

THE ROLE OF APARTMENTS IN MEETING IRISH HOUSING REQUIREMENTS, 2018-2022

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For: Activate Capital

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- Research focuses on housing
 - In particular, long-run housing markets; sustainable/behavioural aspects of real estate
 - Doctorate at Oxford was on the economics of Ireland's property market bubble and crash
- Author and reviewer for a range of journals
 - Including *Journal of Property Research*, *Energy Economics*, *European Review of Economic History* and *Regional Science & Urban Economics*
- Previous experience
 - Economist to Ireland's National Competitiveness Council (2006-2007); Economic Consultant at IBM (2007-2009)
 - Since 2004, responsible for the quarterly *Daft.ie Reports* on the housing market (sales and lettings)



Definitions – for the purposes of this report:

- The “NUTS” classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the EU for the purposes of harmonised statistics, socio-economic analysis and framing EU policies
- “Apartment rate” refers to the fraction of all dwellings that are in apartments (i.e. conventional dwellings in buildings containing three or more dwellings)
- “Low apartment rate” refers to regions where the apartment rate is 10% or less
- “Ireland's peers” refers to the following 17 countries: Austria, Belgium, Denmark, Germany, Spain, France, Italy, Luxembourg, Netherlands, Portugal, Finland, Sweden, UK; Iceland, Liechtenstein, Norway and Switzerland
- “Dublin’s peers” refers to the following 17 cities: Amsterdam, Belfast, Bilbao, Birmingham, Brussels, Cologne, Copenhagen, Florence, Frankfurt, Helsinki, Nice, Oslo, Porto, Prague, Stockholm, Zagreb and Zurich
- “Greater Dublin Area” [GDA] includes the eight local authorities in Dublin, Kildare, Louth, Meath & Wicklow
- Households are broken into four main categories: ‘zero children’ (one person or a married or cohabiting couple); ‘with children’ (one or two parents); ‘with others’ (married or cohabiting couples, with or without children, who have other persons in their house); and ‘crammers’ (more than one family in a dwelling, non-family households and households of unrelated persons)
- “Rural one-offs” refers to all bungalows and 3/4s of detached homes built in non-urban/GDA local authorities prior to 2005 and, since 2005, all single (not scheme) houses built in non-urban/GDA local authorities

Structure

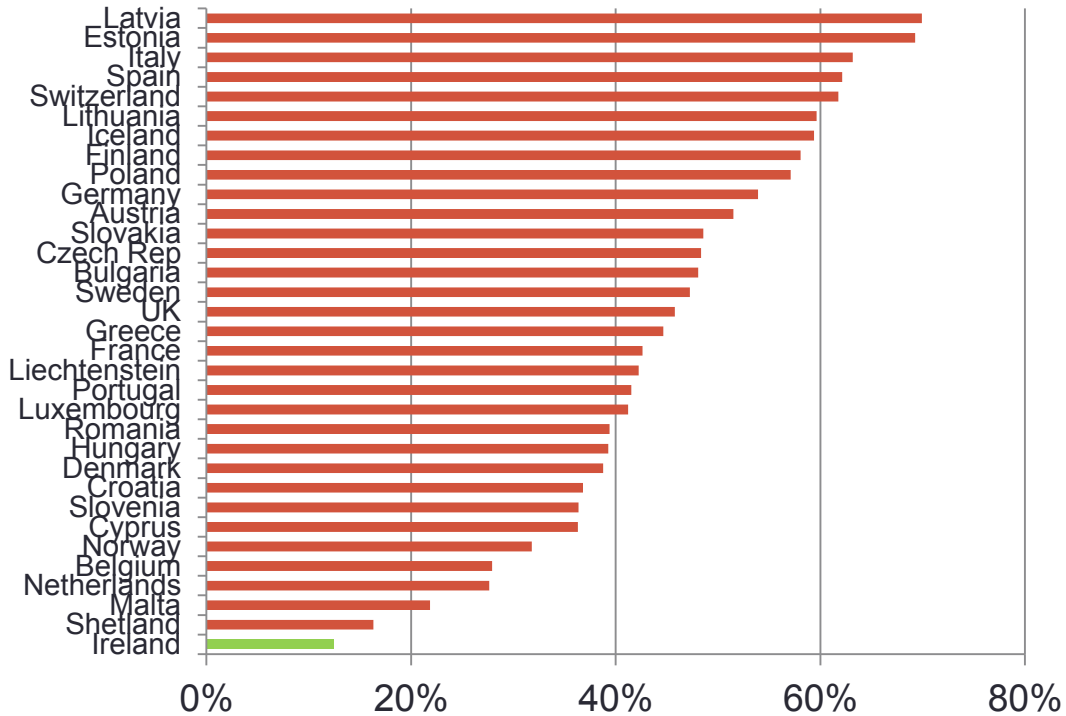
- **Executive Summary**
- Ireland's Apartment Shortage
- The Lifecycle of Housing
- Broader Housing Market Trends

Compared to other EU countries, and to its own population structure, there is a shortfall of ~450,000 apartments in Ireland currently

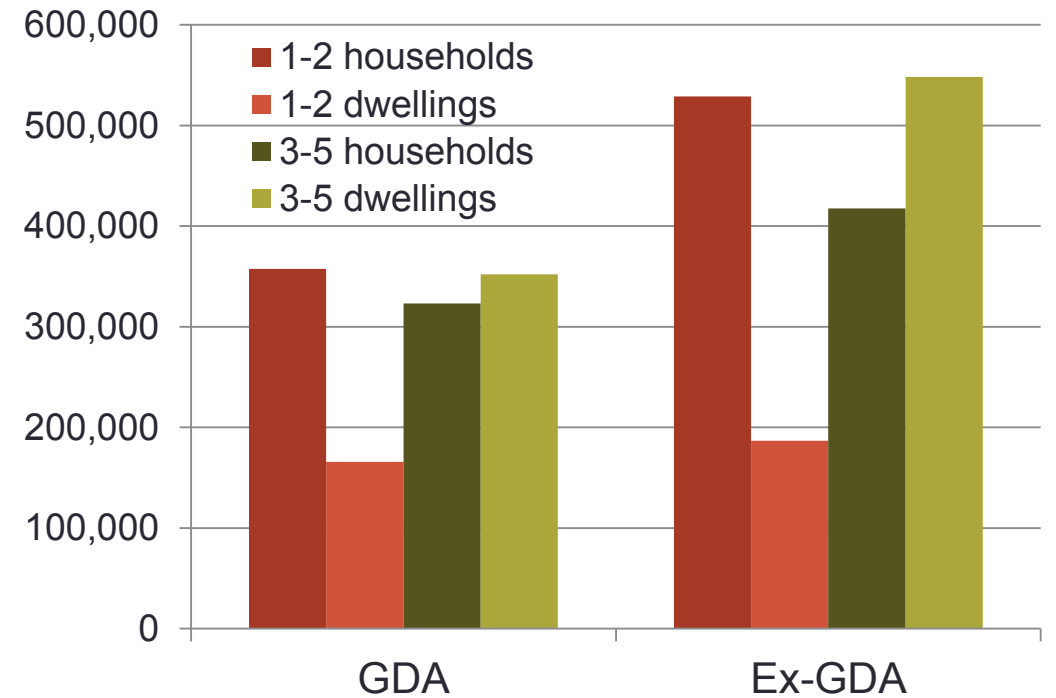
Ireland has just 12% of its dwellings in apartments – a quarter the EU average

Ireland has a shortfall of ~450k apartments [GDA: ~200k] based on the current population

Fraction of dwellings in apartments



Households by number of persons and related dwelling stock, 2016



Ireland requires 25,000 apartments to be built annually (GDA: ~10,000) to address its backlog of “missing” apartments

- If Ireland were in line with the EU average, it would have 0.8m apartments, rather than ~0.2m [GDA: ~375k apartments instead of ~125k]
- Underbuilding of apartments was persistent, especially during the Celtic Tiger
 - Almost half of Ireland's smaller households are new: 2016 Census figures show 0.9m households of 1-2 persons (vs. 0.5m in 1996)
 - However just 15% of the 0.9m new dwellings built 1996-2015 were urban/GDA apartments – twice as many rural one-offs were built during the same period
- Across all Ireland, there are only 350k dwellings for 1-2 persons vs. 900k 1-2 person households [GDA: ~160k dwellings vs. ~360k households]
 - This shortage of at least 450k, and probably above 500k, apartments means that Irish people are empty-nesting, sprawling, and cramming into larger households
 - Construction of 25,000 apartments annually 2018-2040 would be required to address the existing shortfall – this translates into 1 block of 200 units every week in Dublin, and 6 blocks a month elsewhere in the country

Given demographics trends, that level of output is likely to be required every year for the rest of the century

- On top of the existing backlog, demographics will create significant further demand for apartments in the coming decades
 - Ireland's average household size fell from 4.0 in 1971 to 2.7 in 2011 but remains the highest in Western Europe
 - It rose slightly 2011-2016, due to a lack of housing supply: to fall to 2.6 since 2011, ~100,000 new dwellings (almost entirely apartments) would have been needed
- However, to fall to the EU average of 2.3, even with a fixed population of 4.8m, a further 300,000 dwellings (almost entirely apartments) are needed
- Lastly, Ireland's population is expected to grow to 6.2m by 2080
 - With ~2/3s of households comprising 1-2 persons, this means that Ireland will need 1.9m dwellings for 1-2 persons by 2080
 - Given the existing stock of 0.2m, and allowing for 0.1m to be met by rural houses, this translates into an annual output of over 25,000 apartments every year for over 60 years

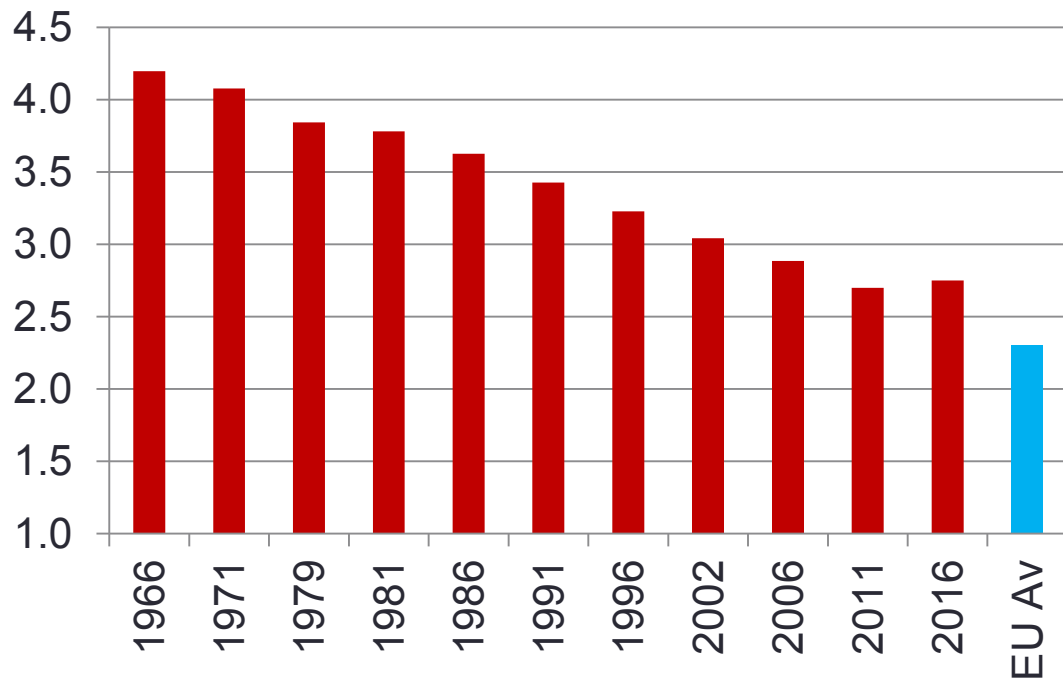
Demand is likely to be concentrated in urban areas, given our standard and cost of living is tied to our main cities

- No other country faces Ireland's demographic swing, as it moves from a falling population for much of the last 150 years to a rapidly rising one
 - Average growth rate per decade will be +5% 2010s-2080s, vs. -5% 1850s-1980s
- Ireland is urbanizing but remains one of least urbanised high-income countries in the world – just 64% of the population lives in cities
 - Urbanization is at the heart of economic growth: cities allow specialization (more productive labour), agglomeration (more productive capital and land) and, through lowering fixed costs, cheaper utilities and a wider variety of public/private services
- Ireland's lack of urbanization is due to housing, not the labour market
 - The result is sprawl, with half the daytime population of Ireland's largest cities travelling from elsewhere to work and college – hour-plus commutes have grown 30% since 2011
- The majority of future population growth will be linked to cities: the choice is whether the housing is in the cities or outside them

Demographics, in particular falling household size, mean that the underlying demand for apartments is strong and persistent

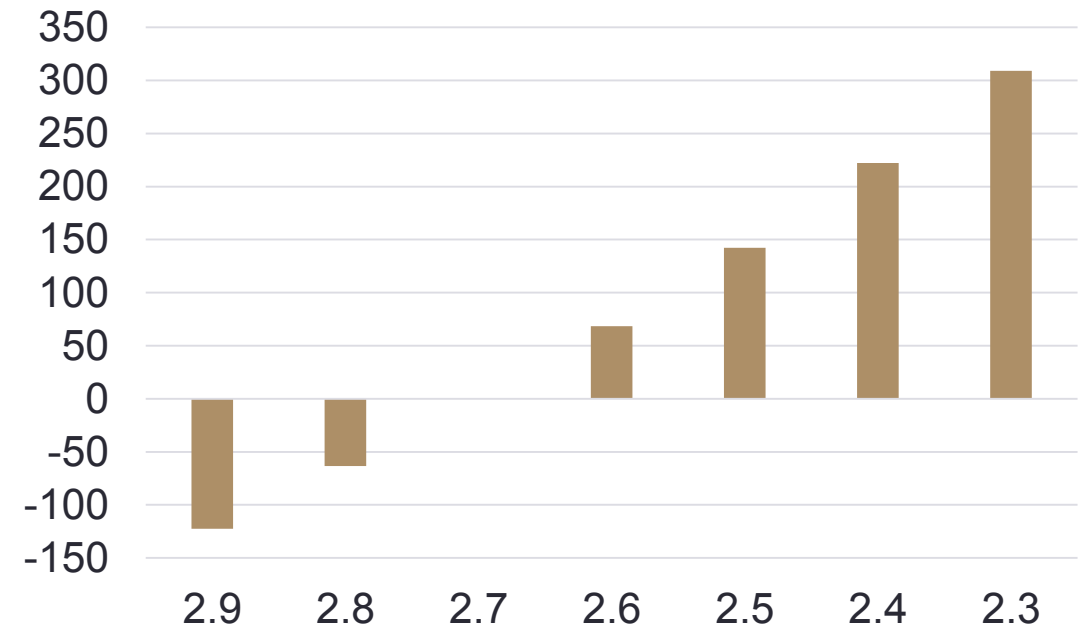
Ireland average household size has been falling steady but is still the largest in Europe

Average household size in Ireland, by Census year



As household size converges to EU average, this will create large demand for apartments

Number of extra dwellings required (000s) for a population of 4.8m, for different average household sizes (relative to 2.7)



Dublin has a substantial requirement for all of the main segments within multiunit, from student to retirement accommodation

- Multifamily apartment development can be broken into at least four main segments: student, worker, downsizer and retirement
 - Dublin has a requirement of ~45,000 student units by 2024, more than four times the existing stock
 - Key worker accommodation – primarily in urban cores – is another critical gap in Dublin's housing: Ireland has ~10x the number of young single people (~900k) as studios (~90k)
 - Couples without children also form a substantial part of housing demand – at all age groups, both working and retired – much of the solution here will be densification of the suburbs, thus retaining access to networks and amenities
 - Among retired households, Dublin also lacks the independent and assisted living components of housing
- In each of these segments, demand ranges across the income distribution – to effectively meet demand, an income-varying subsidy is needed

The picture of the entire housing market in Ireland currently, and out to 2022, is one of strong demand and very weak supply

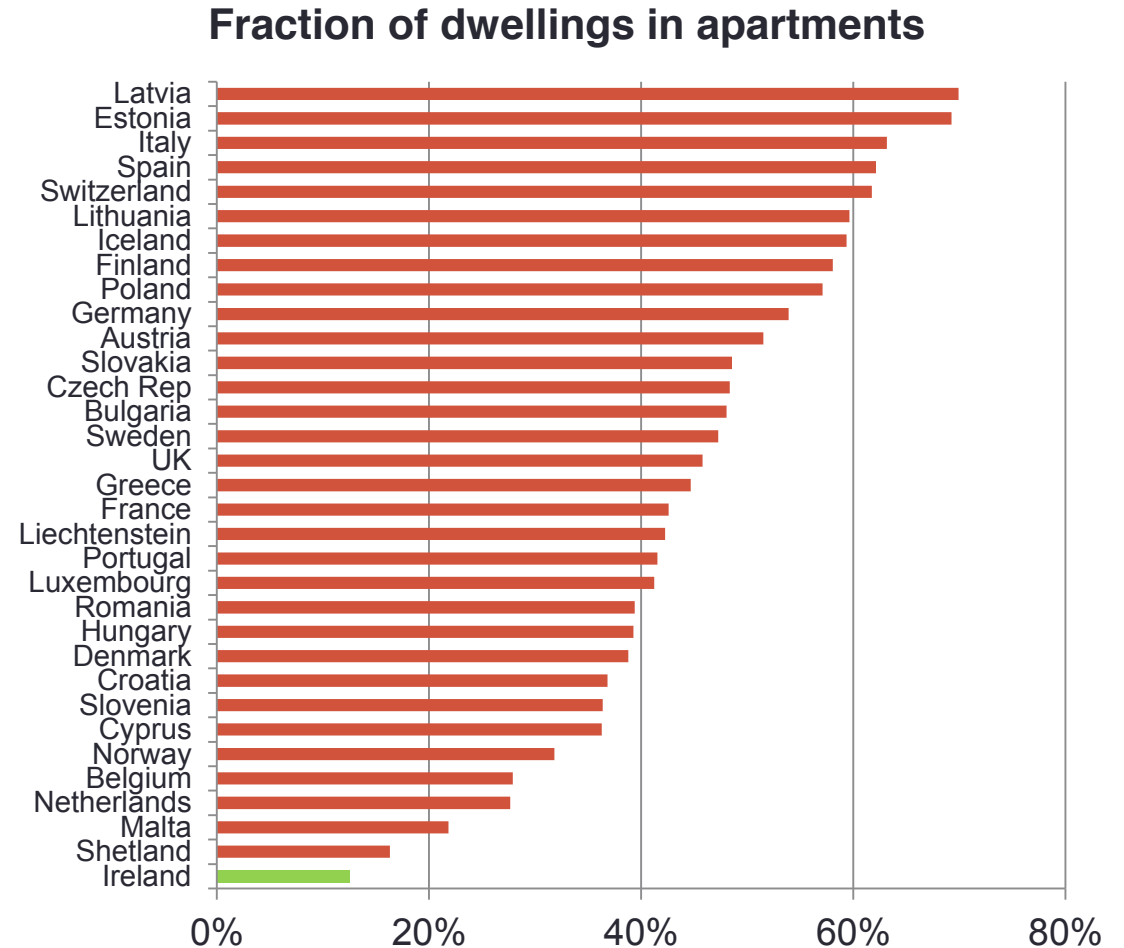
- Macroprudential rules mean that credit conditions and expectations about future prices are less likely to drive swings in capital values
- Transaction volumes have picked up considerably in Dublin since 2011, with ten times as many newly built homes €300k-€700k being traded each month
- As it has consistently over recent decades, declining average household size will push up sale and rental prices in the near future
- Economic demand pressures are likely to remain positive, with falling unemployment, net job creation and migration, and strong on-going net household formation
- At the same time, supply is weak, with >75% (and probably closer to 90%) of new demand in GDA not being met since 2011
 - Even with strong growth in construction, this backlog of unmet demand is likely to grow

Structure

- Executive Summary
- **Ireland's Apartment Shortage**
 - **Shortfall in Existing Stock**
 - Future Demographics
- The Lifecycle of Housing
- Broader Housing Market Trends

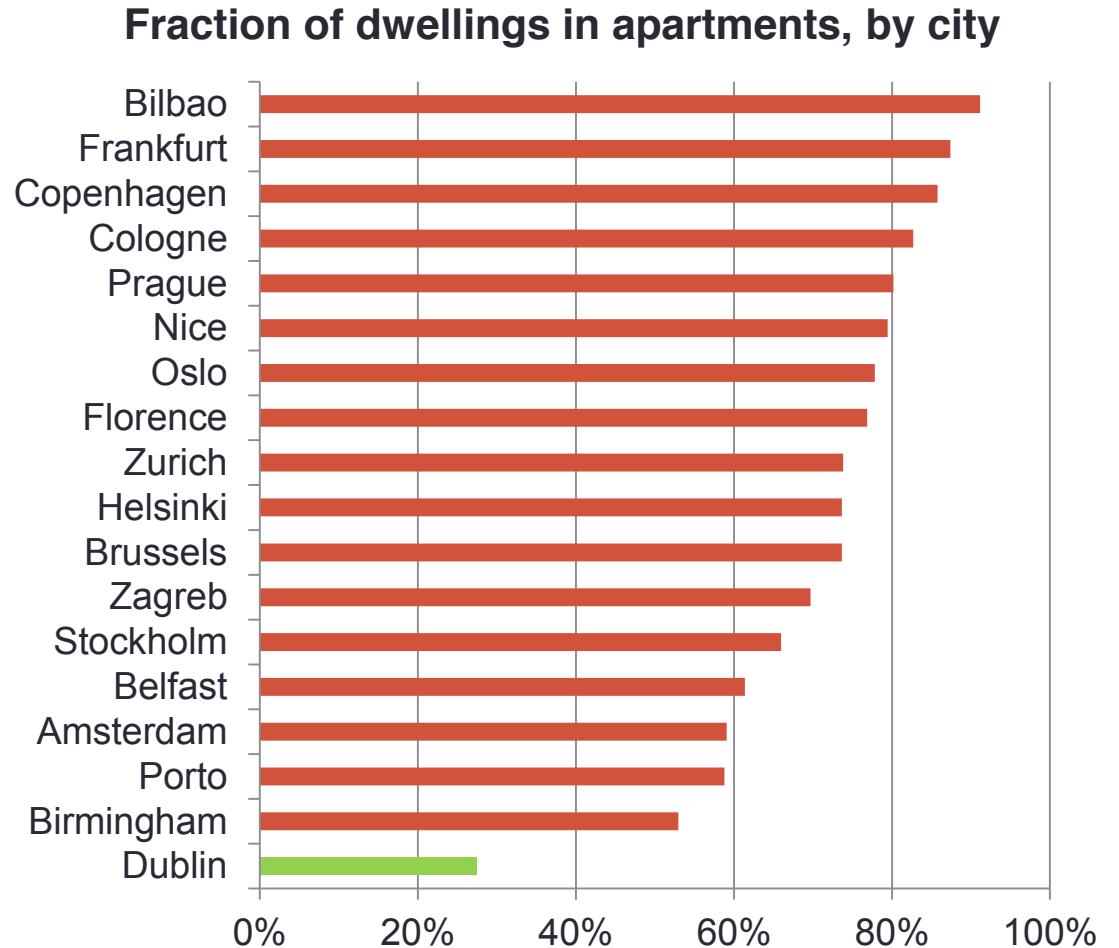
Ireland has just 12% of its dwellings in apartments – one quarter the European average

- The Eurostat Housing Survey covers all 32 EU, EEA and EFTA member states for the year 2011
- In the 32 countries covered, there are a total of 250 million dwellings, of which 50% (125m) are in apartments
- Ireland has by far the lowest apartment rate of any of the 32 countries, at just 12% - the countries with the next lowest apartment rates are Malta (22%) and the Netherlands and Belgium (both 28%)



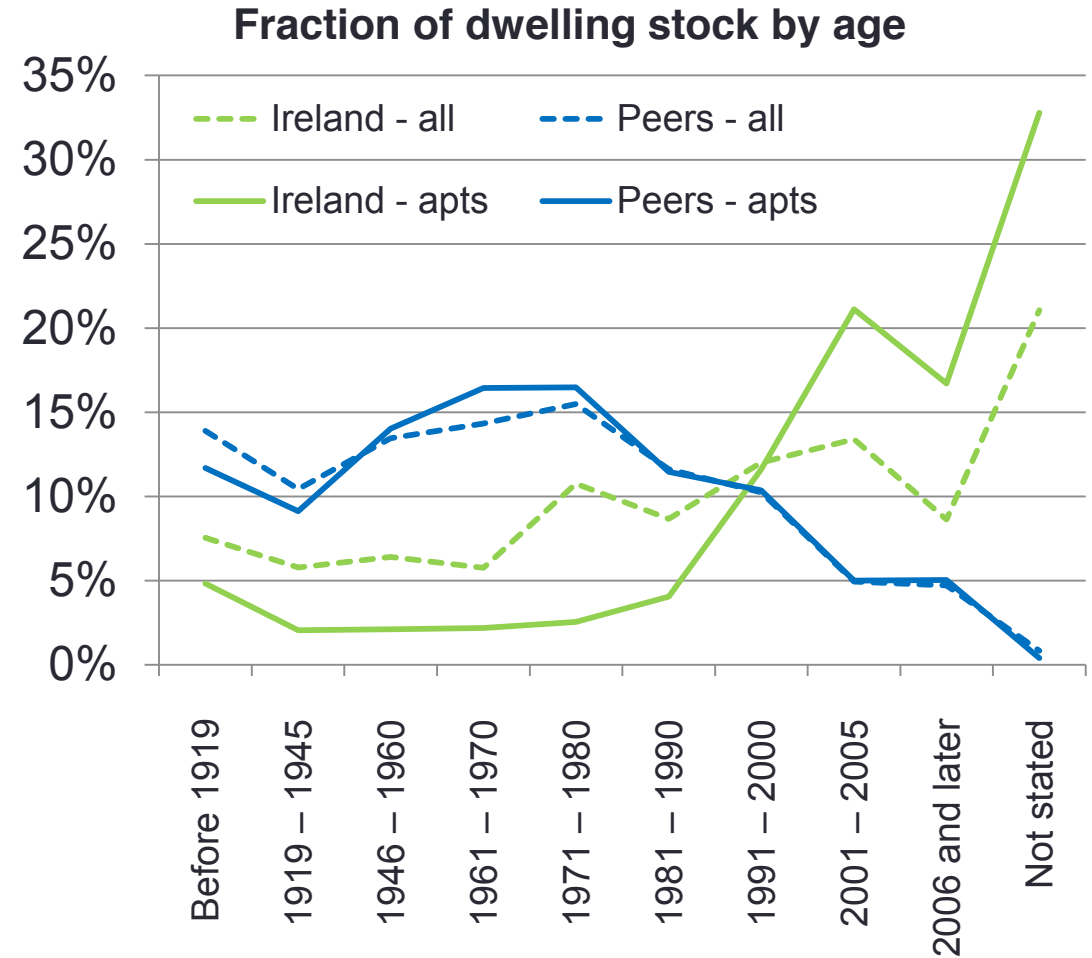
While Dublin’s apartment rate is higher than the rest of Ireland, it is one third the rate seen in many of its peer cities elsewhere in Europe

- The apartment rate for Dublin is 27%
- Dublin is one of the 100 largest NUTS3 regions, by number of dwellings – 0.53m in total
- Of all NUTS3 regions in Europe with more than 0.5m dwellings, the average apartment rate is 63%
- The graph opposite shows Dublin compared to a selection of peer cities of similar size across Europe
 - In most of these cities, at least three quarters live in apartments – vs. one quarter in Dublin



The lack of apartments in Ireland stems from the post-war period, when half of all apartments in Europe were built – vs. less than 10% in Ireland

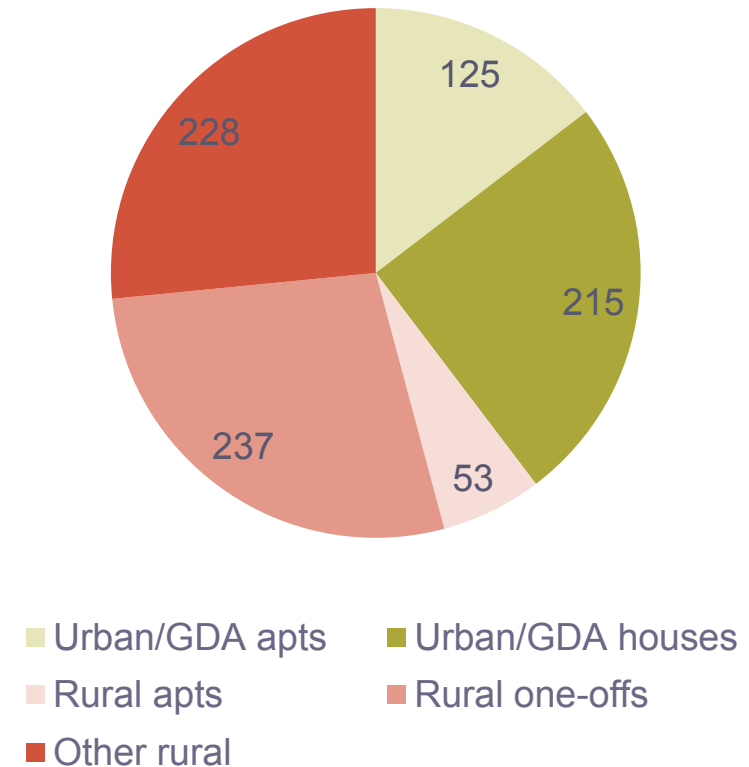
- In Ireland’s peer countries, almost half (47%) of the stock of apartments was built in the period 1946-1980
- In Ireland, just 7% of apartments in existence were built the same period
 - As large a fraction of Ireland’s apartments date from before World War 2
- Apartment building is a relatively new phenomenon in Ireland, with at least 38% built in the 2000s
 - While one third of apartments are of unknown age in Ireland, it is likely that these are mostly modern also



While Ireland has built a large number of dwellings since 1996, the majority of these have been in rural areas – just 15% urban apartments

- Ireland built 860,000 new dwellings during the last two decades
 - This compares with 580,000 additional households formed in the same period
 - These figures (electricity connections) do not take account of obsolescence [likely >200,000 dwellings over 20 years]
- However, 60% of new dwellings were in rural parts of the country
- Just 15% of new dwellings were apartments in the five cities/GDA
 - Twice as many rural one-offs 1996-2016 were built as urban/GDA apartments

New dwellings completed in Ireland, 1996-2015 (thousands)

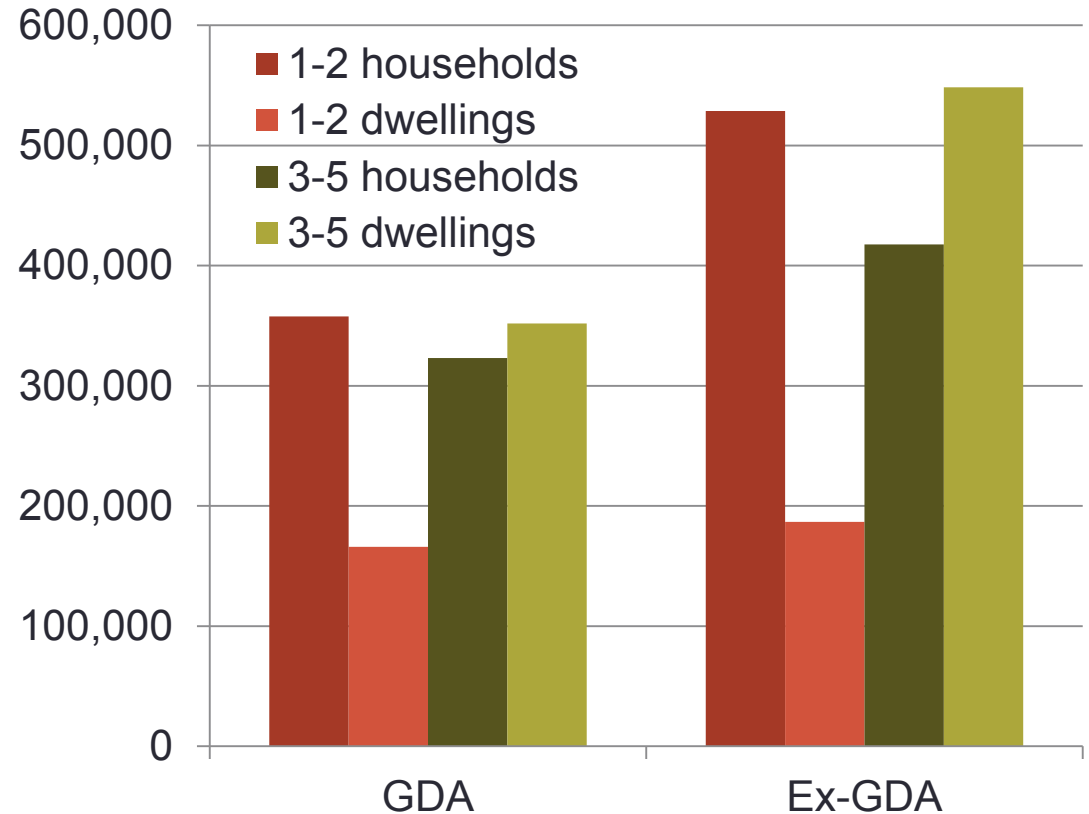


Source: CSO Statbank HSA03/HSA04

Ireland has a shortfall of ~450,000 apartments based on the current population – almost half [~200,000] in the Greater Dublin Area

- The GDA has ~360,000 households of 1-2 persons, but just 165,000 dwellings suitable for these households (i.e. 3-4 rooms)
 - Outside the GDA, there is a similar gap, with almost three times as many 1-2 person households as 3-4 room dwellings (530,000 compared to 187,000)
- Even if ~100,000 of ex-GDA need could be met by smaller single-family, this leaves a national shortfall of ~450,000 apartments
 - Almost half of this is in the GDA

Households by number of persons and related dwelling stock, 2016

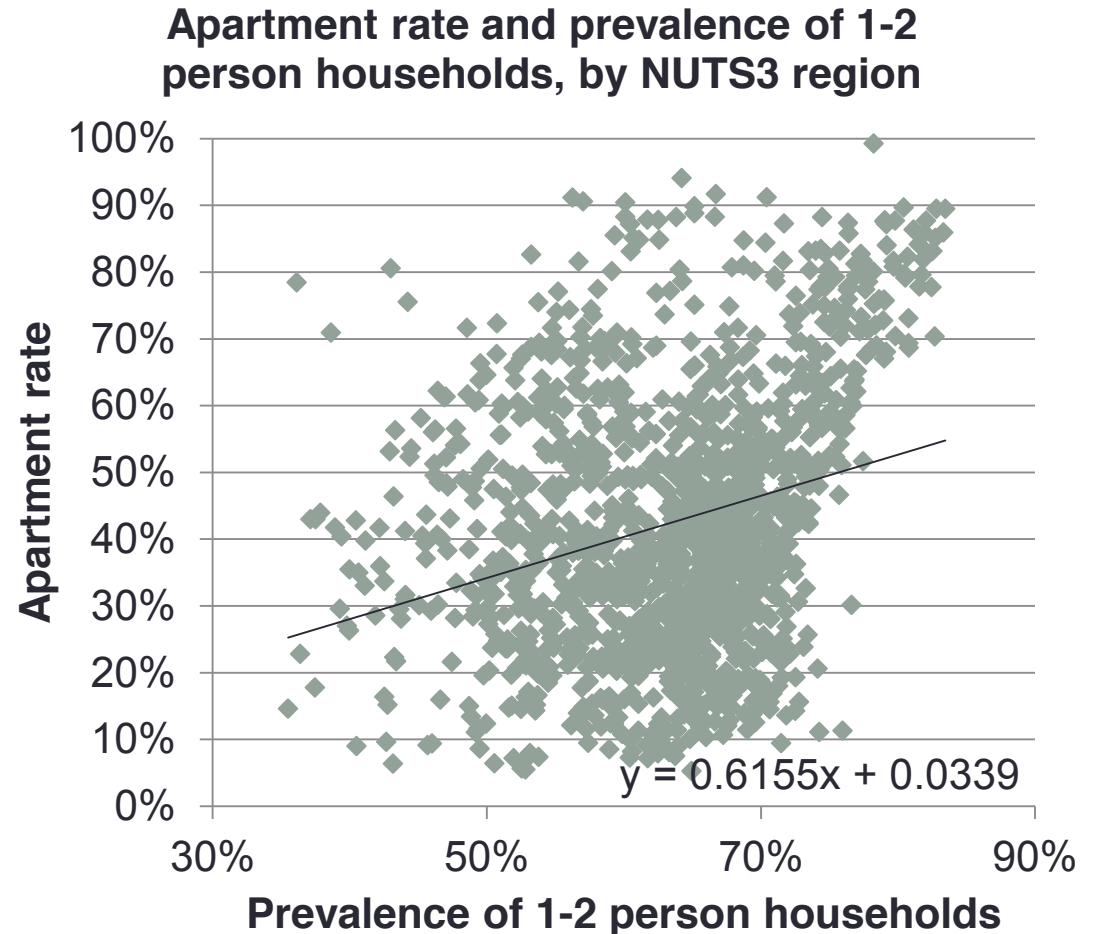


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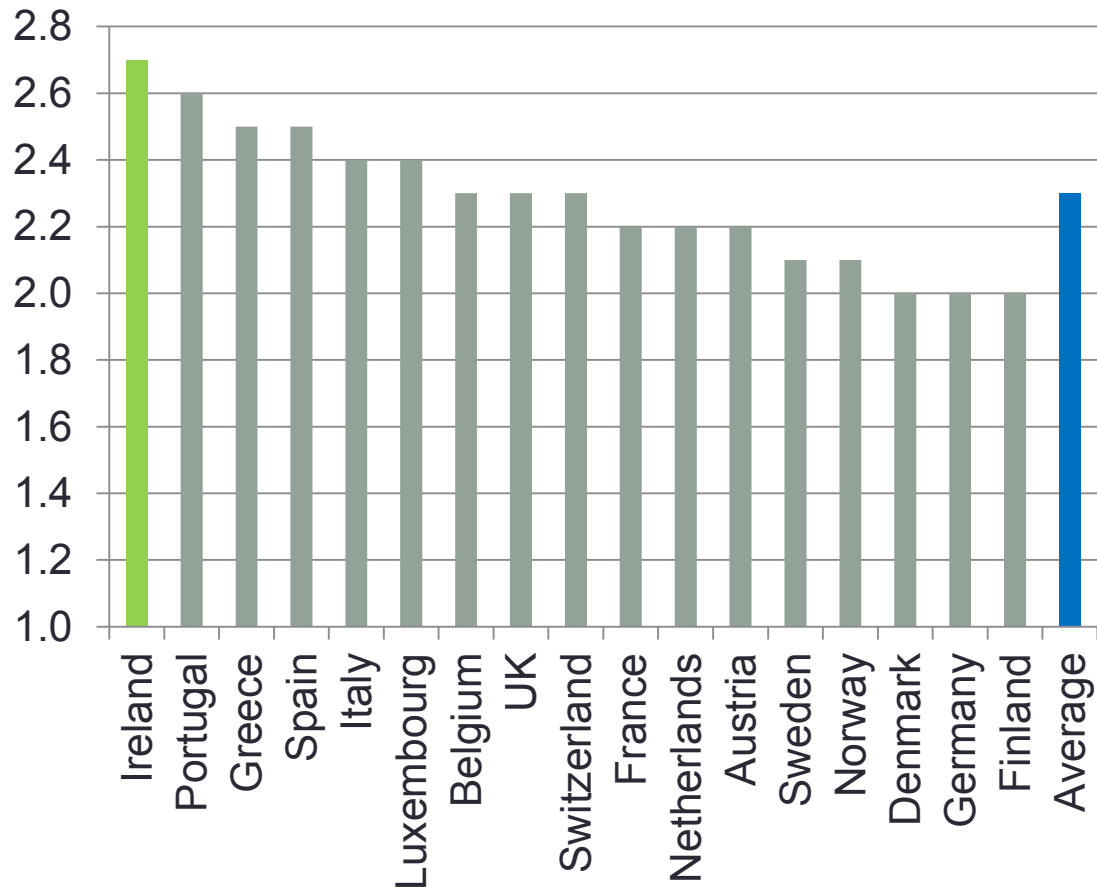
Across Europe as a whole, an extra 10% of households in 1-2 persons is associated with a 6% higher apartment rate

- Apartments are an efficient way to house increasingly smaller European households
- Over 62% of European households contain only 1 or 2 people
 - This varies from <50% in Slovakia, Poland to >70% in Denmark, Germany
- In Ireland, 53% of households contain 1-2 persons, a fraction that has risen in recent decades
 - Underlying causes include smaller family size, delayed marriage and longer lifespans

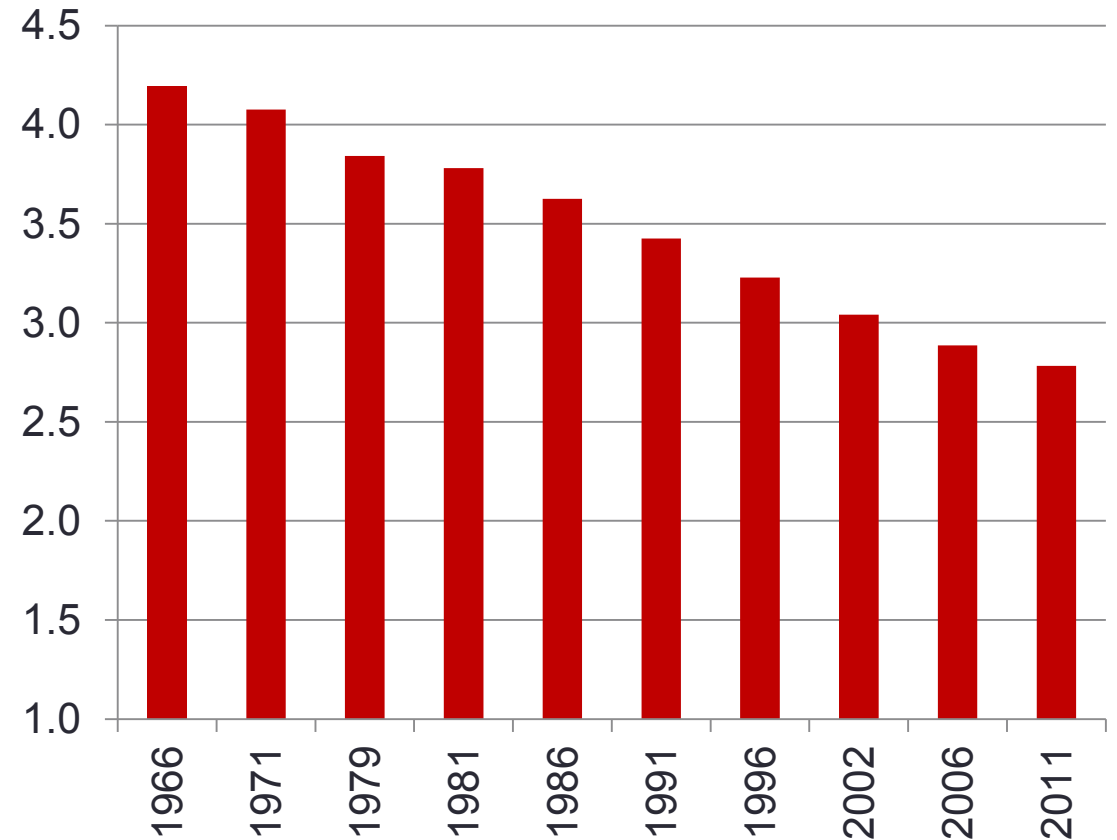


Ireland has Western Europe's largest average household size – but it has been falling steadily over the last five decades

Average household size, by country (2014)

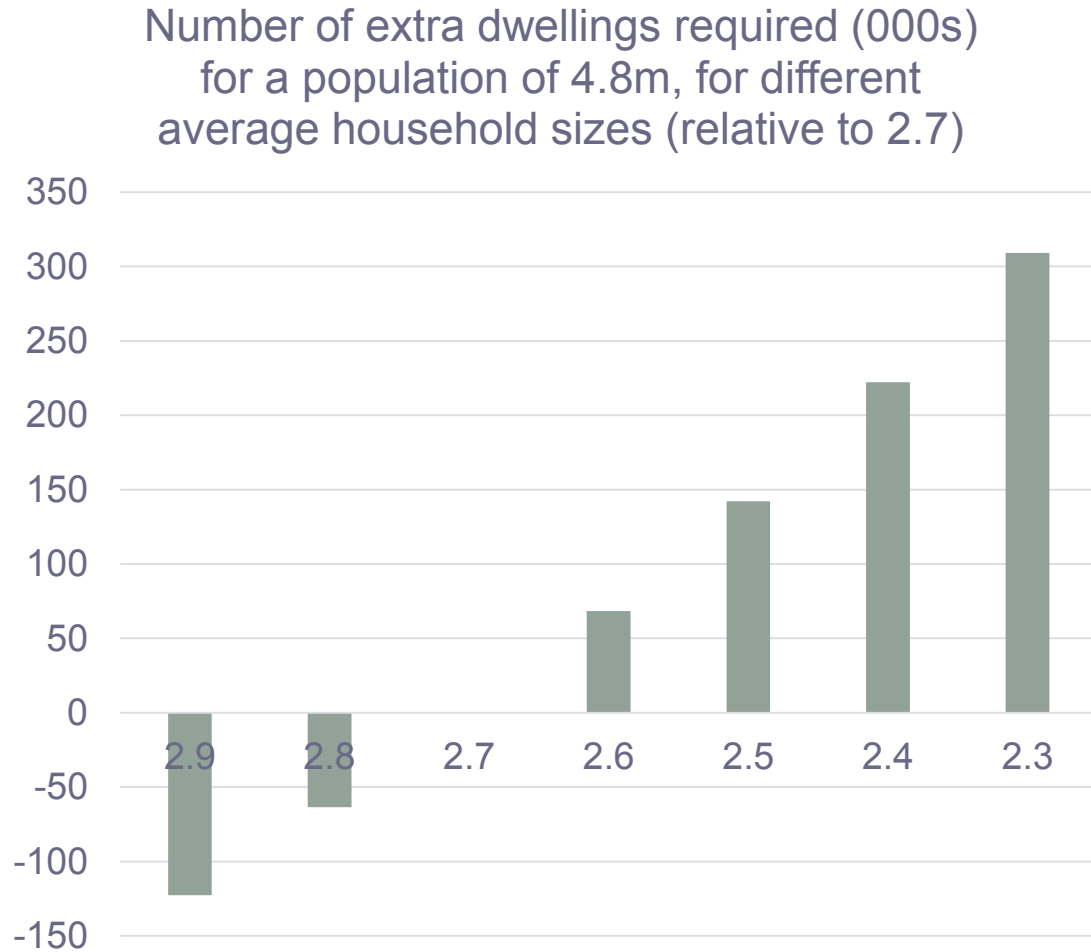


Average household size in Ireland, by Census year



Source: Hypostat 2016; Census of Ireland (various issues)

As Ireland's average household size converges to the European average, this will create significant demand for smaller homes

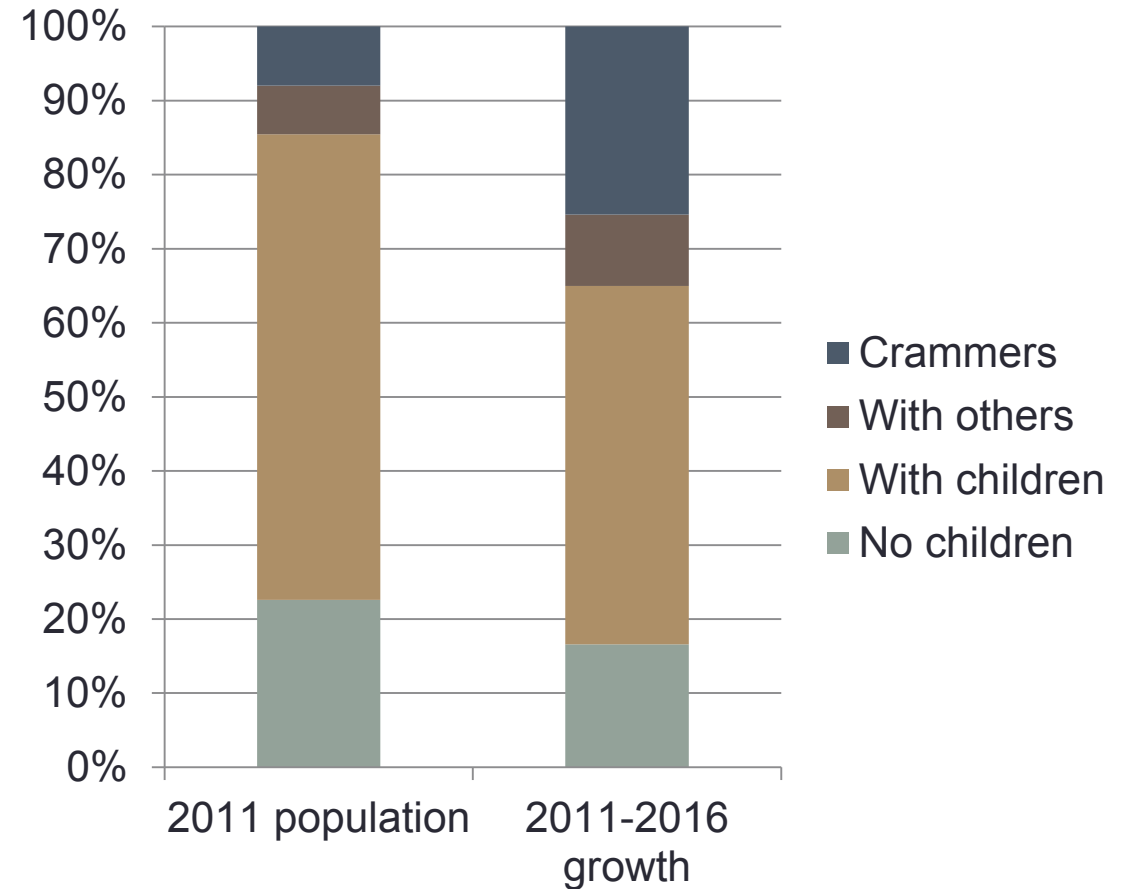


- Even with a fixed population, a rise in the fraction of 1-2 person households creates demand for a significant number of new dwellings
- Relative to a 2.7 average household size, a population of 4.8m with an average household size of 2.5 requires 142,000 extra dwellings
 - This is the equivalent of 11 years construction output at 2015 rates
 - Convergence to EU average of 2.3 would require an additional 300,000 dwellings

Average household size actually rose between the 2011 and 2016 Censuses – but this was driven by scarcity rather than demographics

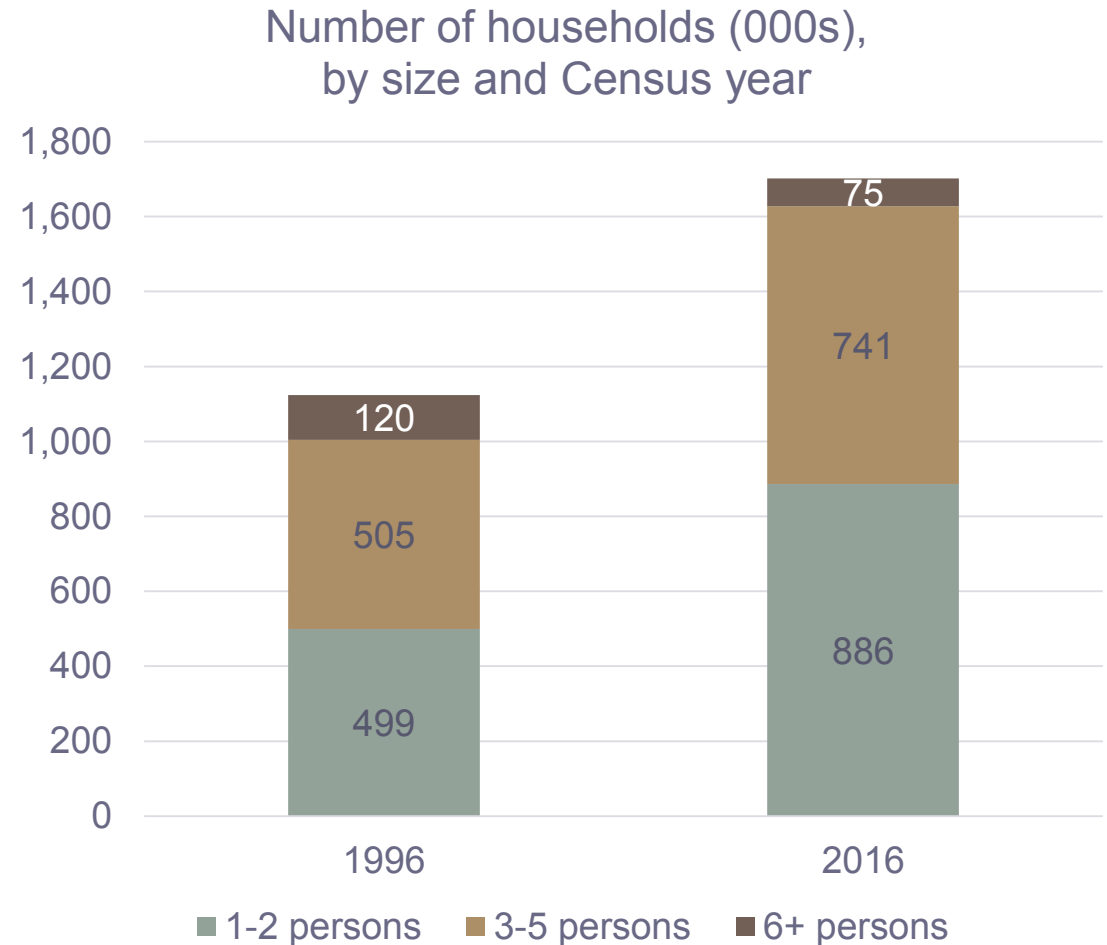
- In Census 2016, the average household size in Ireland was 2.75, up from 2.73 in 2011
- This was not driven by a baby boom
 - Households with children made up 63% of the population in 2011 but just 48% of the population growth 2011-2016
 - Households with unrelated parties, 15% of the 2011 population, made up 35% of the growth between 2011 and 2016
- In order to fall to 2.6 – in line with recent trends – this would have required an extra 120,000 dwellings

Irish households, by broad type, 2011-2016



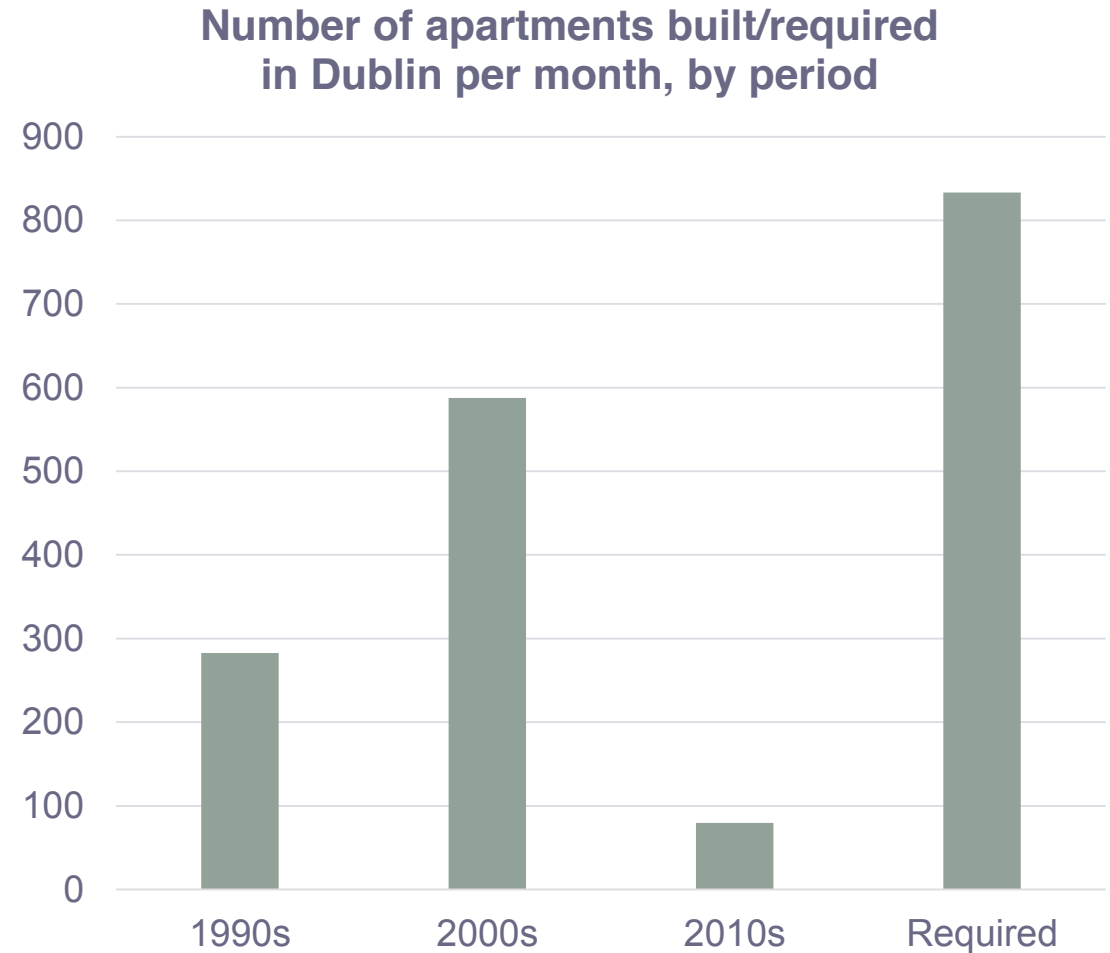
Two thirds of the growth in Irish households since 1996 has been 1-2 persons, who now form the majority of households in Ireland

- The number of Irish households grew by 50% between the 1996 and 2016 Censuses – from 1.1m to 1.7m
- Of the 580,000 new households, two thirds (390,000) were one or two person households
 - This represented 80% growth, from 0.5m to 0.9m households
 - 1-2 person households have increased from 44% to 52% of all households in Ireland
- A further 40,000 new households were ‘crammer’ households

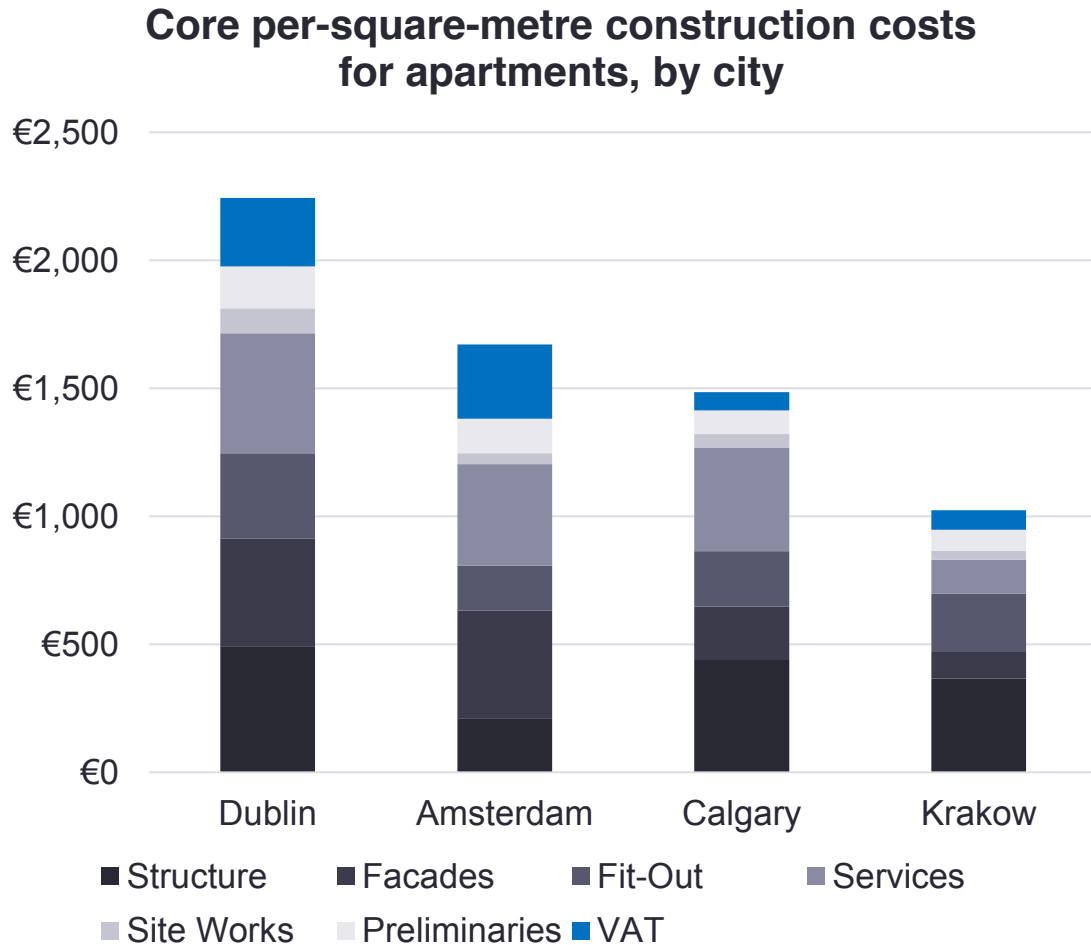


Dublin needs an order-of-magnitude shift upwards in its construction of apartments – the same is true elsewhere in the country

- The GDA annual requirement of 10,000 apartments translates into over 4 blocks of 200 units a month, every month, through to the 2080s
- In the 2010s (to 2017), an average of 80 apartments have been completed a month – less than one tenth the requirement
- Outside Dublin, the gap is even larger: <60 apartments are being completed each month, compared to a requirement of >1,200



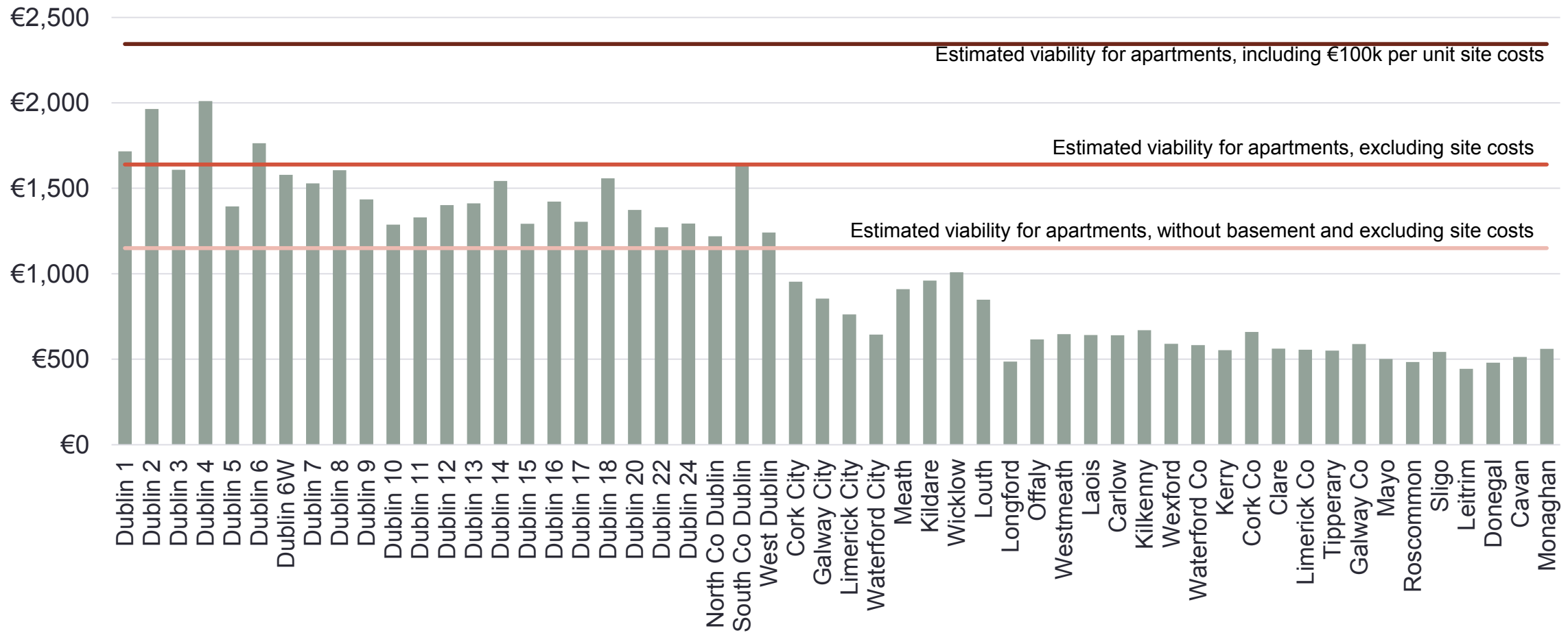
The weak level of construction of new apartments, given strong demand, reflects poor cost competitiveness



- It is estimated that per-sqm construction costs for apartments in Dublin are close to €2,000, ex-VAT
 - This is >40% higher than costs for similar projects in the Netherlands and Canada
- Dublin’s high costs are seen in all six headings used by professionals
 - High regulations for apartment (vs. houses) are relevant here – basement & lift requirements are particularly costly
 - Other restrictions also affect viability, including on orientation, layout and height
- Excluding site costs, apartments are only viable in highest-income areas

High construction costs mean that, once site costs are factored in, it is simply not viable to build apartments in the vast majority of the Irish market

Average monthly rent, 2-bed apartments, by market (mid-2017), compared to break-even



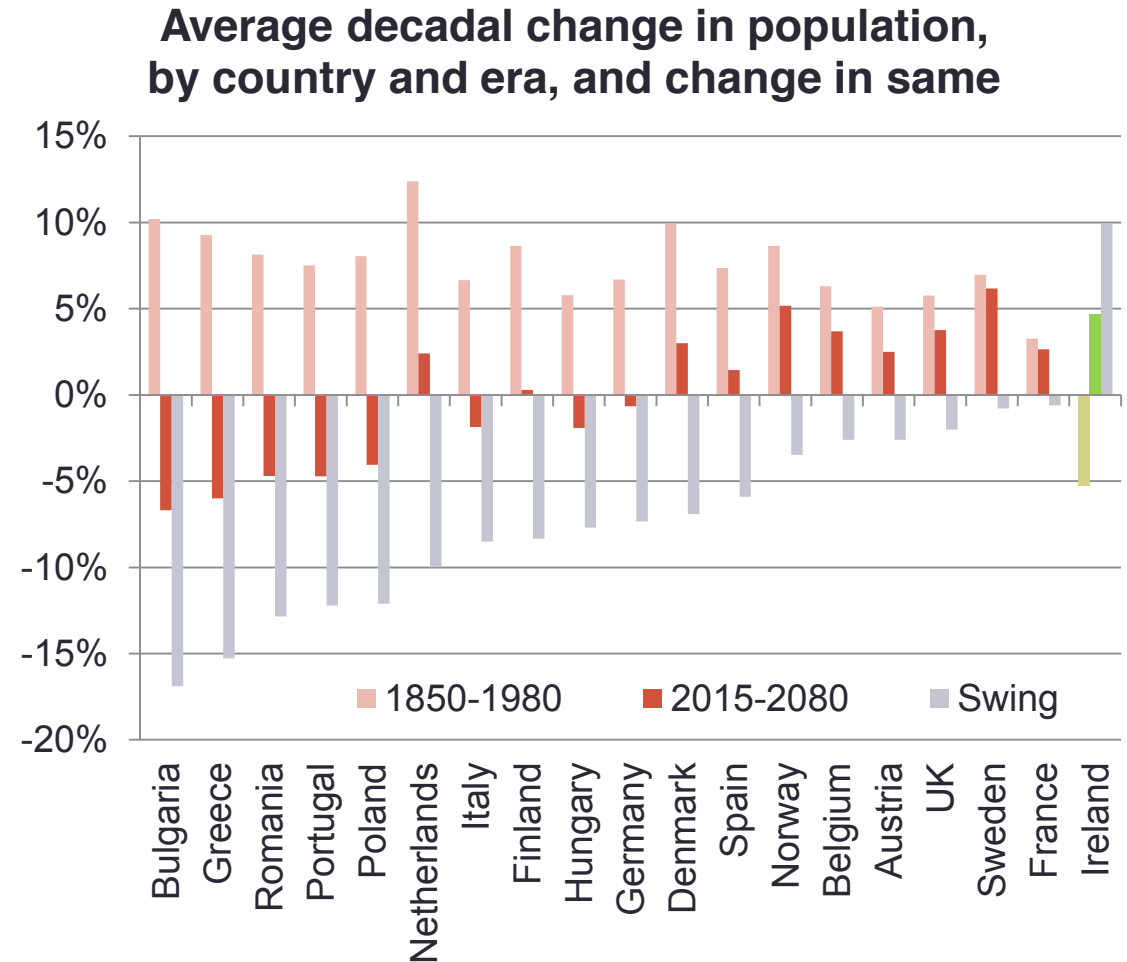
Source: Identify analysis of Daft.ie Reports, various industry sources

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 - Different Housing Needs
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No other country faces Ireland's demographic swing, as it moves from a falling population for much of the last 150 years to a rapidly rising one

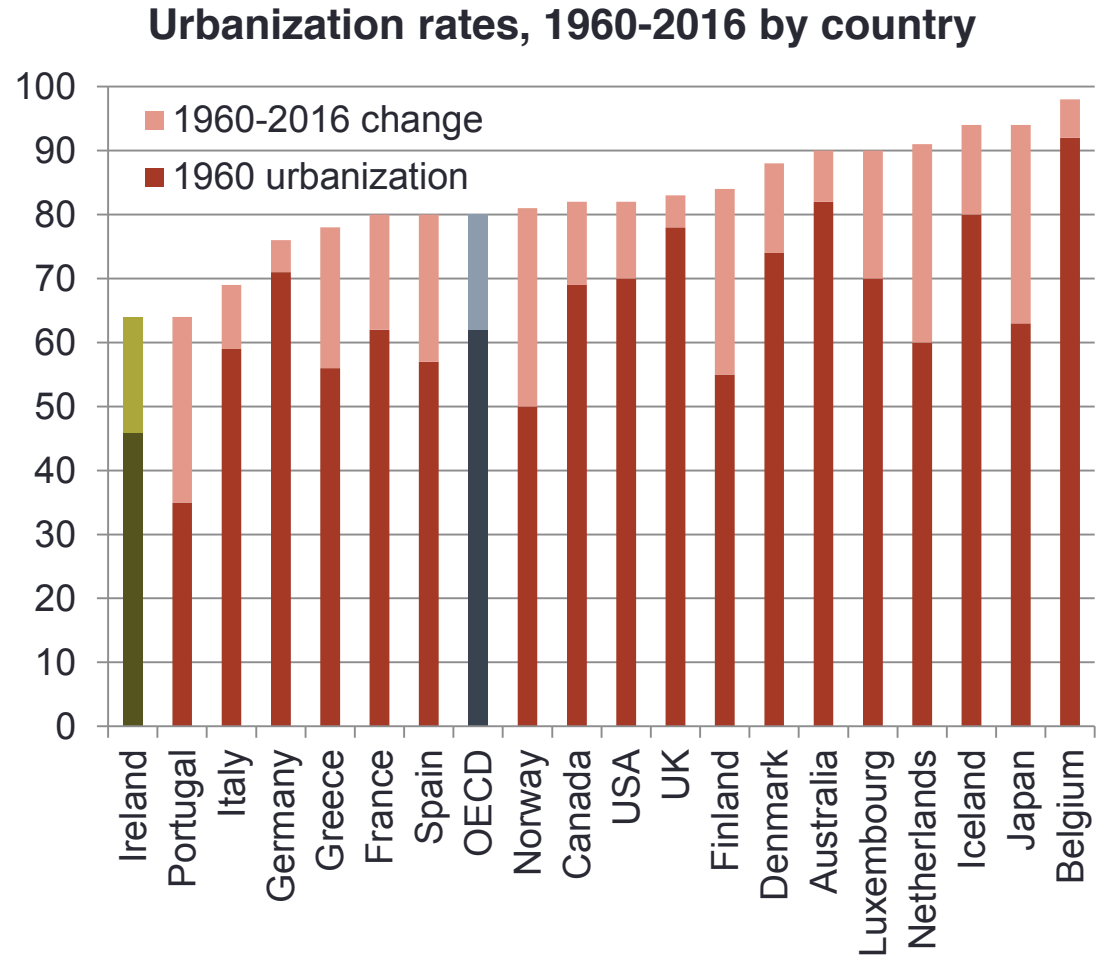
- The lack of apartment building in Ireland before the 1990s is likely to be driven by demographics
 - Ireland was the only European country to experience persistent population decline in the 19th and 20th centuries
- Over coming decades, it will experience one of the fastest rates of population growth in Europe
 - Growth of ~5% a decade 2010-2020 will represent a 10% swing compared to the period 1850-1980
 - All other European countries will experience slower population growth



Source: Eurostat Population Projections (2013); Maddison dataset

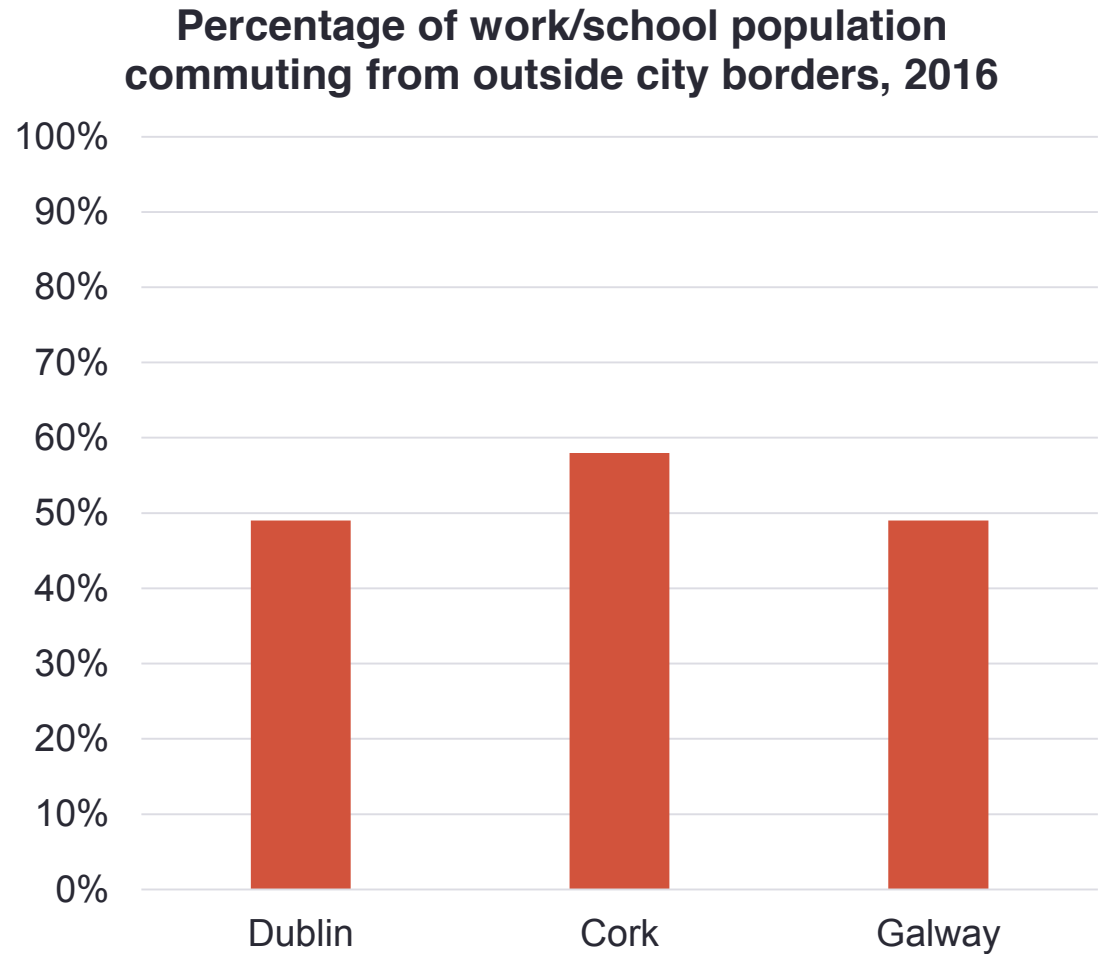
Ireland is urbanizing but remains one of least urbanised high-income countries in the world

- Urbanization is at the heart of economic growth
 - Cities allow specialization (more productive labour) and agglomeration (more productive capital and land)
 - Density also allows cheaper utilities and a wider variety of public/private services
- Since 1960, the fraction of people in high-income countries living in cities has risen from 3-in-5 to 4-in-5
- However, Ireland lags this and is only now at 64%, having been at 46% in 1960



The result is sprawl, with half the daytime population of Ireland's three largest cities travelling daily from elsewhere to work and college

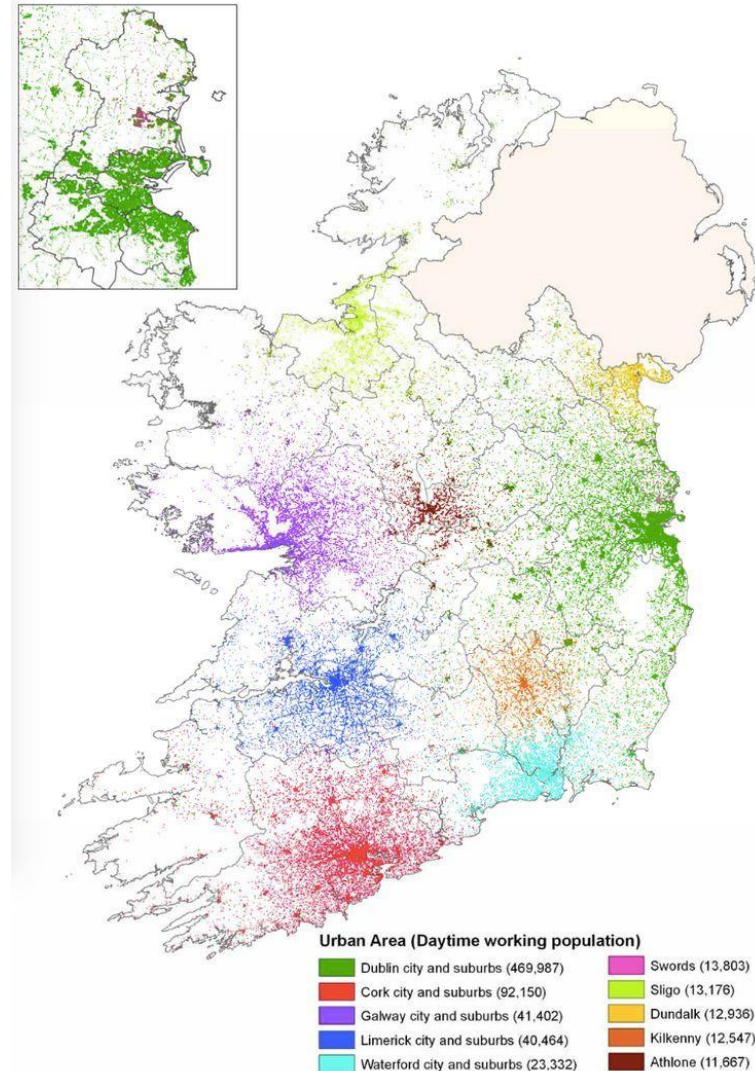
- Ireland's lack of urbanization is not due the nature of its labour market, rather its housing market
 - Half the daytime population of Ireland's three largest cities travel from outside the city borders
- In 2016, >230,000 people commuted at least an hour each way
 - This represents a 30% increase on long commutes in just five years
- One quarter of the working population of Leinster ex-Dublin travels to Dublin each day



The majority of future population growth will be linked to cities

- Ireland’s five largest cities currently house ~0.9m people
- Ireland’s cities are likely to be home to 5 million people by 2080
 - Based on Eurostat population projections and an urbanization rate of 80%
 - In contrast, the rural population of Ireland is likely to decline over the same period
- The policy choice is whether those cities are compact or spread further
 - Already, Ireland’s full metro areas extend far beyond city borders

Map 10 Catchment areas (dot density) of major workplace locations, 2011



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Multifamily apartment development can be broken into at least four main segments: student, worker, no-children/downsizer and retirement

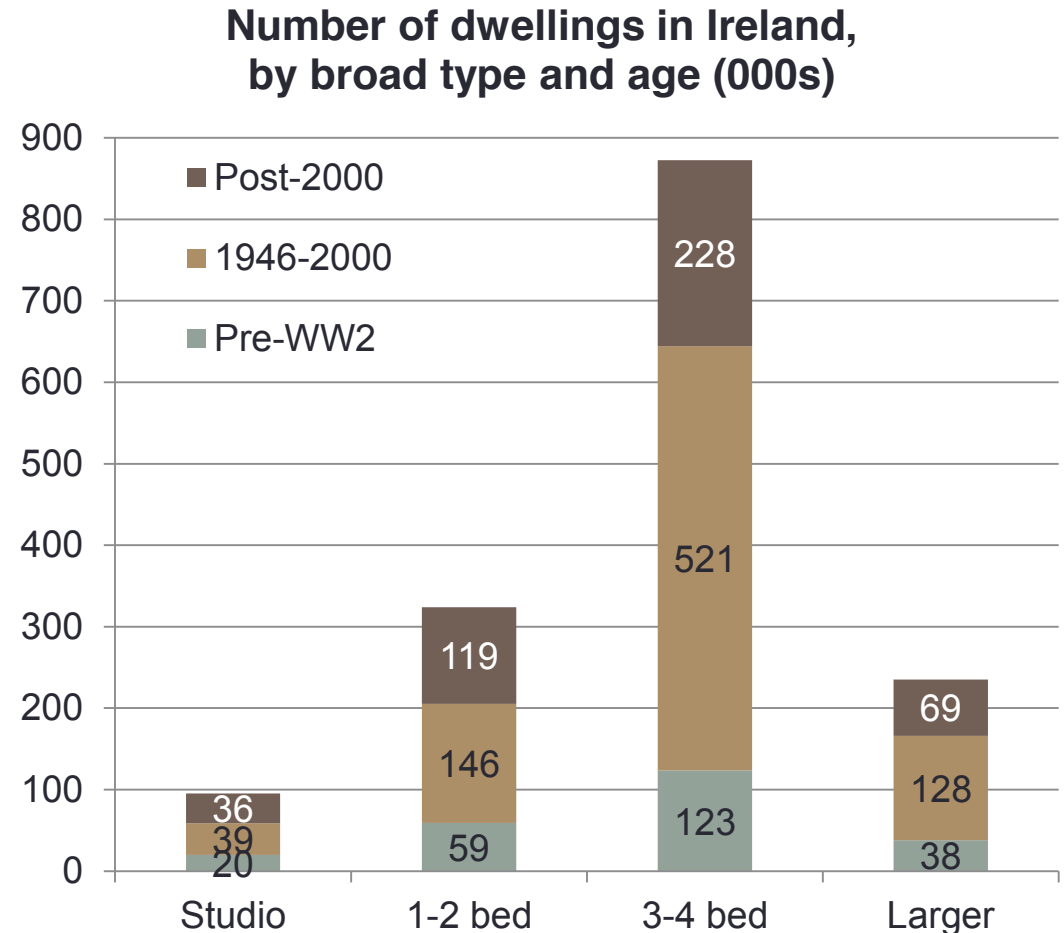
- To now, the discussion here has focused on multifamily/apartment development as a single block, differentiated from single family/houses
- In reality, there are at least four main segments to multifamily/apartment, in line with the lifecycle of households:
 - Purpose built student accommodation:
 - Young professional/key worker accommodation:
 - Apartments for downsizers and those with no children:
 - Independent living and assisted living complexes:
- In each, there is a spread across the income distribution and thus the need for social housing/income supports should also be addressed
- Two other main segments exist in the lifecycle of housing: family homes and nursing homes

Dublin has a requirement of ~45,000 student units by 2024, more than four times the existing stock

- There are roughly 75,000 students in the Greater Dublin Area, including ~10,000 non-EU students
 - Non-EU students have contributed to the much of the growth in student numbers since 2012 - and this is likely to accelerate due to government policy and Brexit
 - ~15% of full-time undergraduates in Ireland live in PBSA vs ~35% in UK
- A 2015 HEA forecast predicted growth in students from 168k to 193k by 2024
 - This almost certainly underestimates growth pressures, given trends in enrolment, demographics and migration – student numbers in 2016 were already 188k
 - A more realistic assessment of demand suggests 247k-318k students by 2024
- Estimated total demand for PBSA in 2024 ranges from <70k (HEA) to >100k, under high scenarios
- Allowing for structural differences with the UK, there is demand in Dublin for ~45k PBSA units, vs. a stock in 2016 of 11k

Key worker accommodation is another critical gap in Dublin's housing: Ireland has almost 10 times as many young single people as studios

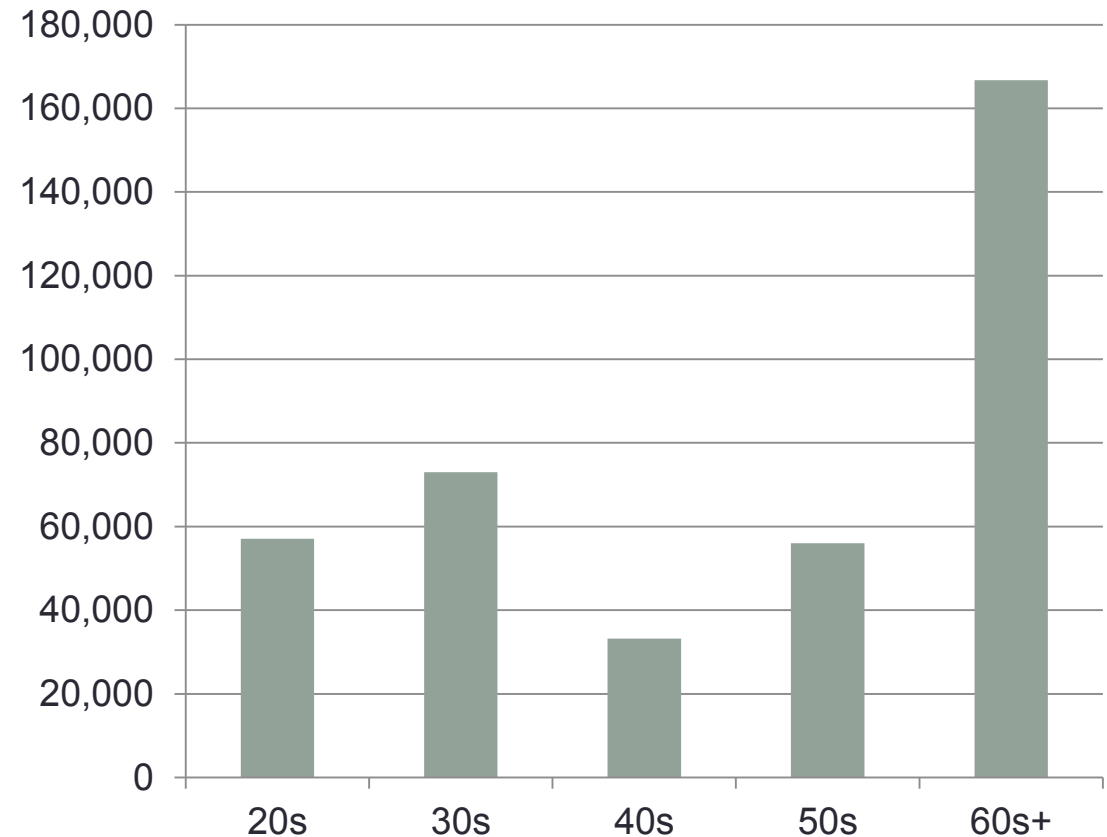
- Just 7% of Irish dwellings (~95k) are studio apartments
 - Only 2% (~36k) are modern studios
- By contrast, there are ~870k single people aged 20-39 in Ireland
 - There are a further ~300k single people aged 40-64 and ~80k aged 65+
- Lack of supply of smaller homes due in part to restrictive requirements
 - This includes size but also orientation, lift and parking requirements and layout
- Demand is likely to be concentrated in urban cores



Couples without children also form a substantial part of housing demand – at all age groups, both working and retired

- There are ~220k married or cohabiting couples in Ireland under 60, with no children
 - This includes “pre-family”, “no family” and “empty nest” cohorts
- In addition, there are >165k couples aged 60 and over without any children
- Demand is likely to be a mix of both urban and suburban
 - Densification of the suburbs will allow downsizers to maintain access to existing networks and amenities

Number of couples without children, by broad age group (Census 2011)



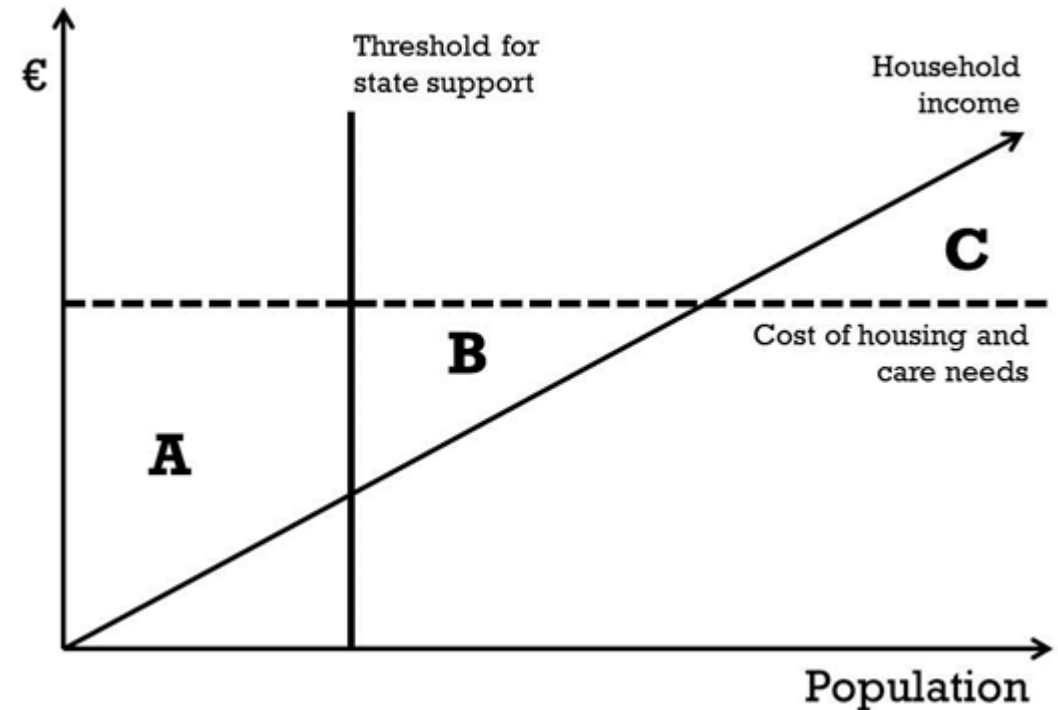
Among retired households, Dublin also lacks the independent and assisted living components of the housing

- Ireland's over-60s face little choice in meeting their housing needs – typically, they stay in the family home until they need to move to a nursing home
 - As outlined earlier, there is no shortage of family homes
 - Similarly, the stock of nursing home beds appears adequate, given the size of the over-65 population (bed capacity of ~4% of the cohort)
- This is also a cohort growing in importance
 - Between 1961 and 2016, the number of over-65s grew by ~300,000
 - Between 2016 and 2046, the number of over-65s is projected to grow by ~900,000
- Even with the single biggest cohort of over-65s staying in the family home, substantial housing gaps exist in independent and assisted living
 - Given existing ~350k older-person households, a need for ~100k homes in independent/assisted living, if Ireland converged slowly to international norms
 - On top of this, annual growth in the 65+ cohort of ~20,000 households, out to the 2040s

In each of these segments, demand ranges across the income distribution – to effectively meet demand, an income-varying subsidy is needed

- Across all segments, there is demand at different income levels
- Nonetheless, viability is rarely reached at lower incomes
 - E.g. gross annual income of €40k translates into a maximum monthly rent of €1,000 – well below viability for a two-bedroom apartment (~€1,700 ex-site)
- The best way of ensuring all demand for housing is met is an income-varying subsidy based on cost-rent
 - Also encourages cost efficiencies
 - Eliminates B in the diagram opposite

Stylised representation of housing need and supports

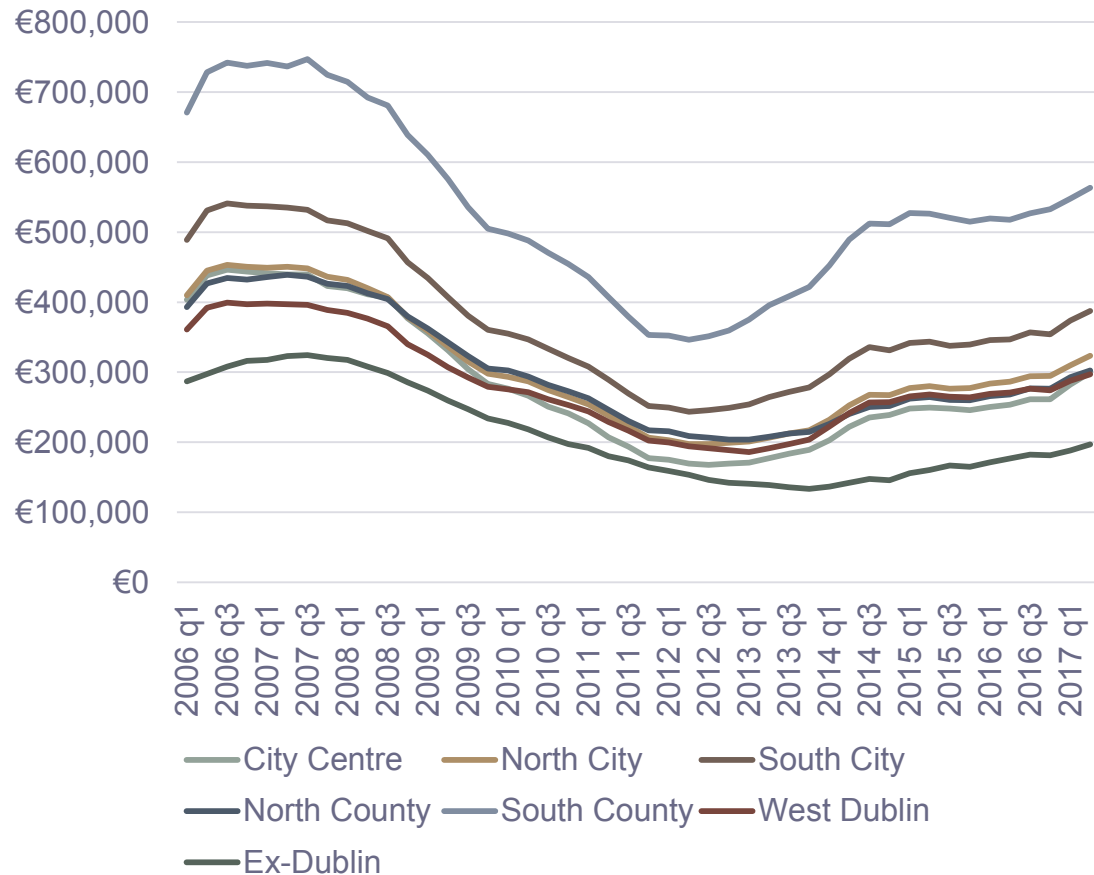


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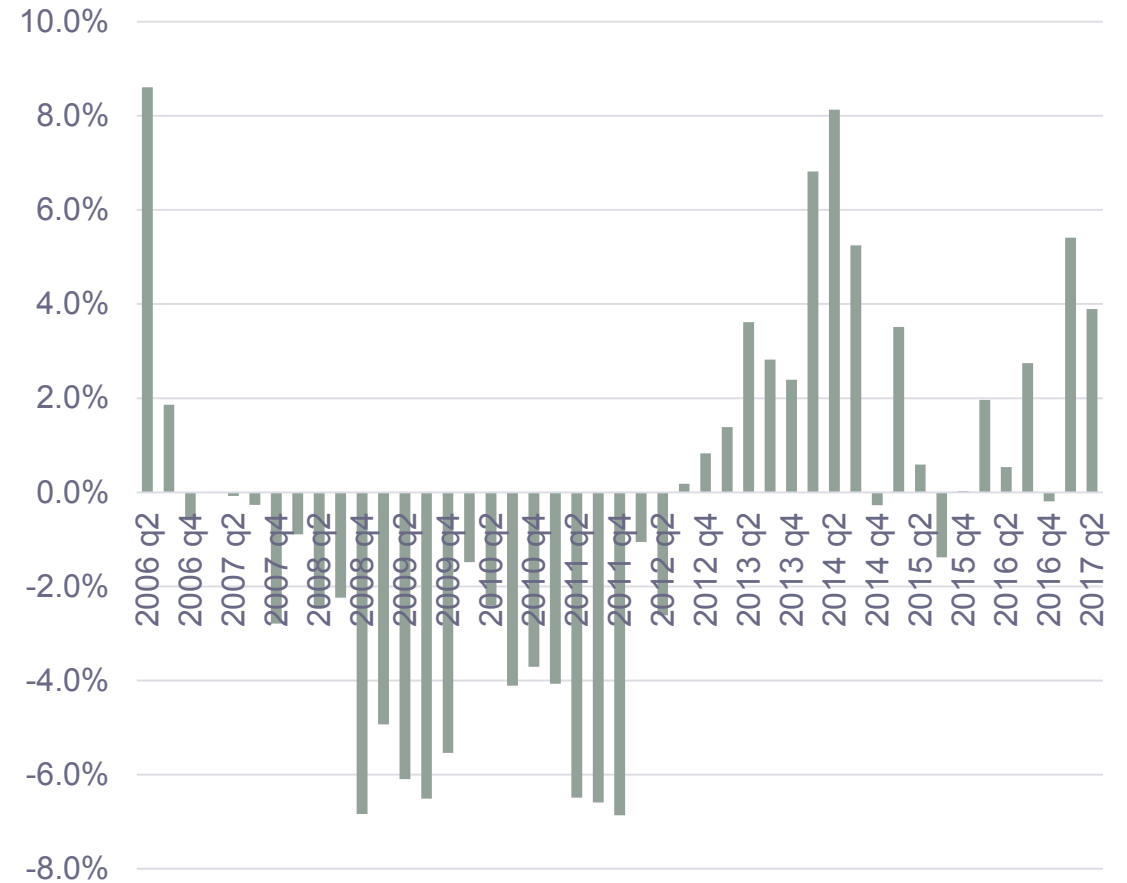
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 - **Prices, Yields & Tenure**
 - Demand and Supply Outlook

Prices in Dublin have risen by 60% since 2012, reflecting the underlying forces of strong demand and very weak supply

Average sale price, by market

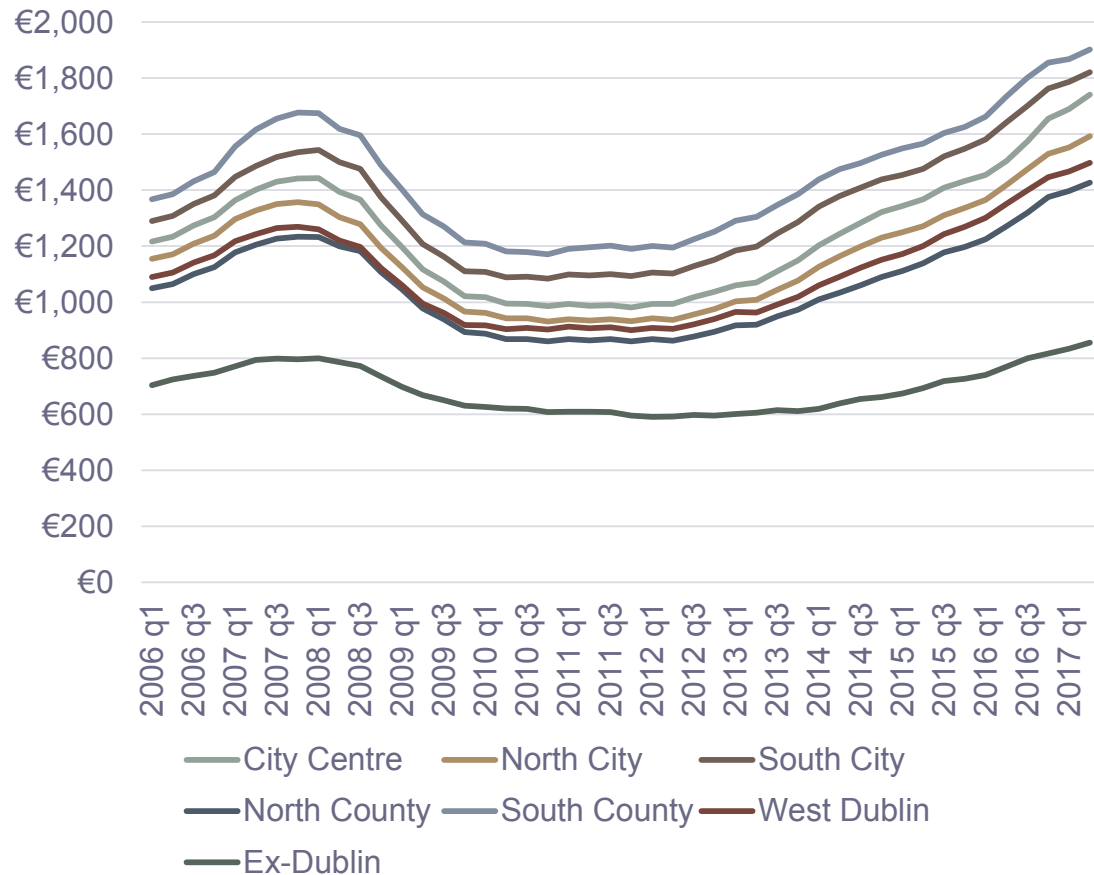


Quarterly change in Dublin prices

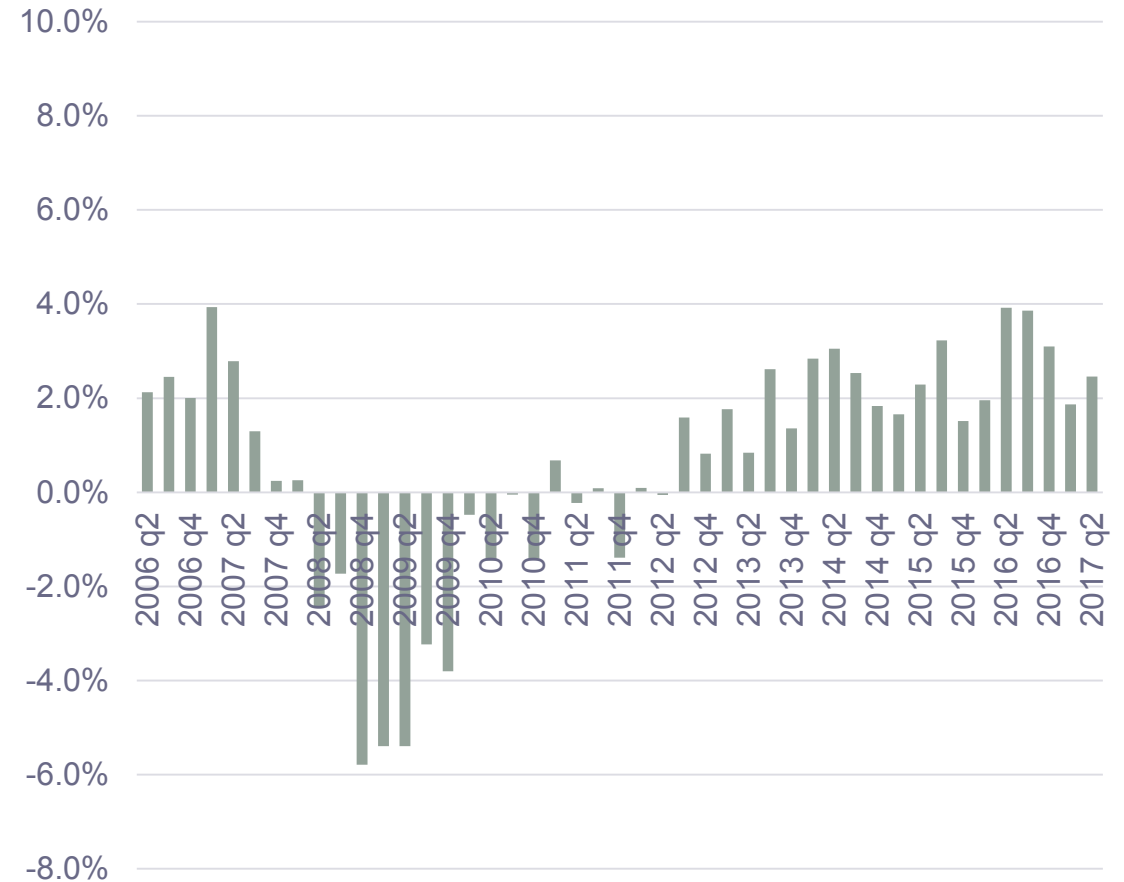


The rental sector shows very similar trends, with a 70% increase – they exceeded their Celtic Tiger peak in early 2016

Average rental price, by market

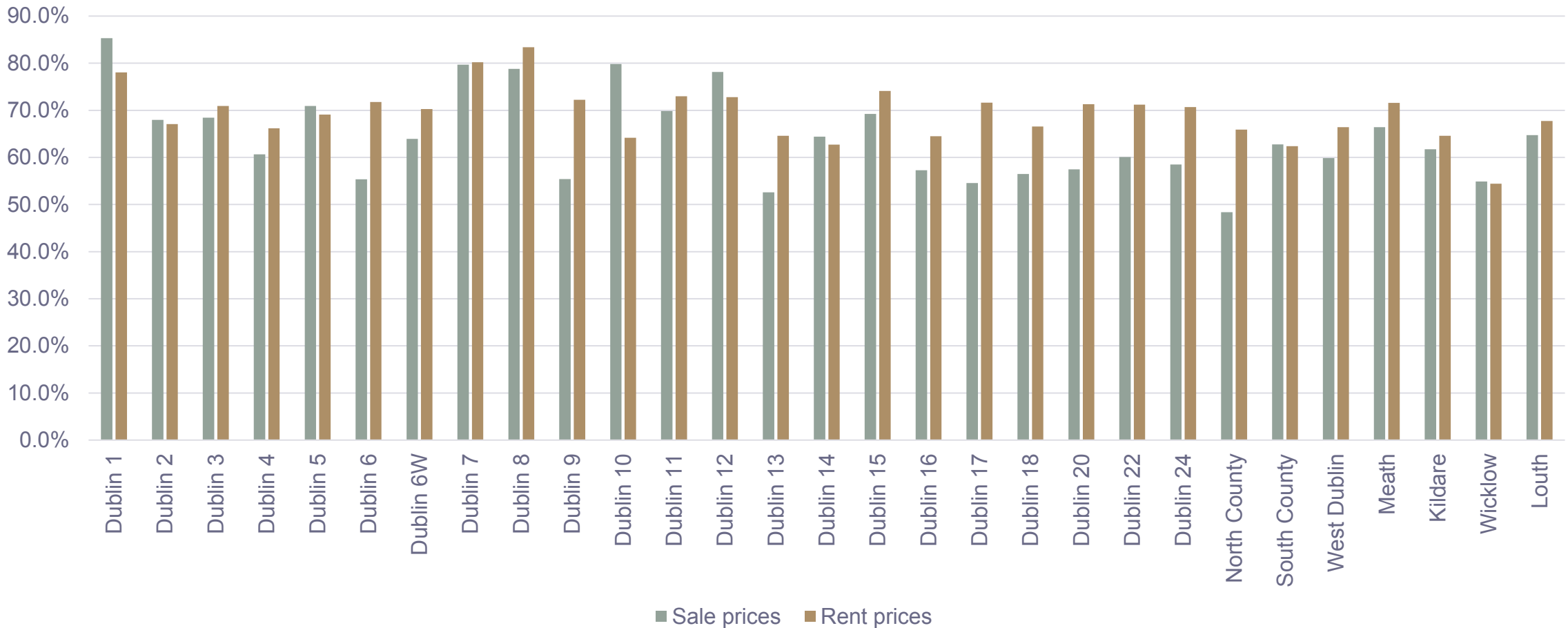


Quarterly change in Dublin rents



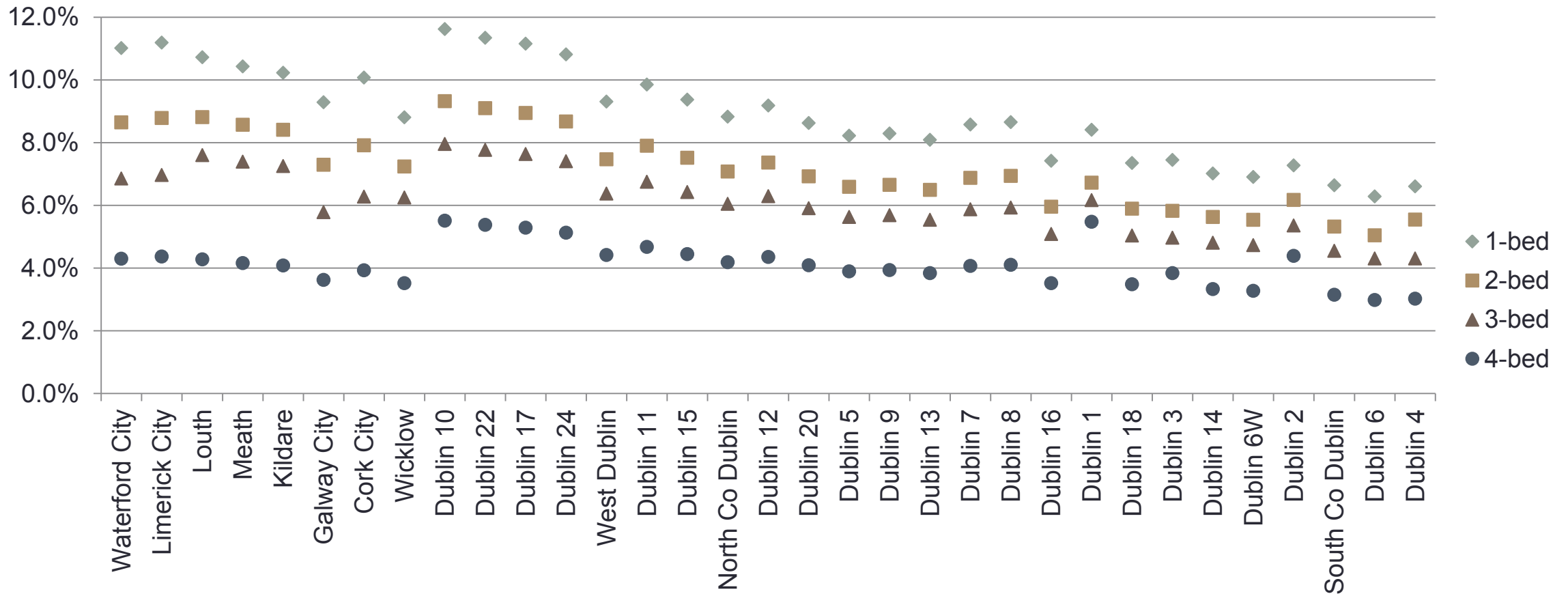
All markets in Dublin have seen substantial increases in both sale and rental prices, although there are differences by district

Percentage increase in sale and rental prices, by market, lowest point to 2017Q2



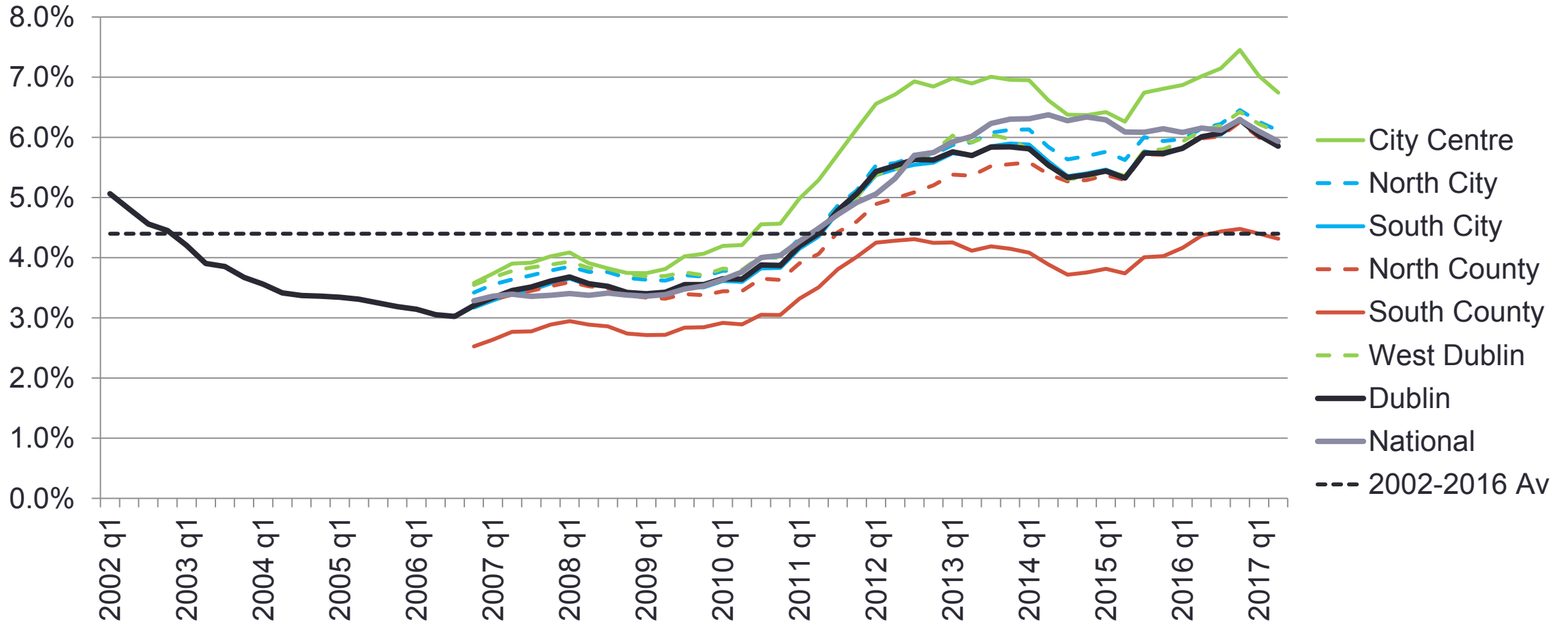
The market currently shows high yields, particularly for smaller properties and those in less expensive areas

Average gross yield for residential real estate, 2017Q2, by size and location (sorted by average sale price of 3-bed semi-detached house)



Gross yields on Dublin housing now stand at close to 6%, compared to a low of just 3% in the bubble

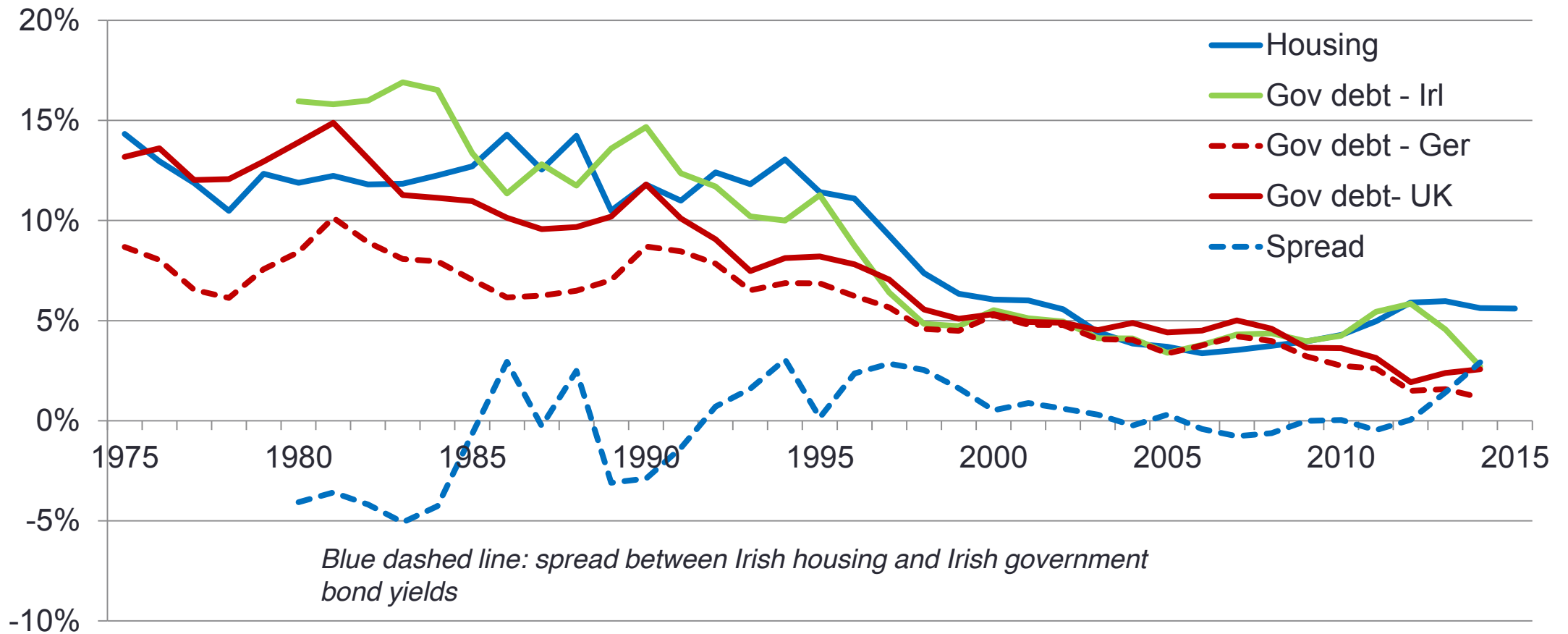
Average gross yield on housing, by market, 2002-2016



Source: Author calculations based on Daft.ie Report & PTSB-ESRI Index

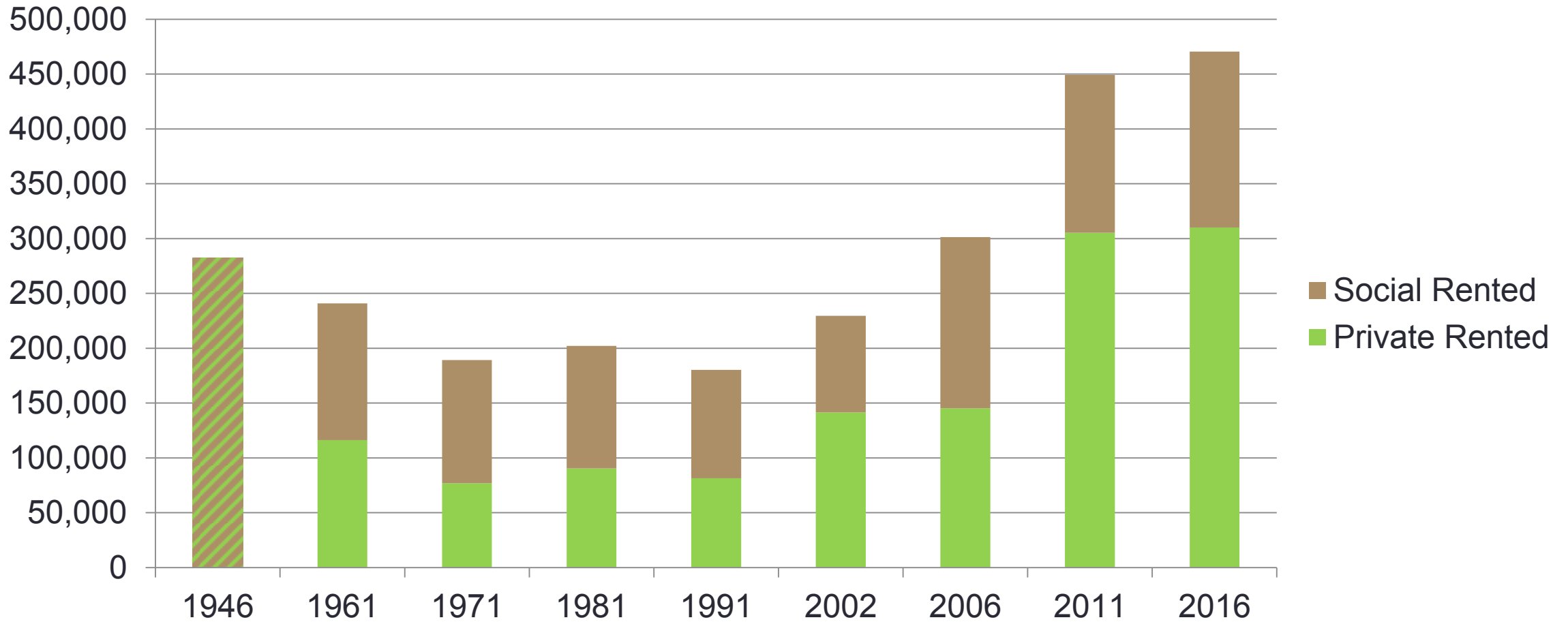
Since 1980, the gross yield on Irish housing has closely tracked the return on 10-year Irish debt

Yield on various 10-year government bonds and Irish housing



Ireland's private rented sector has nearly trebled in size since the 1990s

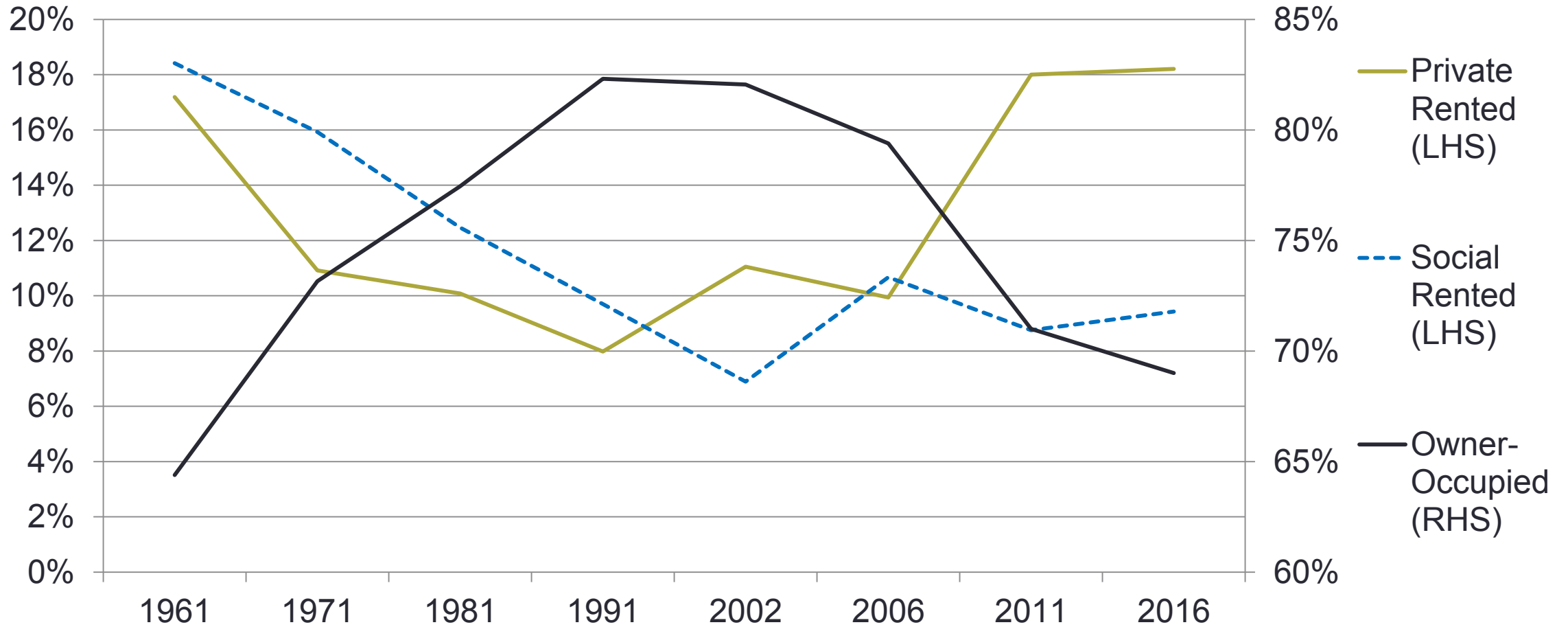
Number of households, by tenure type, 1946-2016



Source: Census (various issues)

At nearly 20%, a greater fraction of households rent privately now than at any point in the last 50 years

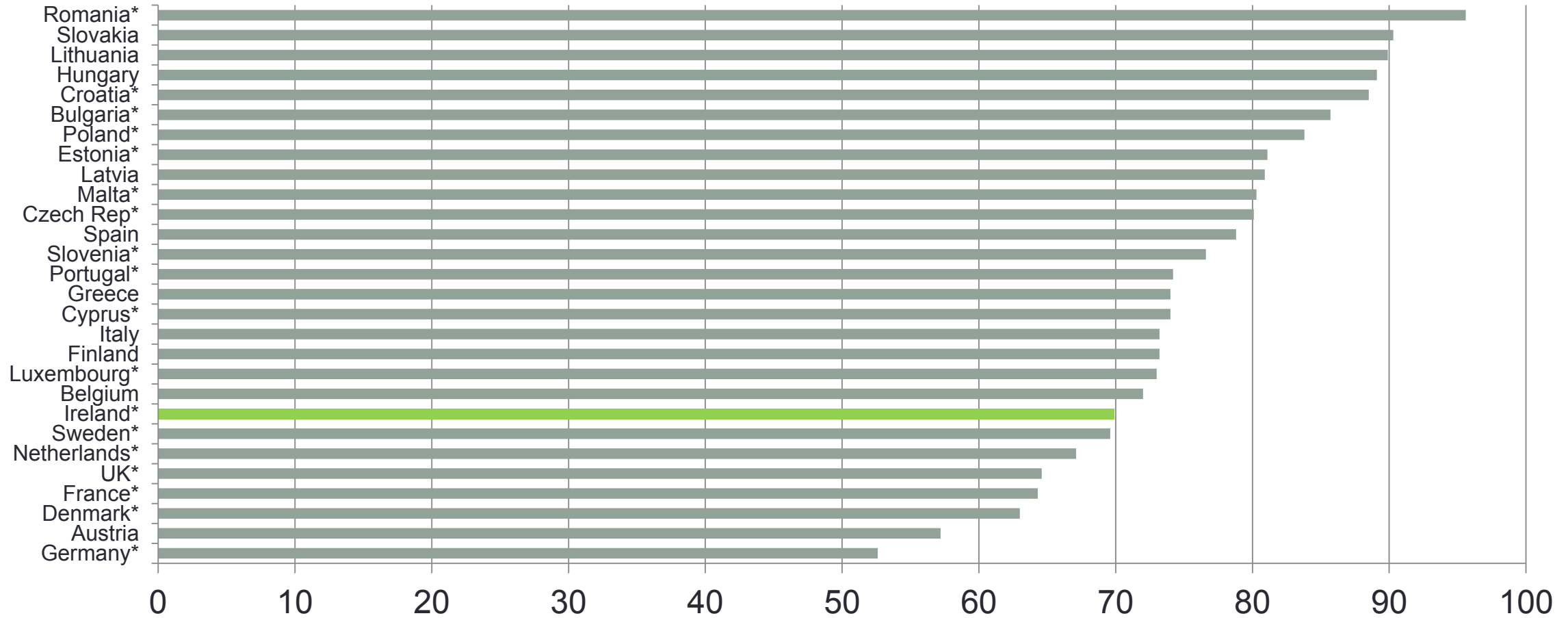
Fraction of households, by tenure type, 1946-2016



Source: Census (various issues)

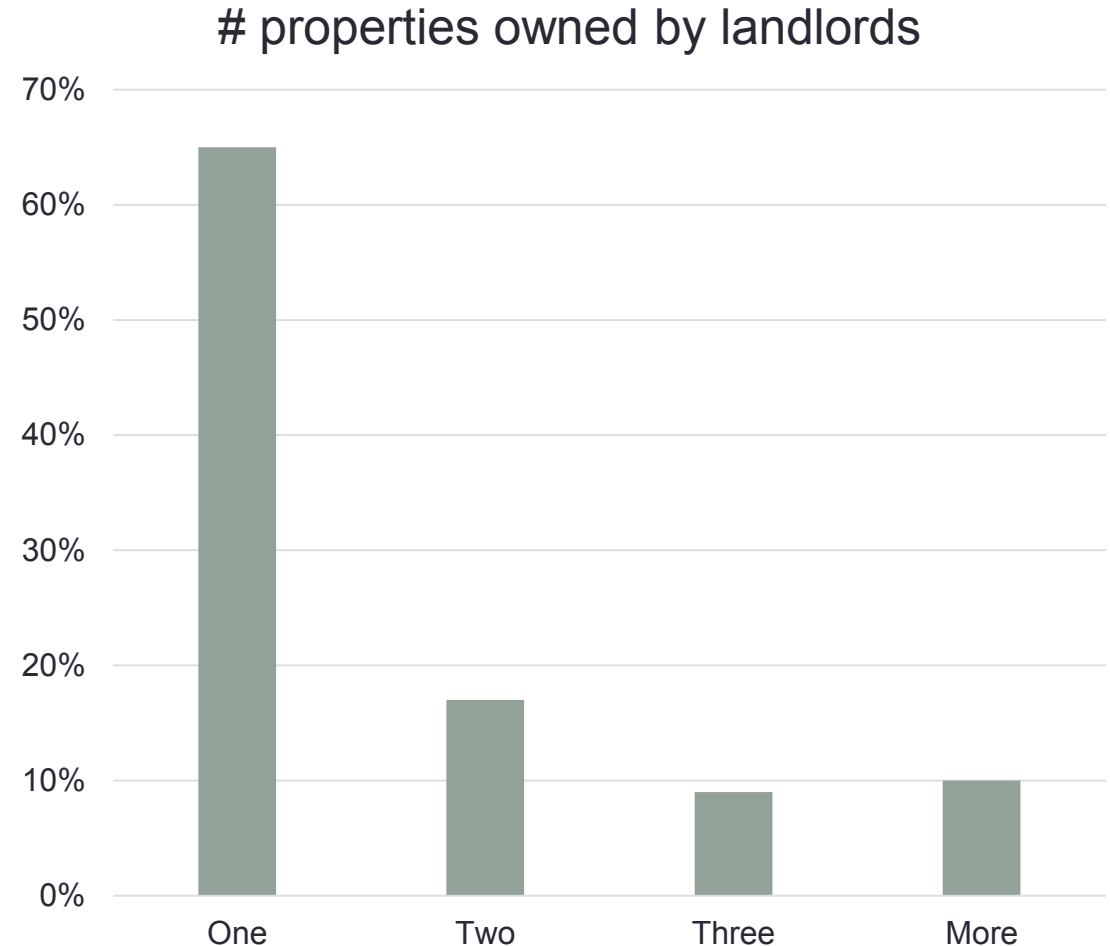
Ireland has one of the lowest rates of owner-occupancy in Europe

Owner-occupancy rate, 2014 (or 2013*)



Ireland’s rental sector remains largely amateur in nature, with many one-off landlords accidental and/or looking to exit the market

- A 2014 report by the RTB included a survey of 400 landlords
 - 65% of respondents owned just 1 rental property – just 10% own more than 3
 - 36% of landlords surveyed became landlords “by accident”
 - 70% of landlords have an outstanding debt on their property
 - 29% of landlords wish to exit the market
- Roughly 4,200 units in Dublin are owned by professional landlords
 - Kennedy Wilson (~1,100), IRES (~1,000), Marathon (~550), Hibernia (~250)

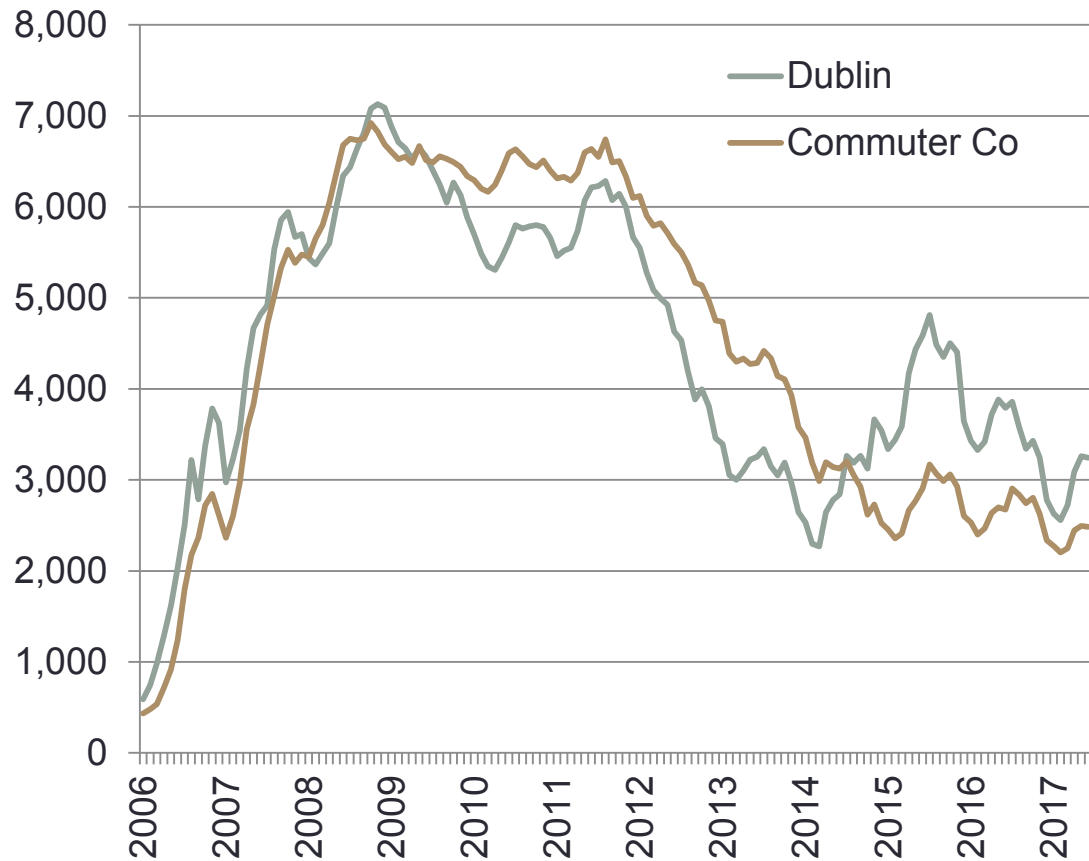


Structure

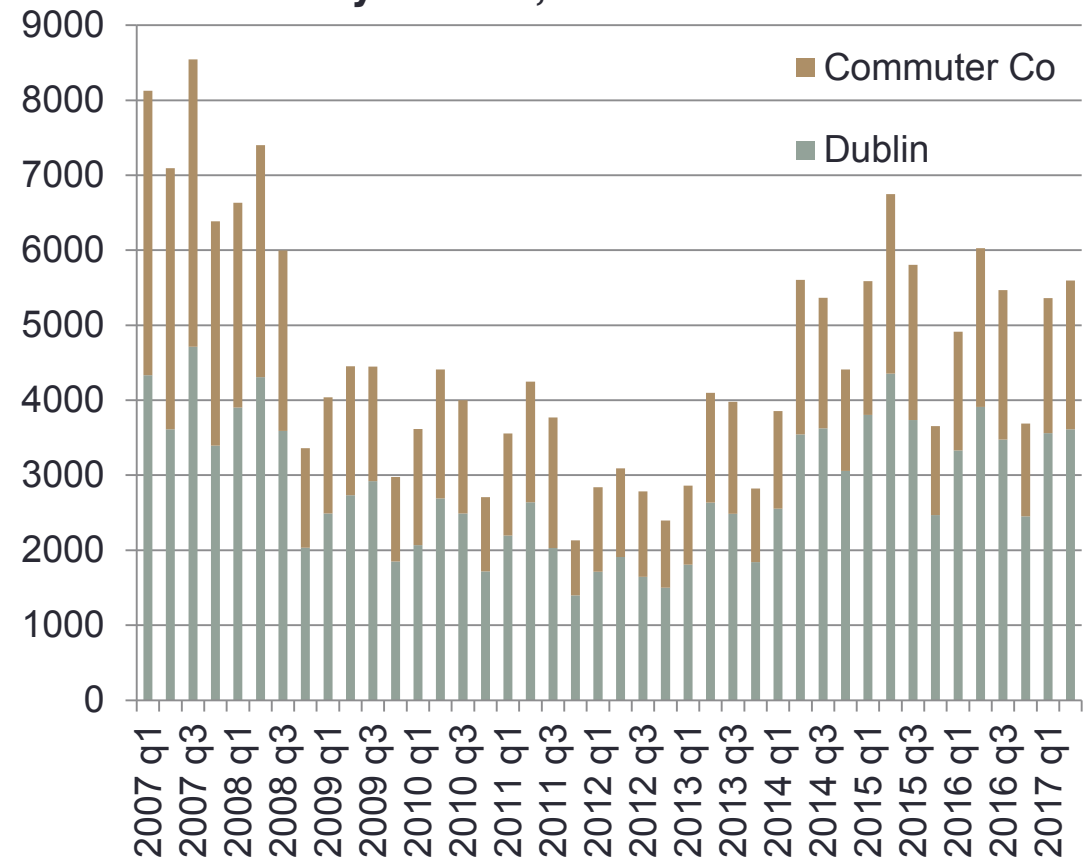
- Executive Summary
- Ireland's Apartment Shortage
- The Lifecycle of Housing
- **Broader Housing Market Trends**
 - Prices, Yields & Tenure
 - **Demand and Supply Outlook**

Despite a pick-up in listings since 2013, the overall stock of homes for sale remains low – with fewer than 3,000 for sale in Dublin on average in 2017

Stock for sale (1st of month), 2006-2017

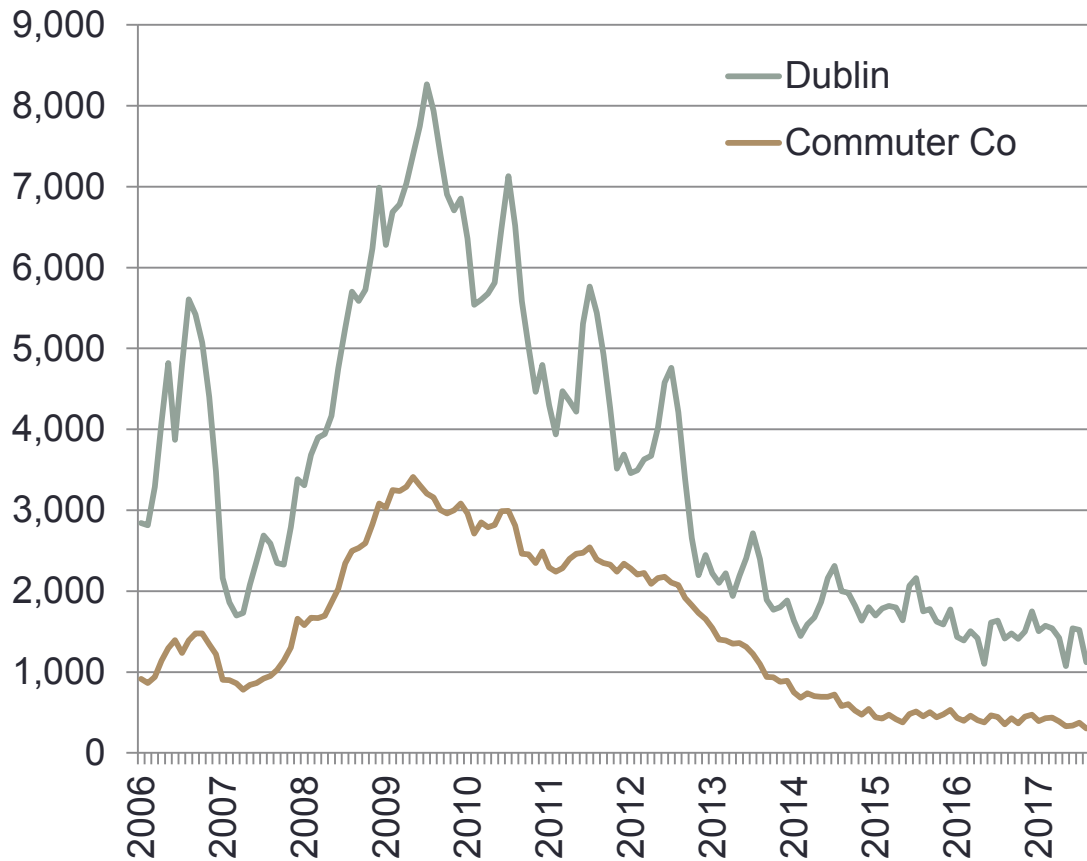


Flow of sale listings during quarter, by market, 2006-2017

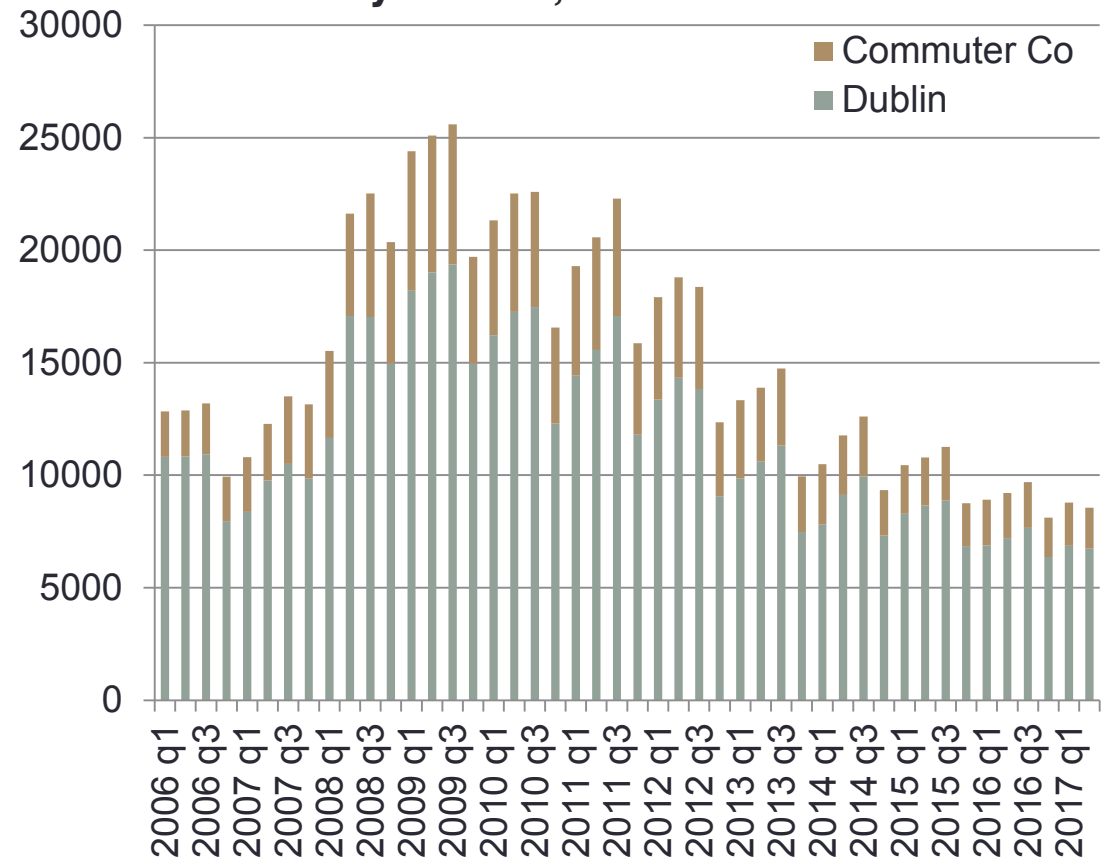


There were just 1,400 units available to rent in the GDA in mid-2017, the lowest on record – flow onto the market has fallen sharply since 2010

Stock to rent (1st of month), 2006-2017



Flow of rental listings during quarter, by market, 2006-2017

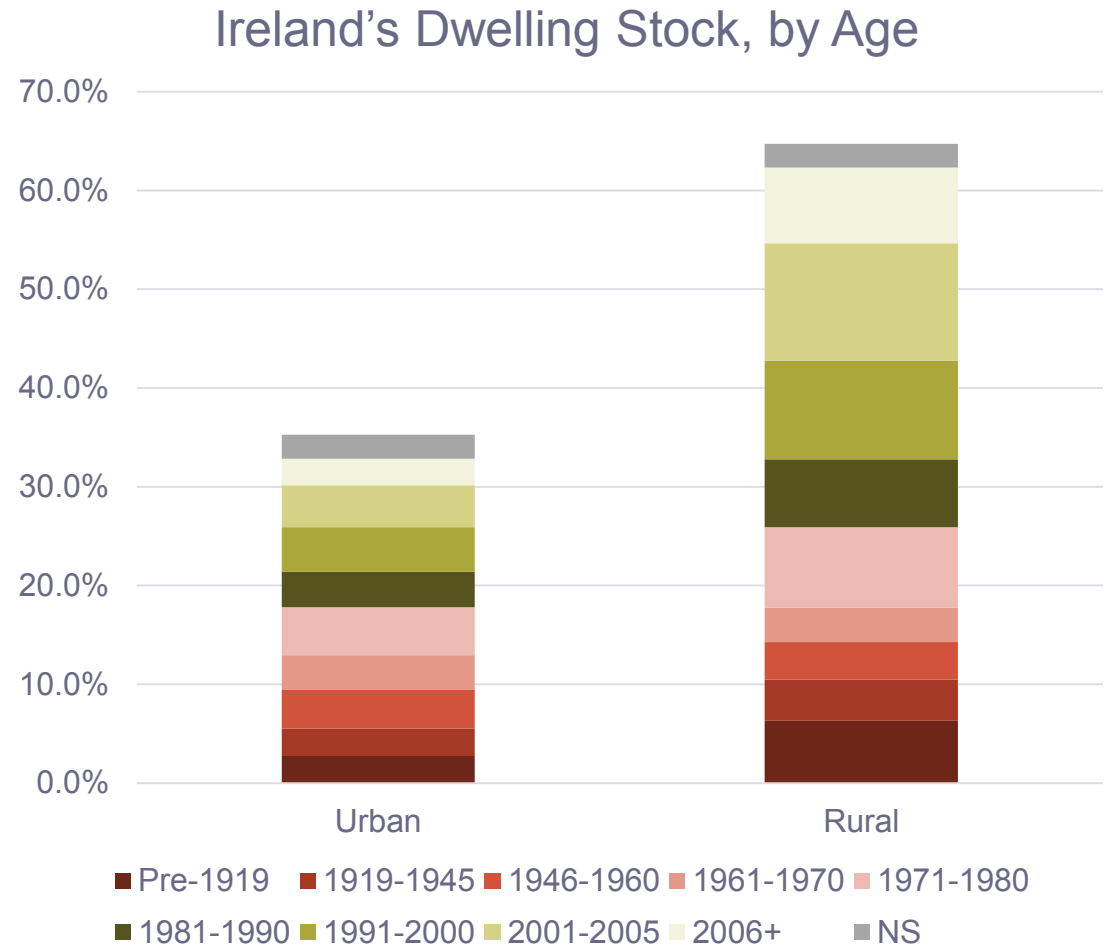


In total, underlying demand for new dwellings countrywide is likely to be at least 40,000 and closer to 50,000 per year

- Current efforts to boost construction from low rates are unlikely to meet underlying demand by 2022
 - Electricity connections – a proxy for housing completions – have been between 10,000 and 15,000 since 2011
 - The stated objective in *Rebuilding Ireland* is to double output to 25,000 by 2021
- Four main components of housing demand in any economy
 1. **Obsolescence:** between 0.5% and 0.8% = 10,000-16,000 p/yr
 2. **Headship rate:** falling household size (from 2.7 to 2.3-2.5) = a further 10,000-15,000 p/yr
 3. **Natural increase:** between 20,000 and 25,000 per year
 4. **Net migration:** 20,000 p/yr = an additional 8,000 homes
- When added together, these suggest at least 40,000 new homes needed per year – and probably closer to 50,000

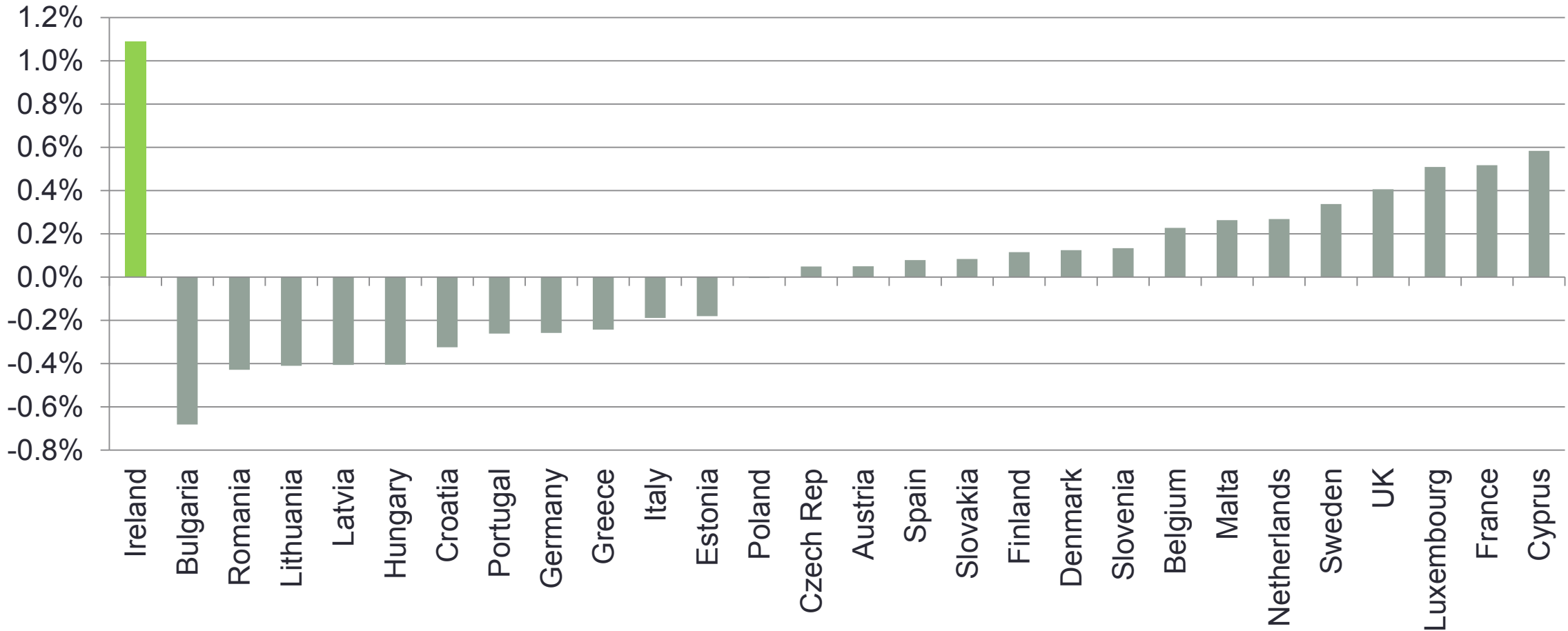
Obsolescence means 10,000+ new homes are needed to the keep the housing stock constant: Ireland’s dwellings are skewed older, rural

- Almost two thirds of Ireland’s stock of dwellings is in rural locations
 - Ireland is experiencing delayed urbanisation – one that is being spatially skewed by land-use restrictions
- 150,000 households (9%) live in dwellings that are 100+ years old
 - 6.3% of Ireland’s dwellings are buildings 100+ years old in rural locations
- If 5% of old urban stock and 10% of old rural stock falls obsolete annually, ~13,000 to “stand still”



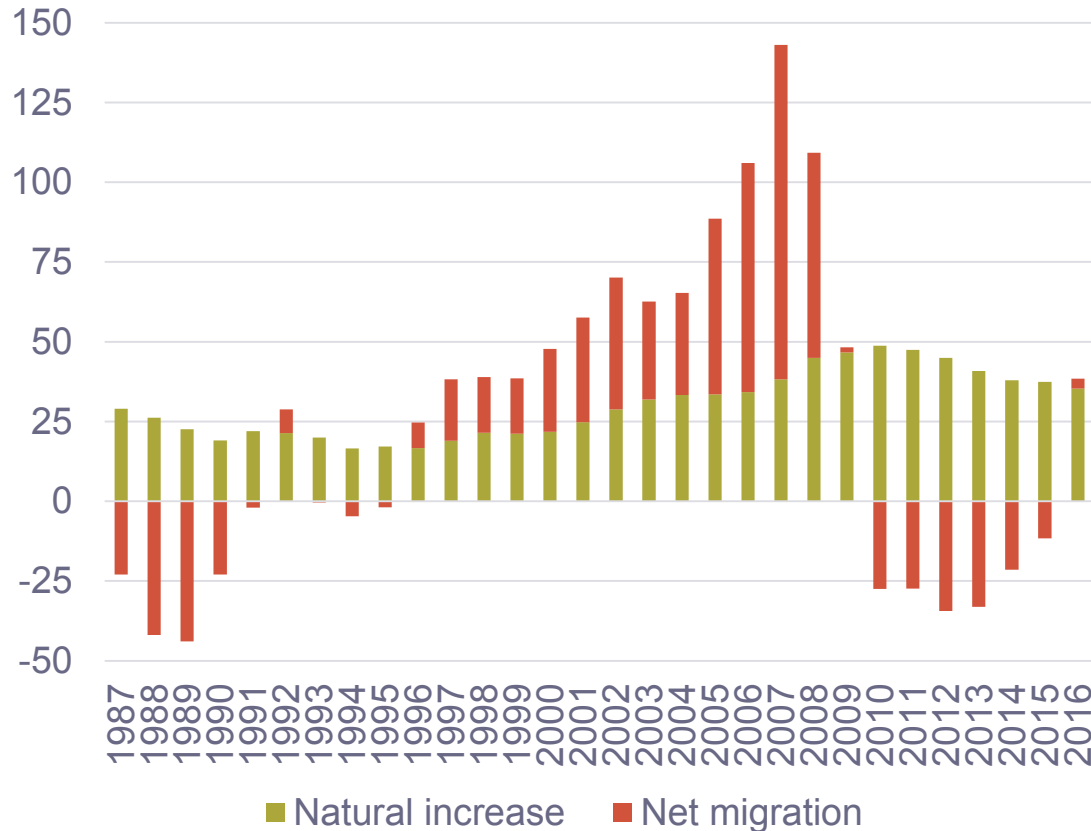
Housing demand also stems from natural increase: Ireland's rate of natural population growth is by far the fastest in Europe

Natural increase, as percentage of 2014 adult population

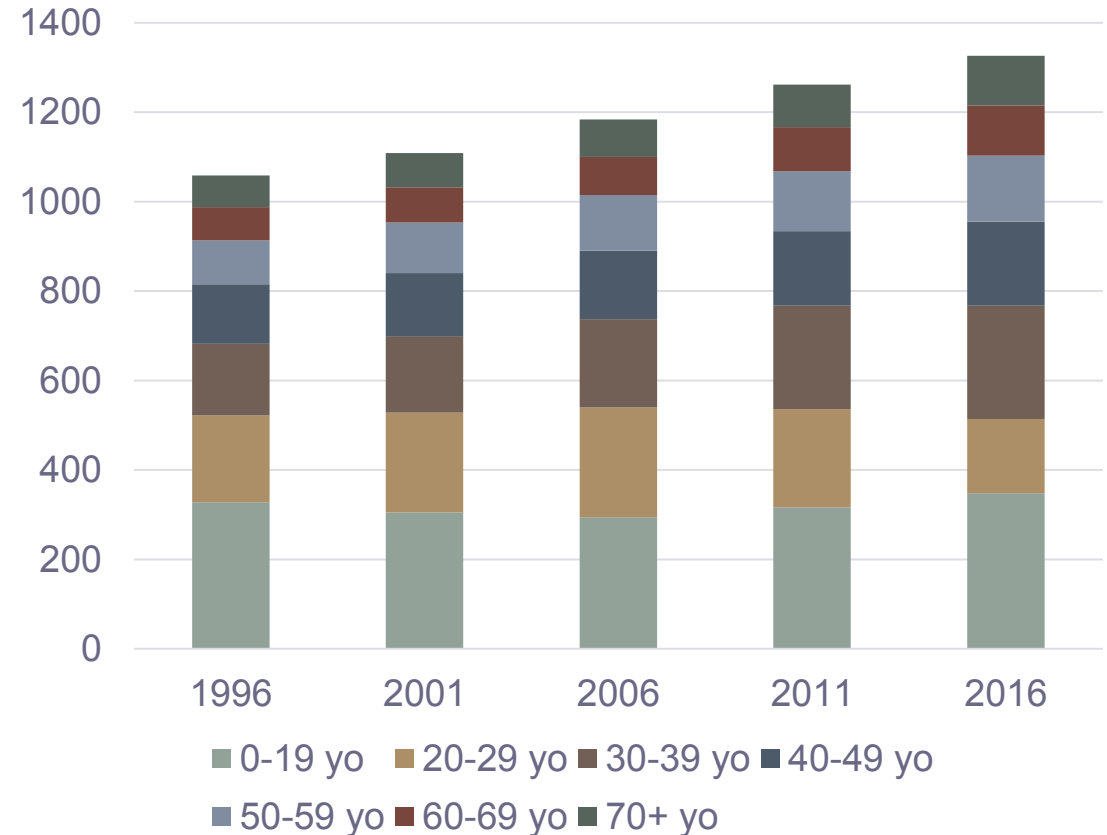


A large and persistent natural increase in the population means that Dublin's population has grown by one quarter since 1996

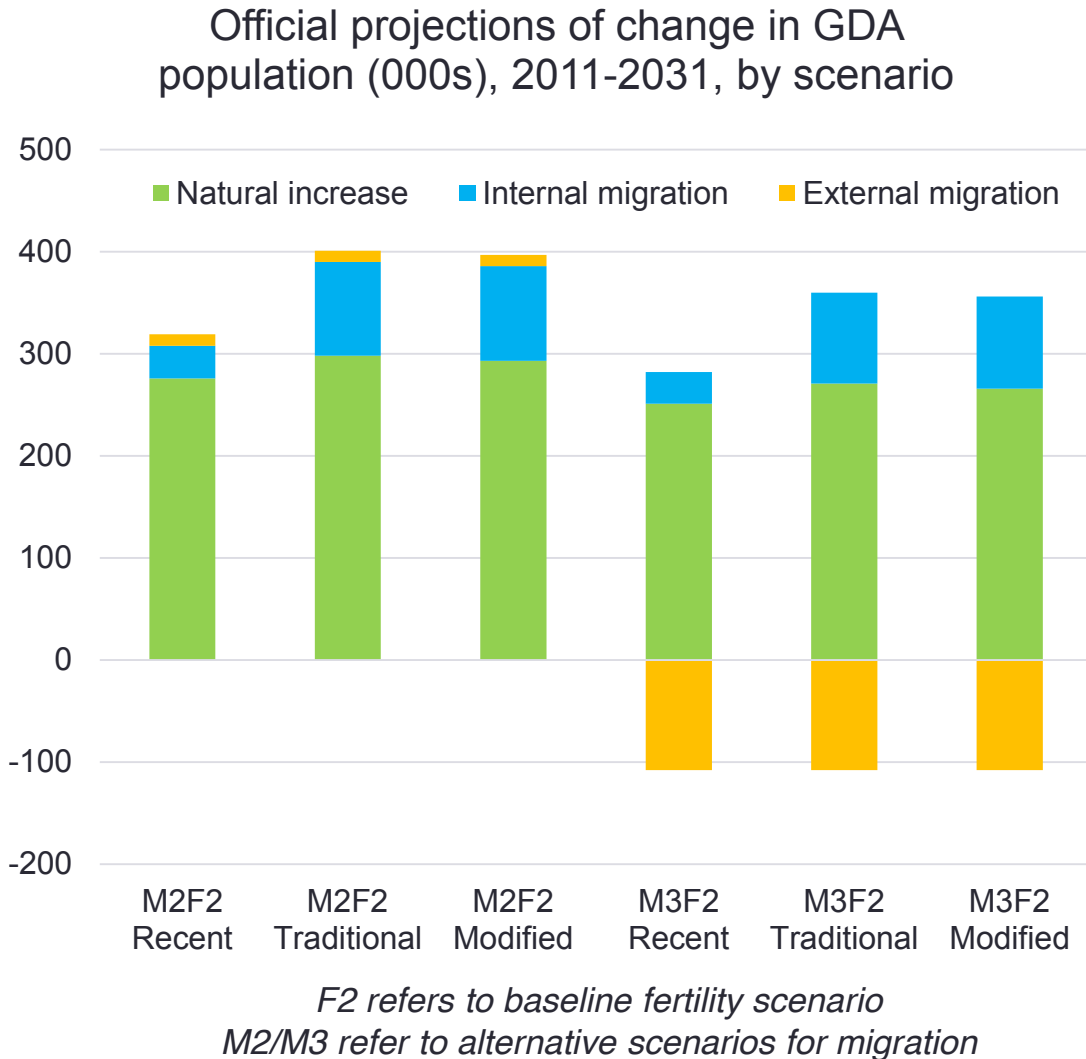
Population change (000s, national), by component and year



Estimated population (000s, Dublin), by year and age group



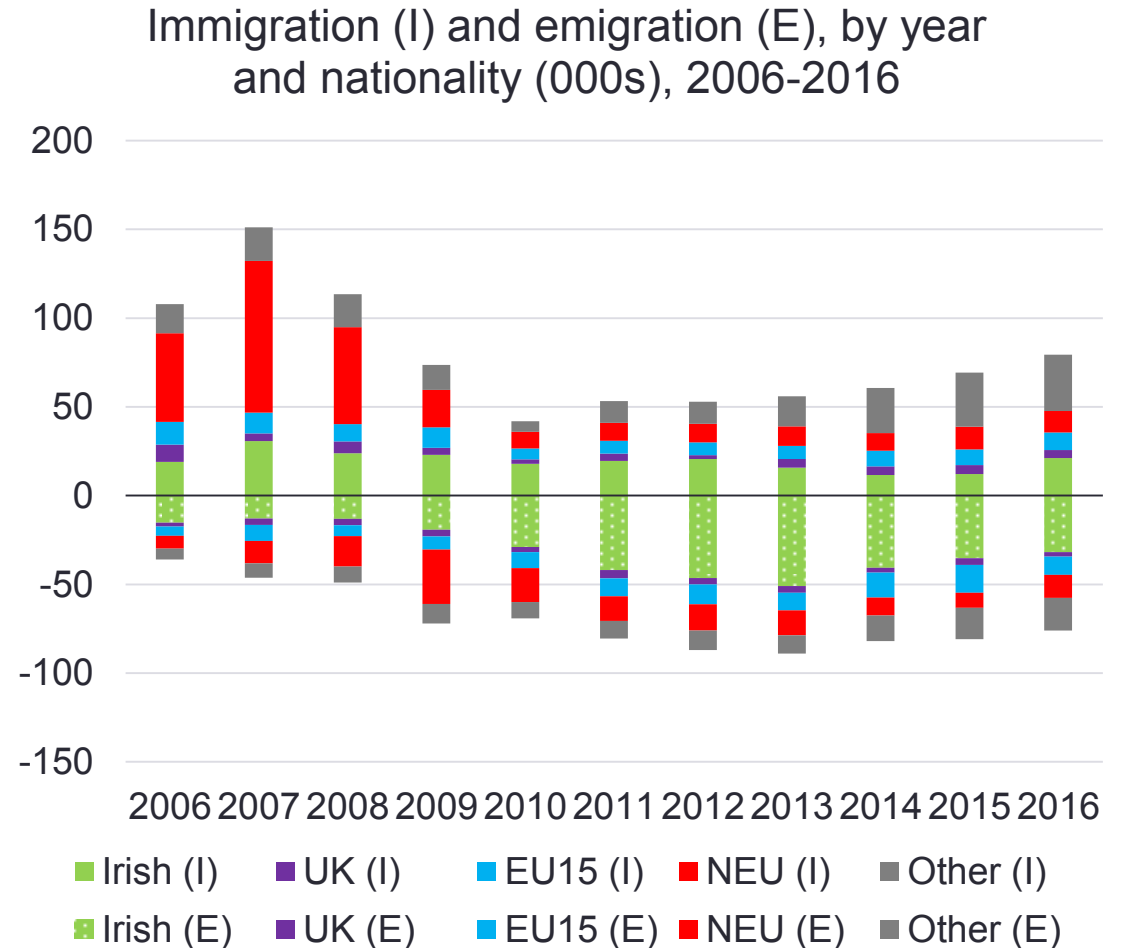
By 2031, the underlying natural increase, coupled with likely migration pressures, will increase GDA's population from 1.8m to ~2.1m



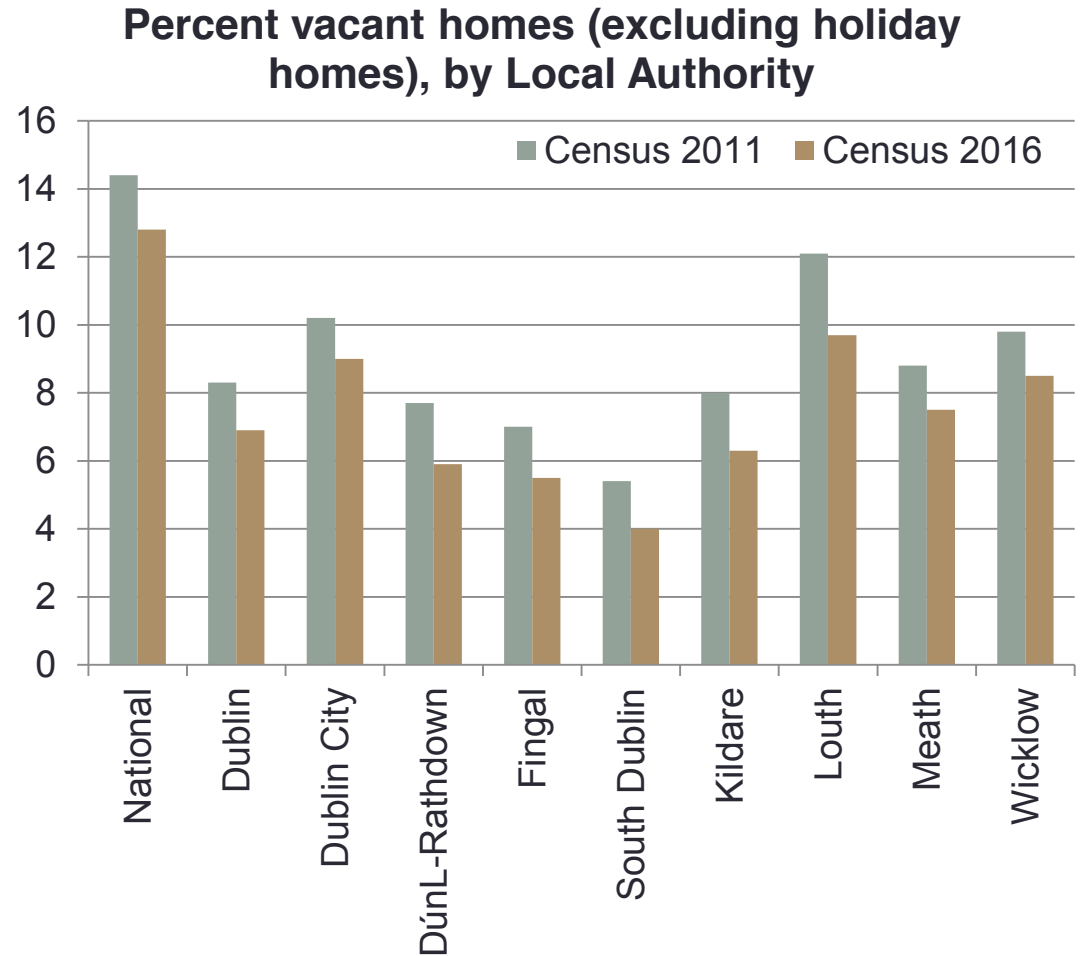
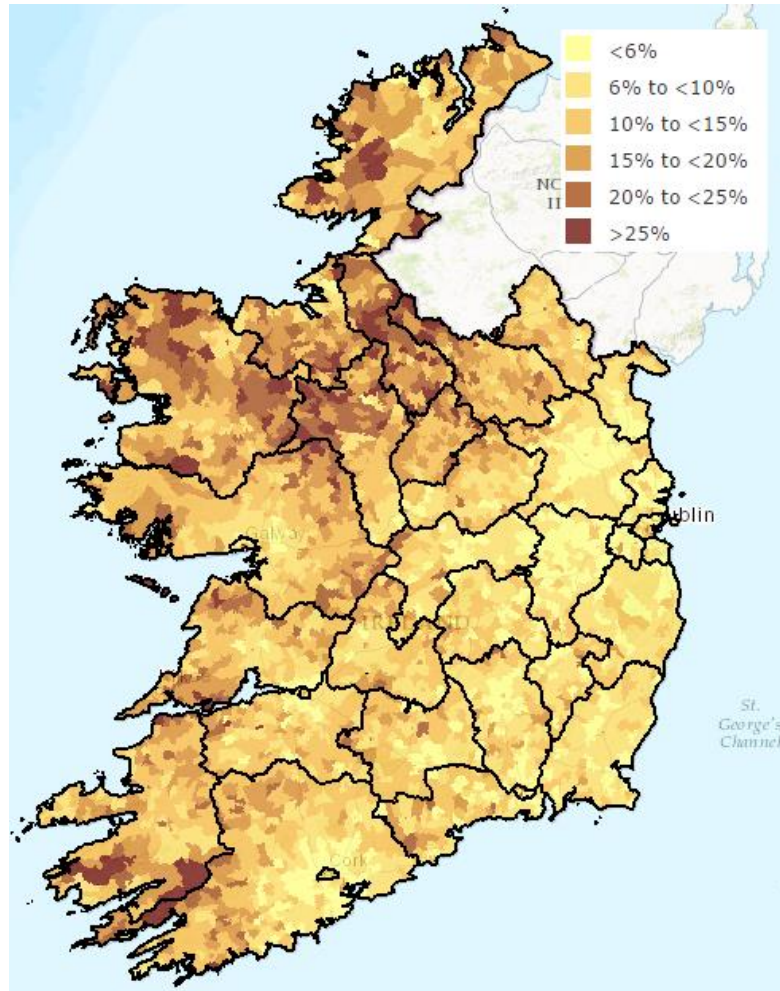
- Official CSO projections in 2011 for 2031 suggest a strong natural increase nationwide
 - ~1.2m births vs. ~0.6m deaths
 - Overall population of 4.9m-5.2m in 2031
- Official population projections from 2011 are conservative with respect to net migration
 - In the “high growth” scenario, there are just 15,000 net migrants nationwide over the entire period 2011-2031
 - In the “low growth” scenario, there is net emigration nationally of 225,000 over the same period

Net migration turned positive in 2016 – every extra 10,000 migrants require 4,000 new dwellings, principally in the cities

- Gross migration to Ireland doubled to 80,000 between 2010 and 2016
 - Emigration has fallen from 90,000 to 76,000, resulting in a swing from net emigration of 34,000 in 2012 to net immigration of almost 4,000 in 2016
 - The fall in emigration is driven by fewer Irish leaving – the rise in immigration by more non-EU nationals coming to Ireland
- Every additional 10,000 migrants require on average 4,000 dwellings
 - Non-Irish households have a lower number of people per HH than the average: 2.52 vs. 2.73 in Census 2011



Ireland's vacant homes in the 2011 and 2016 Censuses – covering all dwelling types – were concentrated away from population centres

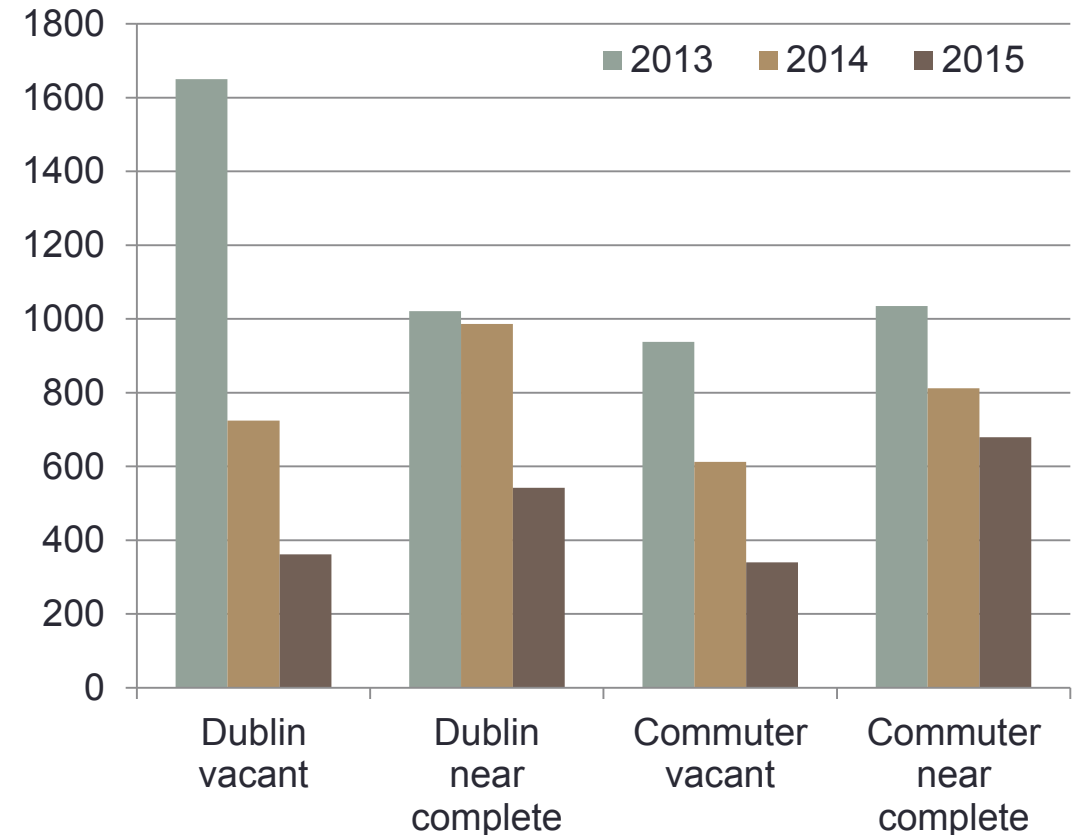


Source: Maynooth University/AIRO; 2016 Census
 Figures refer to vacancy of all dwellings

The number of units in “ghost estates” is now negligible in the GDA, relative to market throughput and requirements

- Of the 76,000 dwellings in unfinished developments nationwide in 2015:
 - 32,000 were occupied
 - 29,000 were not started
 - 4,000 were complete and vacant
 - 5,000 were near complete
- In Dublin, there were 362 complete and vacant units in 2015
 - This was down from 1,650 in 2013
 - Adding nearly-complete units, and units in commuter counties, there were less than 2,000 “ghost estate” units in GDA in 2015
 - This is roughly 3.5 weeks rental supply

Number of dwellings in unfinished developments, by year and status

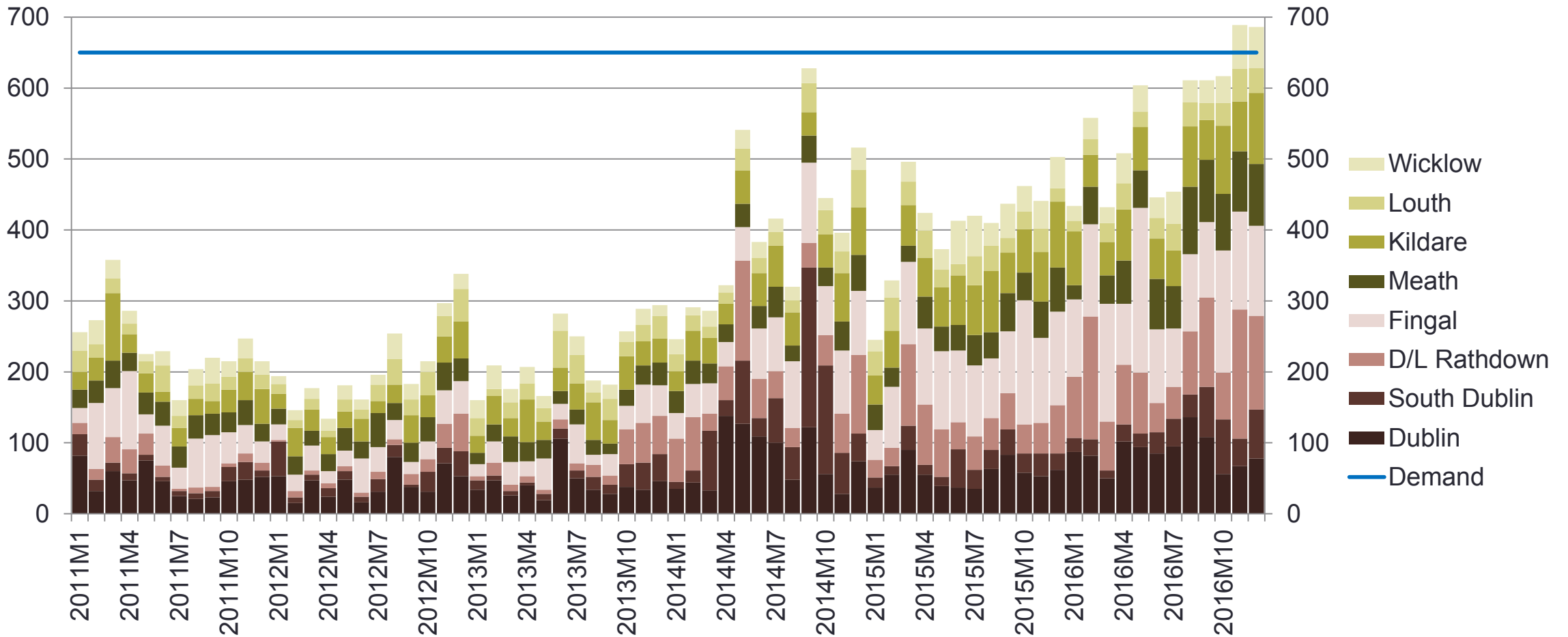


Ireland's high vacancy rate stems from a number of non-transitory factors

- In certain parts of the country, in particular the North-West, the high fraction of vacant homes reflects unfinished developments from the Celtic Tiger period
- However, this does not explain relatively high vacancy rates in urban centres
- This stems from a combination of factors, including:
 - Low rates of annual property taxation, which lowers the holding cost of a vacant property – particularly when combined with a low tax burden for capital gains on residential real estate
 - A patchy register of property and land ownership, with a priority-based system applying in many urban centres (including Dublin) – a switchover to a title-based system is underway
 - Schemes such as 'Fair Deal', which effectively encourages nursing home inhabitants to leave their dwellings vacant while in care
- With the exception of a slowly improving register of ownership, it is unlikely that these factors will change in the near future

Relative to an average of 650 new households formed 2011-2016, only in late 2016 was this number of new dwellings completed in the GDA

New dwellings completed, by local authority and month



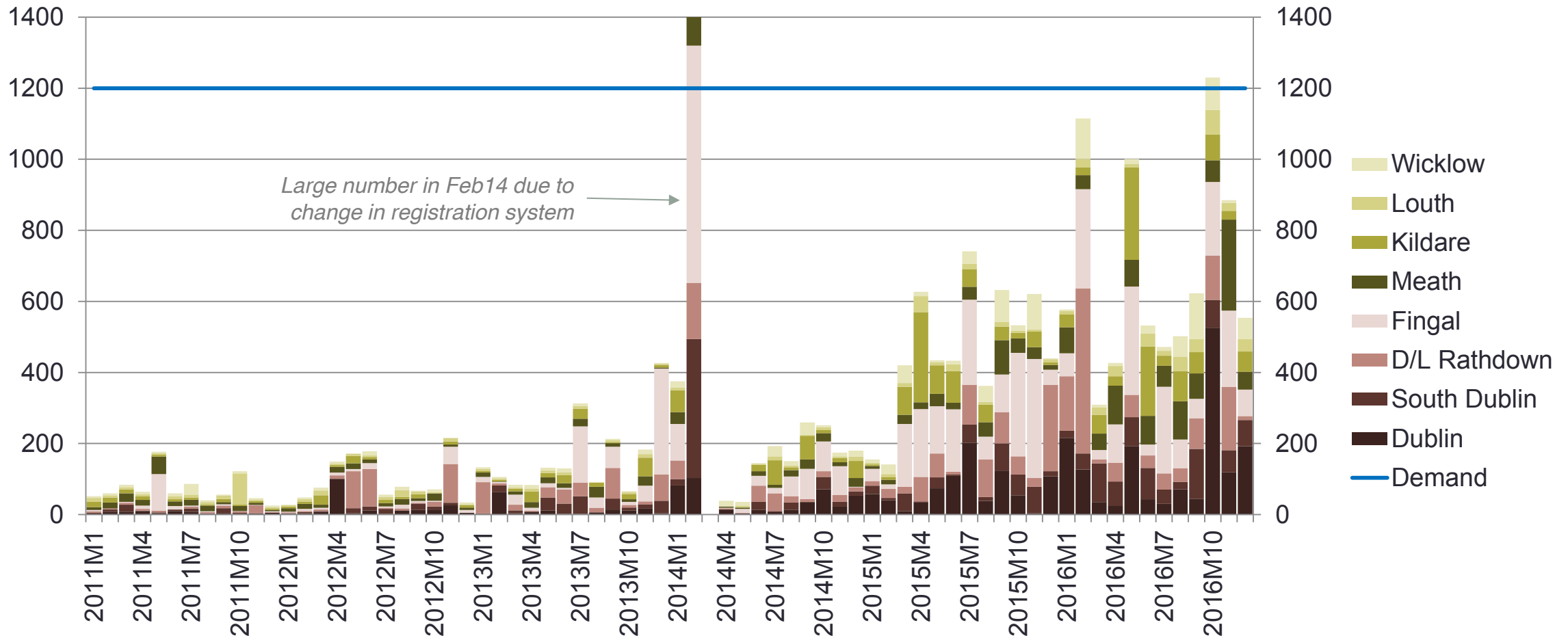
Source: Identify analysis of Census, CSO and Department of Housing figures

It is likely that these figures overstate supply in addition to significantly understating demand

1. Completions are measured by connections to the electricity grid
 - A substantial number 2009- 2016 reflect dwellings built in the Celtic Tiger
 - 51,000 completions nationwide 2011-2015 (10,000 in Dublin) vs. 29,000 commencements
2. The completions figure is gross and does not take account of depreciation
 - As per above, even if the only source of obsolescence was 5% of GDA's 100+ year-old housing (i.e. overall rate of 0.4%), this is an additional 215 dwellings needed per month
3. Household formation is in part endogenous to the availability of housing
 - The Census measures households formed, not desired household formation – lower vacancy (or subdivision) the only other avenues for household formation
 - Underlying demand given by demographics: 1,130 births to first-time mothers in GDA per month – allowing for ~10% no-child households = 1,275 vs. 750 deaths of women 65+
 - If declining headship nationally requires 12,500 new dwellings, ~450 per month in GDA
 - A total of ~1,200 new homes needed per month in the GDA

The gap has been greater comparing commencement activity to a more realistic requirement of 1,200 new homes per month in GDA

New dwellings commenced, by local authority and month



Source: Identify analysis of Census, CSO and Department of Housing figures

More than 275,000 new homes are needed in Ireland 2018-2022, with at least 16,000 needed per year in the Greater Dublin Area

Rounded estimates of new units required per year, in Ireland and Greater Dublin Area, 2018-2022

Source	National	Greater Dublin Area
Obsolescence	10,000	3,500
Headship	12,500	4,400
Natural Increase	16,000	5,600
Net Migration	8,000	2,800
Total	46,500	16,300
<i>of which Rental</i>	<i>16,500</i>	<i>6,500</i>

Notes: Author calculations, assuming 0.5% obsolescence, a fall in household size to 2.5 by 2030, a natural increase of 40,000 and net migration averaging 20,000 per year (with both the natural increase and net migration in 2.5-person households on average)