 2004). This suggests that transport poverty associated with Forced Car Ownership (FCO) is a significant urban problem in Australia.

The themes of transport poverty and FCO has since been further explored and expanded in Europe and Canada. In Europe, transport poverty is usually discussed as a subset of a wider discourse around 'fuel poverty' or 'energy poverty'; the focus is generally on domestic energy consumption and heating, with less concern around transport expenditure (Mattioli, 2015, Mattioli et al., 2017). However an emerging line of research has turned the focus to FCO specifically, finding that between 8% and 12% of low income households are considered 'forced' into car ownership (Mattioli, 2017, Curl et al., 2018). Over 60% of these households were at risk of social exclusion (Mattioli, 2017). Similarly, a recent analysis in Canada found that automobile dependence was strongly associated with debt burdens, particularly automobile loan debt (Walks, 2018).

It is important to note that the term 'Forced Car Ownership' implies a degree of coercion or even passivity. However households do not necessarily perceive car ownership as 'forced' upon them. A survey in Melbourne found that the majority of low-income households enjoy car ownership, although 77% also said they had had no choice in the matter and had to pay the high costs involved (Currie and Delbosc, 2011). In addition, low income households are not passive to financial stresses and employ a range of strategies to reduce their automobile expenditures while maintaining car ownership, such as making shorter trips, getting lifts or performing routine car maintenance at home (Belton Chevallier et al., 2018, Currie and Delbosc, 2011). One paper attempted to overcome the label 'forced' by using the term 'high car ownership on low income' (HCOOLI), (Currie, 2009). Yet despite these shortcomings, because of its widespread adoption in the literature we use the term Forced Car Ownership in this paper.

One corollary to the topic of FCO is understanding the plight of households without cars – variously called car deprivation, car-less households or car-free households (Mattioli and Colleoni, 2016, Brown, 2017, Mattioli, 2017). This stream of research distinguishes between households that *choose* not to own a car versus households who *cannot* own a car (generally because of affordability). In Europe, these two groups are fairly equally sized in the population; one analysis found 11% of households in the UK and Germany were 'car deprived' and a further 11-12% were car-less for other (non-financial) reasons (Mattioli, 2017). In contrast, an analysis in California found that 79% of zero-car households do not own a car because of economic or physical constraints ('car-less') rather than through choice ('car free'). These 'car-less' households were lower income, had lower educational attainment and were more likely to be non-white than 'car-free' households (Brown, 2017). Although zero-car households are not a focus of this paper, they will be briefly discussed on contrast with the trends in FCO households.

Household car ownership and its impacts are closely interlinked with household location and urban form. In some cities, low-income populations are clustered in inner-city areas with middle and upper-class households tend to live in the suburbs (examples include many American cities as well as some British and Belgian cities). In others, upper and middle classes tend to live in inner and middle-ring areas with low income housing on the urban fringe (Kesteloot, 2008). Australian cities tend to fall into this latter category, with many households moving to the urban fringe in search of affordable housing (Currie and Delbosc, 2011, Dodson and Sipe, 2006). This has profound implications for the prevalence and impacts of FCO, with the greatest impacts and intensity felt in low-density outer suburban areas (Mattioli and

Colleoni, 2016). Yet studies have found that mobility and its costs are rarely, if ever, considered when low-income households choose their location (Belton Chevallier et al., 2018). Indeed, whilst many FCO households liked the mobility their car provided, 54% wished they could walk/cycle more and 30% sought greater access to public transport. (Currie and Delbosc, 2011).

If Australian cities continue to prioritise housing in the urban fringe, the negative impacts of FCO will continue to grow. The present paper revisits this topic using an update from the latest 2016 Australian census. It explores the prevalence of FCO in Melbourne and how the geographic distribution of FCO has changed in the past fifteen years.

3. Research Method

Standard census tabulations are adopted from the 2001, 2006, 2011 and 2016 census (Australian Bureau of Statistics, 2011). The census collects a broad range of information; the variables of interest in this study were household location, income and car ownership.

FCO households are defined as low income households with high car ownership. Low income is based on the lowest quartile of the distribution while high car ownership is considered to be two or more cars. Note that this is a conservative estimate; European research defines FCO as 'materially deprived' households with at least *one* vehicle (Mattioli, 2017). The lowest quartile varies by census year as income categories have changed over time. The cut-off lowest quartile income by year was:

- 2001 - $499 per week
- 2006 - $649 per week
- 2011 - $799 per week
- 2016 - $999 per week

It should be noted that the above lowest income quartile threshold is defined by the ranges of income bands; the census does not provide exact quartiles; hence selection of bands within which the quartile threshold lies is necessary. Interestingly for 2016 the $999 per week boundary lies exactly on the 25% quartile. For previous years the boundaries were all above the 25% threshold. This implies previous year data slightly overestimates the number of households in the low income quartile,

A high income set of household results is also reported in the results using the highest income quartile.

Spatial analysis is also undertaken with households aggregated from SA1/SA2 levels to an Inner, Middle and Outer Melbourne definition[1]. These boundaries are illustrated on Figures 3 and 4. All spatial boundaries were checked to be consistent between prior years in the data series as the census boundaries often change; a concordance file was adopted to ensure this.

[1] Inner local government areas included Melbourne, Yarra, Stonnington and Port Phillip; middle local government areas included Hobsons Bay, Maribyrnong, Brimbank, Moonee Valley, Moreland, Darebin, Banyule, Manningham, Boroondara, Whitehorse, Monash, Glen Eira, Bayside, Kingston and Greater Dandenong; outer areas included Wyndham, Melton, Hume, Whittlesea, Nillumbik, Yarra Ranges, Maroondah, Knox, Cardinia, Casey, Frankston and Mornington Peninsula.

4. Results

4.1. Aggregate Spatial Trends in Volume and Share

Appendix 1 presents a tabulation of the raw car ownership and income data by location for households in each of the four census. Figure 1 illustrates the trend data by volume of households and also by share of households. This indicates that:

- Beginning in 2011, FCO households in Outer Melbourne outnumbered Middle Melbourne. This trend increased in 2016.
- FCO households in Outer Melbourne now represent 54,659 households; a 36% increase since 2011. Between 2001 and 2016, Outer Melbourne FCO households increased by 162%.
- Middle Melbourne also has a considerable size of FCO households; 50,019 in 2016. This is also increasing (27% between 2011 and 2016).
- The number of FCO households is increasing in all parts of Melbourne, however the rate of growth is far greater (and accelerating) in Outer Melbourne. There was a 25% growth between 2006 and 2011 but this has increased to 36% between 2011 and 2016.

Figure 1: Volume of FCO Households by Areas and Census Year

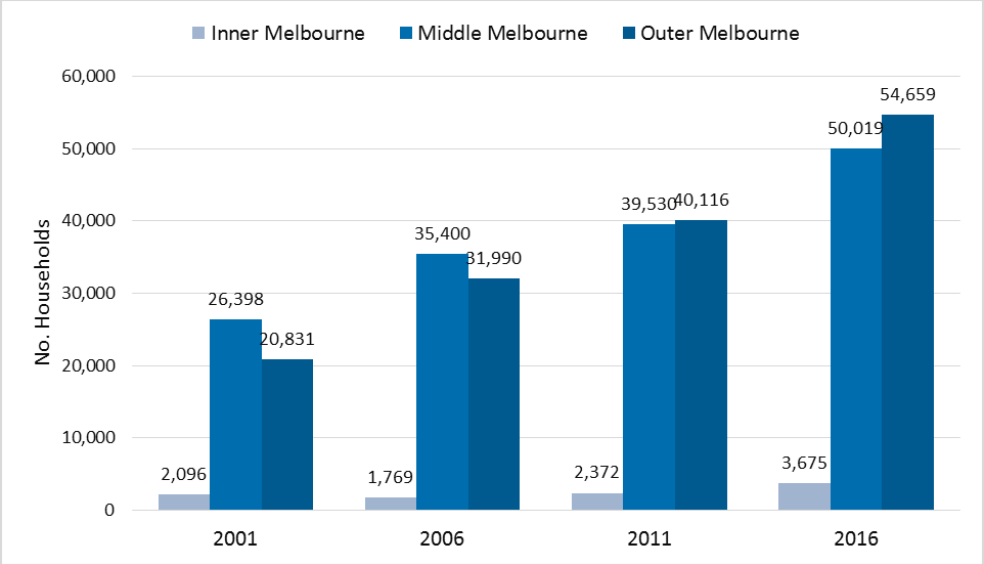
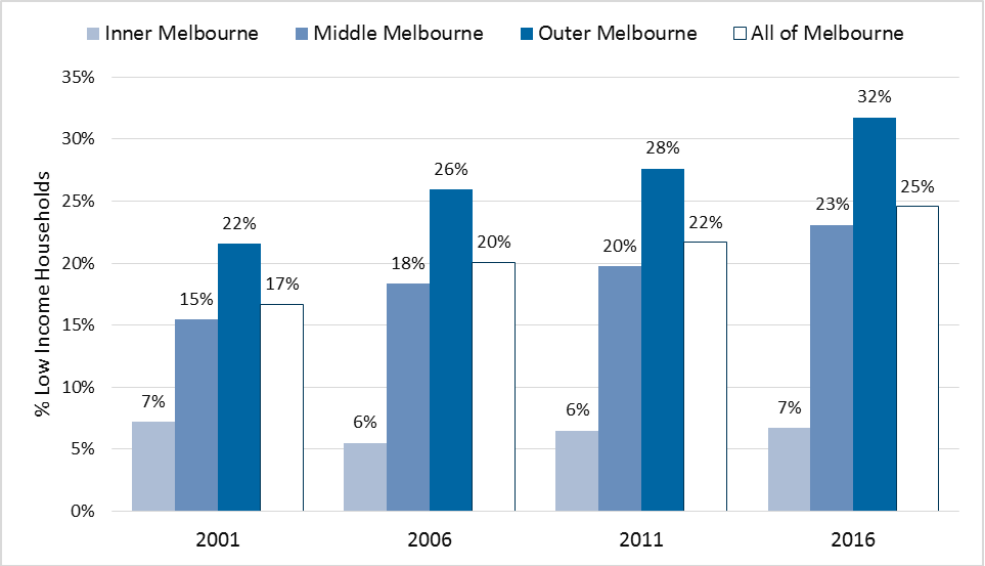


Figure 2 illustrates the share of low income households in each region and year with FCO characteristics.

Figure 2 indicates that:

- Across Melbourne the share of low income households with FCO characteristics (2+ cars) has increased over time from 17% to 25%.
- The share of FCO in Inner Melbourne is low and flat; in Middle and Outer Melbourne the share is high and increasing.
- For Outer Melbourne the rate of increase in the share of FCO households is accelerating since 2006 (from a 2% jump between 2006 to 2011 to a 4% jump between 2011 and 2016).

Figure 2: Share of Low Income Households with FCO by Areas and Census Year



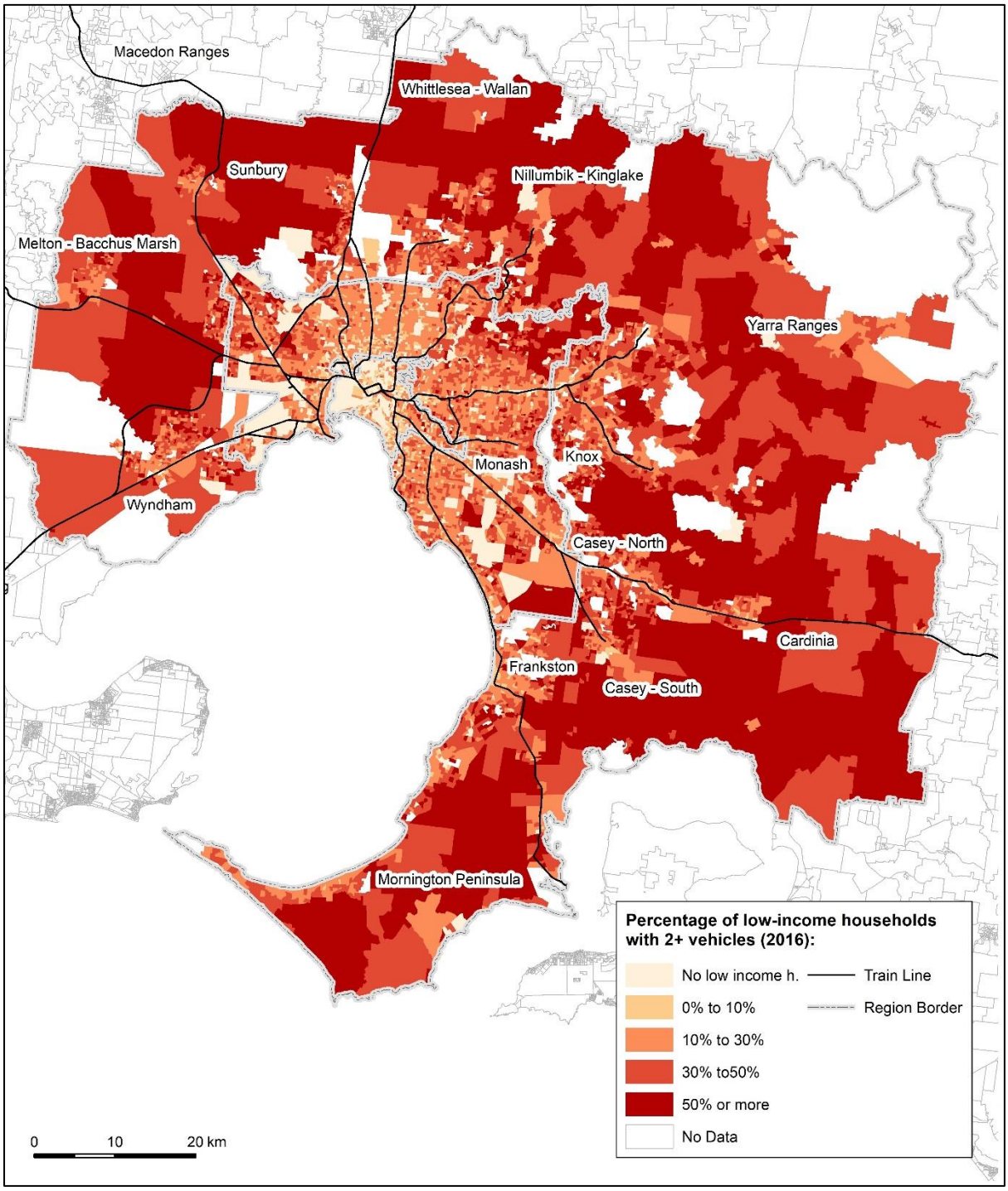
4.2. Disaggregate Spatial Trends and Patterns

Figure 3 illustrates disaggregate spatial pattern of the percentage of low income households with 2+ cars in 2016.

Figure 3 illustrates that:

- There is a clear pattern towards high shares of FCO households in outer and urban fringe areas
- Lower shares are demonstrated in inner areas, areas nearer rail (with better public transport as an alternative to the car) and areas with activity centres (where walking is a feasible alternative to forced car ownership).
- Although Outer Melbourne has an aggregate average share of FCO households of 32% (Figure 2), there are many concentrations of areas with shares above 50%; almost exclusively in areas more remote from public transport and activity centres. These areas are almost all urban fringe locations.

Figure 3: FCO Households as a Share of Low Income Households 2011



Note: Boundaries of Inner, Middle and Outer Melbourne are also illustrated.

Figure 4 illustrates the distribution of the percentage change in absolute numbers of FCO households between 2011 and 2016.

Figure 4: Percentage Change in FCO Households 2011-2016

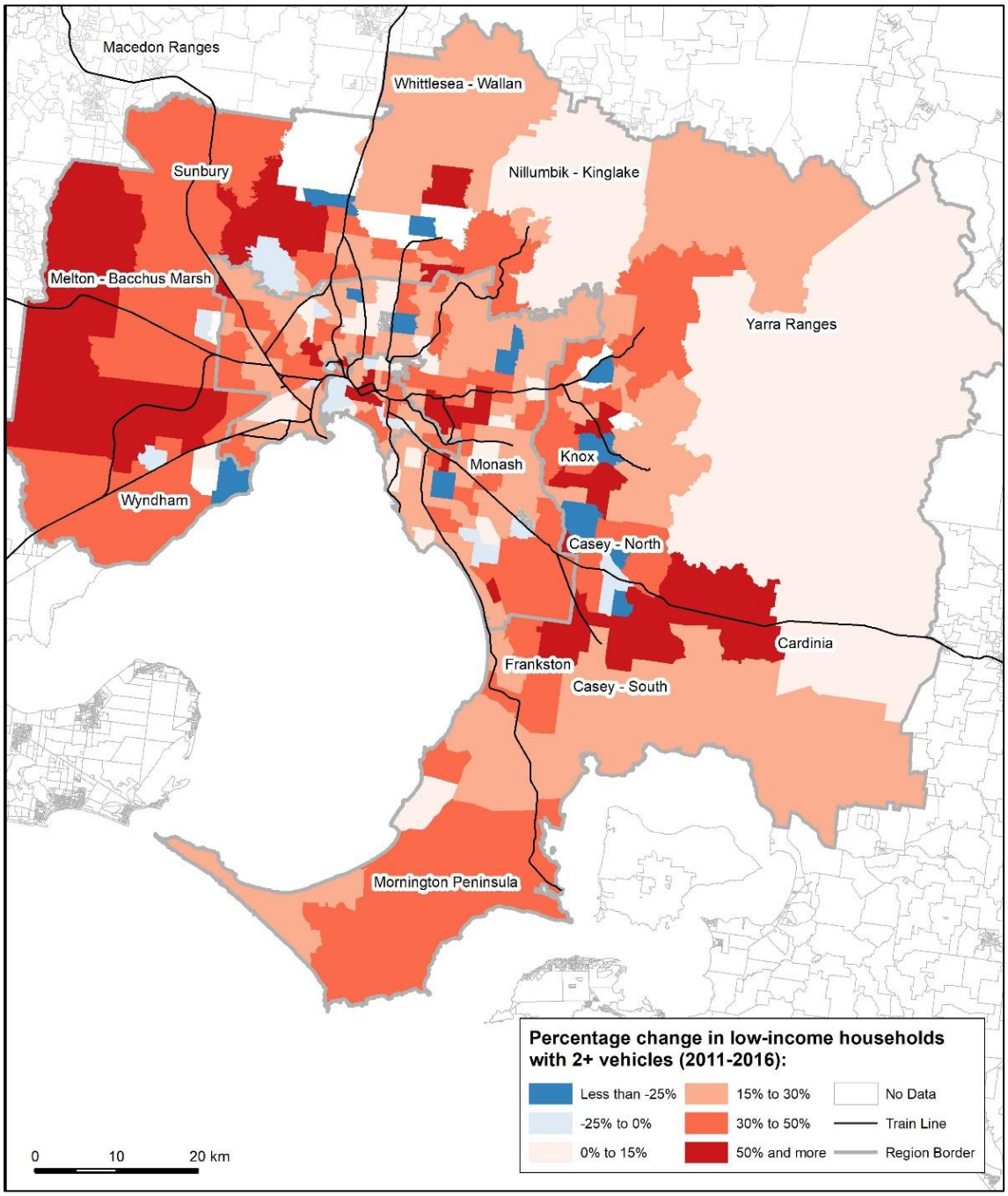


Figure 4 illustrates that:

- There has been growth in FCO households throughout most of Melbourne
- Highest levels of growth (50%+) have been in the outer suburban population growth centres of Pakenham to the South East of Melbourne and Melton to the West. There have been some isolated pockets of high growth in Inner and Middle Melbourne
- A few isolated areas have seen declines in FCO households despite an overriding urban trend in population (and car ownership) growth. These are the blue areas illustrated in Figure 4. They are almost all in Middle Melbourne and are the result of fewer low-income households in these areas (rather than low-income households owning fewer cars).

4.3 Trends in FCO vs. No-Car Households

Much of the emphasis in the literature on transport disadvantage focuses on low-income households without a car. Indeed, in European countries low-income no-car households far outnumber FCO households (Mattioli, 2017). Yet this may not be the case in the Australian context, where the transport system is far more car-oriented.

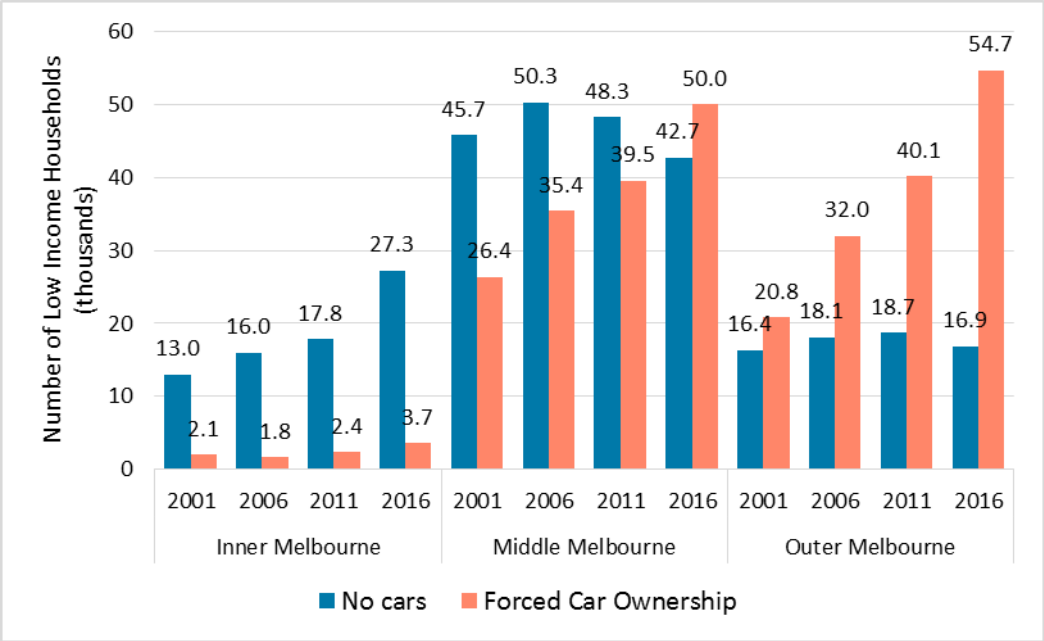
Table 1 shows the number of low income households without cars versus with 2+ cars (FCO) over time. In the 2011 census, the number of no-car and FCO households was almost even. By 2016, the number of FCO households far outnumbered no-car households.

Table 1: Trends low-income, no-car households versus forced car ownership households in Melbourne

	No car	2+ cars (FCO)
2001	75,150	49,325
2006	84,863	70,522
2011	85,201	83,769
2016	87,188	110,225

Figure 5 examines these trends by household location. It shows that the increase in FCO households is occurring in all regions of the city but it is most notable in the middle and outer areas of Melbourne's suburbs. In contrast, no-car households are decreasing in these areas and significantly *increasing* in inner areas.

Figure 5: Trends low-income, no-car households versus forced car ownership households by region



The trend of increasing low-income, no-car households in inner areas is somewhat promising as these households are less likely to need a car to meet their daily travel needs, potentially freeing them from a significant household expense. However this is against a background of rapid increases in FCO in middle and outer Melbourne.

5. Discussion and Conclusions

This paper explores long term trends in Forced Car Ownership in Melbourne. Contemporary research has identified that FCO and the transport poverty it creates is a significant social and economic problems in major cities. This issue is far more prevalent in Australia than in some

other developed countries. Research from Scotland, Germany and the UK identified 8% - 12% of low income households are 'forced' into car ownership (Mattioli, 2017, Curl et al., 2018). This analysis (using a more conservative definition of FCO) found that 25% of low-income households were 'forced' into car ownership in 2016.

Furthermore, the results of this paper suggest a growing problem is getting much worse, especially in outer Melbourne where the growth rate in FCO is accelerating since 2006. FCO households now outnumber low-income households with no cars, especially in middle and outer Melbourne.

The substantial growth in FCO households demonstrates that current policy is not addressing this issue. The acceleration of this trend shows a bad problem is getting worse faster; it might also imply that we are getting worse at addressing it. One of many drivers of this problem is population growth; while there has been some success at inner city, 'infill' development, urban sprawl is also happening. For example Melbourne's outer suburbs are projected to accommodate almost a million more residents by 2051 (DELWP, 2015). Although Australian suburbs are improving at the 'new urbanism' principle of providing necessary social infrastructure within these neighbourhoods (Wear, 2016), clearly this is not reducing the number of low-income households purchasing multiple cars. Conversely, half of low-income households in Inner Melbourne had no car in 2016 compared to 10% in Outer Melbourne. Providing affordable housing in accessible areas is a clear strategy to reduce car dependency in this group.

From a public transport viewpoint accelerating rates of fringe FCO is occurring in a context where per capita service levels are in decline (Currie, 2014). Although service supply has increased between 2011 and 2016, it has not kept pace with population growth which means that service per capita fell by 7%. Far greater investment is needed into public transport in outer areas, supported by a range of supporting policies and practices such as safe cycling and walking infrastructure.

There are a number of areas where the methods adopted in this research can be improved:

- This and our previous papers on this topic have adopted household income as the variable of interest to define FCO households. Reviewers of the paper have suggested 'equivalised household income' which takes into account the number of residents in a household. We propose to explore this in future research on this topic
- The FCO household definition considers households with 2 or more cars regardless of household size. A more accurate measure might measure cars per household in relation to the number of adults in the household to better represent FCO households
- Income bands defined by the Australian Bureau of Statistics used to define FCO households are quite broad; it may be more narrower bands would better represent the lowest income quartile
- It has been suggested that the maps in Figures 3 and 4 overly highlight fringe rural parts of Melbourne which are large spatial areas with low populations. An alternative analysis might filter for a minimum urban density to better higher urban rather than fringe rural areas.
- It is likely that a share of households with 3 or more cars have children who are just reaching driving age. It is unclear if these households represent a problem in terms of Forced Car Ownership but closer exploring of this issue using primary research would be worthwhile.

From a research perspective it would be of great value to understand the drivers of these trends in accelerating FCO growth such that factors causing growth can be identified and addressed. It would also be interesting to map the problem in the urban fringe of other Australian cities. Better understanding the impact of these trends on FCO households is another area for focus; it does not necessarily follow that an increasing in volume of FCO households means the problem is getting bigger, although it certainly seems likely. The costs of operating cars has actually been falling in recent years hence a larger FCO scale may over-represent the problem if costs are more affordable. Clearly primary research of FCO households can better understand these impacts.

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Appendix 1

Raw Census Data: Households by Income, Car Ownership and Region of Melbourne 2001-2011

		2016					
Region	Income	No vehicles	1 vehicle	2 vehicles	2+ vehicles	3+ vehicles	Total
Inner	Low income	**27,254**	21,338	3,409	**3,675**	**266**	55,011
		50%	39%	6%	**7%**	**0%**	
Melbourne	High income	21,583	61,248	34,269	41,676	7,407	126,973
		17%	48%	27%	33%	6%	
	Total	53,511	89,724	41,881	50,795	8,914	248,725
		22%	36%	17%	20%	4%	
Middle	Low income	**42,703**	116,154	43,302	**50,019**	**6717**	216,626
		20%	54%	20%	**23%**	**3%**	
Melbourne	High income	13,119	136,637	205,879	290,683	84,804	446,489
		3%	31%	46%	65%	19%	
	Total	60,208	274,812	273,047	376,801	103,754	833,307
		7%	33%	33%	45%	12%	
Outer	Low income	**16,887**	94,445	46,269	**54,659**	**8390**	172,084
		10%	55%	27%	**32%**	**5%**	
Melbourne	High income	2,640	72,010	187,930	289,127	101,197	368,879
		1%	20%	51%	78%	27%	
	Total	21,112	181,918	254,301	377,117	122,816	691,052
		3%	26%	37%	55%	18%	
All of	Low income	**87,188**	234,620	94,465	**110,225**	**15760**	448,811
		19%	52%	21%	**25%**	**4%**	
Melbourne	High income	37,388	271,644	434,391	632,043	197,652	954,873
		4%	28%	45%	66%	21%	
	Total	135,236	551,330	577,769	818,477	240,708	1,795,491
		8%	31%	32%	46%	13%	
		2011					
Region	Income	No vehicles	1 vehicle	2 vehicles	2+ vehicles	3+ vehicles	Total
Inner	Low income	**17,838**	14,312	2,143	**2,372**	**229**	36,575
		49%	39%	6%	**6%**	**1%**	
Melbourne	High income	16,527	49,499	28,449	34,198	5,749	101,607
		16%	49%	28%	34%	6%	
	Total	38,287	69,357	34,301	41,650	7,349	187,041
		20%	37%	18%	22%	4%	
Middle	Low income	**48,302**	103,629	34,444	**39,530**	**5086**	200,145
		24%	52%	17%	**20%**	**3%**	
Melbourne	High income	16,298	137,798	197,166	274,474	77,308	433,587
		4%	32%	45%	63%	18%	
	Total	70,948	262,994	254,858	352,157	97,299	789,726
		9%	33%	32%	45%	12%	
Outer	Low income	**18,684**	80,700	33,620	**40,116**	**6496**	145,208
		13%	56%	23%	**28%**	**4%**	
Melbourne	High income	3,978	73,834	179,235	273,881	94,646	356,092
		1%	21%	50%	77%	27%	
	Total	25,201	169,430	233,737	350,554	116,817	638,741
		4%	27%	37%	55%	18%	
All of	Low income	**85,201**	201,055	71,515	**83,769**	**12254**	386,632
		22%	52%	18%	**22%**	**3%**	
Melbourne	High income	36,848	263,131	411,309	593,689	182,380	904,576
		4%	29%	45%	66%	20%	
	Total	134,890	506,683	531,465	758,945	227,480	1,638,629
		8%	31%	32%	46%	14%	

		2006					
Region	Income	No vehicles	1 vehicle	2 vehicles	2+ vehicles	3+ vehicles	Total
Inner Melbourne	Low income	**16,007**	12,333	1,449	**1,769**	**320**	32,129
		50%	38%	5%	**6%**	**1%**	
	High income	13,801	43,111	26,801	30,876	4,075	89,653
		15%	48%	30%	34%	5%	
	Total	33,436	60,156	31,792	37,351	5,560	170,138
		20%	35%	19%	22%	3%	
Middle Melbourne	Low income	**50,268**	97,532	30,604	**35,400**	**4796**	192,838
		26%	51%	16%	**18%**	**2%**	
	High income	13,856	127,068	185,706	255,578	69,872	404,128
		3%	31%	46%	63%	17%	
	Total	70,958	246,242	240,153	329,551	89,397	750,523
		9%	33%	32%	44%	12%	
Outer Melbourne	Low income	**18,138**	68,028	26,468	**31,990**	**5522**	123,266
		15%	55%	21%	**26%**	**4%**	
	High income	2,567	64,281	155,390	232,632	77,242	304,934
		1%	21%	51%	76%	25%	
	Total	23,113	146,529	201,628	298,525	96,897	552,272
		4%	27%	37%	54%	18%	
All of Melbourne	Low income	**84,863**	179,896	59,597	**70,522**	**10925**	352,192
		24%	51%	17%	**20%**	**3%**	
	High income	30,281	236,302	373,931	528,833	154,902	810,460
		4%	29%	46%	65%	19%	
	Total	128,095	457,228	481,472	677,942	196,470	1,493,133
		9%	31%	32%	45%	13%	
		2001					
Region	Income	No vehicles	1 vehicle	2 vehicles	2+ vehicles	3+ vehicles	Total
Inner Melbourne	Low income	**13,048**	11,118	1,626	**2,096**	**470**	29,052
		45%	38%	6%	**7%**	**2%**	
	High income	10,133	38,115	24,953	30,353	5,400	81,412
		12%	47%	31%	37%	7%	
	Total	26,149	53,643	29,631	36,723	7,092	133,425
		20%	40%	22%	28%	5%	
Middle Melbourne	Low income	**45,745**	88,006	22,109	**26,398**	**4289**	170,810
		27%	52%	13%	**15%**	**3%**	
	High income	15,473	132,021	184,005	252,362	68,357	409,034
		4%	32%	45%	62%	17%	
	Total	68,356	243,347	230,768	318,377	87,609	674,109
		10%	36%	34%	47%	13%	
Outer Melbourne	Low income	**16,357**	54,938	17,544	**20,831**	**3287**	96,570
		17%	57%	18%	**22%**	**3%**	
	High income	4,577	65,750	143,083	203,653	60,570	279,274
		2%	24%	51%	73%	22%	
	Total	23,700	134,973	179,203	255,387	76,184	436,156
		5%	31%	41%	59%	17%	
All of Melbourne	Low income	**75,150**	154,062	41,279	**49,325**	**8046**	296,432
		25%	52%	14%	**17%**	**3%**	
	High income	30,183	235,886	352,041	486,368	134,327	769,720
		4%	31%	46%	63%	17%	
	Total	118,205	431,963	439,602	610,487	170,885	1,243,690
		10%	35%	35%	49%	14%	

Note: Percentages are row percentages