CRAWLING THROUGH THE SPRAWL: COMMUTING PATTERNS, URBAN FORM AND PUBLIC TRANSPORT IN DUBLIN

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The process of residential sprawl and accompanying car dependence has become irreversible, to the point where the case for further investment in expensive urban public transport systems has been undermined. Investments in facilities such as LUAS are taking place in parts of the Greater Dublin Area with static or declining population. Bus-based public transport looks much better value for our capital city. At the same time, the Government's planned decentralisation of 10,300 public sector jobs will simply add to the existing rapid population growth of many towns - some of which are already dormitory suburbs for Dublin - and will do nothing to reduce car dependency.

INTRODUCTION

It is a commonplace for public transport not to prosper in high-income, low-density cities. The dispersion of population and employment, and hence of trip origins and destinations, makes public transport expensive to deliver and simultaneously less attractive to a car-owning populace. The long-established tendency for Dublin and the smaller Irish cities to sprawl into their hinterlands, with both population and employment spreading through adjoining regions, has been accompanied through the recent economic boom by a sharp rise in car ownership and an increasing reliance on the private car for passenger transport. These trends have persisted despite regular public policy statements deploring sprawl and espousing increased density and a switch to public transport. There has been a pronounced disconnection for at least two decades between the policy rhetoric and the reality of urban development patterns.

At each Census since 1991 the Central Statistics Office (CSO) has published a volume called 'Travel to Work, School and College'. For the 1991 Census this was Volume 11; for the 1996 Census Volume 6, and for the 2002 Census Volume 9, released in February 2004. Sets of tables on commuting, with a lesser level of detail, are also

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available from the CSO for the immediately preceding 1981 and 1986 Censuses. Thus, a 21-year perspective exists in these data as to what has been happening to commuting patterns in Ireland.

In addition to these Census data, the CSO included some once-off questions on commuting in the Quarterly National Household Survey for the first quarter of 2000; these figures were released later that year. The next section of this paper considers the patterns revealed in these data.

COMMUTING PATTERNS FROM THE CENSUS DATA

The 2002 Census - postponed for a year because of the 2001 Foot and Mouth scare - contained the same questions on commuting which have been asked at each Census since 1981. These dealt with modal choice and distance travelled and are asked separately for those at work, those of schoolgoing age and those of college age. Table 1 shows the main trends in modal choice for those commuting to work over the last two decades.

TABLE 1: TRENDS (%) IN COMMUTE-TO-WORK MODAL CHOICE IN IRELAND, 1981-2002

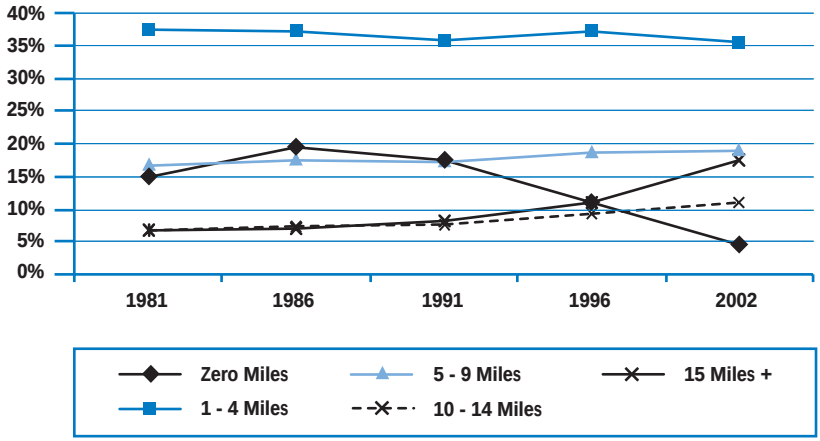
	1981	1986	1991	1996	2002
On Foot	13.4	12.6	11.1	11.5	11.4
Bicycle	4.2	5.6	4.4	3.6	2.1
Bus	9.7	8.6	7.7	7.6	6.7
Train	1.3	1.5	1.7	1.7	2.1
Car Driver	36.0	37.2	38.9	46.3	55.1
Car Passenger	8.1	8.3	8.0	8.7	6.7
Based at Home	19.5	17.2	19.8	12.3	6.1
Other & Not Stated	6.2	7.6	7.2	7.4	8.9
TOTAL	100	100	100	100	100

The percentage based at home has declined, as have those using bicycle, public transport or walking to work. The percentage driving, or travelling as car passengers, has risen from 44% to 62% over the period. Outside the main urban areas public transport's market share is tiny. Even in the Dublin region, the reality is that public transport has experienced a declining market share and faces a fundamentally hostile environment.

The figures for school and college students' commuting preferences show similar trends. Cycling to school has virtually ceased, down from 13% to 3.5% for the 13 to 18 year-old group, while the car mode has risen from 8% to 29%. Detailed tables for commute-to-school and commute-to-college are given in the Census report.

The switch to the car mode has been accompanied by a sharp increase in the typical length of the commuting journey. Figure 1 shows the figures for those at work: similar patterns are evident for school and college students.

FIGURE 1: COMMUTE-TO-WORK TRIP LENGTH, 1981-2002



Those travelling one mile or less to work - perhaps the limit of walking distance for many - fell from 15% to under 5% over the period. There was a small decline in the 1 to 4 mile trip length, a small rise in the 5 to 9 mile category, a sharp rise in 10 to 14 mile commutes, and an explosion in the numbers travelling 15 miles or more to work. (Note that around 13% in 2002 did not give an answer to this question.) Of those who stated an answer, 16.5% of home-to-work commuters had a single journey of 10 miles or more in 1981. By 2002 this figure had roughly doubled to 32.7%. In many rural counties over 50% of home-to-work commuters were travelling more than 10 miles each way by 2002 and in some areas as much as one-third were travelling 15 miles or more. Similar trends are evident in the Census data for school and college students.

The following principal conclusions can be drawn from the foregoing analysis.

- The share of car journeys in Irish commuting trips has been rising rapidly.
- Trip length has also risen sharply.
- Public transport's share is declining.

The product of these three developments has been a huge increase in the incidence of car-dependent, longer-distance commuting, a phenomenon present throughout the country but most pronounced in the Eastern region around Dublin. That region has also seen an upgrading of the national inter-urban road system which has, no doubt unintentionally, facilitated the long-distance car commuter.

THE SPATIAL PATTERN OF POPULATION GROWTH

Actual patterns of change in Ireland's population distribution, which seem to differ in some aspects from popular perception, are shown in Table 2 for the period since 1981.

TABLE 2: POPULATION GROWTH (IN '000) BY AREA, 1981 TO 2002

Area	1981	1986	1991	1996	2002	% Change	
						02/81	02/96
Dublin City	545	503	478	482	496	-9.0	+2.9
Rest of Dublin County	458	519	547	576	627	+36.9	+8.8
Inner Leinster (MKW)	287	315	325	347	413	+43.9	+18.8
Rest of Leinster (ROL)	500	517	510	519	570	+14.0	+9.9
Total Leinster	1,791	1,853	1,861	1,925	2,106	+17.6	+9.4
Munster	998	1,021	1,010	1,034	1,101	+10.3	+6.5
Connacht	424	431	423	433	464	+9.4	+7.2
Ulster (Part)	230	236	232	234	247	+7.4	+5.3
STATE	3,443	3,541	3,526	3,626	3,917	+13.8	+8.0

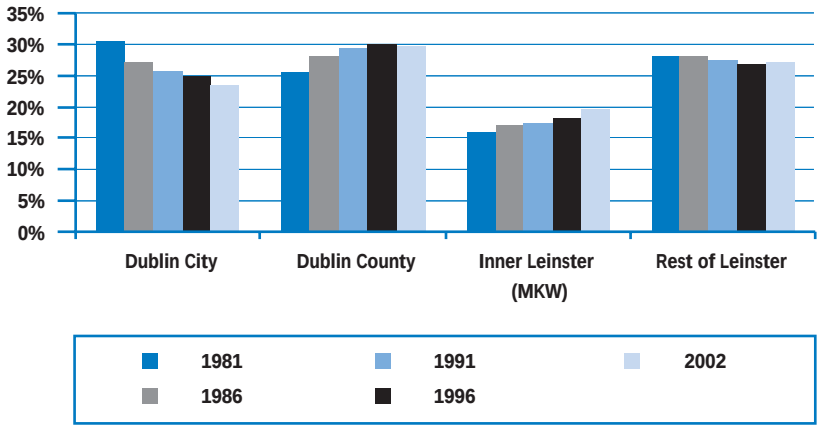
Notes:
All data from Census Volume 1 for the various years. Dublin City is the City Council (formerly Corporation) area. The rest of Dublin County comprises Dun Laoghaire/Rathdown, South County Dublin plus Fingal. Inner Leinster includes the three counties bordering Dublin; namely, Meath, Kildare and Wicklow (referred to as MKW), Rest of Leinster consists of the remaining eight Leinster counties (referred to as ROL).

While the population of the State rose by almost 14% over the 21-year period covered, very significant variations are evident. The population of Dublin City actually fell; and the city area now contains just 12.7% of the State's total compared to 15.8% back in 1981.

This has been one element in a classic doughnut re-distribution of population in the east of Ireland, with very rapid growth in the outer suburbs of Dublin and in the adjoining counties. The populations of Connacht and of the three Ulster counties in the Republic have both risen over the period, contrary perhaps to some widespread perceptions.

But the really radical redistribution of population in these numbers has been within the province of Leinster. The percentage shares in Leinster's population have developed as shown in Figure 2.

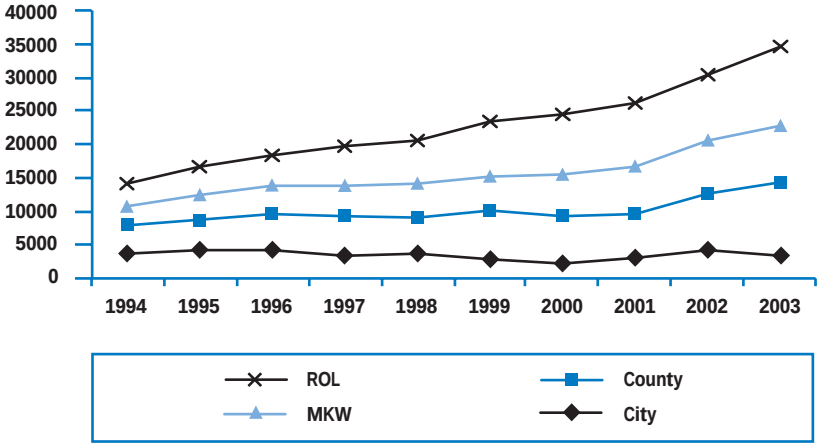
FIGURE 2: PERCENTAGE SHARES IN THE POPULATION OF LEINSTER



The steady fall in the share of Dublin City through every inter-censal period is clear, but Dublin County has also seen its share fall for the first time in the period since 1996. The share of the Inner Leinster counties of Meath, Kildare and Wicklow (MKW) has been rising steadily and has accelerated in the most recent period. Ominously from the perspective of those who favour compact development patterns, the share of the eight Rest of Leinster (ROL) counties, which had been declining gently since 1981, actually rose at the 2002 Census.

A principal driver of these population patterns has been the geographical distribution of residential development. The current and continuing boom in housing output began a decade ago. The geographical distribution is shown in Figure 3.

FIGURE 3: RESIDENTIAL DEVELOPMENT IN LEINSTER (NO. OF NEW DWELLINGS)



In recent years the absolute number of new homes constructed in the Dublin City area - which accounts for roughly one-quarter of Leinster's population - has been no greater than it was a decade ago. But numbers constructed in the eight outer counties (ROL) have trebled over the same period, as have numbers in the three adjoining counties (MKW). In Dublin County numbers have doubled. These figures bear testament to the pronounced doughnut pattern and are perhaps the ultimate evidence of sprawl. Interestingly, the percentage of the State's residential construction taking place in Leinster has been at or below Leinster's population share (53.8%) on average. The eight ROL counties are now seeing a considerable construction boom; if construction were proportional to population, the eight ROL counties would build slightly more new homes per annum than Dublin City, but the recent figures have been roughly three times the level of new build in the metropolitan borough. The ratio of new build (taking the average of 2002 and 2003) to population as per the 2002 Census is presented in Table 3.

TABLE 3: NEW RESIDENTIAL CONSTRUCTION PER 1,000 POPULATION, AVERAGE OF 2002/2003

Dublin City	Dublin County	MKW	ROL
7.6	15.6	20.0	18.8

The recent acceleration in new build in County Dublin, especially in Fingal, has not been enough to bring the build rate per 1,000 population up to the level in the MKW and ROL

counties. The rate in the Dublin City area is now way below the outer areas. This is a pronounced sprawl pattern, and a radical and sustained re-direction of land-use policy would be required to shift it. The decade covered in these Tables saw the greatest housebuilding boom in the State's history. These are facts on the ground and the spatial pattern of residential development in Leinster has been altered dramatically, in a manner which may prove for practical purposes irreversible - at least over any relevant planning horizon.

Table 4 shows the rate of growth of population in Leinster during the 1996-2002 period for the four sub-divisions of Dublin and the remaining 11 counties.

TABLE 4: RANKED % POPULATION GROWTH RATES IN LEINSTER, 1996-2002

1. Meath	22.1	7. Laois	11.0	13. Longford	3.0
2. Kildare	21.4	8. Carlow	10.6	14. Dublin City	2.9
3. Dublin-Fingal	17.1	9. Louth	10.5	15. Dun Laoghaire	0.9
4. Westmeath	13.5	10. Dublin South	9.2	LEINSTER	9.4
5. Wexford	11.7	11. Offaly	7.7		
6. Wicklow	11.7	12. Kilkenny	6.6		

Of the four Dublin local authority areas, only Dublin-Fingal is near the top of the growth league, with the reality of sprawl putting Westmeath, Wexford and Laois into the top half of the Table. Dublin City and Dun Laoghaire, the two most central zones in the province, and the two best served by public transport, are at the bottom. Of the eight ROL counties, five of them saw their populations grow by 10% or more in the six-year period to 2002. The demographic 'vital rates', shown in Table 5, suggest that these trends are likely to persist.

TABLE 5: THE BASIC DEMOGRAPHICS OF LEINSTER SINCE 1996 (RATES PER 1,000)

	Births	Deaths	Net Increase	Net Migration	Pop. Change
Dublin City	13.7	9.7	4.0	0.8	4.8
Dublin County	16.0	5.1	10.9	3.2	14.1
MKW	16.3	6.4	9.9	18.6	28.5
ROL	14.4	8.5	5.9	9.7	15.6
LEINSTER	15.1	7.4	7.7	7.3	15.0

Dublin City had a very low natural increase and virtually no inward migration over the six

years to 2002. Interestingly, Dublin County had low inward migration although natural increase was stronger given the age structure. The widespread belief that Dublin is a magnet for inward migration in modern Ireland is simply mistaken. The highest inward migration was in the MKW area, but there was also a big inflow into the eight ROL counties. These figures would suggest that population prospects are not good for Dublin City: the age structure is not positive and the pattern of low or zero in-migration is well established.

The recent Housing volume of the Census allows the construction of the following Table 6.

TABLE 6: AGE OF THE HOUSING STOCK IN LEINSTER (%)

	Built post-1991	Built post-1996
Dublin City	14.0	7.6
Dublin County	25.3	16.0
Meath, Kildare, Wicklow (MKW)	30.0	23.2
Rest of Leinster (ROL)	26.1	19.0
TOTAL LEINSTER	24.0	16.1

The Kildare, Meath and Wicklow area has the youngest housing stock, with almost a quarter built in the period from 1996 to 2002. At mid-2004, it would be a fair guess that about one-third of the MKW housing stock is less than ten years old. The Rest of Leinster figures, in terms of the newness of the housing stock, are not far behind those for Meath, Kildare and Wicklow. Dublin city has an older housing stock and the pace of new build is too slow to change this profile.

IMPLICATIONS FOR COMMUTING

An inevitable consequence of the population weakness in Dublin is that investments in facilities such as LUAS are taking place in parts of the Greater Dublin Area with static or declining population.

TABLE 7: POPULATION CHANGE IN THE LUAS HINTERLAND, 1996 -2002

	1996	2002	% Change
Dundrum Wards (5)	18,018	17,137	-4.9
Tallaght Wards (13)	63,021	62,799	-0.4
Inchicore/Kilmainham Wards (5)	11,191	11,248	+0.5

It is an automatic consequence of sprawl that city centre areas and inner suburbs become demographically weak as household size declines. They become less able to support high-capacity, fixed-line transit systems. But the areas of rapid population growth are low density and car dependent. They can never be reached by fixed-line systems at tolerable cost. Sprawl hurts the public transport market.

There has been a further, and perhaps unintended, development affecting residential location preferences, commuter mode choice and car dependence. The principal National Primary road routes are in the process of a substantial upgrading, with emphasis on the main arterial routes radiating out from Dublin. These are the N1, north to Drogheda and Dundalk; the N2, north west to Slane and Monaghan; the N3, north west to Navan and Cavan; the N4 west to Athlone; the N7 south west to Portlaoise, with N9 spur to Carlow, and the N11 south to Wicklow and Wexford. It is planned to complete sections of motorway on each of these alignments, ranging in distance up to 80 kms and more from Dublin. The route to Dundalk (about 75 kms) is already complete and the 80 km stretch to Portlaoise will be complete by the end of 2004. The full set of routes will be completed at various dates over the next five years.

These routes are intended to provide the backbone Leinster sections of the national network, but will also greatly ease the journeys of longer-distance car commuters and indeed have already done so. Proposed tolls on some of these routes, at amounts below €2, will not discourage commuting; and rural living is becoming particularly attractive to those employed in the "edge cities" beginning to grow up around, and just beyond, Dublin's M50 orbital motorway, at distances around 10 kms from the city centre. These include the Swords/Airport area to the north, the Leixlip/Maynooth area and the Parkwest and Citywest complexes to the west and the Cherrywood zone to the south. Data on the location of employment are not available, but it would appear that central areas are facing increasing competition from these out-of-town "edge cities", a pattern evident in the more sprawl-affected US cities.

DECENTRALISATION, URBAN FORM AND TRANSPORT POLICY

Urban dwellers tend to own fewer cars and to use them less frequently than do rural households, according to the Household Budget Survey 2000-2002 - as shown in Table 8.

TABLE 8: CAR OWNERSHIP AND USE, URBAN AND RURAL, PER HOUSEHOLD

	Urban	Rural	State
Car Ownership	0.93	1.18	1.02
Annual Mileage	7,840	12,285	9,434

Other things being equal, a population concentrated in urban areas will, on these figures, own fewer cars and travel fewer miles than a similar population living in rural areas.

In the December 2003 Budget Statement the Government announced plans to decentralise from Dublin 10,300 public service jobs. Almost 9,000 of the total are headed to specific identified destinations in 25 counties; that is, in every county in the Republic except Dublin. All 11 Leinster counties and every other county in Ireland will be a destination for public service jobs under the scheme as proposed. It has been shown already that the 11 Leinster counties, other than Dublin, experienced rapid population growth over the most recent inter-censal period.

The Government's planned decentralisations are controversial, particularly with civil and public service trades unions but also with critics who have questioned the consistency of the scheme with the National Spatial Strategy. There is clear evidence that, in many or even most cases, the 25 target counties exhibit the following characteristics.

- They have been experiencing rapid population growth.
- They contain target towns which are already dormitory suburbs for Dublin.
- They have average commuting distances longer than those in Dublin.
- They have lower public transport shares than Dublin.

Since Dublin has in absolute terms one of the lowest car ownership rates in the country, it can be stated with a high degree of certainty that any decentralisation policy will increase the national car ownership level. It will also increase average car usage for the same reason.

Since all 25 counties outside Dublin have been included, the Leinster counties in the high growth belt are recipients of public service jobs. Towns such as Athy, Newbridge, Drogheda, Navan, Mullingar, Edenderry and Portlaoise are already commuter towns for Dublin and have had very rapid increases in population. Nonetheless, they are included on the list of recipient towns for decentralised Government offices. This planned pattern of decentralisation bears no discernible relationship to the alleviation of demographic weak spots, nor does it redirect jobs in a manner which will reduce car dependence.

The sprawl phenomenon is associated intimately with reliance on car commuting. Glaeser and Kahn (2003) argue that it is the sharp reduction in transport costs made possible by the private car which has allowed cities to spread, and which has permitted large numbers of middle and lower- income households to afford larger, if more distant, homes. They argue that the ideal conditions for sprawl are population growth combined

with rising real incomes, precisely the conditions in Ireland over the last decade.

Irish policy responses have included a variety of proposals to deal with the perceived congestion problems that have arisen. These have included new rail schemes that would be appropriate in high-density cities, but which may prove uneconomic in a sprawl environment. An example is the proposal for a new rail line from Dublin to the town of Navan in County Meath, a distance of about 40km. A twin-track suburban line can support up to twenty trains per direction per hour, with a capacity of up to 1,000 passengers each. That is to say, the hourly capacity of an optimal service, fully using the infrastructure, on the Navan alignment, would exceed the prospective population of the town and its hinterland on current plans.

This Navan suburban rail scheme is a proposal, the LUAS light rail scheme a reality. Excluding any provision for the considerable disruption costs during construction, the cash costs are expected to reach about €800m on latest estimates. The cost estimate at the time of the Government decision (1996) would correspond to roughly €480m including VAT in today's money, inflated by the appropriate construction cost index.[1] There has thus been a substantial cost overrun, a feature of many urban rail schemes around the world.[2] It is too early to say whether the ambitious patronage targets for LUAS will be reached. International experience has been, on average, for urban rail schemes to under-shoot patronage targets, as well as to over-shoot on costs. But even where timetables and all cost/patronage targets are met, fixed-line systems are expensive and clearly less suited to low-density cities experiencing rapid urban sprawl.[3]

CONCLUSIONS

The zone around Dublin is already a low-density sprawl, characterised by extensive and growing car dependence. It may be unrealistic to expect that any economically sensible public transport scheme exists which can square the circle which has been created. The car is the best available transport solution for residents of sprawl regions and they express this preference every day, even in countries where cars and auto fuel are heavily taxed.

Once the sprawl has been created, there is limited potential for public transport solutions more appropriate to a strategy of sprawl-prevention, such as fixed-line rapid transit. These schemes can succeed in high-density corridors, but we have not been creating any in the Dublin region. It is now too late to undo the consequences of forty years of restrictive zoning and bus-based public transport looks much better value in Dublin than

[1] See McCarthy, 2004.
[2] Flyvbjerg et al., 2003.
[3] See Transportation Research Board, 2001.

schemes such as LUAS. Congestion charging, higher density housing, less restrictive zoning and further bus priority are of course worthwhile, but it may be time to accept that serious damage has been done to the prospects for rail-based engineering solutions and that the damage is irreversible.

Proposals to invest heavily in a Metro system, with cost estimates as high as €8bn., should not be proceeded with pending a review of the outturn of LUAS. In the meantime, there are plentiful opportunities to zone derelict land along existing rail lines in the Dublin area. If pressure from residents' associations is inhibiting local councils and their officials from the necessary decisions, central government would be justified in withdrawing the relevant powers from them.

The worst outcome would be continued sprawl, with costly investment in elaborate fixed-line systems condemned to permanent under-utilisation. Recall Edmund Burke's admonition (in 'On American Taxation'): "...whenever we are involved in difficulties from the measures we have pursued, that we should take a strict review of those measures, in order to correct our errors if they be corrigible; or at least to avoid a dull uniformity in mischief, and the unpitied calamity of being repeatedly caught in the same snare."

It is time to accept that Dublin, unfortunately, now resembles a US sunbelt city, irreversibly car dependent, and that the sprawl which has already occurred severly limits the potential of rail-based public transport solutions. There is nothing to be said for compounding the errors in land-use policy by proceeding as if they had not happened.

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