Initial findings from Census 2011

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1 Introduction

In March 2012, the Central Statistics Office (CSO) published the main findings from Census 2011 relating to Ireland's population in a report entitled "This is Ireland – highlights from Census 2011". This publication was accompanied by the general release through the CSO web site of a dataset of population statistics from Census 2011. Following this, in October 2012, the CSO released a full dataset of individual records from the Census relating to travel to work and education to the National Transport Authority and other state bodies involved in transport policy and planning. These are highly valuable and important datasets, and will be used by the Authority in combination with similar data from previous Census years to inform transport planning and decisions on the provision of transport services both nationally and within the GDA over the coming years.

This report sets out the initial headline findings of the National Transport Authority relating to travel patterns and travel behaviour both nationally and within the Greater Dublin Area (GDA) following a preliminary analysis of demographic and travel data from the 2011 Census. Over the next few months, the Authority will undertake an in depth analysis of the data from Census 2011 and will extract detailed information on travel patterns and behaviour that will be used to update its transport model for the GDA and transport models in other city regions.

2 CSO datasets

This report presents a preliminary headline analysis of travel related information from Census 2011 using two main datasets released by the CSO during 2012. These datasets are described in summary form below:

- **SAPS** - The ***small area population statistics*** dataset provides information about Ireland's population from the Census aggregated into different geographic sub-regions of the country - including by county and by electoral division (ED).
- **POWSCAR** - The ***place of work and school census anonymised records*** dataset gives individual census records of the travel to work and education information supplied by people in the census. Each individual record also includes demographic and other information relevant to travel (including economic status, socio-economic group and car ownership). The specific travel information in POWSCAR includes mode and time of travel and time of departure for work and education. Critically, each record contains the geographic location of the place of work or education (i.e. co-ordinates to a 250m by 250m grid). This enables the extraction of detailed information on the patterns of travel to both work and education that is key to the planning of transport infrastructure and services.

  It should be noted that 2011 is the first Census to contain information on detailed patterns of travel to education – i.e. the first time that the address of place of education has been geographically coded. The census in previous years (2006 and 2002) gave detailed travel patterns for trips to work only - in a database entitled "POWCAR".

Section 3 of this report gives the results of a preliminary analysis of the SAPS and POWSCAR datasets that have been made available by the CSO in 2012. The analysis is restricted at this stage to headline data only and comparisons with similar data from previous census years to identify trends in travel behaviour both nationally and within the GDA.

3 Headline results

This section sets out the Authority's initial findings relating to travel patterns and behaviour from a preliminary analysis of Census 2011 and comparisons with equivalent data from previous census years. The analysis concentrates on the following important indicators that are key to transport planning as follows:

- Population distribution
- Employment distribution
- Means of travel
- Journey time
- Time of departure
- Car ownership

3.1 Population distribution

The distribution of population is a critical determinant of travel behaviour. In particular, the location of population relative to key services such as work, education, retail and leisure determines the demand for travel and distances travelled. In turn this has a critical impact on people's choice of mode – i.e. the more remote people live from public transport and destinations served by public transport the more likely they are to drive.

Table 1 shows the changes in population by GDA county and nationally since 2006.

Table 1 – Changes in population by GDA County and nationally since 2006

County	2006	2011	% Change
Dublin City	506,211	527,612	4%
South Dublin	246,941	265,205	7%
Fingal	239,995	273,991	14%
DLR	194,039	206,261	6%
Kildare	186,336	210,312	13%
Meath	162,831	184,135	13%
Wicklow	126,194	136,640	8%
GDA	1,662,547	1,804,156	9%
State	4,239,848	4,588,252	8%

The table shows that the population of the state grew by 8% since 2006 with a slightly higher growth rate of 9% in the GDA. The table also shows that the growth in population was far from uniform within the GDA, with the largest growth shown in Fingal (14%), and Kildare and Meath (13%). In contrast, the population of Dublin City grew by a modest 4% since the last Census.

The changes in population for Ireland as a whole between 2006 and 2011 are graphed at an electoral district (ED) level in Figure 1A.

Figure 1A – National change in population between 2002 and 2011 by ED

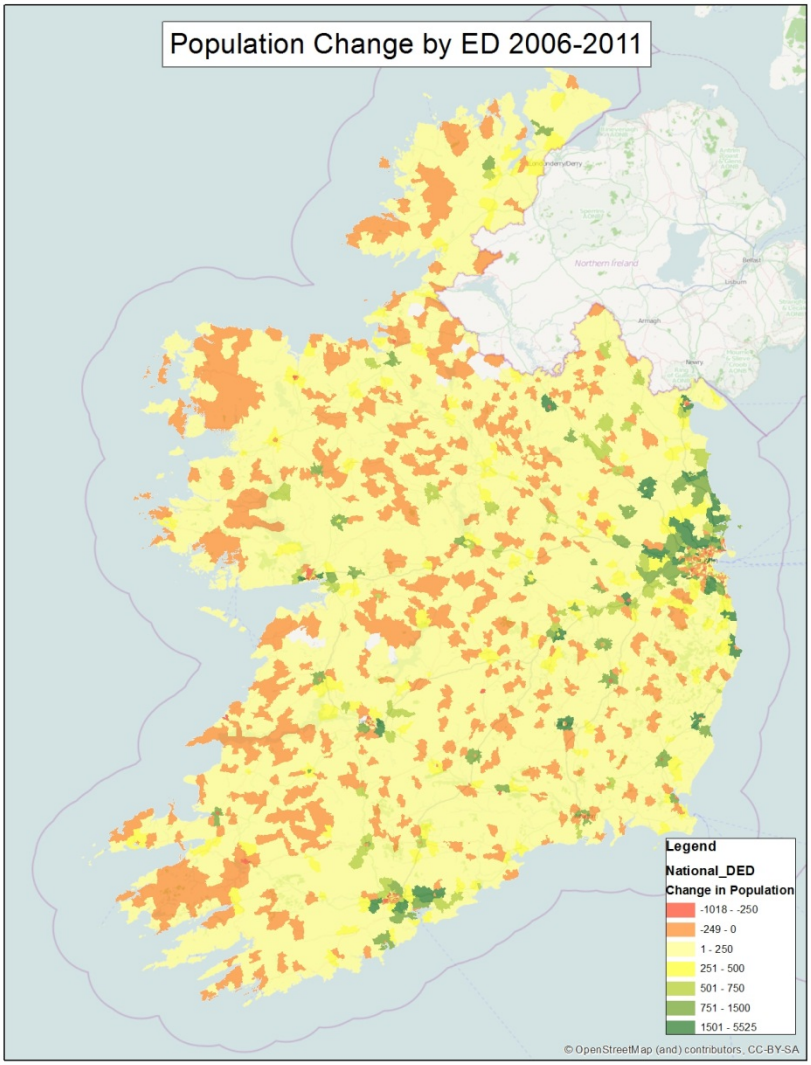


Figure 1A shows that the strongest population growth (dark green) occurred in the commuter belts of the city regions of Dublin and Cork in particular. This is in stark contrast to the rest of Ireland where the population continues to decline in many rural areas and along the western seaboard in

particular with the exception of the peripheries of Galway and Limerick. The pattern shows large increases in population across Leinster in particular and in the outer suburbs of the capital.

Figure 1B shows the percentage change in population between 2006 and 2011 for Dublin city.

Figure 1B – % Dublin city change in population between 2006 and 2011

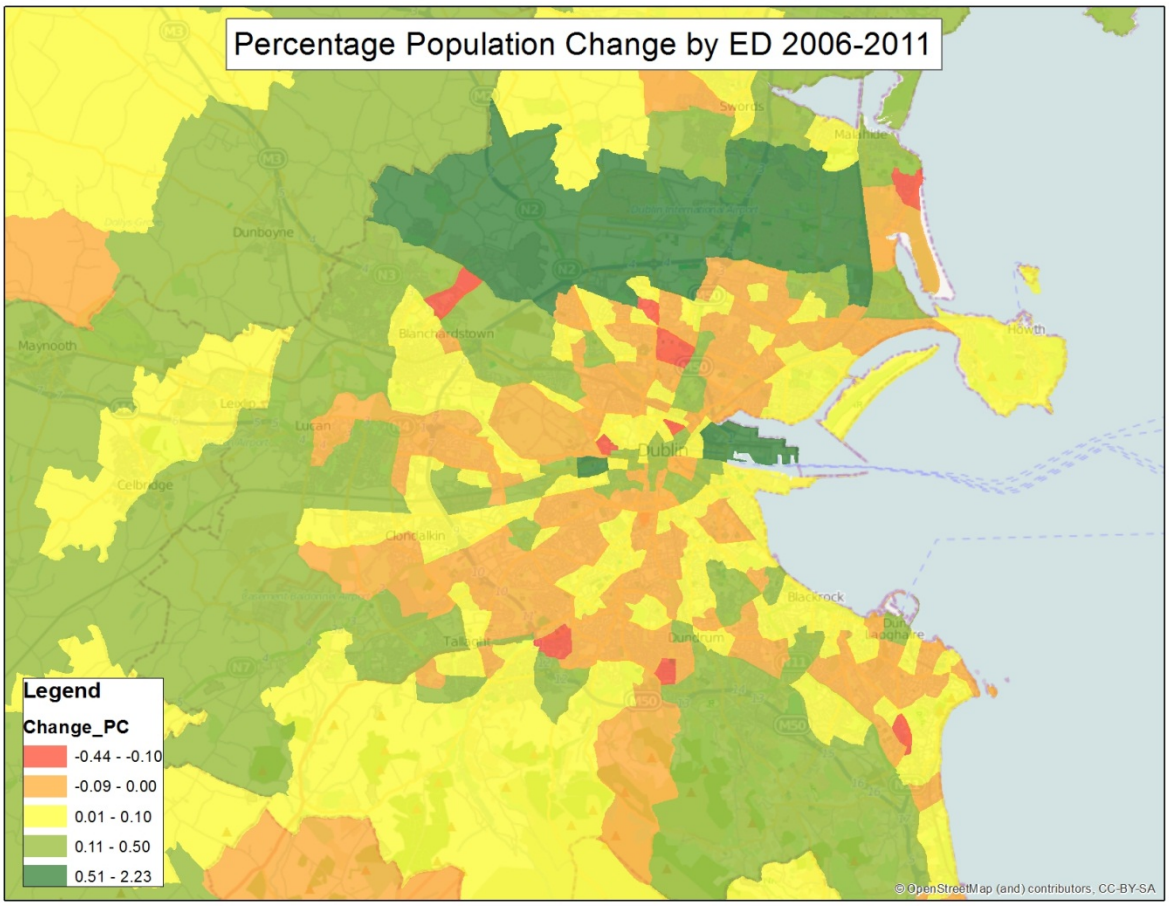
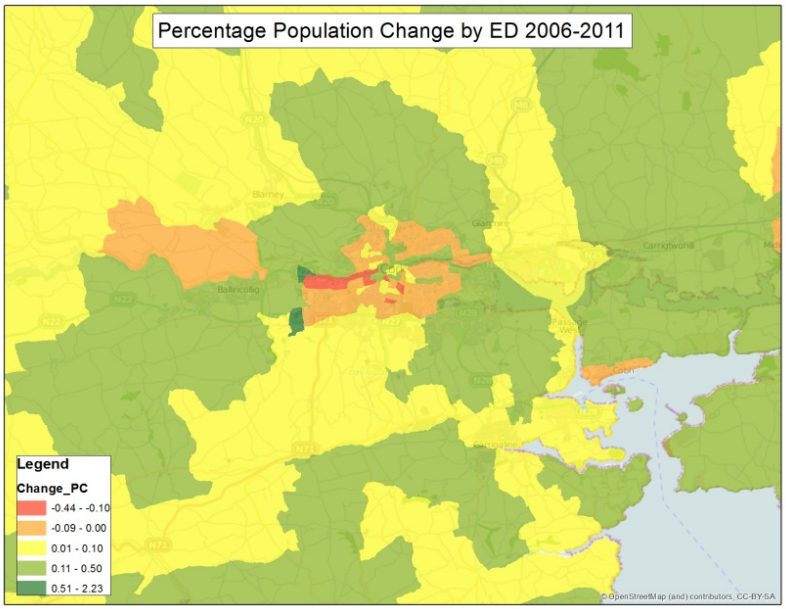


Figure 1B shows the percentage change in population in the Dublin city region between 2006 and 2011. It reveals that the highest population growth in Dublin (dark green) has occurred in the northern fringe of the metropolitan area and in the suburbs to the west and south. Many areas of the inner city have shown population decline with the exception of the Docklands area and the area around Heuston Station.

A similar pattern of population changes can be seen (in Figure 1C) for the Cork city region where significant growth in population in the outer suburbs is in contrast to population decline in many parts of the inner city.

Figure 1C - % Change in population in the Cork city region between 2006 and 2011



3.2 Employment distribution

The distribution of employment is a key determinant of travel patterns – particularly in the morning peak period when most people travel to work. Census 2006 was undertaken as Ireland was coming to the end of an economic boom, while the 2011 census is the first census in over 15 years to have been undertaken in the midst of an economic downturn. The changes in employment levels and the distribution of these changes between the two census years is a key indicator of the impacts of the economic downturn and also identifies the regions most and least affected by this downturn.

Table 2 shows the changes in the numbers of people in employment nationally and in each of the GDA counties since 2006.

Table 2 – Changes in persons employed by GDA County and nationally since 2006

County	2006	2011	% Change
Dublin City	245,007	227,429	-7%
South Dublin	119,280	106,534	-11%
Fingal	120,794	119,276	-1%
DLR	87,815	87,490	0%
Kildare	91,581	85,587	-7%
Meath	78,437	74,342	-5%
Wicklow	57,326	52,907	-8%
GDA	800,240	753,565	-6%
State	1,930,042	1,807,360	-6%

Table 2 shows that the number of persons employed has dropped by 6% both nationally and in the GDA between 2006 and 2011. Within the GDA there are marked variations in the distribution of employment. South Dublin has been the worst affected by the economic downturn with an 11% drop in persons employed, while Dun Laoghaire Rathdown has been largely unaffected with a drop in persons employed of less than 1%.

Figure 2A uses the trips to work data from POWCAR 2006 and POWSCAR 2011 to illustrate the changes in employment destinations within each ED nationally between 2006 and 2011. It should be noted that Figure 2A excludes mobile employment where work destinations are variable and hence not included in either dataset. Hence, the graphic excludes the impact of the economic downturn on mobile construction jobs.

Figure 2A – Changes in numbers of employment destinations nationally at an ED level

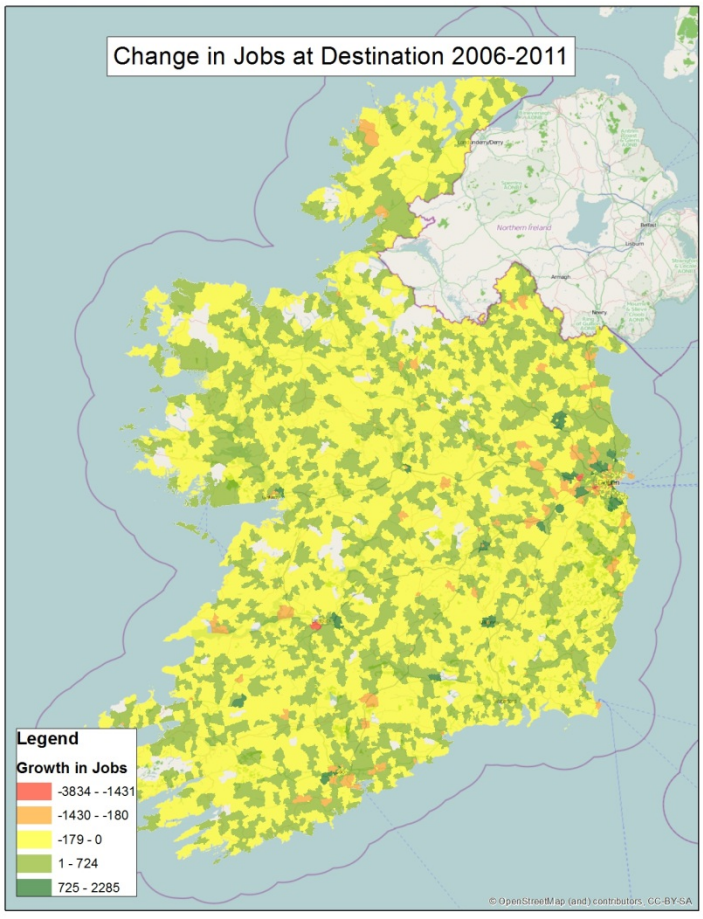
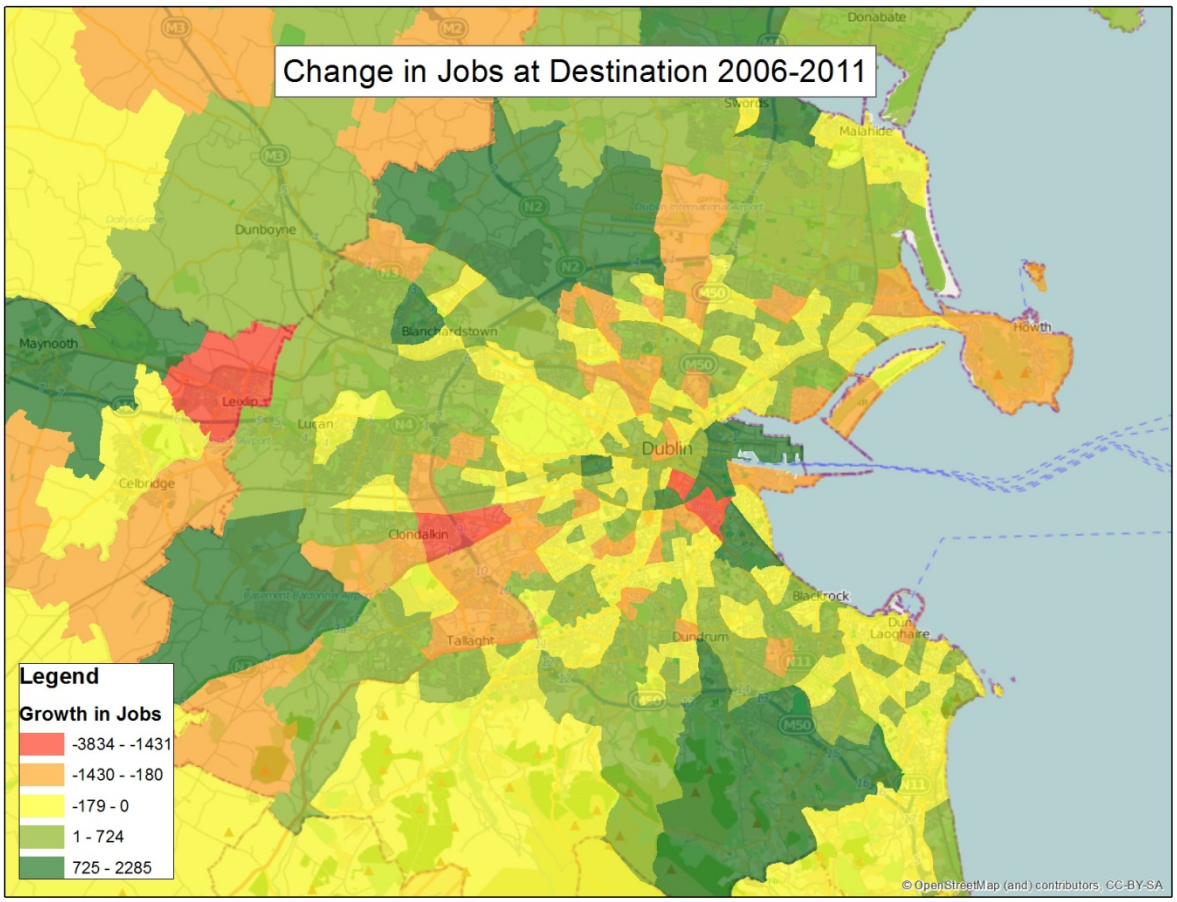


Figure 2A does show that jobs have been lost widely across the country since 2006 with some increases in jobs (light and dark green) mainly in peri-urban areas.

An examination of the changes in employment destination for Dublin City (Figure 2B) illustrates the increasing trend of suburbanisation of employment in our main urban centres. While employment has dropped in many areas of the city, Sandyford, Cherrywood, Blanchardstown and City West all emerge as major employment growth areas for Dublin in the period 2006-2011. Some central areas such as Docklands, Heuston and the South East Inner City have also shown job growth.

Figure 2B – Changes in employment destinations in Dublin City between 2006 and 2011



3.3 Means of travel

While the distribution of population and employment are critical determinants of overall travel demand, the means of travel people choose is an important measure of travel behaviour. Means of travel is affected by a number of factors, including the location of development, general economic conditions, availability of public transport, changes in fuel costs and public transport fares and other transport policy interventions. The economic boom between 1994 and 2006 had all the classic impacts on travel behaviour in Ireland as have been experienced in other developed economies in the world – i.e. increases in car ownership and in car use, increased traffic congestion in cities and a general decline in the use of public transport and other sustainable modes (e.g. walking and cycling). However, while the national trend was one of increased car use and car dependency, this trend was significantly reversed in the core of the major urban centres by the introduction of parking controls and by investment and improvements in public transport and other sustainable modes.

An analysis of the means of travel to work and education in the 2011 Census and comparison with equivalent data from earlier census years gives a good indication of the impacts of the recent economic downturn and other factors on people's travel behaviour.

Means of travel to Work

Table 1A below shows the change in trips by mode and mode share percentages between 2006 and 2011 for people travelling to work nationally, while table 1B gives the same comparison for persons travelling to work in the GDA.

Table 1A – % Mode Share comparison for trips to work nationally 2006 vs 2011

Persons travelling to work by mode nationally	2006 Trips	2006 % Mode Share	2011 Trips	2011 % Mode Share	Change in Mode Share	% Change in Trips
On foot	205,688	11.7%	170,510	10.5%	-1.2%	-17%
Bicycle	36,306	2.1%	39,803	2.4%	0.4%	10%
Bus, minibus or coach	114,956	6.5%	91,676	5.6%	-0.9%	-20%
Train, DART or LUAS	54,942	3.1%	52,749	3.2%	0.1%	-4%
Motorcycle or scooter	13,049	0.7%	8,443	0.5%	-0.2%	-35%
Motor car: Driver	1,080,446	61.5%	1,067,451	65.5%	4.0%	-1%
Motor car: Passenger	104,861	6.0%	69,164	4.2%	-1.7%	-34%
Other , incl. lorry	147,035	8.4%	131,018	8.0%	-0.3%	-11%
Total	**1,757,283**	**100%**	**1,630,814**	**100%**	**0%**	**-7%**

Table 1B - % Mode Share comparison for trips to work in the GDA 2006 vs 2011

Persons travelling to work by mode in the GDA	2006 Trips	2006 % Mode Share	2011 Trips	2011 % Mode Share	Change in Mode Share	% Change in Trips
On foot	90,423	12.2%	81,886	11.8%	-0.5%	-9%
Bicycle	23,282	3.2%	28,544	4.1%	0.9%	23%
Bus, minibus or coach	88,573	12.0%	73,956	10.6%	-1.4%	-17%
Train, DART or LUAS	49,471	6.7%	47,922	6.9%	0.2%	-3%
Motorcycle or scooter	8,386	1.1%	5,831	0.8%	-0.3%	-30%
Motor car: Driver	406,327	55.0%	399,381	57.3%	2.3%	-2%
Motor car: Passenger	32,929	4.5%	24,107	3.5%	-1.0%	-27%
Other , incl. lorry	39,463	5.3%	34,843	5.0%	-0.3%	-12%
Total	**738,854**	**100%**	**696,470**	**100%**	**0%**	**-6%**

Both tables show similar trends at the GDA and national level with an increase in mode share for car and reductions in walking and travel by bus. Against a background of a general decrease in trips to work of 6% in the GDA and 7% nationally, the only mode to increase in absolute terms was cycling. There was an increase of 10% in cycling trips to work nationally and a significant increase of 23% in cycling trips to work in the GDA. Further analysis of cycling reveals that there was a 40% increase in cycling trips within the city centre of Dublin (within the canals) between 2006 and 2011. This increase in cycling has been influenced by a number of factors in recent years, including the increases in fuel costs and in public transport fares and investment in cycle networks in urban centres. The success of the Dublin bikes scheme has also had a major impact on attitudes to cycling – particularly in Dublin city centre.

Of note are the trends in mode share for car drivers and car passengers. While the mode share for car as driver has increased both in the GDA and nationally, the mode share for car as passenger has declined. This reflects a general decline in car occupancy levels for trips to work, with the occupancy level in 2011 close to 1. The decline in the mode share for walking is less pronounced in the GDA as it is at a national level, while the decline in mode share for Bus is also more evident at a national level.

Car as the dominant mode

Analysis of means of travel to work from Census data going back to 1996 shows a growing reliance on the private car. However, this overall trend masks significant spatial variations in this trend that are revealed in analysing the mode share for car at an ED level. Figure 3A shows the % mode share for travel to work by car at an ED level for the Dublin commuter belt. Figure 3B shows the same data for the Cork commuter belt.

Figure 3A Car mode share for trips to work in the Dublin commuter belt – at an ED level.

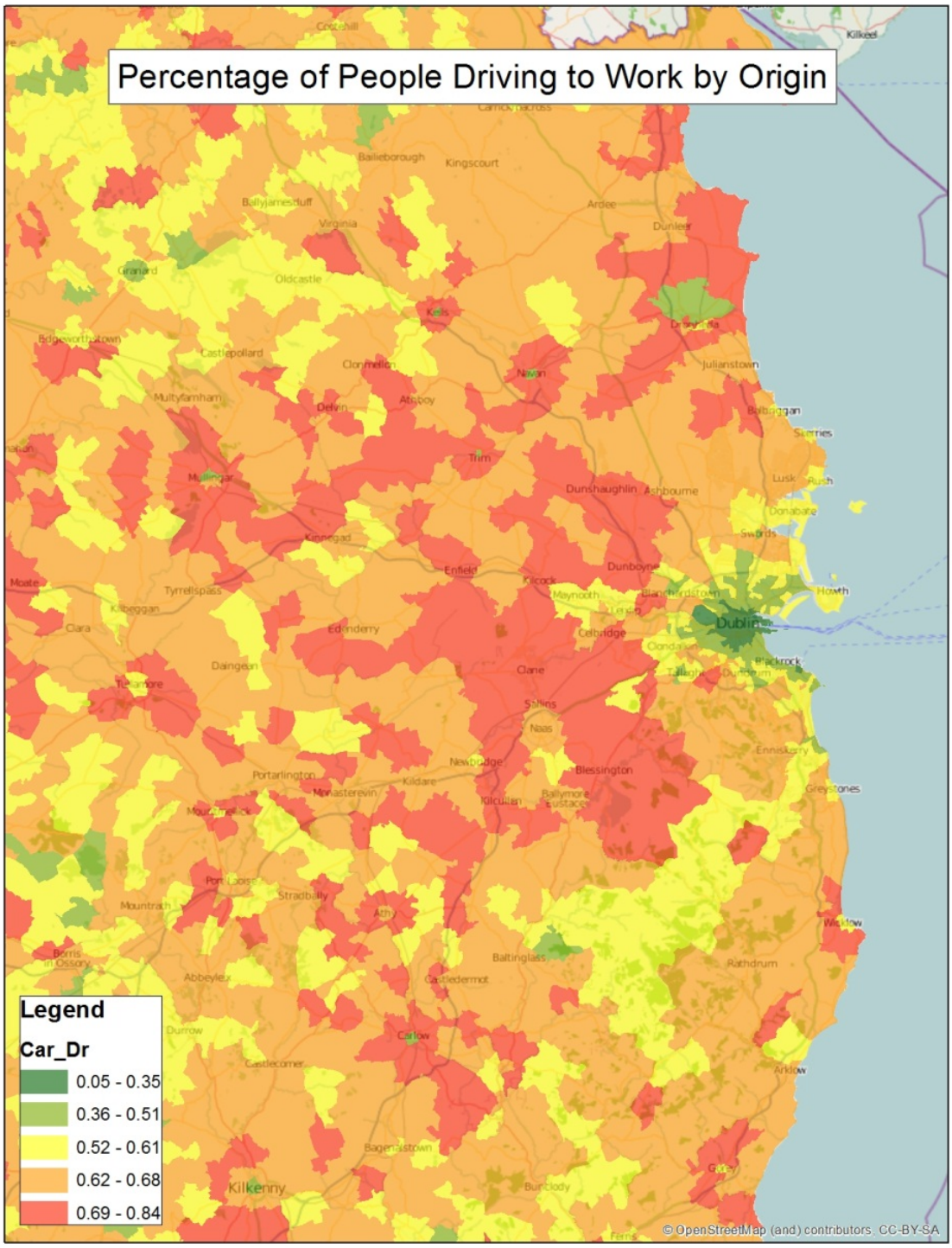
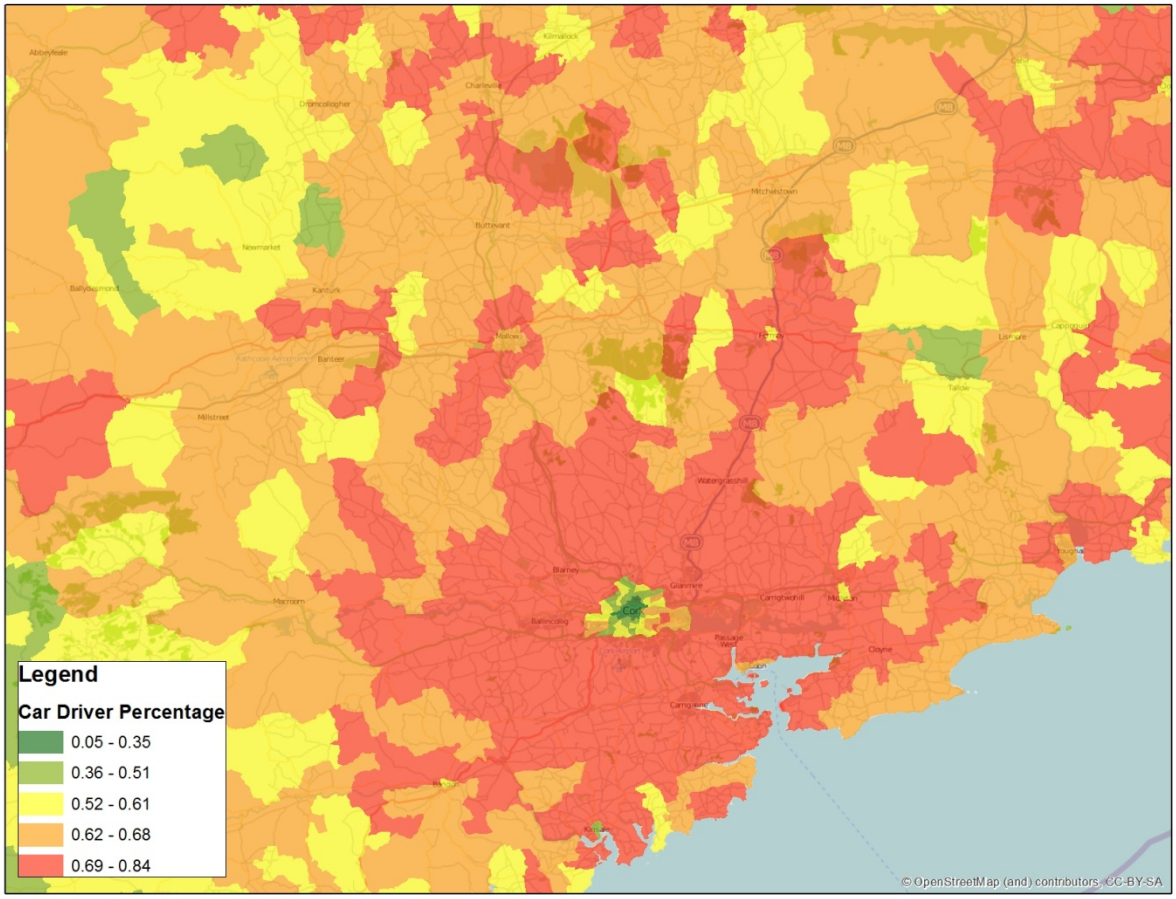


Figure 3B – Car mode share for trips to work in the Cork commuter belt – at an ED level.



Figures 3A and 3B show similar trends with the highest levels of car dependency around both Metropolitan areas and in peri-urban and semi-rural fringes where more than 7 in 10 people drive to work. This is in contrast to the situation in the commercial core of both cities where less than one in 4 people drive to work. Car dependency levels are also lower in areas where agriculture plays a greater role in the local economy.

Means of travel to Education

Table 2A shows the comparison of mode share for trips to education nationally between 2006 and 2011, while table 2B shows the same comparison for trips to education in the GDA. Both tables show similar trends with reductions in mode share for walking and bus, in contrast to increases in mode share for car both as driver and as passenger. The increase in cycling trips that was evident for work trips, is also evident for trips to education, and this increase is particularly evident in the GDA.

It should be noted that in contrast to the overall reduction in trips to work nationally and in the GDA, the opposite trend is evident with regard to trips to education – with a 13% overall increase in education trips nationally and a 14% increase in the GDA. The increased numbers of people in full time education is most evident in the Primary and Tertiary sectors – with a 29% increase in third

level students nationally between 2006 and 2011. Hence, the increases in overall population and in the pupil / student population in particular have more than compensated for the impact of reduced employment on overall levels of travel demand in the past 5 years.

Table 2A – % Mode Share comparison for trips to education nationally 2006 vs 2011

Persons travelling to education by mode nationally	2006 Trips	2006 % Mode Share	2011 Trips	2011 % Mode Share	Change in Mode Share	% Change in Trips
On foot	227,422	26.1%	244,428	24.8%	-1.3%	7%
Bicycle	17,654	2.0%	21,374	2.2%	0.1%	21%
Bus, minibus or coach	211,993	24.4%	196,886	20.0%	-4.3%	-7%
Train, DART or LUAS	16,716	1.9%	18,227	1.9%	-0.1%	9%
Motorcycle or scooter	1,289	0.1%	869	0.1%	-0.1%	-33%
Motor car: Driver	37,866	4.4%	59,945	6.1%	1.7%	58%
Motor car: Passenger	354,636	40.7%	439,174	44.6%	3.9%	24%
Other , incl. lorry	2,893	0.3%	3,097	0.3%	0.0%	7%
Total	**870,469**	**100%**	**984,000**	**100%**	**0%**	**13%**

Table 2B - % Mode Share comparison for trips to education in the GDA 2006 vs 2011

Persons travelling to education by mode in the GDA	2006 Trips	2006 % Mode Share	2011 Trips	2011 % Mode Share	Change in Mode Share	% Change in Trips
On foot	113,591	34.4%	123,943	32.9%	-1.5%	9%
Bicycle	11,196	3.4%	14,198	3.8%	0.4%	27%
Bus, minibus or coach	70,326	21.3%	70,272	18.7%	-2.6%	0%
Train, DART or LUAS	14,332	4.3%	15,293	4.1%	-0.3%	7%
Motorcycle or scooter	636	0.2%	435	0.1%	-0.1%	-32%
Motor car: Driver	12,104	3.7%	18,423	4.9%	1.2%	52%
Motor car: Passenger	106,934	32.4%	133,048	35.4%	2.9%	24%
Other , incl. lorry	763	0.2%	684	0.2%	0.0%	-10%
Total	**329,882**	**100%**	**376,296**	**100%**	**0%**	**14%**

3.4 Journey time

The economic boom between the mid 1990's and 2006 had the characteristic impact of increasing overall travel demand and traffic congestion levels – in particular in urban areas. This in turn had an impact on journey times to work in particular. An analysis of journey to work times from Census 2011 is useful to reveal if the trend up to 2006 has been halted or reversed in response to the economic downturn.

Figure 4A gives the profile of journey times for people travelling to work nationally and compares this with the equivalent journey time profile for the GDA. The profiles show journey times on average are longer in the GDA than at a national level. While over 70% of all trips to work nationally take 30 mins or less, the equivalent percentage in the GDA is 51%. Eleven per cent of trips to work nationally and in the GDA take longer than an hour.

Figure 4A – Profile of journey times to work in 2011 – National vs GDA

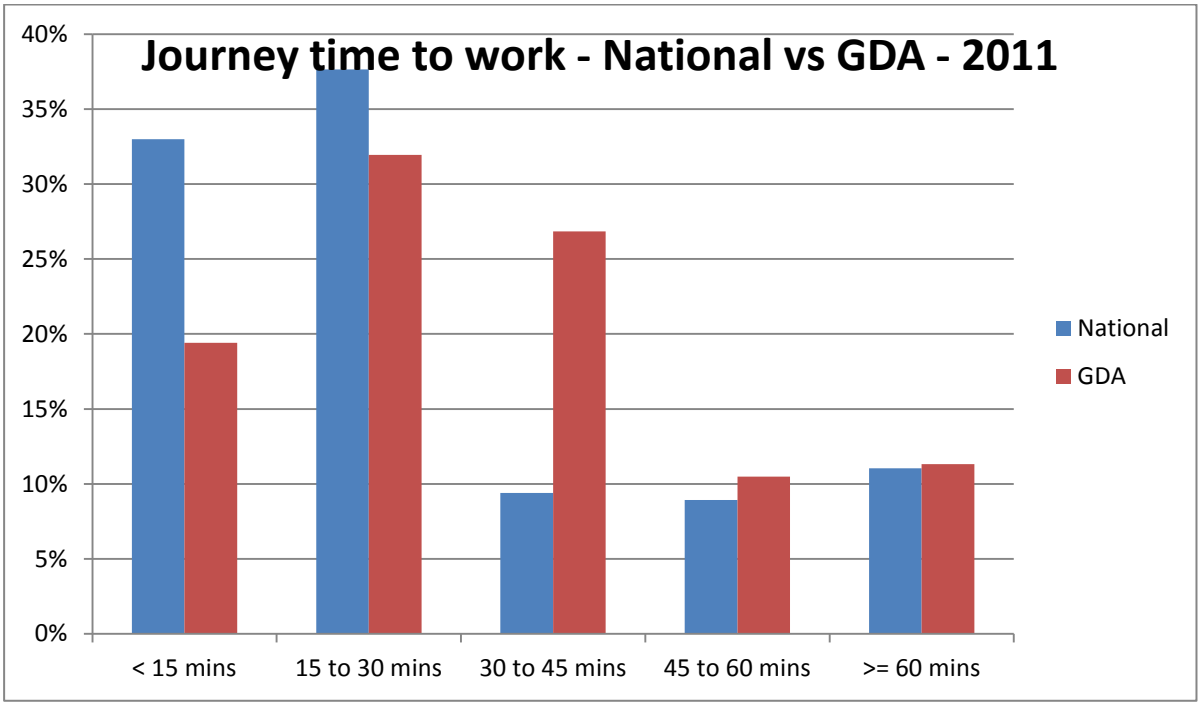
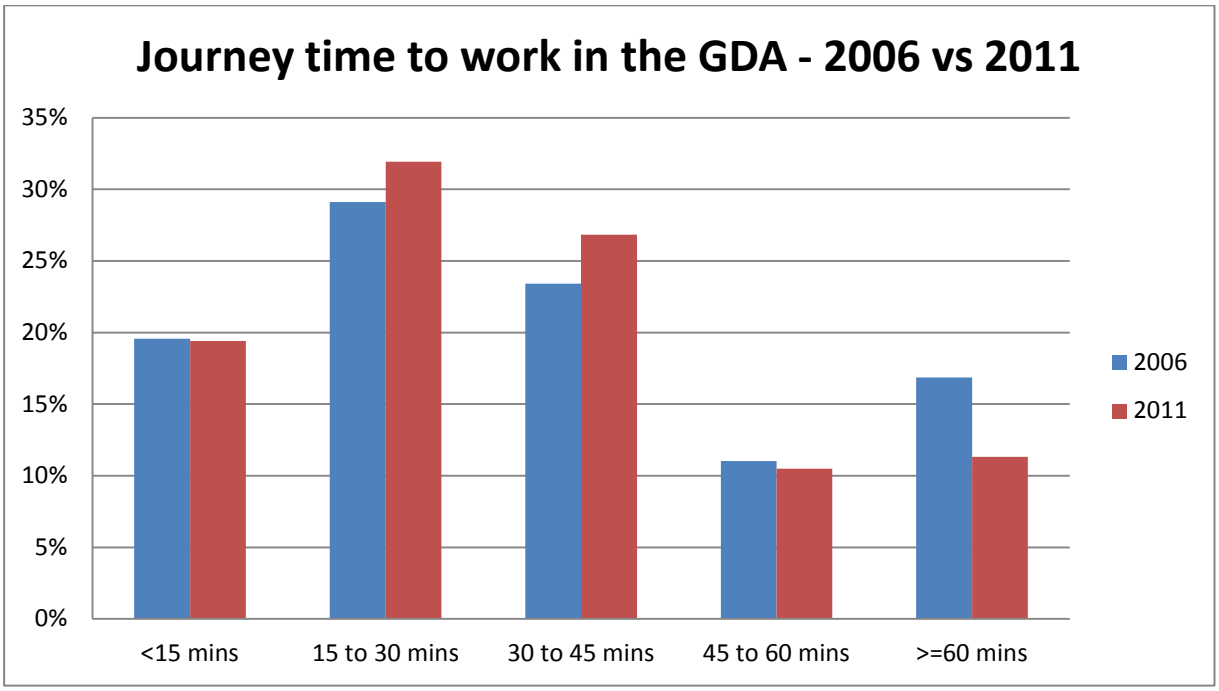


Figure 4B compares the profile of journey times to work in the GDA in 2011 with the equivalent profile in 2006. This shows a general reduction in average journey times due in the main to reduced congestion levels in Dublin coupled with the significant improvements in the national road network feeding into the capital.

Figure 4B – Comparison of journey times in the GDA – 2006 vs 2011



3.5 Departure time

Increased traffic congestion in the economic boom years made for longer journey times and caused commuters in urban areas in particular to depart earlier to be certain of arriving on time for work. The phenomenon of peak spreading was particularly evident in the GDA as revealed by comparison of travel to work departure times in the 2002 and 2006 census years. Analysis of departure times for travel to work form Census 2011 is useful to reveal if the trends in peak spreading have altered or reversed in the past five years.

Figure 5A gives the profile of departure times for journeys to work and compares the national profile with the equivalent profile in the GDA. The profiles are very similar, with a greater % of GDA commuters leaving for work before 7:30 than is the case nationally. One third of GDA commuters leave for work before 7:30 in the morning, whereas nationally this percentage is 28%.

Figure 5 A– Profile of departure times for trips to work – National vs GDA

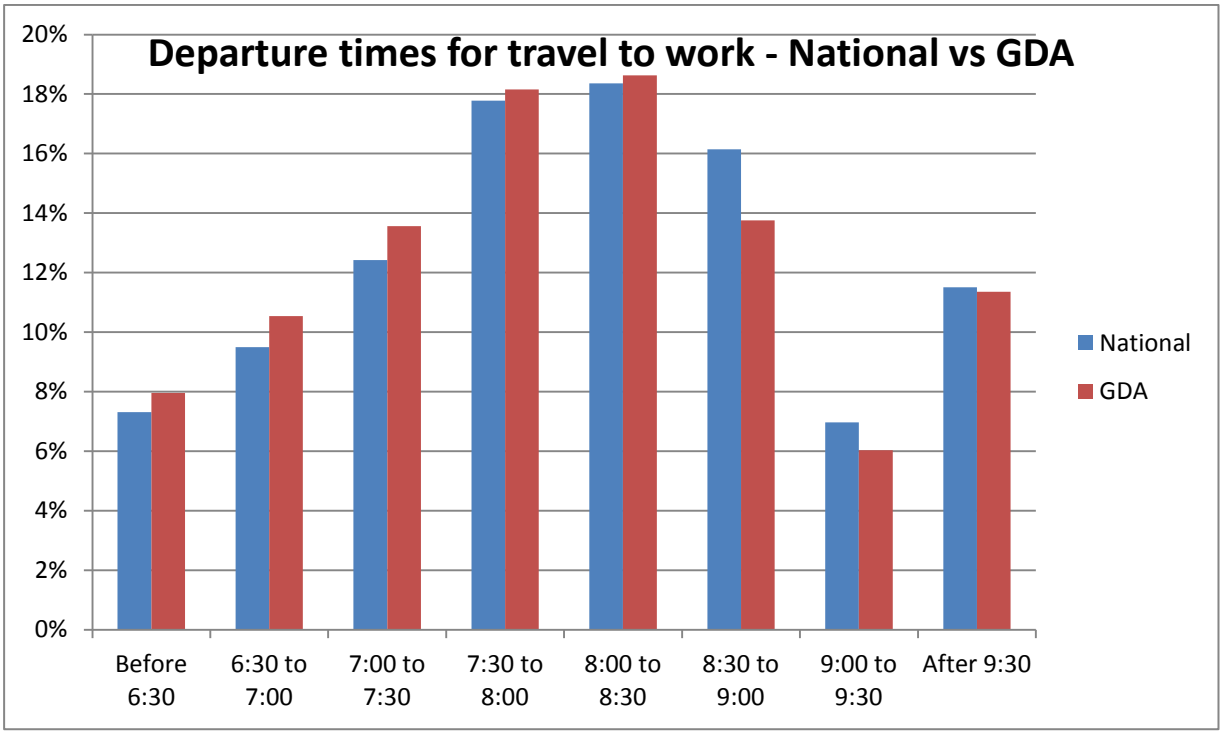
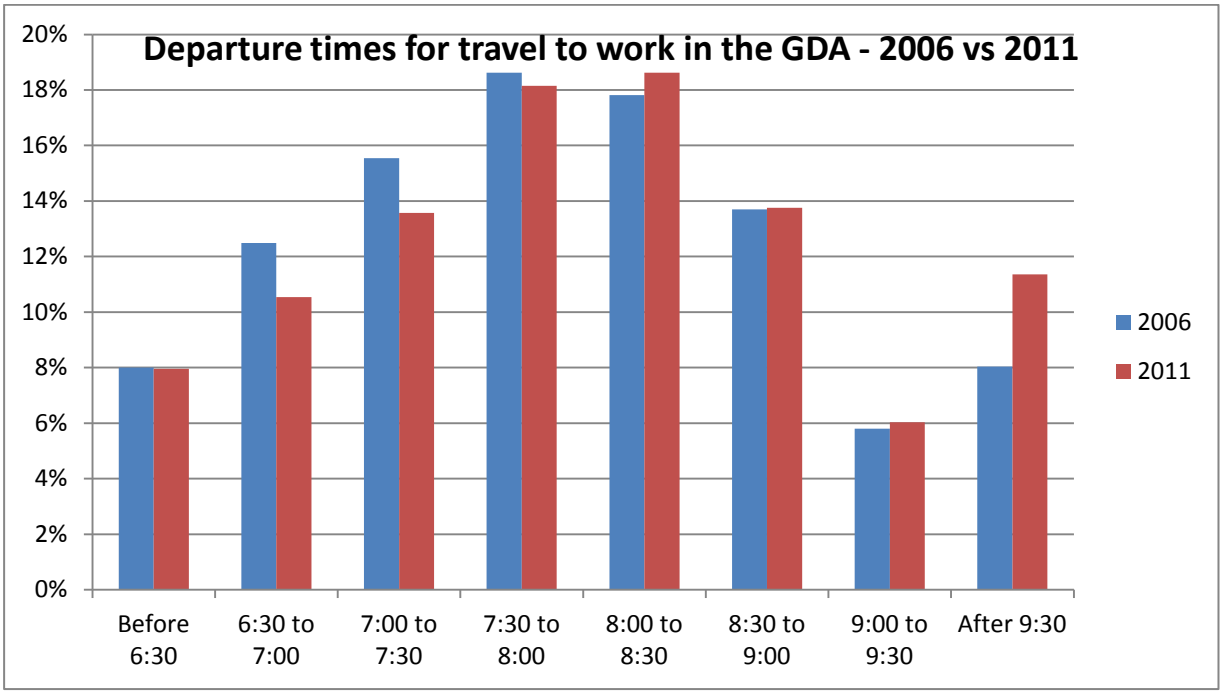


Figure 5B compares the departure time profile of trips to work in the GDA for 2011 and 2006. This comparison shows that the reduction in congestion levels means that fewer commuters are now departing for work before 7:30 (32% in 2011 as against 36% in 2006), while more are departing for work after 8:00 (50% in 2011 as against 45% in 2006). In summary, the AM peak within the GDA has contracted over the last 5 years.

Figure 5 B– Profile of departure times for trips to work in the GDA – 2006 vs 2011



3.6 Car ownership

Levels of car ownership have a critical impact on people's travel behaviour – in particular on the number of trips they will make and the means of travel they will choose. Prior to the economic boom in the early 1990's, Ireland had one of the lowest levels of car ownership in the EU with one in four persons in the state owning a car. As has been the case in most developed economies worldwide, the economic boom in Ireland lead to huge increases in car ownership to levels that are now on a par with many of our EU partners. There are, however significant spatial variations in this trend, with still quite low levels of car ownership in central Dublin in particular and lower than the national average in the other main urban centres. This is in contrast to car ownership levels of over 500 cars per 1,000 population in many counties, and particularly high levels of ownership in counties within the commuting catchment of the main urban centres.

Of particular interest in analysis of the 2011 Census is to determine if the economic downturn has impacted on the general trend of growth in car ownership up to 2006. Rather than comparing the 2011 data with 2006, it is more instructive to examine trends in car ownership since 1991. Table 3 shows the trends in car ownership in the GDA counties since 1991 and compares the GDA trend with the trend nationally. The car ownership figures are presented as total cars and vans (owned for private use) per 1,000 of population. Figure 6 shows the same car ownership trends in graph form.

Table 3 – Trends in car ownership since 1991 in the GDA – compared with the national trend

Cars per 1,000 population in GDA counties and nationally since 1991

County	1991	2002	2006	2011
Dublin City	184	299	317	342
South Dublin	244	417	450	465
Fingal	273	438	471	479
DLR	339	467	495	518
Kildare	289	450	493	510
Meath	314	474	526	528
Wicklow	279	441	493	511
GDA	251	398	433	452
State	260	408	459	484

Figure 6 – Car ownership trends in GDA counties compared with the national trend

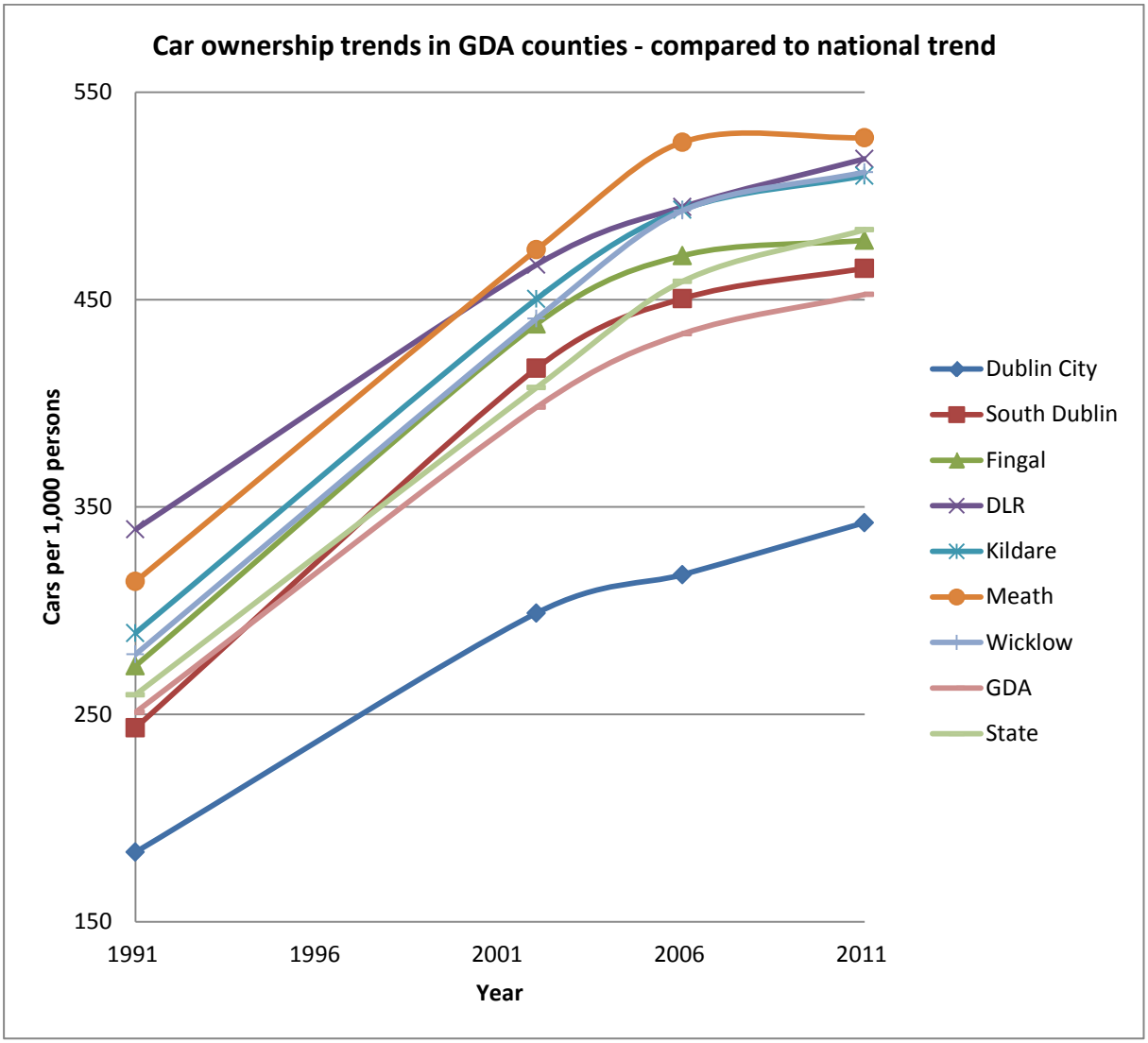


Figure 6 shows the characteristic historic trend in car ownership (i.e. S-Curve) for all GDA counties and nationally. Within the GDA, Meath has the highest levels of car ownership with rates that are well ahead of the national average. However it is clear from the graph that levels of car ownership in Meath are now approaching saturation levels (i.e. where every person legally entitled to drive owns a car), and the period 2006 to 2011 showed only a small increase in ownership levels in this county. Though levels of car ownership in Dublin City are much lower than in any other part of the country, there was a significant jump in ownership between 2006 and 2011. The impact of the economic boom between the mid 1990's and 2000 is clearly evident in the car ownership trends. It is also clear that despite the economic downturn since 1996, car ownership levels have continued to rise and are only levelling off where they are reaching saturation levels. The increases in car ownership despite recent economic conditions may also be indicative of the reduced cost of owning a car in Ireland – in particular the cost of second hand cars that has fallen significantly over the past 5 years.

4 Summary and main conclusions

Some of the main findings from this preliminary analysis of the Census 2011 travel datasets are as follows:

- Despite the economic downturn and a sharp rise in the unemployment rate, a significant increase in population has meant that there has only been a modest 6% drop in trips to work nationally and in the GDA over the past 5 years.
- In contrast to the drop in trips to work, there have been significant increases in trips to education both nationally (13%) and in the GDA (14%).
- In the case of both trips to work and education, there have been reductions in mode share for walking and travel by bus and increases in the mode share for car and cycling. For travel to work, cycling has been the only mode to show and increase in absolute terms. This increase has occurred nationwide, but is particularly significant (40% increase) in Dublin city centre.
- The economic downturn has reduced congestion levels in the major urban centres, and this has led to a reduction in travel times and a contraction of the morning peak.
- Car ownership continues to increase despite the economic downturn, but some counties are now approaching saturation levels and these counties have shown only a small increase in ownership levels since 2006.