

THE LEGACY OF DUBLIN'S HOUSING BOOM AND THE IMPACT ON COMMUTING

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Abstract

Dublin, like many other international cities has experienced a significant housing boom in the past decade. This boom has seen an unprecedented increase in the numbers of houses built and in the density of housing at the periphery of the city. In addition, Dublin has become a more dispersed city with centres of employment no longer being focussed only in the Central Business District (CBD). At the same time, the provision of public transport infrastructure, while it has improved, has not kept pace with the increase in housing stock, leading to high levels of car dependency in these peripheral suburban areas. This paper seeks to examine how commuting patterns have changed as a result of this increasing in housing stock. The results presented in this paper shows that even within the same electoral districts, commuters living in housing built after 2001 are more likely to drive than those living in older housing. This paper analyses the modal choices of commuters living in both new and older housing and describes the factors that may be leading to higher levels of car dependency in those living in newer housing. The case study presented in this paper shows a city region in transition and documents the impact that a housing boom has had upon commuting patterns.

INTRODUCTION AND BACKGROUND

This paper outlines how Dublin's suburbs have grown and changed over the last decade, leading to an increase in housing in the periphery of the city, where public transport infrastructure has not always been provided. Those living in new houses are more likely to be car dependent than those living in pre 2001 housing. Much of the new housing construction has taken place at the periphery of the city and so higher car dependency amongst those living in these house is to be expected. However, the data shows that even within the same areas those living in newer homes (built after 2001) are more likely to drive than are their neighbours living in older homes. In this paper, an attempt is made to explore the issues and to examine why this might be. It is postulated that some of the higher levels of car dependency seen in people living in newer homes may relate to issues such as life stage (younger people with children) and also with their work destinations, which may be more dispersed and less likely to be focussed in the city centre. At the same time as the housing boom in Dublin, there was also a significant increase in the numbers of people working in the Greater Dublin Area between 2000 and 2008. That growth in employment and jobs has not, however, taken place only in the city but employment in more dispersed and there a number of employment centres in the Greater Dublin Area that did not exist prior to 2000.

LITERATURE REVIEW

The relationships between urban sprawl and increased travel time and unsustainable trip patterns has been well documented in the literature (1;2;3;4;5). The evolution of cities from monocentric to polycentric with many employment centres and where commuting travel

patterns are more complex is also well-documented (5;6;7). In cities with many employment centres, the demand for more flexible transport and more orbital transport routes are high.

Bertolini et al (8) emphasise the need for integrated transport and land use planning in bringing about more sustainable travel, but state that while this is widely acknowledged, in reality that integration is rarely realised in city planning. While Handy (9) also stresses that land use policies are important in developing more sustainable travel, pricing policies may be the most effective method of promoting sustainable car use in the short term. Handy et al (10) further adds to the research in this area by conducting a quasi-longitudinal study into the relationships between neighborhood characteristics and travel patterns in North California. While the authors indicate that the findings of the study are preliminary, they do show that if land use policies are used to locate residents closer to destinations and provide viable alternatives to driving, it can lead to a switch to more sustainable modes. Banister (11) also stresses this conclusion that mixed-use developments will reduce trip lengths and car dependency.

Bento et al (6) discuss how density, road network and city shape affect commuting patterns and trip lengths, postulating it is not only population density but also population centrality that impacts upon trips length. Cities where populations are closer to the city centre will have shorter trips lengths and less dispersed employment. In their study of American cities, Bento et al (6) found that compact cities lead to lower levels of car ownership and use.

Cervero and Kockelman (12) examine the impacts the 3 D's (density, diversity and design) have upon commuting patterns in San Francisco. The findings show that residential density, mixed land-use and pedestrian orientated design all result in increased trip rates for sustainable modes. However, other researchers also point to the fact that cities and urban form are evolving away from the traditional city with a strong central business district to cities with many employment centres and in these cities it may not be sufficient to provide mixed land-use and pedestrian oriented design to encourage more sustainable travel: if employment centres are sufficiently diverse, travel patterns will be more complex, particularly with the growth of two-income households where both members could be travelling to alternative destinations (7). In these cities, destinations are more varied. Garcia-Lopez and Muniz (5) in their study of employment distribution in Barcelona state that most modern cities are polycentric and give the example of Barcelona where employment is becoming more decentralized and scattered, a pattern they claim is repeated in many cities in the developed world and leading to more varied destinations for work trips. Kloosterman and Musterd (7) also discuss this phenomenon and its impact on commuting patterns. They describe that the development of these cities with more than one centre of employment lead to greater cross-commuting and more traffic congestion in all directions at peak hours. Horner (13) states that more research is required to assess the impacts of job-housing balance and more dispersed, polycentric cities on commuting, congestion and travel.

The increased greenfield housing and its impact upon travel patterns is not unique in Ireland. Metz (14) shows that in the United Kingdom that the majority of green field developments have taken place on the outskirts of towns and cities and that individuals living in these areas are largely dependent upon the car for travel. Chen et al (15) report the findings of a study on the rapid growth of new housing developments in Beijing. The results show large increases in car ownership and subsequent congestion in these new developments. Caulfield (16) also found that those living in lower density housing in Dublin were shown to have much higher car ownership rates and more reliant on the car for work trips.

Bart (17) identifies parking control as one of major tools to alleviate the negative impacts of new housing and retail developments. The research presented highlights how limiting the numbers of new parking spaces in new developments can be used encourage sustainable modes in these developments.

The case study presented in this paper adds to the field of research in this area by showing how the housing boom in Dublin has had an adverse effect on commuting and sustainable travel patterns. The results from Dublin will be of interest to other city regions experiencing the same economic conditions and to regions under going a property bubble and how best to plan minimise the negative impacts seen in Dublin.

DATASET

The data used in this paper was taken from the 2011 census of Ireland (18). The data used represents individuals' most frequent mode of transport used to travel to work. The dataset contains 1.7 million respondents in Ireland. While this is the most comprehensive database collected in Ireland on individuals' trips, it is worth noting that work based trips typically account for a quarter of all trips taken in Ireland (19). It should be noted at this stage that distance travelled was not a variable collected in this dataset.

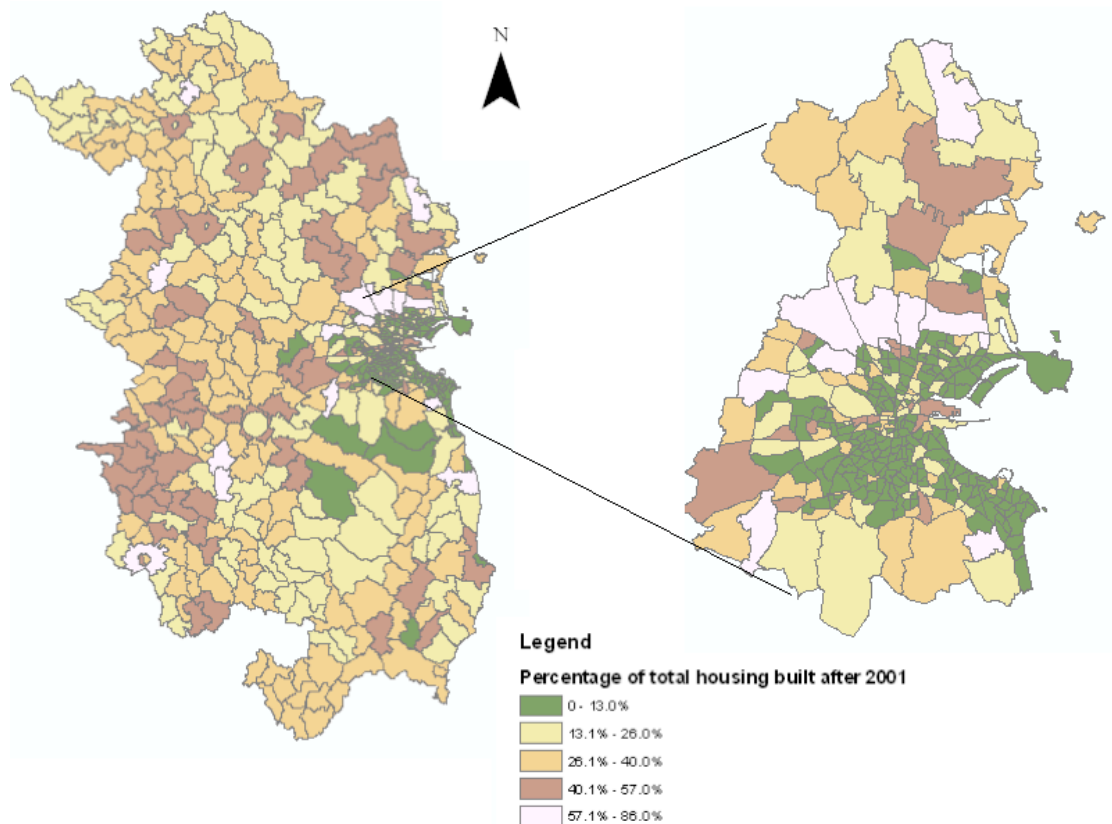
HOUSING IN THE GREATER DUBLIN AREA AND TRAVEL TO WORK

A breakdown of the housing stock in the GDA (Greater Dublin Area) is presented in Table 1. The results show that in the five-year period from 2001-2006 18% of the housing stock in the GDA has been constructed. This is the same percentage of housing as was constructed in the decade immediately prior to 2001, demonstrating a doubling in the rate of house construction during the boom time in Dublin. Figure 1 maps the percentage of new housing for each of the electoral districts in the GDA. The results show that the highest concentrations of new housing tend to be dispersed and on the outskirts of the GDA. Much of this new housing is at a higher density to the older, more traditional Dublin suburbs, and comprises apartments and duplexes which were rarely seen in older suburban developments. Due to the breakdown of the property market and construction industry in Ireland there is now a large stock of unfinished and unoccupied housing in the GDA. Figures show that there were almost 90,000 unfinished housing units in the GDA in 2011, this accounts for 75% of all unoccupied housing units (20).

TABLE 1: Housing stock in the Greater Dublin Area

Year constructed	N	%
Before 1970	225831	32
1971 – 1990	178215	25
1991 – 2000	116334	16
2001 – 2005	119421	17
After 2006	74181	10
Total	713982	100

FIGURE 1: Percentage of new housing built since 2001



The construction of new, high-density housing in the periphery of the GDA has significant and obvious implications for the modal choices and travel patterns of those living in these new houses. Many of these new housing developments are not linked to Dublin city centre by any rail network, and provision of new public transport infrastructure to new areas has generally lagged behind the construction of housing. This has led to quite high levels of car use and car dependency in the boomtime suburbs. However, within the same electoral districts, those living in housing built after 2001 are more likely to drive than those living in houses in that area built after 2001. This is evident from Figures 2 and 3 which show the percentage of individuals that drive alone to work for each of the electoral districts in the GDA. Figure 2 details those that were living in housing stock that was built before 2001 and Figure 3 shows those living in housing stock constructed after 2001. A comparison between the two maps shows that a much higher percentage of individuals living in housing built after 2001 were shown to drive alone to work. This paper explores why this might be.

Table 2 presents the results of a cross-tabulation conducted to determine what impacts the year in which housing was built might have on travel time to work. The work locations that were chosen were either the Central Business district (CBD) or non-CBD work destinations. The chi-square analysis conducted on the research shows both cross-tabulations presented in Table 2 show the difference between the results to be statistically significant. The results show little variation in the non-CBD work trip destination. However, there is a trend showing that those living in newer housing were marginally more likely to have longer trips than those in older housing.

The results, when examining the CBD destination work trips, show that 71% of those living in housing built between 2006-11 have a commute of greater than 20 minutes. This compares to 55% of those living in housing built before 1970.

TABLE 2: Impact of housing on departure time

	Before 1970		1971-90		1991-00		2001-05		2006-11	
Travel to work – Destination non-CBD*										
Travel Time	N	%	N	%	N	%	N	%	N	%
Less than 5 mins	11800	11	10519	10	6365	9	6032	8	3676	8
6-10 mins	15044	14	17775	17	9968	14	10160	14	5903	13
11-15 mins	14170	13	15773	15	8937	13	9147	12	5499	12
16 - 20 mins	17193	16	17455	16	10570	15	10719	15	6493	15
21 - 30 mins	24109	22	21684	20	15109	22	15664	21	9733	22
31 mins +	28020	25	23253	22	18413	27	22034	30	13015	29
Total	110336	100	106459	100	69362	100	73756	100	44319	100
Travel to work – Destination CBD**										
Travel Time	N	%	N	%	N	%	N	%	N	%
Less than 5 mins	4491	5	1350	2	1019	3	919	2	697	3
6-10 mins	10242	11	3588	6	2509	6	2173	5	1709	6
11-15 mins	11834	12	4606	8	3258	8	2751	7	2170	8
16 - 20 mins	15910	17	7244	12	4864	12	4044	10	3087	12
21 - 30 mins	23632	25	13925	24	9341	23	8385	21	5718	21
31 mins +	28830	30	27756	47	19372	48	21398	54	13215	50
Total	94939	100	58469	100	40363	100	39670	100	26596	100

*P<.000, Chi-square = 2,705, 20 degrees of freedom

**P<.000, Chi-square = 11,158, 20 degrees of freedom

The year in which housing was built is cross-tabulated against mode of transport to work and presented in Table 3. The chi-squared statistics presented with the results in Table 4 show the difference between the results to be statistically significant. One can see that in a comparison between the two sets of results that those that have a non-CBD work trip had a higher proportion of individuals travelling to work driving alone. The results show that 68% those living housing built between 2006-11 with a non-CBD work destination drove to work alone compared to 56% of those living in housing built before 1970. The results also show a difference in those walking or cycling to work in the CBD. Over 30% of those living in housing built before 1970 walk or cycle to work compared to 19% of those living in housing built between 2006-11.

TABLE 3: Impact of housing on mode choice

	Before 1970		1971-90		1991-00		2001-06		2006-11	
Travel to work – Destination non-CBD*										
Travel Time	N	%	N	%	N	%	N	%	N	%
Walk	13075	11	11007	10	5406	7	5640	7	3637	8
Cycle	4246	3	2397	2	1485	2	1220	2	777	2
Bus	9817	8	6372	6	3818	5	3854	5	2601	6
Rail	4577	4	2567	2	1880	3	1968	3	1499	3
Motorcycle	814	1	625	1	399	1	393	1	216	0
Drive-alone	68120	56	73546	64	49981	68	53664	69	31391	68
Drive-passenger	4312	4	4746	4	2441	3	3079	4	1762	4
Van	7374	6	7858	7	4656	6	4860	6	2891	6
Other inc lorry	881	1	835	1	551	1	428	1	278	1
Work from home	9177	7	4956	4	2992	4	2162	3	1186	3
Total	122393	100	114909	100	73609	100	77268	100	46238	100
Travel to work – Destination CBD**										
Travel Time	N	%	N	%	N	%	N	%	N	%
Walk	20143	21	5490	9	6187	15	4649	12	3776	14
Cycle	9702	10	3040	5	2003	5	1601	4	1250	5
Bus	16602	17	10934	18	6298	15	6689	17	4696	17
Rail	9194	10	8211	14	5366	13	6469	16	4729	18
Motorcycle	1140	1	875	1	529	1	427	1	258	1
Drive-alone	35973	37	28110	47	18853	46	18634	46	11058	41
Drive-passenger	2545	3	1809	3	996	2	1104	3	802	3
Van	1106	1	901	2	537	1	529	1	266	1
Other inc lorry	79	0	49	0	43	0	32	0	14	0
Work from home	1	0	0	0	0	0	0	0	0	0
Total	96485	100	59419	100	40812	100	40134	100	26849	100

*P<.000, Chi-square = 10,786, 40 degrees of freedom

**P<.000, Chi-square = 9,677 40 degrees of freedom

DISCUSSION AND CONCLUSIONS

It is apparent from the analysis of the data presented in this paper that in Dublin, those living in newer housing stock have longer commute times than those living in older houses. They also are more likely to start their commuting trips earlier and drive alone to work. Thus, it would appear that those living in newer homes have less sustainable commuting patterns and higher levels of car dependency than those living in older homes. At the start of this paper, it was postulated that those living in newer homes would have longer journeys as much of the newer homes had been built on the periphery of Dublin. However, the analysis shows that in all parts of Dublin, those in newer homes have longer journeys and are more car dependent.

While Dublin has become a more dispersed city with employment moving away from traditional CBD out into the suburbs, this dispersal of employment does not explain why those living in newer homes have longer, more car dependent journeys. Their journeys are longer, they depart earlier and are more likely to drive alone to work both to CBD and non-CBD destinations. The question must be asked, therefore, have we designed newer homes and developments in such a way as they actually encourage car use and car dependency? It

was not possible in this work to look at the locations of newer developments in relation to public transport stops and to compare this to the location of older developments and their proximity to public transport stops. However, future work should examine whether new and older developments located within the same areas, have varying levels of accessibility to public transport as the disparity between the levels of car use in newer and older houses is very marked. Caulfield and Ahern (21) present a fuller set of results on this topic.

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