Cardiff Council

LDP Demographics – Update the Evidence

October 2021

edge analytics

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Acknowledgements

Demographic statistics used in this report have been derived from data from the Office for National Statistics licensed under the Open Government Licence v.3.0.

Contents

1 Introduction

Context

1.1 The Local Development Plan (LDP) for Cardiff, adopted in January 2016, sets out development proposals for the city for the period 2006–2026[1]. In line with legislation requiring local authorities to review their LDP every four years, Cardiff Council is preparing a Replacement LDP, which will set out development proposals for the period 2021–2036.

1.2 A key component of the Replacement LDP will be establishing an appropriate level of growth for the city in terms of housing, jobs and school places, using the latest available demographic evidence.

1.3 In 2020, Edge Analytics produced a suite of demographic evidence for Cardiff Council, informing the development of its LDP. Since the 2020 analysis was completed, a range of new demographic evidence has become available, whilst COVID-19 restrictions have continued to restrict the daily activities of UK businesses and communities.

1.4 This report provides an update to the 2020 reports, considering new demographic statistics, presenting COVID-19 evidence, updated economic forecasts, plus a range of growth forecasts for Cardiff.

Approach

1.5 Edge Analytics specialises in Data Science, applying a combination of research, data, technology, and analytical models to generate insight that better informs business planning and decision-making. Edge Analytics has a particular expertise in demographic modelling and school place planning and has worked with local authorities across the UK, including the majority of Welsh Councils.

1.6 POPGROUP technology has been used to configure a range of growth scenarios for Cardiff, replicating official projections from the Welsh Government (WG), alternative trend scenarios, housing-led forecasts, plus employment-led outcomes. In each of the scenarios, historical data is included for the period 2001–2020, providing the baseline for growth forecasts over a 2021–2036 plan period. The scenario analysis is prefaced with a demographic profile of Cardiff, for both district-level and ward geographies, plus evidence on COVID-19 impacts.

1.7 Section 2 examines Cardiff's growth profile and components of population change, plus its historical patterns of international and domestic migration. The analysis includes an examination of Cardiff's ward-level geography, illustrating the patterns and trends in demographic change since 2001. The

[1] Cardiff LDP, January 2016

impact of the COVID-19 pandemic, its restrictions and the subsequent easing of these is also considered.

1.8 Section 3 presents a suite of growth outcomes for Cardiff, combining WG 2014-based and 2018-based scenarios, with alternative trend outcomes under different migration, fertility and mortality assumptions. In addition, housing-led and employment-led outcomes are considered alongside the trend scenarios.

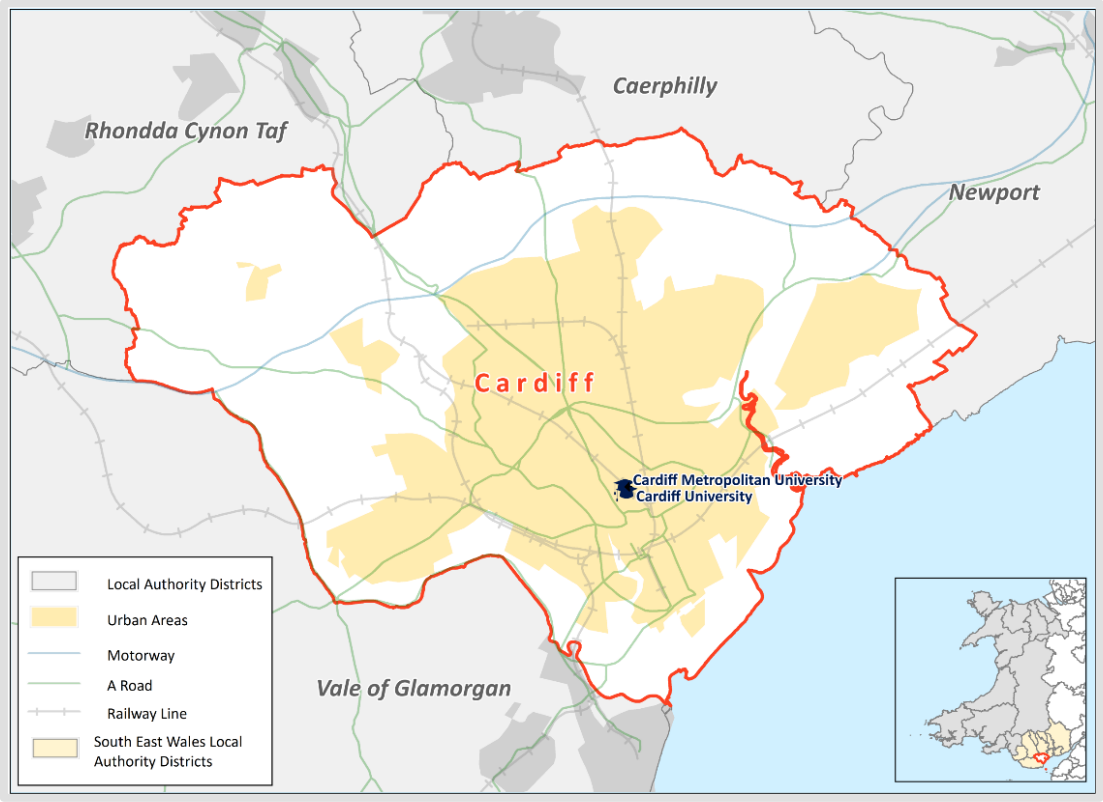
1.9 Section 4 concludes the analysis with a summary of findings for the Council to consider in the development of its Replacement LDP.

1.10 The Appendices to this report detail the methodology, data and assumptions used in the formulation of the demographic analysis and projections.

2 Demographic Profile

Geographical Context

2.1 Situated at the heart of the ten unitary authorities that comprise the South East (SE) Wales Region, Cardiff is bordered by the Vale of Glamorgan, Rhondda Cynon Taf, Caerphilly and Newport (Figure 1).



COVID-19 Context

2.2 The unprecedented impact of COVID-19 phases is best illustrated by community mobility statistics which have been derived from the aggregated and anonymised data from the Google users who have turned on their 'Location History' setting. Google has made its data available for analysis during the pandemic through a series of 'Community Mobility Reports'[2], showing the movement trends across different categories of place: **Workplace**, **Residential**, **Transit Stations**, **Retail & Recreation**, **Grocery & Pharmacy** and **Parks** (Figure 2).

[2] Google Community Mobility Reports

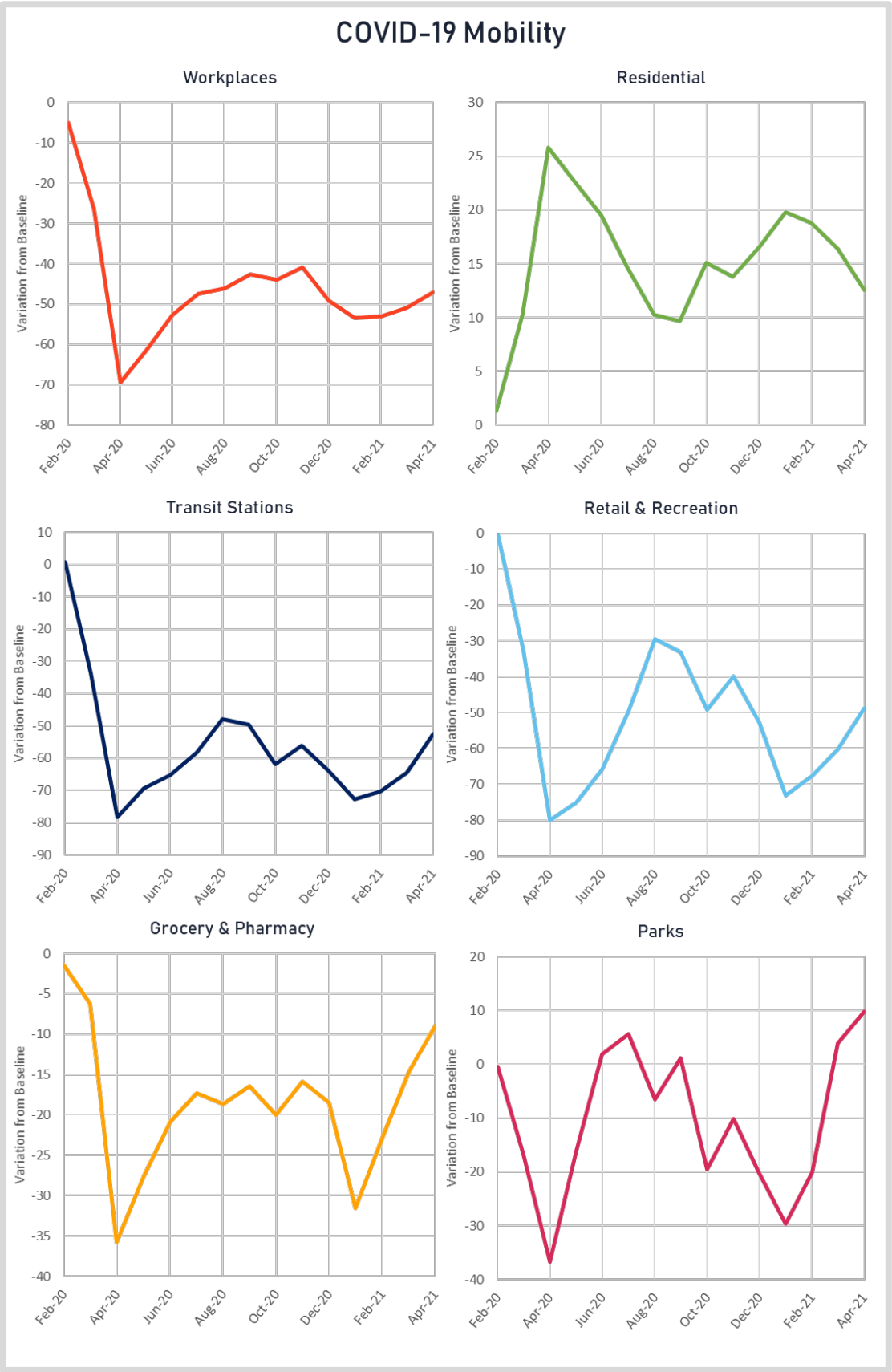


Figure 2: Cardiff - Mobility Trends, February 2020–April 2021
Source: Google

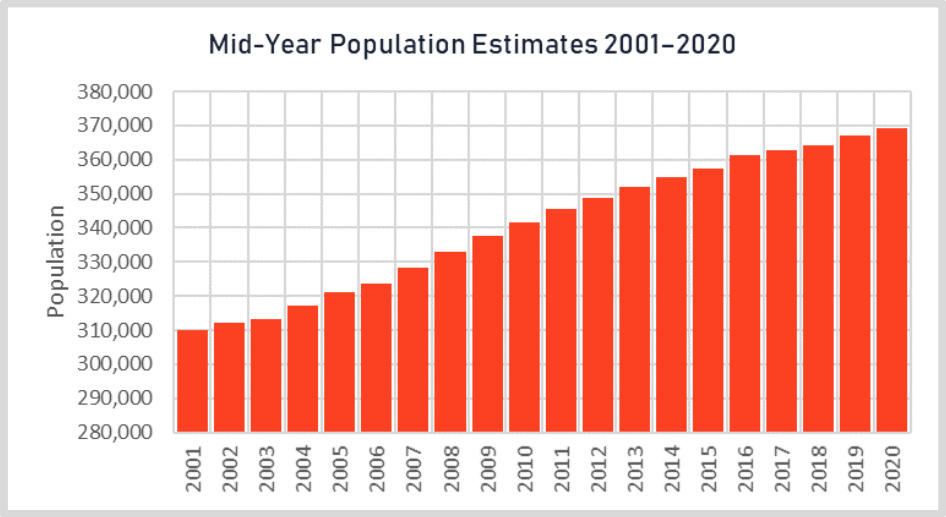
2.3 For each category of place, the Google data illustrates the daily change in mobility against a 'baseline', which represents a *normal* value for that day of the week (calculated from a 5-week period, 3rd Jan–6th Feb 2020). For illustration, the daily statistics have been aggregated to produce a monthly profile for Cardiff.

2.4 From February to April 2020, a sharp reduction in movement was recorded in all places with the exception of **Residential**, reflecting the first national lockdown restrictions. A similar pattern was evident during the second and third lockdowns, with a recovery in movement between the restrictions.

2.5 Since March 2021, movement in all places has begun to return towards *normal* levels but **Workplaces** and **Transit** activities continue to have some way to go to return to pre-pandemic levels.

Population Change

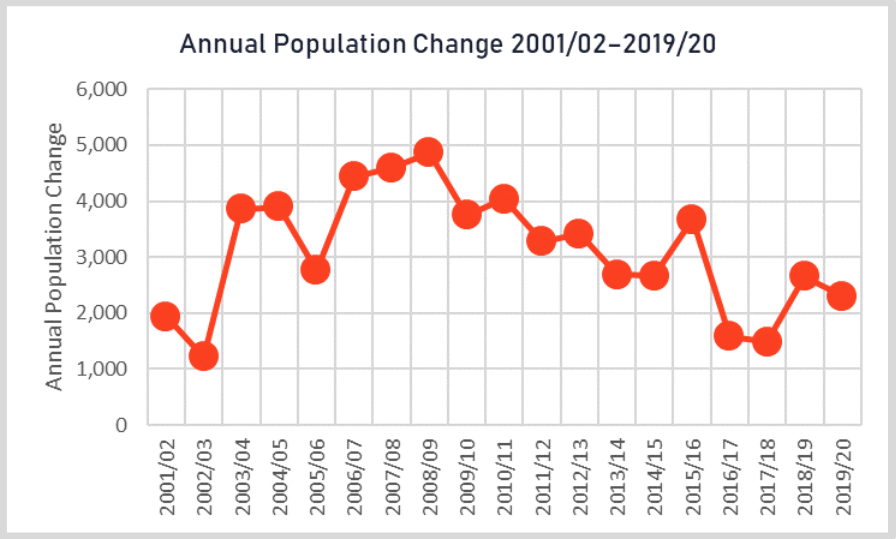
2.6 According to Office for National Statistics (ONS) mid-year estimates (MYE)[3], the population of Cardiff had grown to 369,202 by mid-year 2020, an increase of approximately 19% since 2001 (Figure 3).



Source: ONS

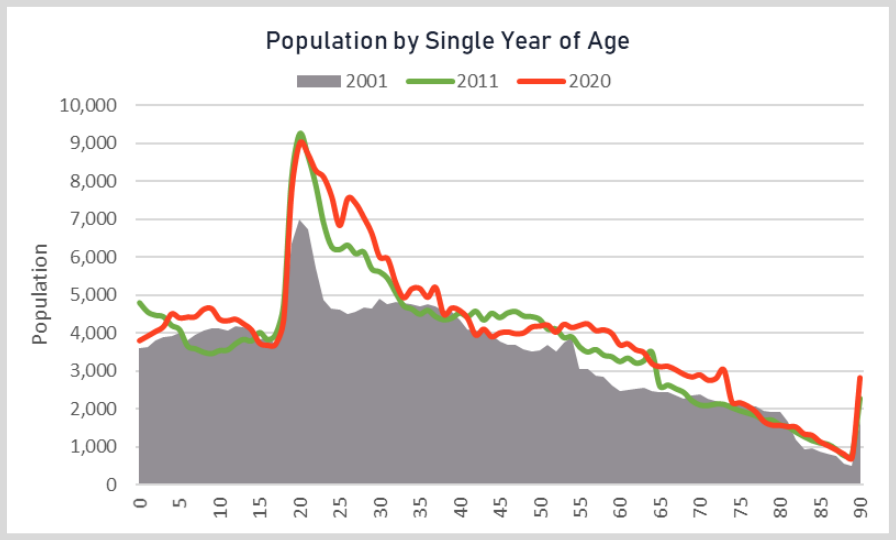
2.7 Although the city has experienced positive population growth in all years since 2001 (average of +3,100 per year), the annual rate of growth has been lower since the global financial crisis in 2007/08 (Figure 4).

[3] ONS: Mid-Year Population Estimates, June 2021



Source: ONS

2.8 Cardiff's population has grown in the majority of age-groups since 2001, but particularly in the young adult age-groups due to net in-migration and in the older adult age-groups due to the gradual ageing of the larger birth cohorts from the 1950s and 1960s (Figure 5).



Source: ONS

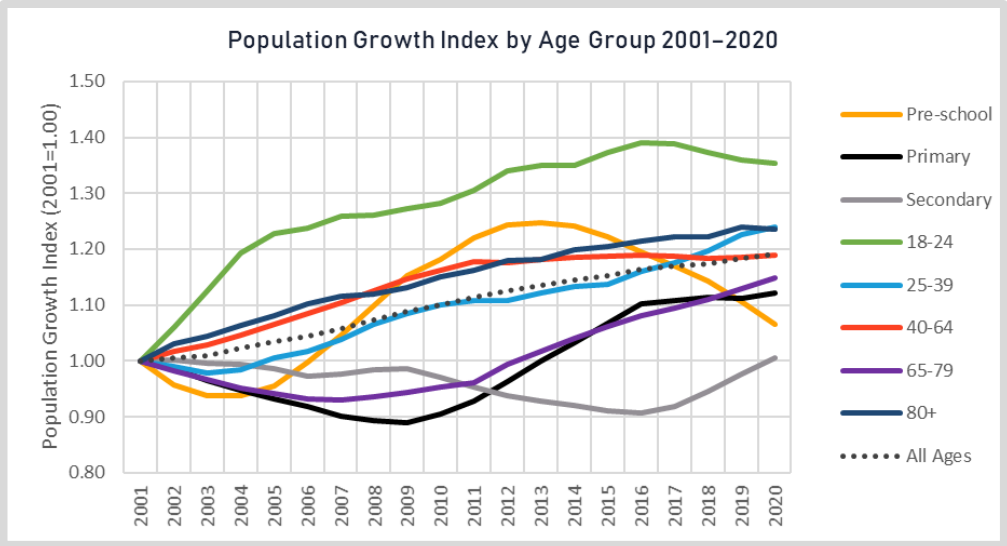
2.9 Converting this changing age-profile into trajectories of indexed growth for the 2001–2020 period, reveals the temporal fluctuations in key age-group populations (Figure 6).

2.10 Pre-school (aged 0–3) populations increased sharply to 2013 but have declined thereafter. Primary school age-groups (aged 4–10) have naturally followed suite with an appropriate time-lag, whilst secondary school age-groups (aged 11–17) are only just starting to recover back to 2001 levels.

2.11 The 18–24 student age-group has seen the largest growth in numbers since 2001, although this has reduced since 2016, most likely as a result of the application of the Higher Education Leavers Methodology (HELM) methodology to ONS internal migration estimates (see later discussion).

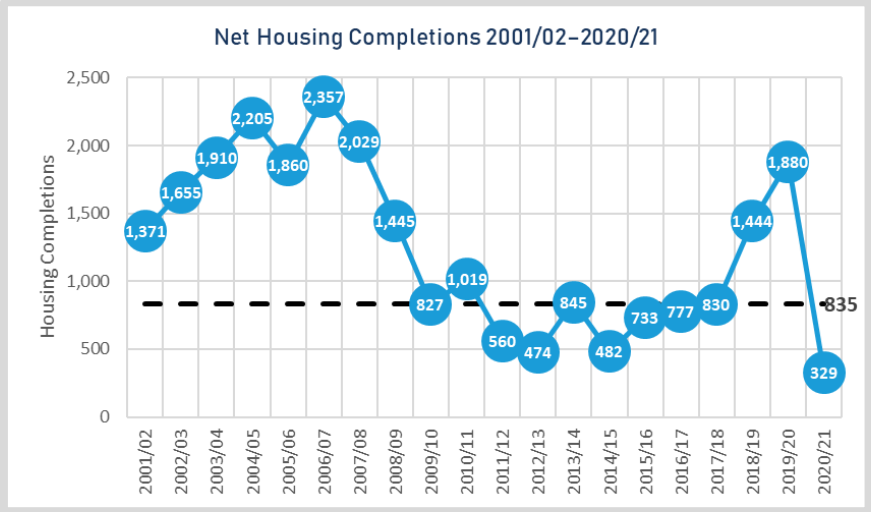
2.12 The older-adult, labour force ages (25–64) have increased by approximately 20% since 2001, although the dampened growth of 25–39 year-olds in recent years may be evidence of the effects of Cardiff's net migration outflow since 2012/13.

2.13 The older age-groups (65–79 and 80+) are subject to consistent annual increase, a trend that will continue over the remainder of the Cardiff LDP period, as birth cohorts from the 1950s and 1960s reach older age.



Source: ONS

2.14 The city's profile of annual population growth has been influenced by the rate at which new homes have been built. Prior to 2018/19, housing delivery rates in Cardiff slowed substantially from a 2006/07 peak, with an average of +1,668 dwellings per annum (dpa) between 2001–2011, compared to +835 dpa between 2011–2021. The data for 2018/19 and 2019/20 indicated a recovery in the build rate, with annual housing completions at their highest level for a decade, however the estimated completions figure for the latest year suggests COVID-19 restrictions have slowed the build rate significantly (Figure 7).

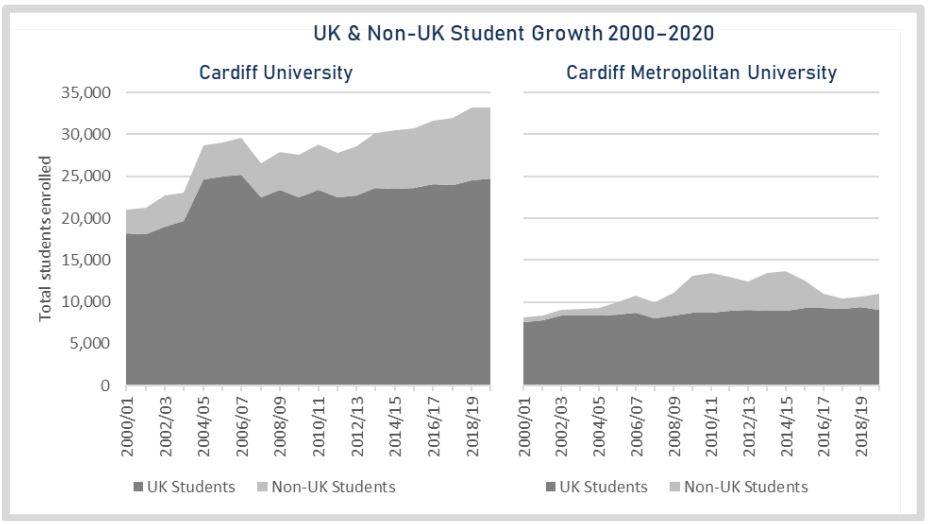


Note: The two year completion figure for 2019–2021 of 2,209 has been apportioned to individual years using HM Land Registry data on new property transactions in 2019/20 and 2020/21.

Figure 7: Cardiff - Housing Completions, 2001/02-2020/21
Source: Cardiff JHLAS[4] 2019; Cardiff Council

2.15 Cardiff's fluctuating population and its in and out-migration profile, is strongly influenced by the number of students enrolling at its universities. In the 2019/20 academic year, there were approximately 44,200 students attending Cardiff University and Cardiff Metropolitan University, with further student numbers at the Cardiff Campus of the University of South Wales.

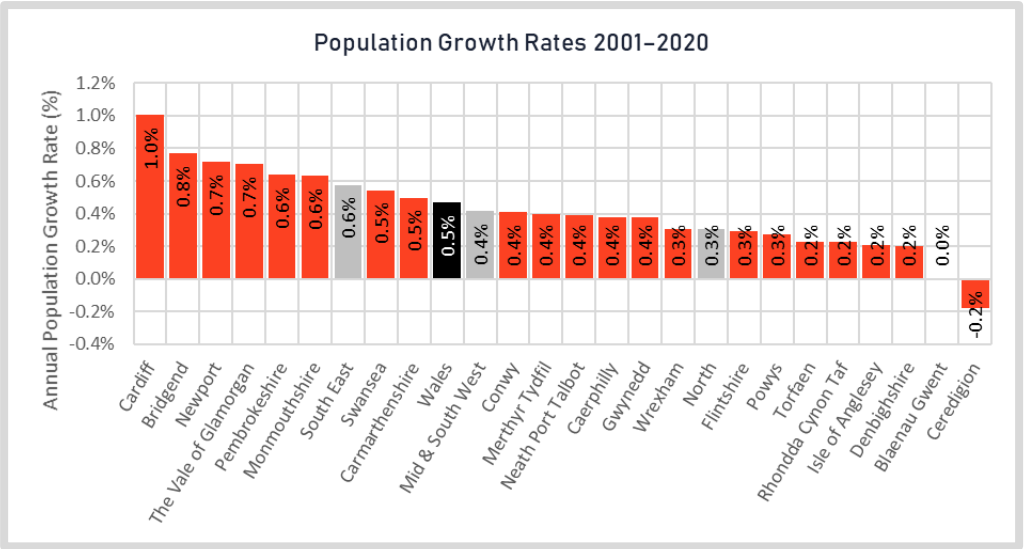
2.16 Higher Education Statistics Agency (HESA)[5] statistics for the two larger universities, illustrate that an estimated 23% of students originate from overseas (Figure 8). Cardiff University has seen a 59% rise in the number of students since 2000/2001, whilst Cardiff Metropolitan has seen a smaller 34% rise over the same period. 2019/20 has shown the first annual decline in international students at Cardiff University since 2011/12.



Source: HESA

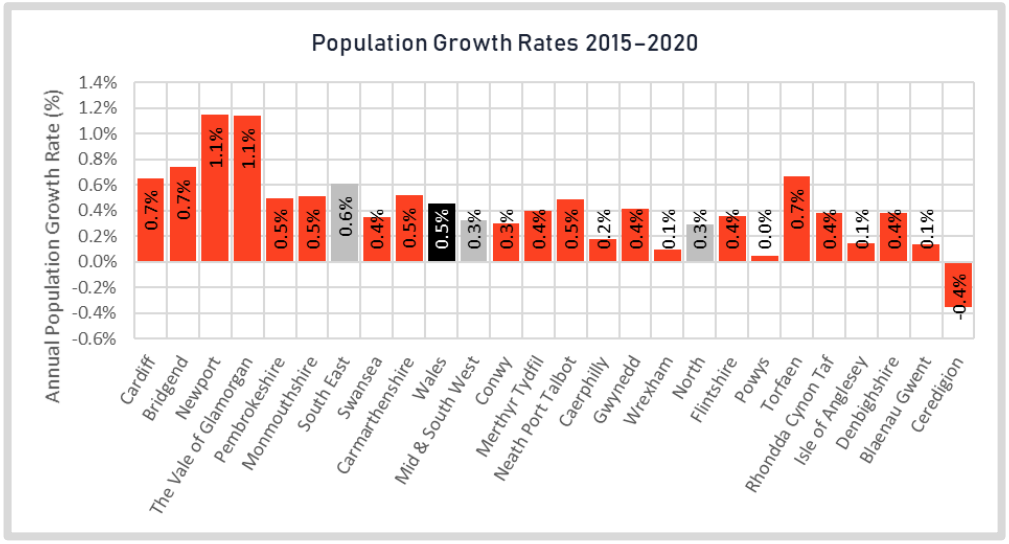
[4] Joint Housing Land Availability Study, April 2019
[5] HESA: Open Data and Official Statistics

2.17 Across Wales, there has been positive population growth in most unitary authorities between 2001–2020, with population decline in just one of the 22 (Figure 9). At 1.0% per year, Cardiff has experienced the highest annual rate of growth in its population, over twice the Welsh average (0.5% per year) and considerably higher than the SE Wales regional average (0.6% per year). Bridgend, Newport, the Vale of Glamorgan, Pembrokeshire, Monmouthshire, Swansea and Carmarthenshire have all exceeded the national growth rate between 2001–2020.



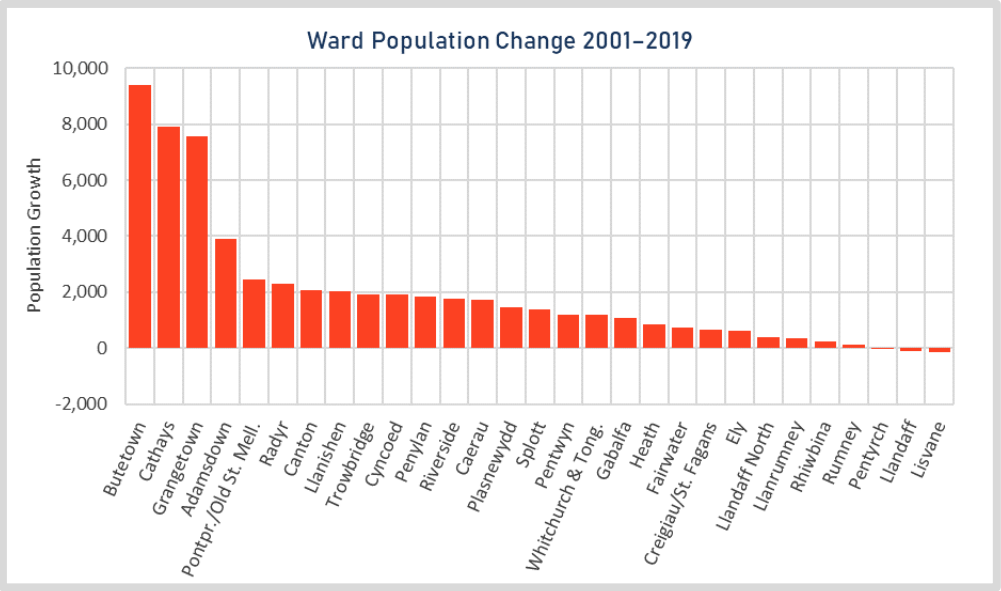
Source: ONS

2.18 A comparison of growth rates achieved since 2015, reveals the slowdown in Cardiff's population change relative to other parts of Wales (Figure 10). Its average annual growth rate for the last five years has declined to a level just above the SE Wales regional average. Bridgend, Newport, the Vale of Glamorgan and Torfaen are all estimated to have experienced higher growth rates than Cardiff since 2015.



Source: ONS

2.19 Small-area population estimates published by ONS[6] provide a perspective on how Cardiff's population growth since 2001 has been distributed across its ward geographies. Of its 29 wards, just three experienced population decline between 2001–2019 (Pentyrch, Llandaff and Lisvane). In contrast, the four wards of Butetown, Cathays, Grangetown and Adamstown have been responsible for 51% of the city's 57,000 population growth since 2001 (Figure 11, Appendix A).

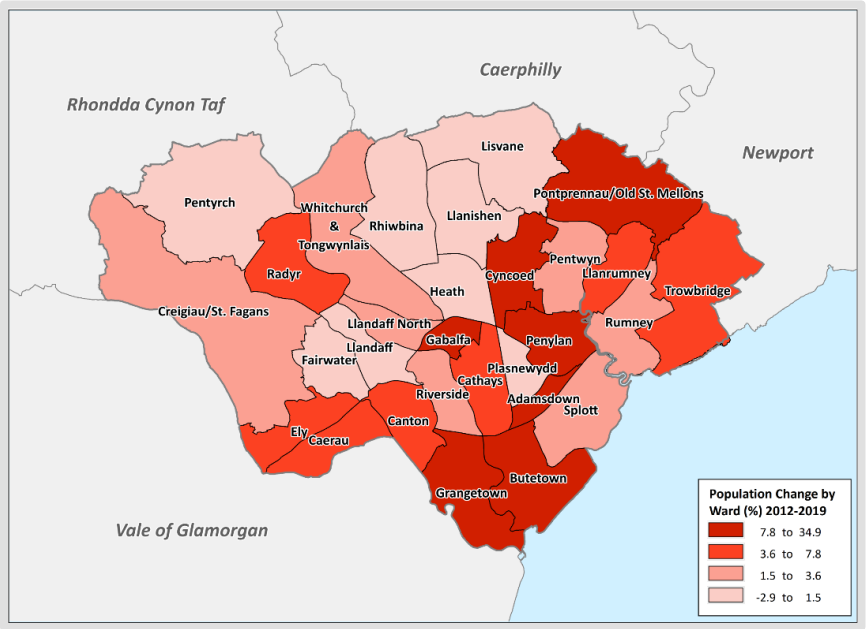


Source: ONS

2.20 Considering change since 2012, the spatial distribution of Cardiff's growth is presented as both population and residential property growth, the latter derived from address count changes recorded in the Royal Mail's Postcode Address File (PAF)[7] (Figure 12, Figure 13).

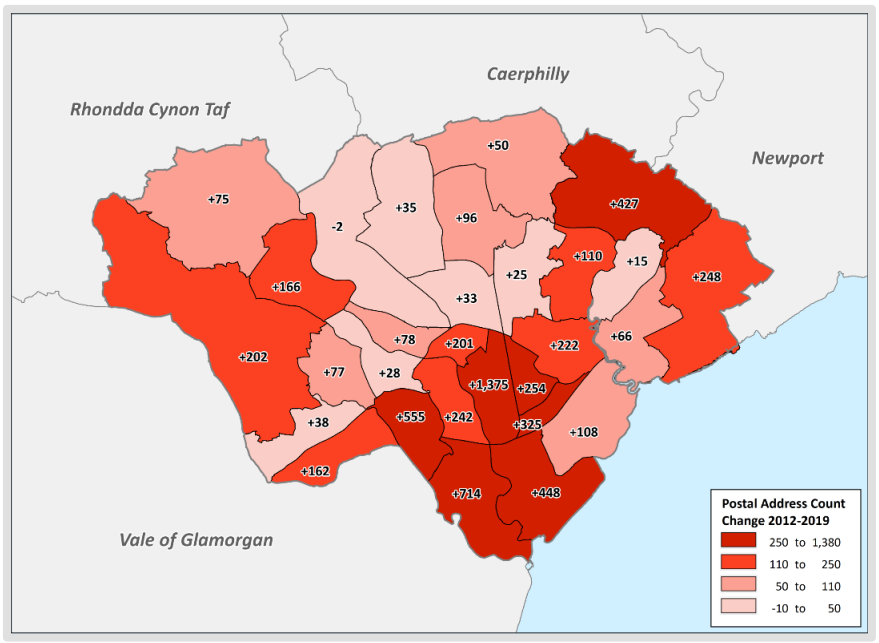
[6] ONS: Lower layer Super Output Area population estimates, September 2020
[7] Royal Mail: Postcode Address File

Population Growth



Source: ONS

Residential Property Growth



Source: PAF

2.21 Growth in the number of residential addresses generally corresponds with population growth. Cathays has overwhelmingly had the greatest address count growth since 2012 (+1,375), although has had the 11th largest population growth (5.0%) over the same period, indicating a relatively low average occupancy of properties. Pontprennau/Old St. Mellons, which borders both Caerphilly and Newport, has also experienced relatively high address count growth of +427 with estimated population growth of 9.9%, indicating a likelihood of higher occupancy properties.

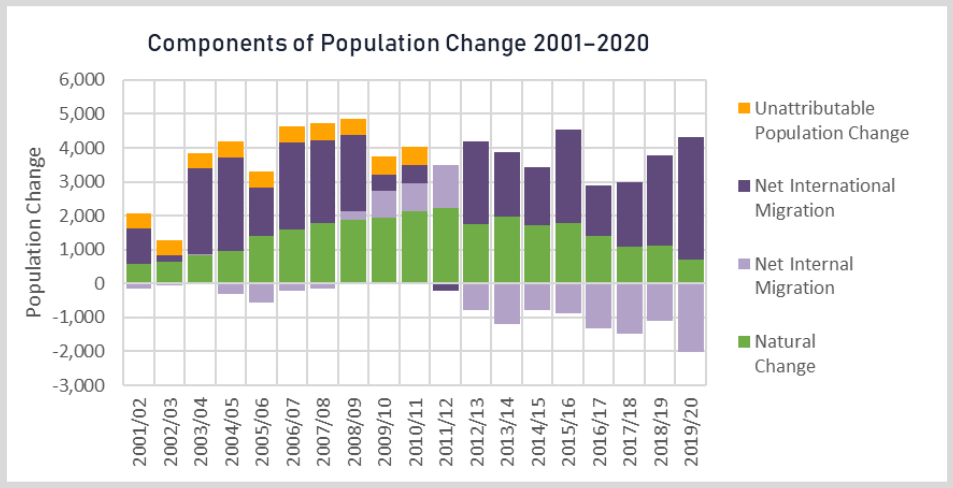
2.22 The most significant population growth since 2012 has been concentrated in the southern and central wards of Cardiff; with Butetown, Adamsdown, and Gabalfa experiencing the largest uplift (34.8%, 14.0% and 12.3% respectively).

Births, Deaths & Migration

2.23 Cardiff's 'components of change' profile reveals that its population estimate was subject to an upward revision following the 2011 Census (Figure 14). Population adjustments will invariably be a feature of the population estimates that result from the 2021 Census but, at this moment in time, it is not certain what this might mean for Cardiff.

2.24 International migration continues to be the most challenging component of population change to estimate robustly, with Cardiff's growth profile heavily weighted towards net-immigration. The existing ONS estimation methodology combines sample statistics from the International Passenger Survey (IPS) with evidence from a number of administrative datasets, including the patient register, higher education statistics and national insurance number (NINo) registrations.

2.25 In addition, ONS has sought to improve its internal migration estimation with the introduction of the Higher Education Leavers Methodology (HELM)[8]. Applied from mid-2017 onwards, the HELM methodology is designed to better reflect the speed and pattern of movement of students, following graduation. Its impact upon Cardiff's migration profile is examined below.



Source: ONS

2.26 The balance of demographic components driving Cardiff's population growth have changed over the course of the last nineteen years (Figure 14). Natural change (the difference between the number of births and deaths) and international migration have exerted a consistently positive impact upon annual population growth, although the natural change contribution has declined since a peak in 2011/12. In contrast, from 2012/13, internal migration (to and from other parts of the UK) has

[8] ONS: Population estimates for the UK, mid-2020 methods guide, June 2021

reverted to an annual net loss of population. The net outflow has been particularly high since 2016/17, the point at which ONS implemented its new HELM methodology.

Natural Change

2.27 Births in Cardiff have been on a downward trend since 2011/12, falling by an average of 191 in the last five years. Death numbers declined steadily to 2011/12, contributing to the peak contribution from natural change, but have begun to fluctuate on an upward trajectory thereafter (Figure 15).

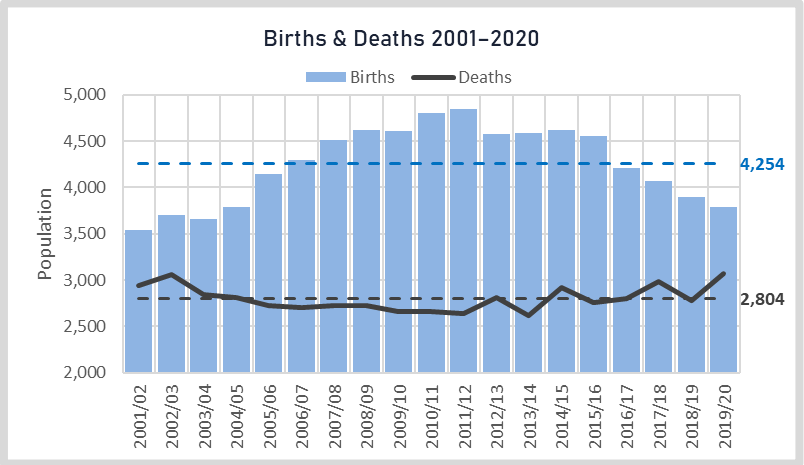


Figure 15: Cardiff – Birth and Death Profile, 2001–2020
Source: ONS

2.28 Looking at the monthly profile of deaths over the COVID-19 period shows there has been an excess in deaths when compared to an expected five-year average. Figure 16 indicates the spike in excess deaths during the first phase of the pandemic and in the second spike in infections. The latest rise in the number of COVID-19 infections has not been associated with a rise in excess deaths, with total deaths falling below the 'expected' five-year average.

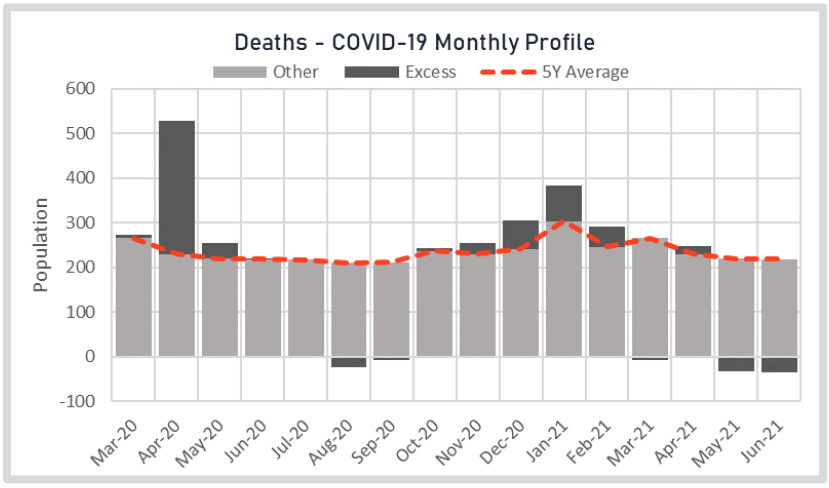


Figure 16: Cardiff - Deaths, March 2020–April 2021
Source: ONS[9]

[9] ONS: Deaths Registered Monthly in England and Wales, July 2021

Internal Migration

2.29 A more detailed scrutiny of the internal migration statistics reveals that until recently, both the inflows and outflows from and to the rest of the UK have each increased gradually since 2001. A net outflow to 2007/08, reverted to a short period of net inflow to Cardiff. However, since 2012/13, a reduced but recovering inflow accompanied with a rising migration outflow has resulted in a negative net internal migration balance. Data for 2019/20 reveals Cardiff has experienced an annual decline, in both in- and out-migration, resulting in the largest net outflow since 2001 (Figure 17).

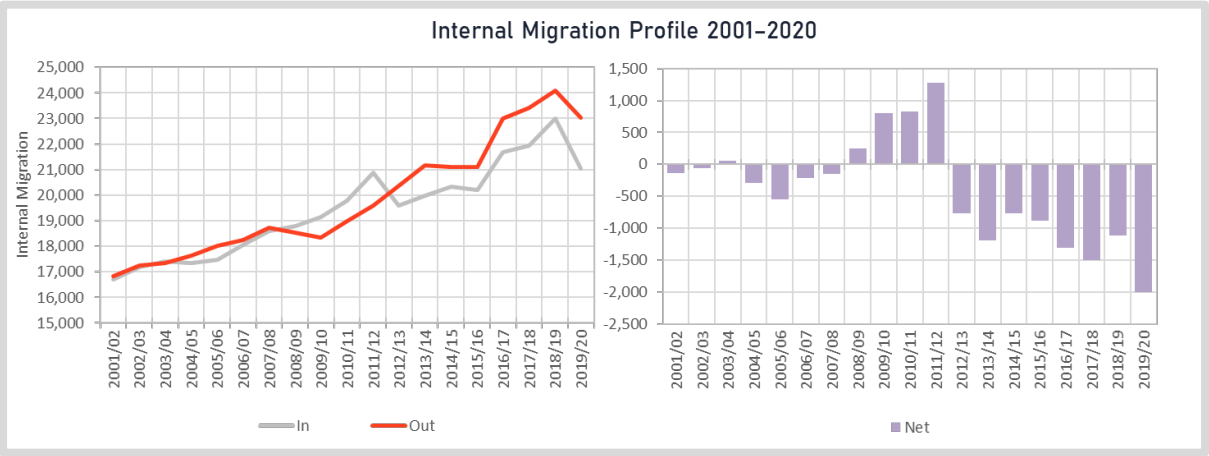
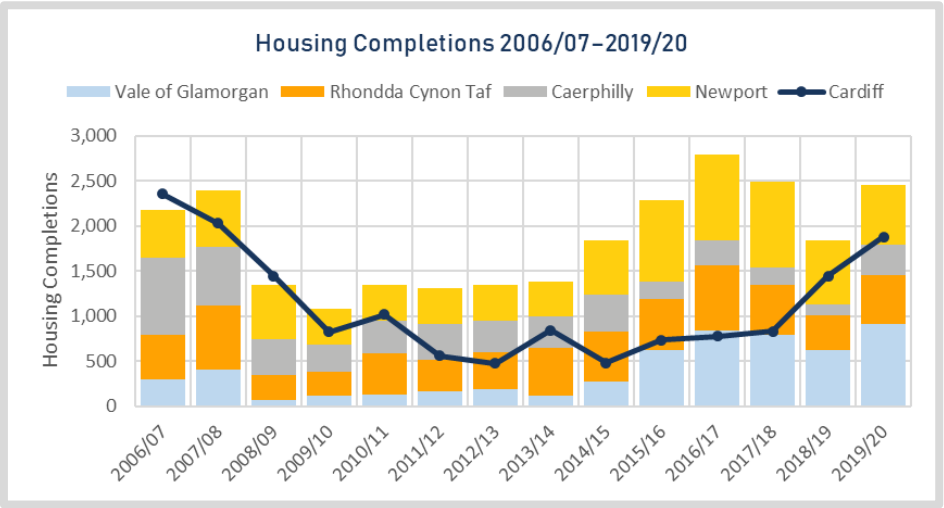


Figure 17: Cardiff - Internal Migration Profile, 2001/02–2019/20
Source: ONS

2.30 Cardiff's changing profile of internal migration should be considered alongside fluctuations in its university student numbers, specifically those originating from other parts of Wales and the rest of the UK (Figure 8). The annual inflow and outflow of students in the 18–24 age-range, is a key component of Cardiff's migration balance.

2.31 In addition, the migration profile should be considered alongside housing completion rates both within Cardiff and within its neighbouring authorities: the Vale of Glamorgan, Rhondda Cynon Taf, Caerphilly and Newport (Figure 18). Whilst Cardiff's completion rate was high relative to its four neighbouring authorities before 2009, the last six years have seen an acceleration in the rate of new build in Newport, the Vale of Glamorgan and Rhondda Cynon Taf, in particular.



Note: For Rhondda Cynon Taf, 2019/20 is a planned completion figure

Figure 18: Housing Completions, 2006/07–2019/20
Source: Councils

2.32 A final factor to consider, relates to the prominent increase in both inflow and outflow estimates from 2016/17 onwards, which aligns with the HELM methodological change implemented by ONS as part of its improvements to population estimation, redistributing student numbers based on historical patterns, post-graduation. The analysis below provides an illustration of some of the geographical effects of these factors upon Cardiff's migration profile.

2.33 In the first 11 years of the migration time-series, up to 2011/2012, Cardiff's most significant net migration inflows (higher inflow than outflow) originated from Ceredigion, Carmarthenshire and Swansea. Its largest net migration outflow exchange (higher outflow than inflow) was with the Vale of Glamorgan, with an average annual net loss to Cardiff's population of 653 per year (Figure 19).

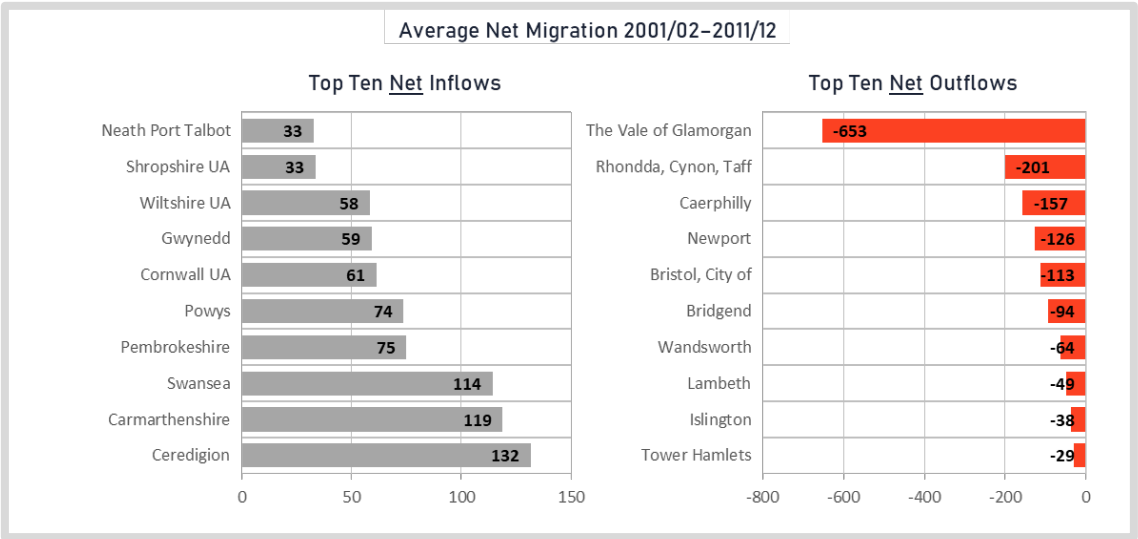


Figure 19: Cardiff - Net Inflow and Outflow Migration Balances, 2001/02–2011/12
Source: ONS

2.34 Despite an increasing net outflow through internal migration since 2012/13, the average net inflow exchanges with Ceredigion and Swansea have increased in this period. The top five inflow destinations

have altered slightly in comparison to the 2001/02–2011/12 statistics (Figure 20) with a decrease in average net inflow exchanges for Pembrokeshire and Powys. At the same time, Cardiff's average annual net outflow exchange with the Vale of Glamorgan, Rhondda Cynon Taf, Caerphilly and Newport have all increased since 2012/13.

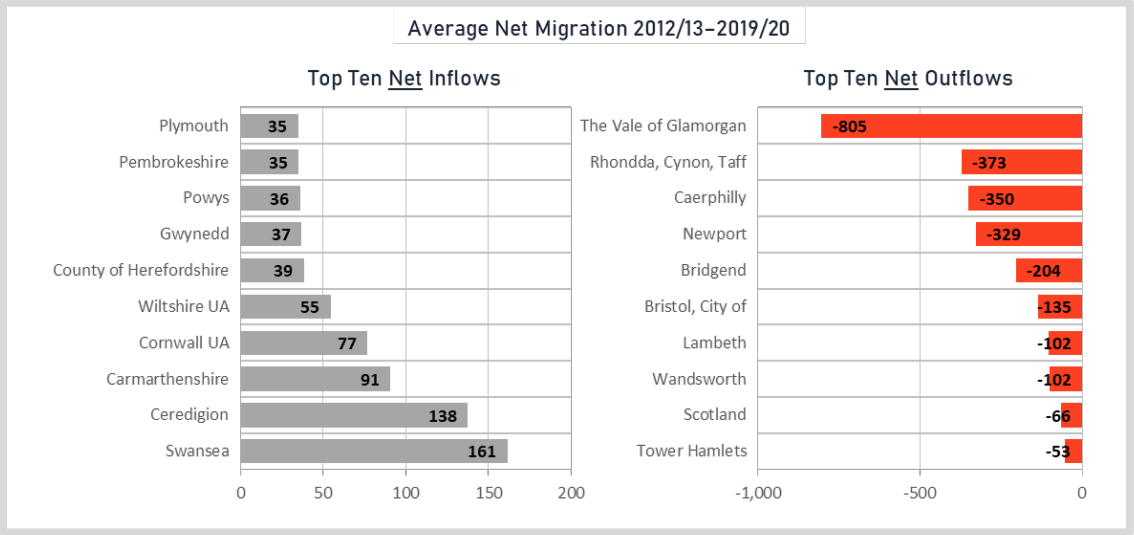


Figure 20: Cardiff - Net Inflow and Outflow Migration Balances, 2012/13–2019/20
Source: ONS

2.35 An illustration of the full extent of Cardiff's in- and out-migration distribution between 2012/13 and 2019/20, reveals the concentrations of flows to and from Welsh and South West of England local authorities (Figure 21).

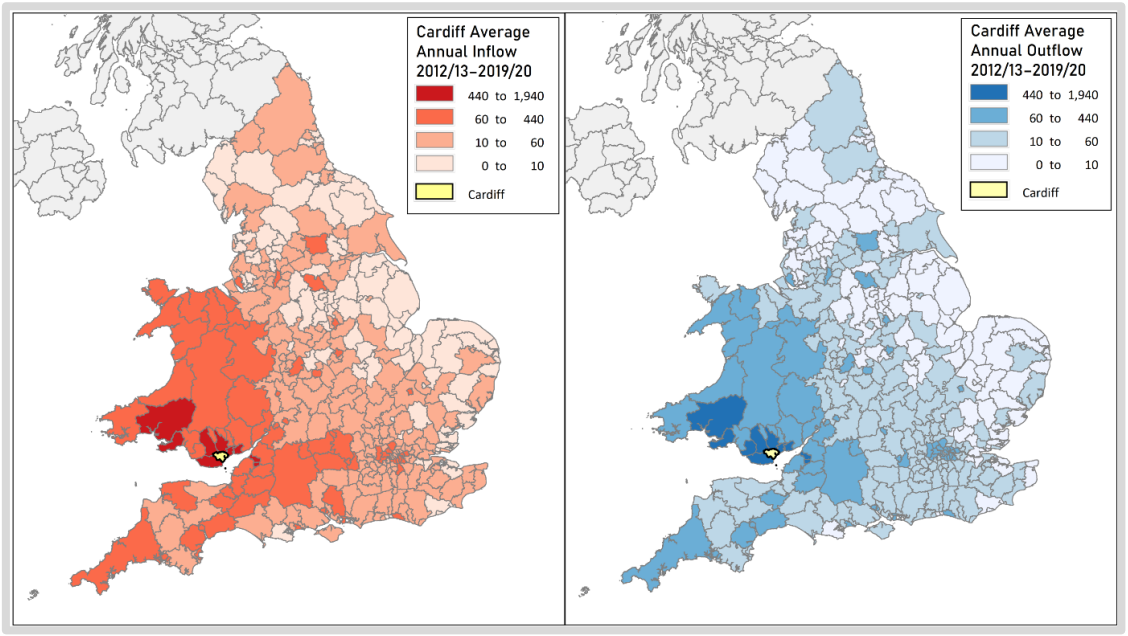


Figure 21: Cardiff - Average Annual Inflows and Outflows, 2012/13–2019/20
Source: ONS

2.36 Focusing on the last four years of migration evidence, corresponding to the period for which the ONS HELM estimation methodology has applied (and for which housing completions in contiguous local

authorities have been high), reveals an uplift in the annual average net inflow and net outflow balances for all areas in close proximity to Cardiff, as well as districts in south west England (Figure 22).

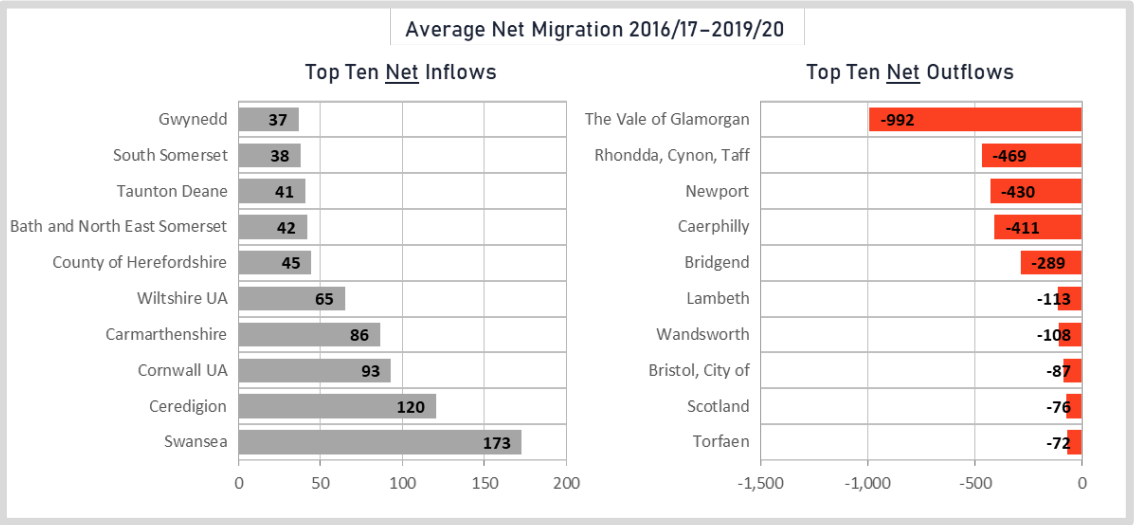


Figure 22: Cardiff - Net Inflow and Outflow Migration Balances, 2016/17–2019/20
Source: ONS

2.37 The dominance of the annual student inflow and outflow is illustrated by the profile of net internal migration by five-year age-group. It is only the 15–19 age-group that records a positive net migration balance for Cardiff in each of the three time-periods. All other age-groups are subject to an annual average net outflow, highest in the 20–24 group (as students return following graduation) and in the youngest adult age-groups 25–39 (Figure 23). The trend is for a higher (or lower) net migration balance in the 2016/17–2019/20 age profile, across the majority of age-groups.

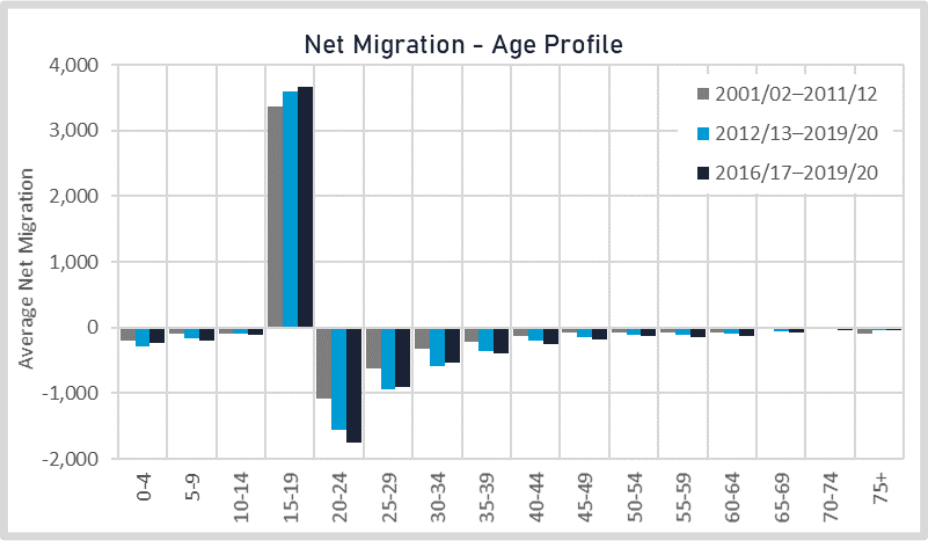


Figure 23: Cardiff - Internal Migration Age Profile
Source: ONS

2.38 The Royal Mail provides a mail redirection service to home movers (both owner-occupied and rented properties) and the data provides a proxy measure of migration within the UK during the COVID-19

period. In Cardiff, the net balance of moves has generally been negative but with a more positive balance during May-July 2020. Since September 2020, the monthly net outflow has generally been higher than that recorded in the 5-year average (Figure 24).

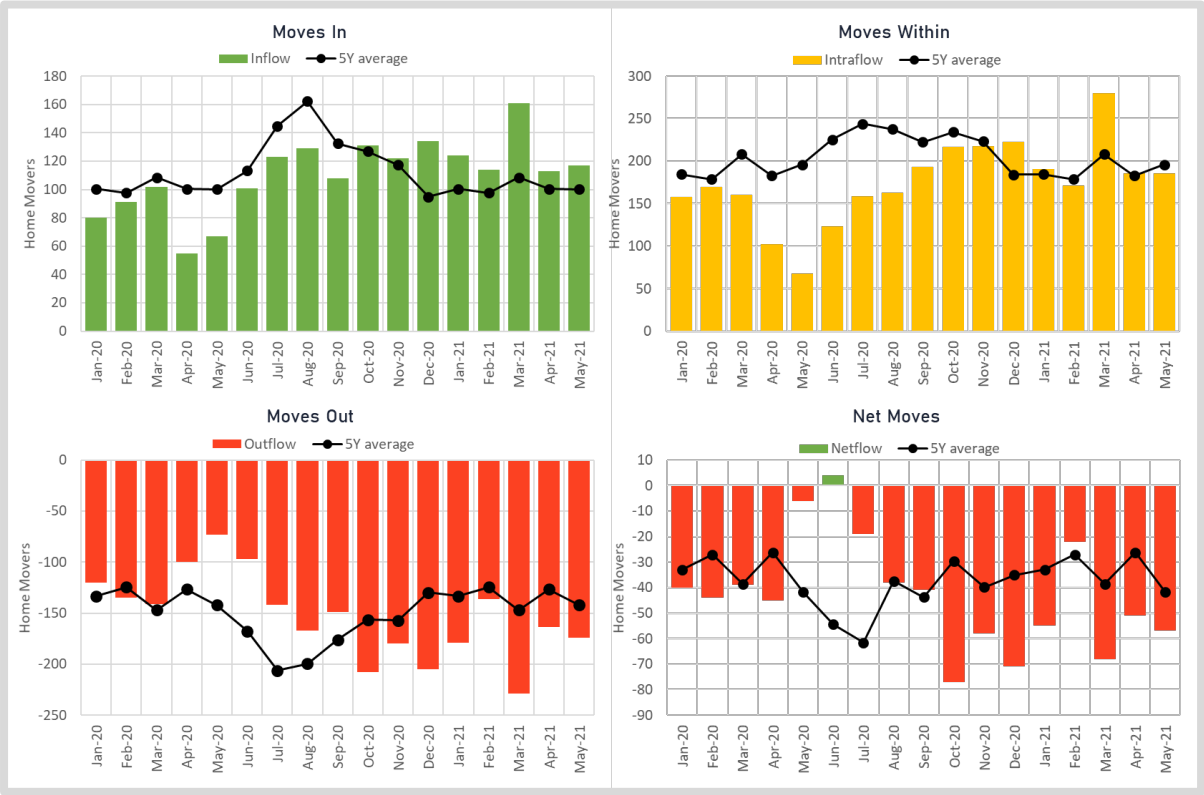


Figure 24: Cardiff - Home Movers, January 2020–May 2021
Source: Royal Mail[10]

2.39 Land Registry data provides an indication of how house sale transactions have been impacted by the COVID-19 pandemic, for both existing and new properties. Figure 25 illustrates the drop in transactions after March 2020, particularly noticeable for new properties. The easing of lockdown restrictions in summer 2020 saw a return to the annual average for existing properties, but the most recent lockdown has seen a more severe decline in transaction numbers.

[10] Royal Mail: Home Movers Data

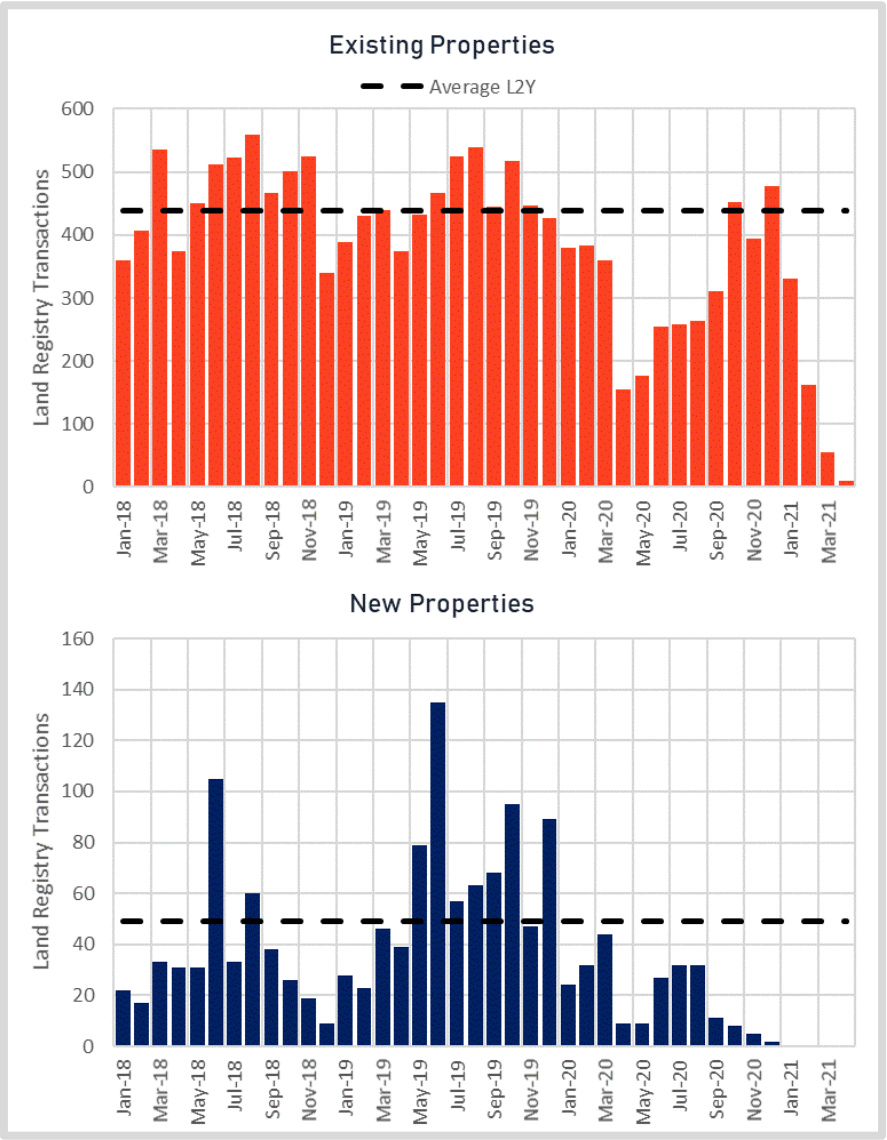


Figure 25: Cardiff - Land Registry Transactions, January 2018–April 2021
Source: HM Land Registry[11]

International Migration

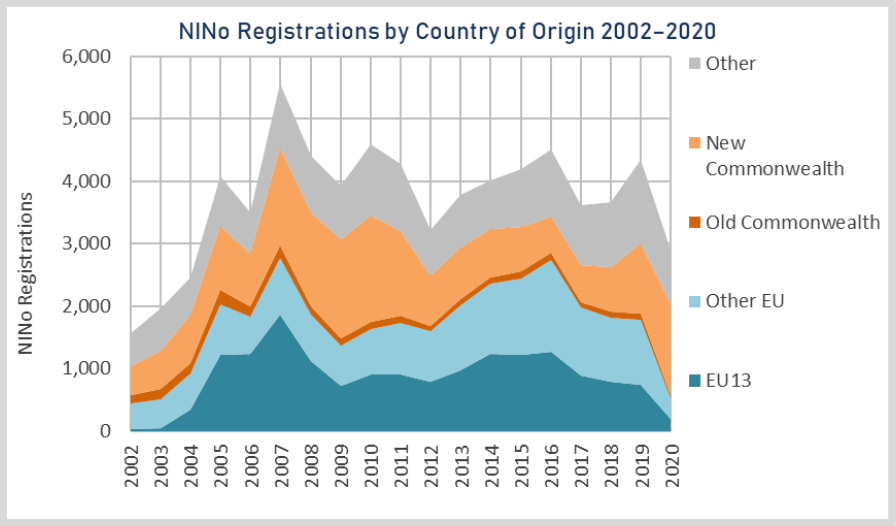
2.40 International migration continues to be the most difficult component to estimate robustly, with ONS downgrading its output to 'experimental statistics' status, whilst improvements continue[12]. The IPS provides the foundation of the UK's immigration and emigration estimates but this is being discontinued, in favour of a mix of administrative datasets, including the patient register, higher education statistics and national insurance number (NINo) registrations.

2.41 For Cardiff, international migration has been a key contributor to population growth since 2001, with an average annual net international migration balance of approximately +1,800 per year. In 2019/20,

[11] HM Land Registry Data
[12] Statement from the ONS on the reclassification of international migration statistics, August 2019

net immigration was the dominant driver of Cardiff's population change, contributing an estimated +3,583 to growth over the twelve-month period.

2.42 The Department for Work and Pensions' (DWP) NINo statistics provide a complementary illustration of international migration inflow to Cardiff; different to the ONS MYE statistics in that they refer only to work-based in-migration and include migrants whose stay may be shorter than 12 months. NINo registrations peaked in 2007 in excess of 5,000, with the number fluctuating around 4,000 per year thereafter. 2020 has shown a sharp decline in all origin categories (Figure 26).



EU13 refers to countries who have joined the EU since 2004:
Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia

Figure 26: Cardiff - NINo registrations by Country of Origin Category, 2002–2020
Source: DWP

2.43 Since 2002, the number of registrations has been highest for migrants from Poland and India, totalling almost 11,000 from India and 7,000 from Poland. Three countries from the EU13 (Czech Republic, Romania and Poland) have a combined total of over 11,500 registrations since 2002 (Figure 27).

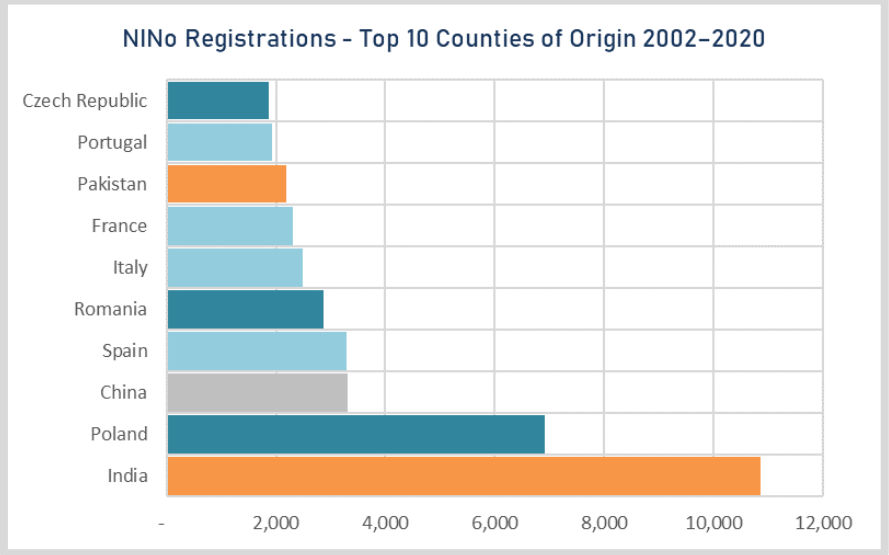


Figure 27: Cardiff - NINo Registration Top 10 Countries of Origin, 2002–2020
Source: DWP

2.44 Looking at NINo registrations on a quarterly basis helps to demonstrate the impact the COVID-19 pandemic has had on both EU and Non-EU migrant workers arriving in Cardiff. Figure 28 illustrates the drop in NINo registrations at Q2 2020, the start of the COVID-19 period. The drop has been more severe for EU migrants, compared to Non-EU, with a recovery in the latter during Q4 2020.

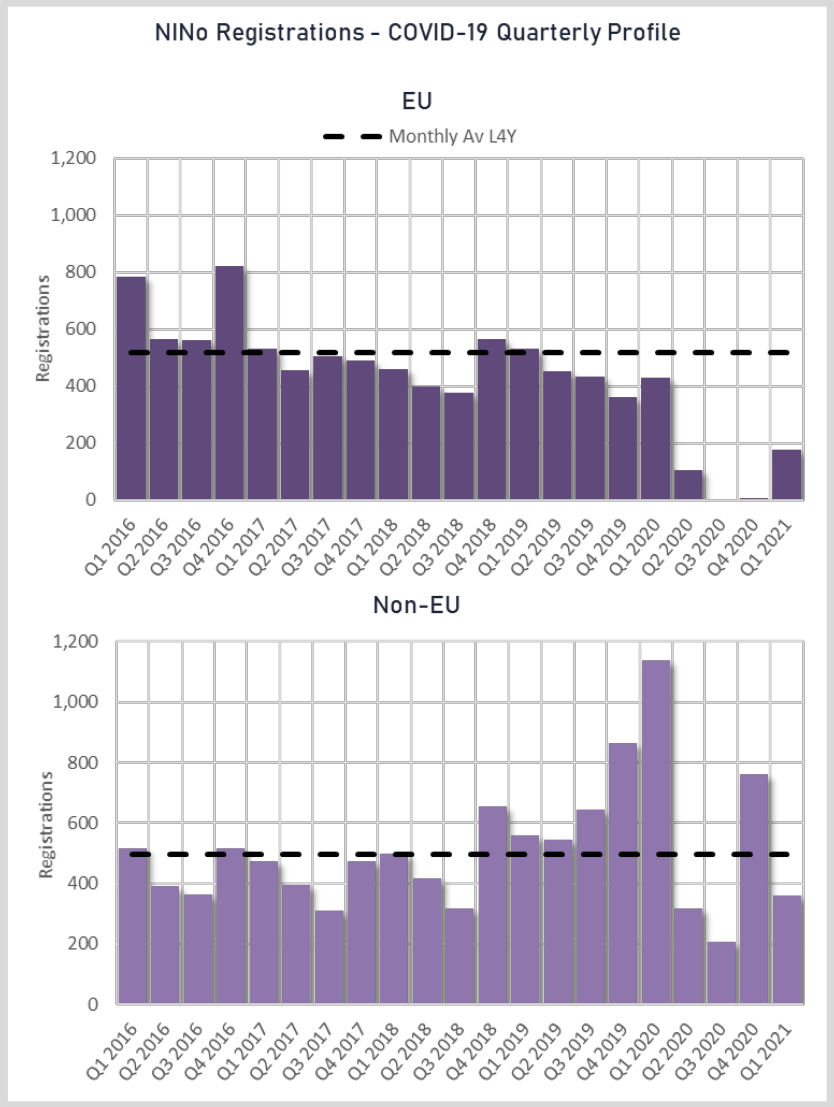


Figure 28: Cardiff - NINo Registrations - Quarterly Profile 2016–2021
Source: DWP

2.45 There remains considerable uncertainty surrounding the recovery of international mobility (work-based, education and tourist), and whilst the UK government's new border policies will provide for migrant labour and continue to encourage the inflow of foreign students, it is likely that a reduction in previous levels of international migration will be a feature of the next 5-10 years. Lower levels of international migration would have an important impact upon Cardiff's future growth profile.

3 Demographic Scenarios

Scenario Definition

3.1 POPGROUP (PG) technology (see Appendix B) has been used to configure a suite of growth scenarios for Cardiff (Table 1). Additional detail on scenario data inputs and assumptions is provided in Appendix C.

3.2 The WG scenarios include the 2014-based *Principal* projection, plus the full suite of variants that make up the 2018-based projections.

3.3 The WG scenarios are accompanied by the Greater London Authority's (GLA) own demographic projections, which consider the impact of higher and lower growth in London upon other parts of the UK. The GLA's 'central' 2019-based scenarios are presented, providing alternative trend outcomes for Cardiff.

3.4 PG trend scenarios consider growth outcomes based on a continuation of Cardiff's short-term and long-term migration histories, incorporating a 2020 base year.

3.5 A **Net-Nil** scenario estimates future population growth on the assumption of balanced (zero) net migration.

3.6 The **Dwelling-led 10Yr** scenario considers how a continuation of Cardiff's latest 10-year history of housing completion rates would impact upon future population growth. The **Dwelling-led_1600** scenario considers the impact of future housing growth of 1,600 dwellings per annum (dpa). Both scenarios have a 2020 base year.

3.7 Employment-led scenarios consider the relationship between future employment growth and demographic change, incorporating key assumptions on economic activity rates, an unemployment rate and a commuting ratio, with a 2020 base year. Two of the Employment-led scenarios are underpinned by employment forecasts formulated by Experian and Oxford Economics respectively. A third scenario considers employment growth at a higher level of 1,600 per year. See Appendix C for detail on the annual employment growth applicable to each employment-led scenario.

3.8 Under each scenario, population, household, migration, dwelling and employment growth is presented over a 2021–2036 plan horizon, in line with Cardiff's Replacement LDP period.

3.9 For all scenarios, household and dwelling growth is estimated using assumptions from the WG 2018-based household projection model. In modelling the relationship between households and dwellings, a dwelling vacancy rate of 3.7% has been applied, derived from 2011 Census statistics.

Table 1: Cardiff Scenario Definition

WG-2014- Principal	Replicates the WG 2014-based *Principal* population projection, using historical population data for 2001–2014.
WG-2018-Principal	Replicates the WG 2018-based *Principal* population projection, using historical population data for 2001–2018.
WG 2018-HIGHPOP	Replicates the WG 2018-based *High* population projection, using historical population data for 2001–2018 and incorporating high fertility, mortality and migration assumptions.
WG 2018-LOWPOP	Replicates the WG 2018-based *Low* population projection, using historical population data for 2001–2018 and incorporating low fertility, mortality and migration assumptions.
GLA-2019-Central_Upper	Replicates the GLA Central-Upper 2019-based scenario, using historical population data from 2001–2019. Migration assumptions are derived from a 10-year historical period (2009/10–2018/19).
GLA-2019-Central_Lower	Replicates the GLA Central-Lower 2019-based scenario, using historical population data from 2001–2019. International migration assumptions are derived from a 10-year historical period (2009/10–2018/19) and domestic migration from a 5-year historical period (2014/15–2018/19).
PG-Long Term	Uses an ONS 2020 MYE base year and calibrates its migration assumptions from a 19-year historical period (2001/02–2019/20).
PG-Short Term	Uses an ONS 2020 MYE base year and calibrates its migration assumptions from a 6-year historical period (2014/15–2019/20).
Net Nil	Uses an ONS 2020 MYE base year and assumes that internal and international migration flows are balanced (zero) between in and out migration.
Dwelling-led 10Yr	Models the population impact of an average annual dwelling growth of +835 dpa, based on a 10-year history of housing completions in Cardiff (2011/12–2020/21).
Dwelling-led_1600	Models the population impact of an average annual dwelling growth of +1,600 dpa over the plan period.
Employment-led_OE	Models the population impact of an average annual employment growth of +998 per year over the plan period, detailed in the Oxford Economics (OE) economic forecast.
Employment-led_Exp	Models the population impact of an average annual employment growth of +707 per year over the plan period, detailed in the Experian economic forecast.
Employment-led Target	Models the population impact of an average annual employment growth of +1,600 per year over the plan period.

Cardiff Growth Outcomes 2021–2036

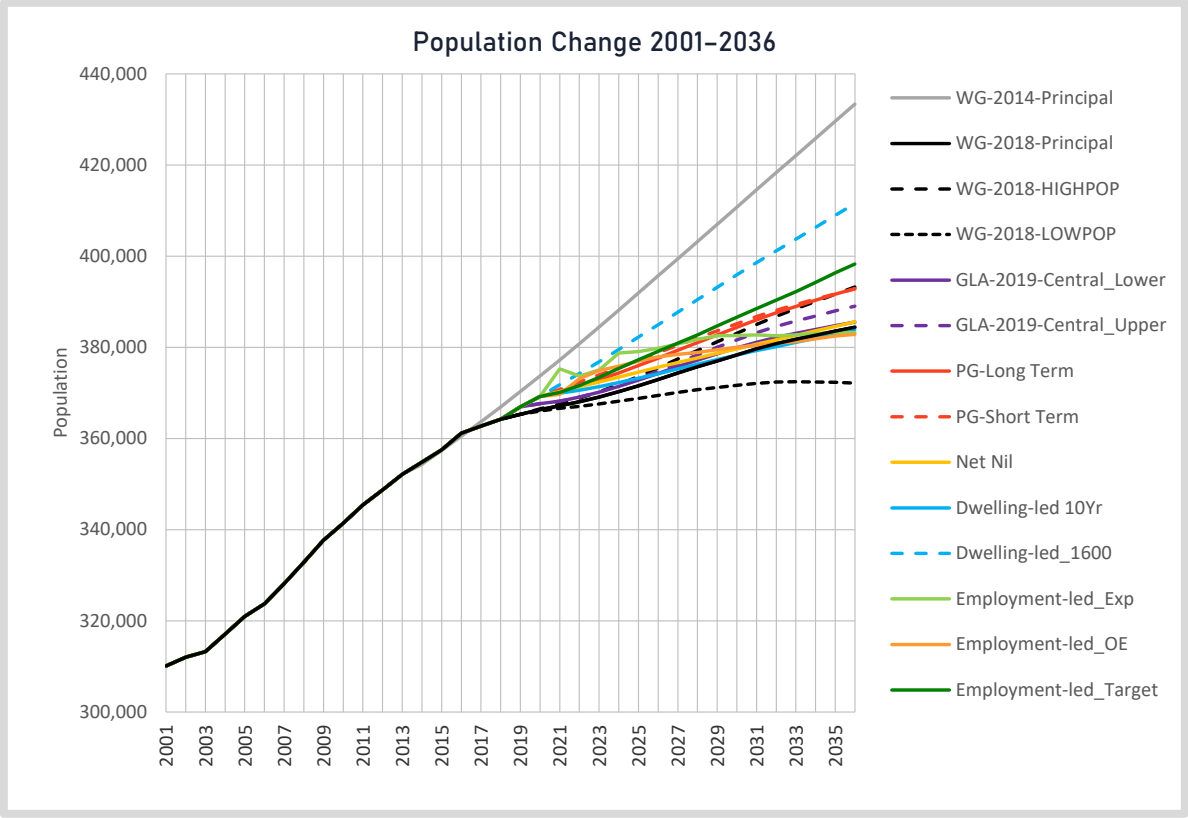


Figure 29: Cardiff - Population Growth Scenarios, 2001–2036

Table 2: Cardiff - Scenario Outcomes, 2021–2036

Scenario	Change 2021–2036				Average per year	
	Population Change	Population Change %	Households Change	Households Change %	Net Migration	Dwellings
WG-2014-Principal	56,154	14.9%	29,363	18.3%	1,129	2,034
Dwelling-led_1600	39,742	10.7%	23,103	14.6%	1,390	1,600
Employment-led_Target	28,191	7.6%	18,111	11.5%	740	1,254
WG-2018-HIGHPOP	25,620	7.0%	16,243	10.4%	372	1,125
PG-Long Term	22,574	6.1%	15,753	10.0%	397	1,091
PG-Short Term	22,016	5.9%	14,744	9.4%	367	1,021
GLA-2019-Central_Upper	20,824	5.7%	16,118	10.3%	550	1,116
GLA-2019-Central_Lower	17,314	4.7%	14,294	9.1%	300	990
WG-2018-Principal	17,194	4.7%	12,962	8.3%	171	898
Net Nil	15,321	4.1%	11,573	7.4%	0	802
Dwelling-led 10Yr	13,980	3.8%	12,063	7.7%	-100	835
Employment-led_OE	13,174	3.6%	11,735	7.5%	-180	813
Employment-led_Exp	7,959	2.1%	9,734	6.1%	-559	674
WG-2018-LOWPOP	5,566	1.5%	8,781	5.6%	-2	608

Scenario Summary

3.10 The 2001–2036 population growth trajectories for all Cardiff scenarios are presented in Figure 29. In Table 2, each of the scenarios is summarised in terms of population and household growth for the 2021–2036 LDP period, alongside the average annual net migration and dwelling growth outcomes.

3.11 Population change for the 2021–2036 period ranges from 1.5% under the **WG 2018-LOWPOP** scenario, to 14.9% under the **WG 2014-Principal** scenario. The range of population growth equates to an estimated housing requirement of +608 to +2,034 dpa.

3.12 The **WG-2018-Principal** projection for Cardiff estimates a much-reduced growth outlook (+898 dpa) compared to **WG-2014-Principal** (+2,034 dpa), with a very different components of change profile (Figure 30). With dampened fertility and life expectancy assumptions, coupled with an increasing net outflow from internal migration since 2013, **WG-2018-Principal** has a lower natural change contribution to annual growth, combined with a large and consistent net outflow from internal migration. Population growth is bolstered by a larger net contribution from international migration.

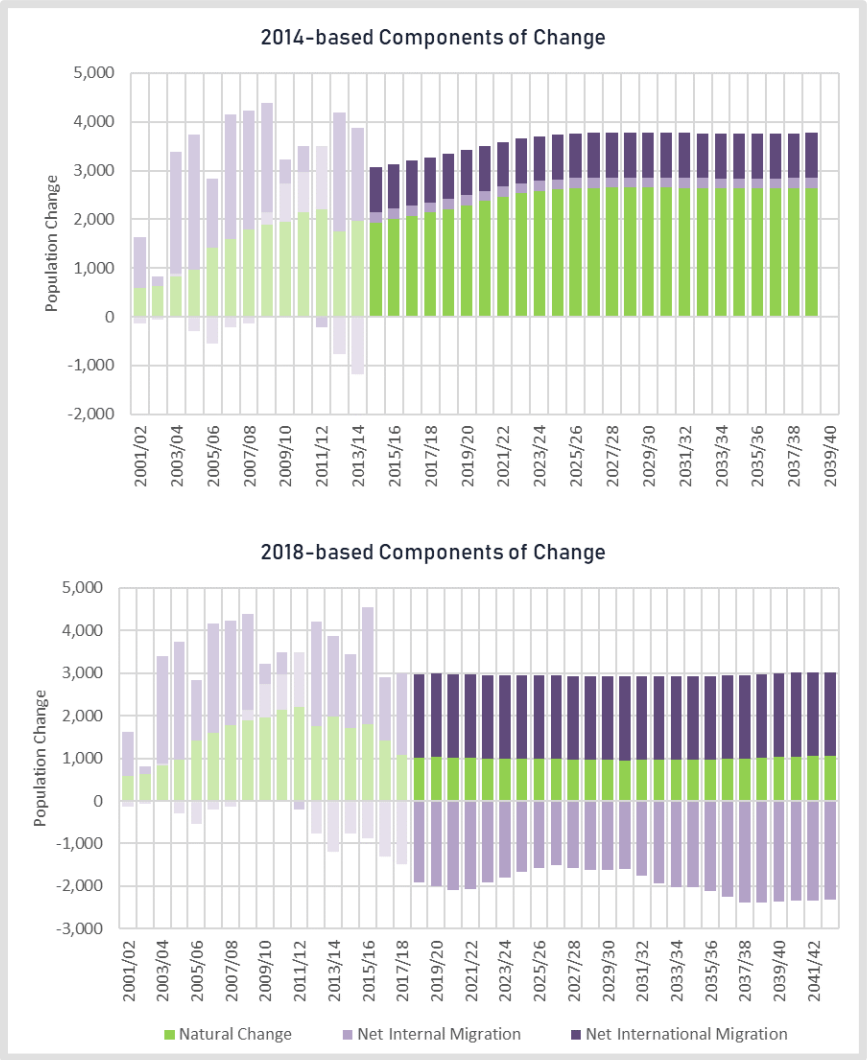


Figure 30: Cardiff - Components of Population Change, WG Principal Scenarios
Source: WG

3.13 The **Dwelling-led_1600** scenario based on an average annual dwelling growth of +1,600 dpa and **Employment-led Target** scenario based on an average annual employment growth of +1,600 per year present high growth outcomes. The scenarios estimate population growth of 10.7% and 7.6% respectively, with a corresponding dwelling growth of +1,600 and +1,254 dpa over the plan period.

3.14 The OE and Experian employment-led scenarios present lower growth outcomes as in both cases the estimates of employment growth are high in the earliest years, tailing off to relatively low growth in the later years of the forecast. In each scenario, workplace-based employment forecasts have been used to estimate likely population growth, using economic activity rates and a fixed commuting ratio that are consistent with other scenarios, plus an unemployment rate that varies in line with that estimated by Experian and OE respectively.

3.15 Of the two additional employment-led scenarios, the **Employment-led_OE** scenario estimates the highest population growth of 3.6% and associated dwelling growth of +813 dpa. The **Employment-led_Exp** scenario estimates growth of 2.1% and +674 dpa.

3.16 A relatively low growth outcome is confirmed in the **Dwelling-led 10Yr** scenario, continuing the recent history of housing completions (+835 dpa) to produce a population growth of 3.8% over the LDP period, lower than both the **WG-2018-Principal** and the **Net Nil** scenario, which is based on a balanced (zero) annual impact of both internal and international migration.

3.17 The **GLA-2019-Central_Lower** scenario, which assumes a high net migration outflow from London, produces a similar population growth outcome to the **WG-2018-Prinicpal** (4.7%) with an associated dwelling growth of +990. The **GLA-2019-Central_Upper** results in a higher population change of 5.7% and dwelling growth of +1,116.

3.18 The PG scenarios examine the impact of a range of alternative migration assumptions, in conjunction with the ONS *Principal* assumptions on fertility and mortality. **PG-Short Term** and **PG-Long Term** scenarios produce very similar outcomes (+1,021 and +1,091 dpa), driven by Cardiff's migration histories, with high international migration being a critical component of the **PG-Short Term** outcome. The **PG-Long Term** scenario results in a higher growth outcome, with the internal migration assumptions drawn from an extended historical period (2001–2020) which included both net inflow and net outflow to and from Cardiff.

Age Profile

3.19 The changing age profile that is estimated over the 2021–2036 LDP period is very different under the **WG-2014-Principal** outcome compared to all other scenarios. The **WG-2018-Principal** and **PG-Long Term** scenarios are presented for comparison (Figure 31).

3.20 The **WG-2014-Principal** scenario results in growth in all but the 55–64 age-groups, with particularly high growth estimated in the 15–24, 40–49 and 75+ age-groups. Under the **WG-2018-Principal** scenario, growth is dampened across all age-groups, with the exception of 20–24 year-olds, with a near 6,000 increase over the plan period. Low growth and net-loss is the key feature of the pre-school and school-year age-groups, an important consideration for longer-term school-place planning. The

30–39 and 50–64 age-groups are also estimated to decline, with more substantial growth expected in the 65+ age-range as Cardiff's population ages, albeit with dampened life expectancy improvements.

3.21 Under the **PG-Long Term** scenario, the profile of growth by age-group is similar to the **WG-2018-Principal** outcome. This is to be expected given the consistent fertility and mortality assumptions, although the longer historical time-period from which the migration assumptions have been drawn in the **PG-Long Term** scenario, results in less extreme variations in growth and decline across the age-range. The growth in 20–24 year-olds is lower, with higher growth for age 40–49, plus a smaller decline in the school-age children, in the 30–39 age-group and in the 55–64 age-group.

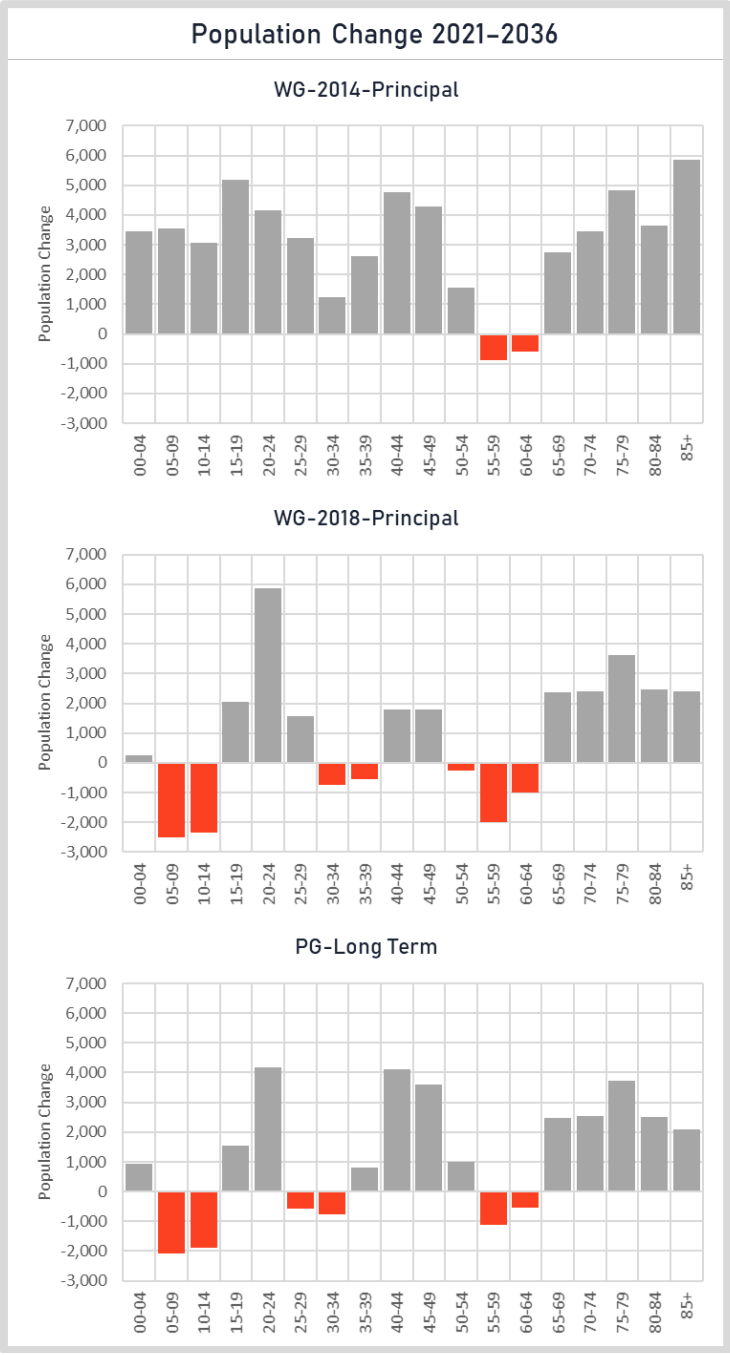


Figure 31: Cardiff – Population Change by Age-Group, WG Principal Scenarios, 2021–2036
Source: WG

Linking Population and Employment

3.22 A final set of summary statistics present the estimated impact of each growth scenario upon employment growth within Cardiff, comparing directly to the Oxford Economics and Experian estimates (Figure 32). The relationship between population and employment is modelled using key assumptions on economic activity rates, unemployment and commuting (see Appendix C). The economic activity rates determine the estimated annual change in Cardiff's resident labour force, whilst the unemployment and commuting ratios link the labour force to workplace-based employment in Cardiff.

3.23 Application of these assumptions to each scenario across the 2021–2036 plan period results in a range of employment growth outcomes that varies from +707 per year under the **Experian** scenario, to +2,151 per year under the **Dwelling-led_1600** scenario.

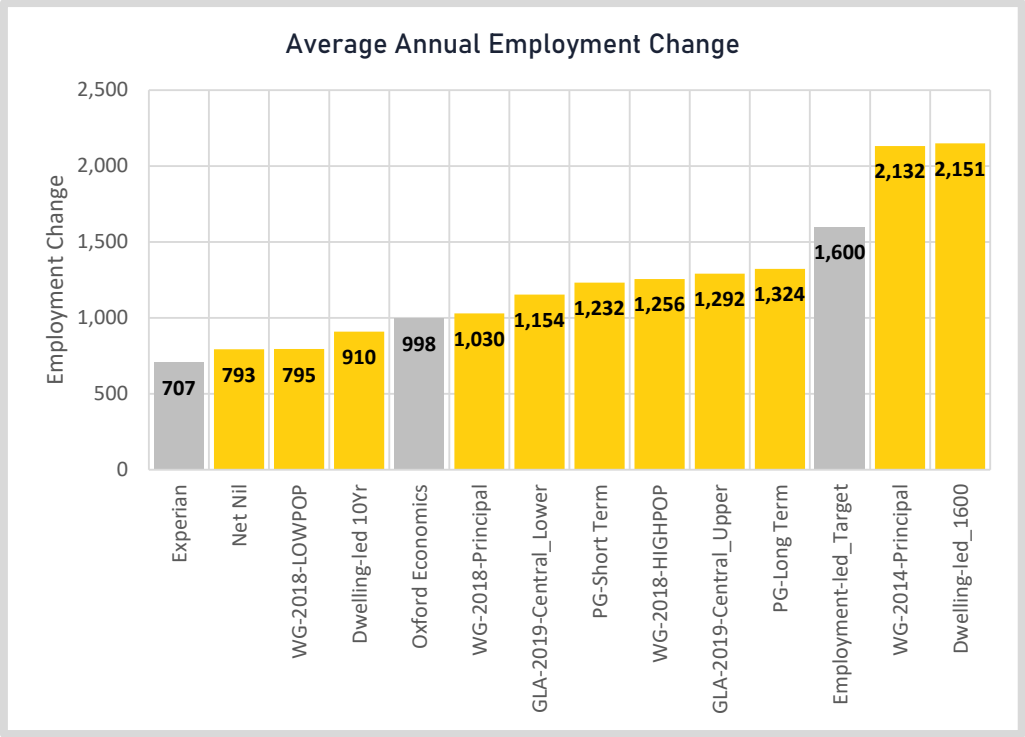


Figure 32: Cardiff - Average Annual Employment Growth, 2021–2036

4 Summary

Demographic Change

4.1 At mid-year, 2020, Cardiff's population was estimated by ONS to be approximately 369,000, over 59,000 higher than its 2001 total, a 19% increase. Much of this growth was experienced prior to the global financial crisis, with lower annual growth rates since 2009.

4.2 The city's profile of annual population growth has been influenced by the rate at which new homes have been built. Housing delivery rates in Cardiff have slowed substantially from a 2006/07 peak, with the recent recovery hindered by COVID-19 restrictions. Since 2014, Cardiff's population growth rate has been exceeded by Torfaen, Bridgend, Newport and the Vale of Glamorgan, bolstered by a faster recovery in new housing completions in these areas and an increasing net inflow from Cardiff.

4.3 Cardiff's population profile is influenced by the number of students at its universities. In the 2019/20 academic year, there were approximately 44,000 students attending Cardiff University and Cardiff Metropolitan University (c. 50% growth since 2001), with further student numbers at the Cardiff Campus of the University of South Wales. Approximately 23% of students attending the two larger universities originate from overseas.

4.4 Natural change (the difference between the number of births and deaths) and international migration have exerted a consistently positive impact upon Cardiff's annual population growth, although the natural change contribution has declined since a peak in 2011/12, as birth numbers have fallen year-on-year. In contrast, from 2012/13, internal migration (to and from other parts of the UK) has resulted in an annual net loss of population. The net outflow has been particularly high since 2016/17, the point at which ONS implemented its new HELM methodology.

4.5 In terms of population age-structure, pre-school populations increased sharply to 2013 but have declined thereafter, with primary school age-groups following suite with a short time-lag. Secondary school age-groups are only just starting to recover back to 2001 levels.

4.6 The 18–24 student age-group has seen the largest growth in numbers since 2001, although this has reduced since 2016, most likely as a result of ONS' application of its HELM methodology to internal migration estimates. Nevertheless, the importance of the 18–24 age-group to Cardiff's annual population growth history, will be reflected in its growth projections.

4.7 The key labour force age-groups (25–64) have increased by approximately 20% since 2001, although the dampened growth of 25–39 year-olds in recent years may be evidence of the effects of Cardiff's increasing net migration outflow. The 65+ age-groups are subject to consistent annual increase, a trend that will persist over the remainder of the Cardiff LDP period, as birth cohorts from the 1950s and 1960s continue to reach older age.

Growth Outcomes

4.8 POPGROUP technology has been used to configure an updated suite of growth scenarios for Cardiff, integrating latest ONS evidence, new GLA projections, plus independent economic forecasts. Under each scenario, population, household, migration, dwelling and employment growth is presented over a 2021–2036 plan period.

4.9 Household growth has been estimated using household membership rate assumptions from the WG's 2018-based household projection model. Associated dwelling growth has been estimated using a dwelling vacancy rate of 3.7% for Cardiff, derived from the 2011 Census. Estimates of the changing size of Cardiff's labour force and employment that results from the variant population growth outcomes have been calculated using a combination of economic activity rates, an unemployment rate and a commuting ratio for the county.

4.10 Over the 2021–2036 LDP period, population growth of 1.5% to 14.9% is estimated under the range of scenarios. The associated annual dwelling growth ranges from +608 dpa to +2,034 dpa (Figure 33). The **WG-2014-Principal** and 'policy-based' scenarios present the highest growth outcomes. In contrast, the OE and Experian employment-led scenarios suggest low growth due to the 'front-loaded' nature of the employment forecasts, with lower employment growth in the later years of the LDP period.

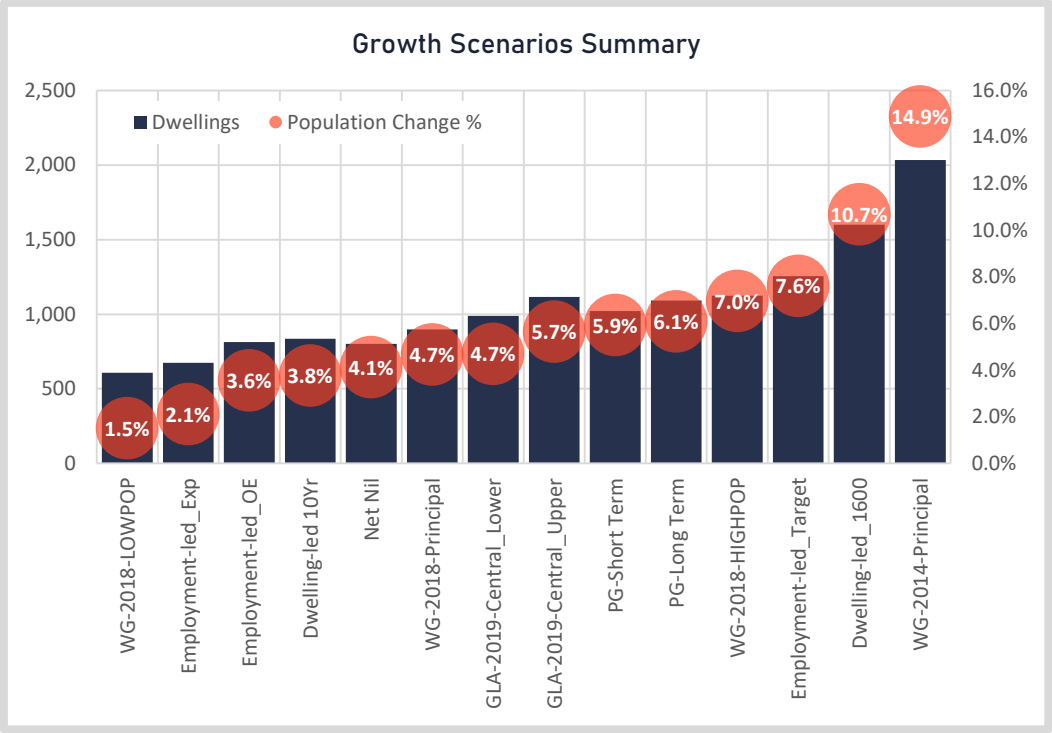


Figure 33: Cardiff Growth Scenarios Summary (2021–2036)

LDP Development and COVID-19

4.11 Following the political turbulence of Brexit, the global COVID-19 pandemic has resulted in an unprecedented interruption to the daily lives of all UK citizens. The updated growth scenarios,

presented as evidence to inform the replacement LDP for Cardiff, have been formulated towards the end of this period of extraordinary social and economic upheaval. Sustained economic and social recovery now appears to be a realistic outcome for 2022.

4.12 The COVID-19 pandemic resulted in the UK economy suffering its largest ever economic decline, with output falling almost 10% in 2020[13]. The pandemic has had a differential effect upon industry sectors, with hospitality suffering a 90% fall in output during the first lockdown, compared to finance, which has been little affected.

4.13 The pandemic has affected the daily lives of all communities, with the Google mobility statistics (Figure 2) providing a powerful image of the impact upon household mobility throughout the phases of lockdown. But employment and earnings impacts have varied considerably across households, with some experiencing sharp falls in income and rising indebtedness while others, less affected by restrictions, have been able to save considerable amounts.

4.14 There are now increasingly positive signs for the UK economy and society. The rapid rollout of effective vaccines has enabled the planned relaxation of COVID-19 restrictions, resulting in a faster-than-expected economic rebound in recent months[14]. The latest compilation of economic forecasts for the UK economy (July 2021) estimates average GDP growth of +7.1% in 2021, a further 5.4% in 2022[15]. The Google-sourced mobility curves are moving toward 'normal', although there remains some way to go with regard to pre-pandemic workplace and travel norms.

Concluding Comments

4.15 The National Plan[16] for Wales has set the agenda for recovery through investment in infrastructure and services, underpinned by an effective national planning system[17]. Conformity between national, regional and local development plans is an imperative. Cardiff is at the heart of the SE region and the wider Welsh economy. Its growth and vibrancy, underpinned by strong housing and employment markets are key to the achievement of the national strategic ambition.

4.16 The WG's 2028-based projections presented here, reveal a much-reduced growth outlook for Cardiff when compared to the **WG-2014-Principal** projection that informed its current LDP. Cardiff's low rate of housing completions in the last ten years, in combination with higher housing growth in other parts of SE Wales, are a key driver of these lower growth trajectories, in combination with the dampened outlook for long-term fertility and mortality.

4.17 A net annual outflow of population has become the norm for Cardiff, with population growth sustained by relatively high net international migration and an excess of births over deaths. But the future scale of international migration is uncertain, as COVID-19 restrictions persist, and as new UK border controls take effect. In addition, the recruitment of international students to Cardiff's universities may be challenging in the face of the continuing global impact of the pandemic. Although

[13] ONS: GDP monthly estimate, UK
[14] OBR: Economic and Fiscal Outlook, March 2021
[15] HM Treasury: Forecasts for the UK Economy: July 2021
[16] Future Wales: The National Plan 2040
[17] Planning Policy Wales

this may be offset by an increase in demand from UK students over the next ten years, resulting from the higher birth rates of the early 2000s.

4.18 The low population and dwelling growth revealed by the Experian and OE employment-led scenarios are a result of lower employment growth forecast from 2030, effectively increasing net out-migration from Cardiff in later years of the LDP period at a time when the population will be subject to significant ageing of its labour force profile.

4.19 The **Dwelling-led_1600** scenario demonstrates the impact of a return to a more positive outlook on housing completions. The housing industry remains a critical component of the continued economic bounce-back and a key driver of the future growth and distribution of population. For Cardiff, a continued renaissance in its housing completions, recovering from the COVID-19 interruption, will be a fundamental component of its future economic development, underpinning the achievement of the National Plan's strategic ambition.

Appendix A
Ward Population Change

Table 3: Cardiff Wards - Estimated Population Change, 2001–2019

Cardiff Ward Name	Population			% Change		
	2001	2012	2019	2001-2012	2012–2019	2001-2019
Butetown	4,677	10,455	14,094	123.5%	34.8%	201.3%
Cathays	14,200	21,047	22,095	48.2%	5.0%	55.6%
Grangetown	14,590	19,821	22,164	35.9%	11.8%	51.9%
Radyr	4,653	6,551	6,965	40.8%	6.3%	49.7%
Adamsdown	8,159	10,586	12,073	29.7%	14.0%	48.0%
Pontprennau/Old St. Mellons	8,297	9,789	10,762	18.0%	9.9%	29.7%
Cyncoed	10,422	11,417	12,335	9.6%	8.0%	18.4%
Caerau	10,258	11,411	11,983	11.2%	5.0%	16.8%
Penylan	11,687	12,552	13,532	7.4%	7.8%	15.8%
Riverside	12,318	13,885	14,097	12.7%	1.5%	14.4%
Canton	13,167	14,406	15,230	9.4%	5.7%	15.7%
Llanishen	15,790	17,647	17,815	11.8%	1.0%	12.8%
Trowbridge	14,762	15,929	16,691	7.9%	4.8%	13.1%
Creigiau/St. Fagans	4,418	4,925	5,074	11.5%	3.0%	14.9%
Splott	12,260	13,227	13,657	7.9%	3.3%	11.4%
Gabalfa	8,738	8,752	9,828	0.2%	12.3%	12.5%
Pentwyn	14,693	15,504	15,890	5.5%	2.5%	8.2%
Plasnewydd	16,598	18,312	18,040	10.3%	-1.5%	8.7%
Whitchurch and Tongwynlais	15,966	16,682	17,146	4.5%	2.8%	7.4%
Heath	11,824	12,619	12,670	6.7%	0.4%	7.2%
Fairwater	12,352	13,003	13,074	5.3%	0.5%	5.8%
Llandaff North	7,853	8,044	8,249	2.4%	2.6%	5.0%
Ely	14,727	14,805	15,342	0.5%	3.6%	4.2%
Rhiwbina	11,286	11,429	11,517	1.3%	0.8%	2.0%
Llanrumney	11,373	11,169	11,710	-1.8%	4.8%	3.0%
Rumney	8,992	8,872	9,105	-1.3%	2.6%	1.3%
Pentyrch	3,536	3,485	3,534	-1.4%	1.4%	-0.1%
Llandaff	8,999	8,946	8,875	-0.6%	-0.8%	-1.4%
Lisvane	3,494	3,454	3,355	-1.1%	-2.9%	-4.0%
Cardiff	**310,088**	**348,724**	**366,903**	**12.5%**	**5.2%**	**18.3%**

Appendix B
POPGROUP Methodology

B.1 Demographic forecasts have been developed using the POPGROUP suite of products. POPGROUP is a family of demographic models that enables forecasts to be derived for population, households and the labour force, for areas and social groups. The main POPGROUP model (Figure 34) is a cohort component model, which enables the development of population forecasts based on births, deaths and migration inputs and assumptions.

B.2 The Derived Forecast (DF) model sits alongside the population model (Figure 35) providing a headship rate model for household projections and an economic activity rate model for labour force projections.

B.3 For further information on POPGROUP, please refer to the Edge Analytics website: www.edgeanalytics.co.uk

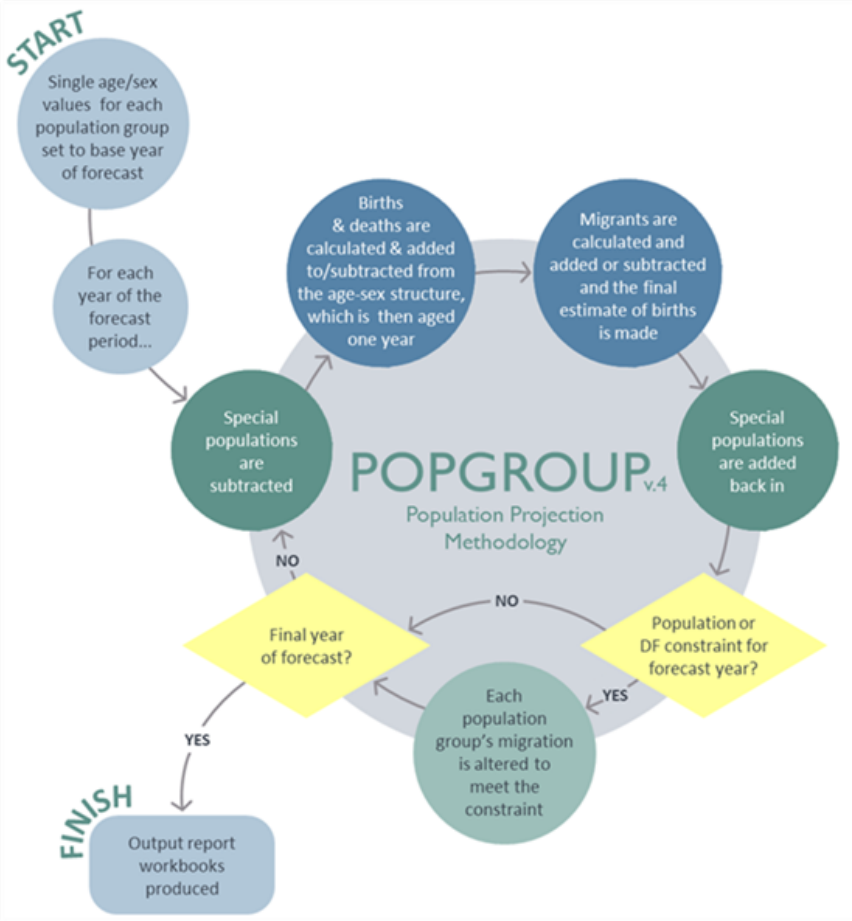
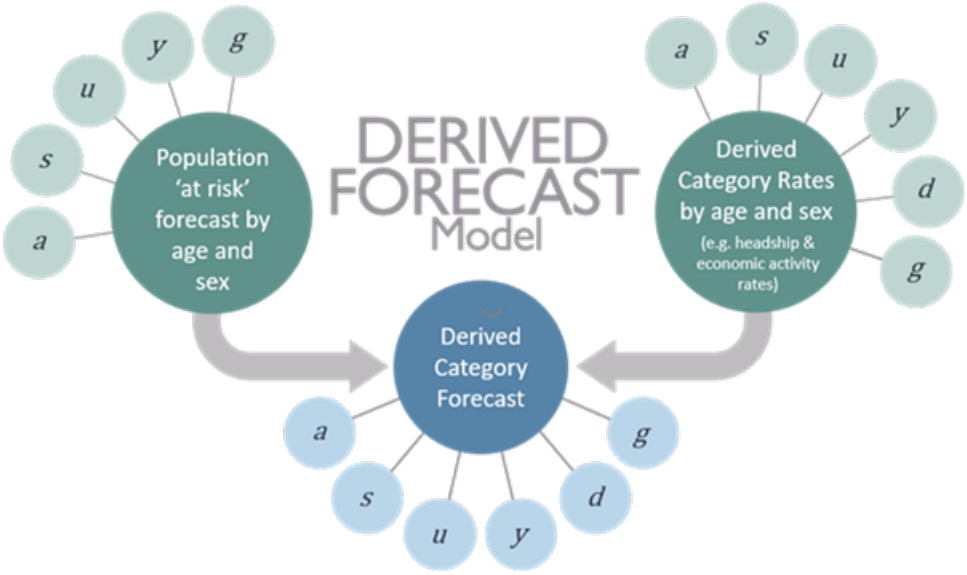


Figure 34: POPGROUP Population Projection Methodology



$$D_{a,s,u,y,d,g} = \frac{P_{a,s,u,y,g} \; R_{a,s,u,y,d,g}}{100}$$

D	Derived Category Forecast	y	Year
P	Population 'at risk' Forecast	d	Derived category
R	Derived Category Rates	g	Group (usually an area, but can be an ethnic group or social group)
a	Age-group		
s	Sex		
u	Sub-population		

Figure 35: Derived Forecast (DF) Methodology

Appendix C
Data Inputs & Assumptions

Population & Components of Change

C.1 In each scenario, historical population statistics are provided by the ONS mid-year population estimates (MYEs), with all data recorded by single year of age and sex. MYEs are used up to the respective base years of each scenario. From the base year onwards, future population counts for Cardiff are estimated by single year of age and sex to ensure consistency with the official projections. For the PG, dwelling-led and employment-led scenarios, the latest ONS MYE data (2020) is used as the base year population.

Births & Fertility

C.2 In each scenario, historical mid-year to mid-year counts of births by sex have been sourced from the ONS MYEs. Under the WG and GLA scenarios, historical births counts have been used until each scenario's base year.

C.3 For the employment-led, dwelling-led and PG scenarios, birth counts are used from 2001/02 to 2019/20. From 2020/21, an area-specific and age-specific fertility rate (ASFR) schedule is derived from the 2018-based National Population Projection (NPP) for Wales.

C.4 In combination with the 'population-at-risk' (i.e. all women between the ages of 15–49), these ASFR assumptions provide the basis for the calculation of births in each year of the forecast period.

C.5 In each of the WG and GLA scenarios, the future counts of births are reproduced from the base year onwards, to ensure consistency with the respective population growth outcomes.

Deaths & Mortality

C.6 In each scenario, historical mid-year to mid-year counts of deaths by sex and 5-year age group have been sourced from the ONS MYEs. Under the WG and GLA scenarios, historical deaths counts have been used until each scenario's base year.

C.7 For the employment-led, dwelling-led and PG scenarios, death totals are used from 2001/02 to 2019/20. From 2020/21, an area-specific and age-specific mortality rate (ASMR) schedule is derived from the latest 2018-based NPP.

C.8 In each of the WG scenarios, the future counts of deaths are reproduced from their base year onwards to ensure consistency with the respective population growth outcomes.

Internal Migration

C.9 In each scenario, historical mid-year to mid-year estimates of internal in- and out-migration by five-year age-group and sex have been sourced from the 'components of change' files that underpin the ONS statistics.

C.10 In the WG and GLA scenarios, these historical estimates are used up to each respective base year, with future counts of migrants specified to remain consistent with the corresponding projection.

C.11 Under the PG scenarios, an area and age-specific migration rate (ASMigR) schedule is derived from a number of years of historical internal migration data, which then determines the future number of internal in- and out-migrants for the remainder of the forecast period. For the **PG-Short Term** scenario, this is derived from six years of historical data (2014/15–2019/20) and for the **PG-Long Term** scenario, this is derived from the full nineteen years of historical data (2001/02–2019/20).

C.12 Under the dwelling-led and employment-led scenarios, future internal migration assumptions have been derived from the full nineteen-year historical period (**PG-Long Term**), with migration altered to meet annual dwelling or employment growth requirements.

International Migration

C.13 Historical mid-year to mid-year counts of immigration and emigration by five-year age groups and sex have been sourced from the 'components of population change' files that underpin the ONS MYEs.

C.14 In the WG and GLA scenarios, these counts are used up to each scenario's respective base year, with future counts of migrants reproduced directly from the projection statistics.

C.15 In the **PG-Short Term** and **PG-Long Term** scenarios, historical counts of immigration are used from 2001/02 to 2019/20. From 2019/20 onwards, an ASMigR schedule of rates is derived from a six-year and nineteen-year international migration history respectively and used to distribute future counts by single year of age and sex.

C.16 For the dwelling-led and employment-led scenarios, future international migration assumptions are derived from the full nineteen-year historical period (**PG Long Term**).

Households & Dwellings

C.17 A household is defined as, "*one person living alone, or a group of people (not necessarily related) living at the same address who share cooking facilities and share a living room or sitting room or dining area*." A dwelling is defined as a unit of accommodation which can either be occupied by one household or vacant.

C.18 Apart from in the dwelling-led scenario, the household and dwelling implications of each population growth trajectory have been estimated through the application of household membership rates, communal population statistics and a dwelling vacancy rate. These assumptions have been sourced from the 2011 Census and the WG's 2018-based household projection model. In the dwelling-led

scenarios, these assumptions are used to determine the level of population growth required by the defined dwelling growth trajectory.

Membership Rates

C.19 Membership rates are used to calculate the proportion of the household population in each household category by age group and sex (Table 4), taken from the WG household model for Cardiff. The household population is then converted into households using average household size assumptions, drawn from the household model.

Table 4: WG 2018-based Household Model - Household Categories (Source: WG)

Household Category
1 person
2 person (No children)
2 person (1 adult, 1 child)
3 person (No children)
3 person (2 adults, 1 child)
3 person (1 adult, 2 children)
4 person (No children)
4 person (2+ adults, 1+ children)
4 person (1 adult, 3 children)
5+ person (No children)
5+ person (2+ adults, 1+ children)
5+ person (1 adult, 4+ children)

Communal Population Statistics

C.20 Household projections in POPGROUP exclude the population 'not-in-households' (i.e. the communal/institutional population). These data are drawn from the WG household projections. Examples of communal establishments include prisons, residential care homes and student halls of residence.

C.21 For ages 0–74, the number of people in each age group not-in-households is fixed throughout the forecast period. For ages 75–85+, the population not-in-households varies across the forecast period depending on the size of the population.

Vacancy Rate

C.22 The relationship between households and dwellings is modelled using a 'vacancy rate', derived from the 2011 Census using statistics on households (occupied household spaces) and dwellings (shared and unshared). A vacancy rate of 3.7% for Cardiff has been applied and fixed throughout the forecast period. Using this vacancy rate, the 'dwelling requirement' of each household growth trajectory has been estimated.

Labour Force & Jobs

C.23 The labour force and employment implications of each population growth trajectory have been estimated through the application of three key economic assumptions: economic activity rates, commuting ratio and an unemployment rate.

Economic Activity Rates

C.24 Economic activity rates are the proportion of the population that are actively involved in the labour force, either employed or unemployed and looking for work.

C.25 Economic activity rates by five-year age group (ages 16–89) and sex have been derived from Census statistics, with adjustments made in line with the Office for Budget Responsibility's (OBR) analysis of labour market trends in its 2018 Fiscal Sustainability Report[18] (Figure 36).

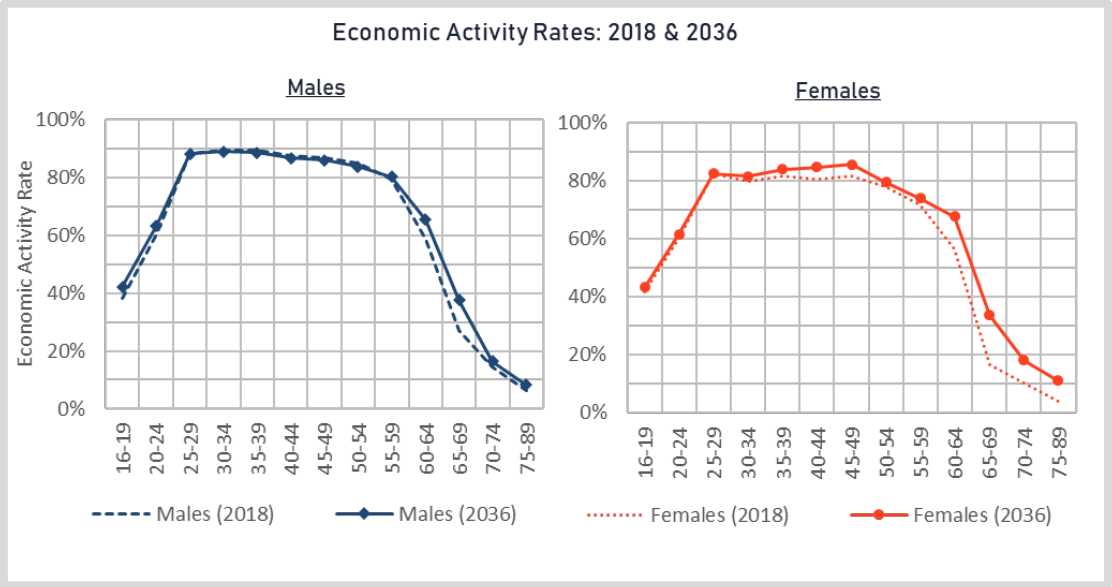


Figure 36: Cardiff - Economic Activity Rates, 2018 & 2036

Commuting Ratio

C.26 The commuting ratio measures the balance between the level of employment and the number of resident workers in a local authority. A commuting ratio greater than 1.00 indicates that the size of the resident workforce exceeds the level of employment available in the area, resulting in a net out-commute. A commuting ratio less than 1.00 indicates that employment in the area exceeds the size of the labour force, resulting in a net in-commute.

C.27 The 2011 Census recorded 160,000 resident workers and a total of 200,000 people engaged in (workplace-based) employment in Cardiff. This results in a commuting ratio of 0.80, a large net in-commute, which is applied in all scenarios and fixed throughout the forecast period.

[18] OBR Fiscal Sustainability Report, July 2018

Unemployment

C.28 The unemployment rate is the proportion of unemployed people within the total economically active population. Historical unemployment rates are sourced from ONS model-based estimates. For Cardiff, the 2020 rate of 3.8% has been applied in each of the trend and dwelling-led scenarios, plus the **Employment-led Target** scenario, fixed throughout the forecast period.

Employment Forecasts

C.29 The employment-led scenarios model the demographic impact of a projected level of annual employment growth, measured as *workplace-based employment*. Workplace-based employment is a 'people-based' measure, rather than a jobs-based measure of economic activity. The two measures are directly related, but the jobs-based measure is typically reported in employment forecasts, including both full-time and part-time positions. The work-place based employment figure measures the number of people employed, linking directly to people-based measure of unemployment, commuting and economic activity.

C.30 The **Employment-led_Target** scenario is modelled on a fixed average annual employment growth of 1,600 per year. The OE and Experian employment-led scenarios (**Employment-led_OE** and **Employment-led_Exp**) model the demographic impact of annual workplace-based employment growth detailed in the Experian and Oxford Economics employment forecasts for Cardiff (Figure 37).

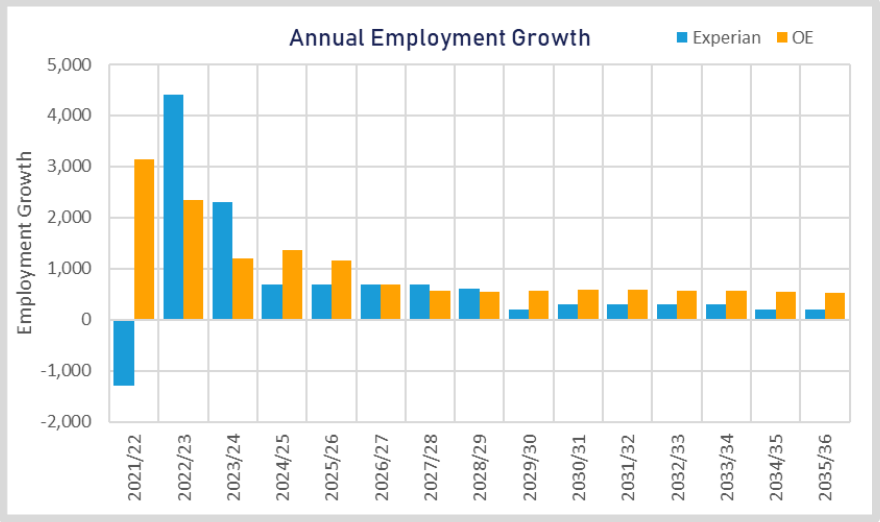
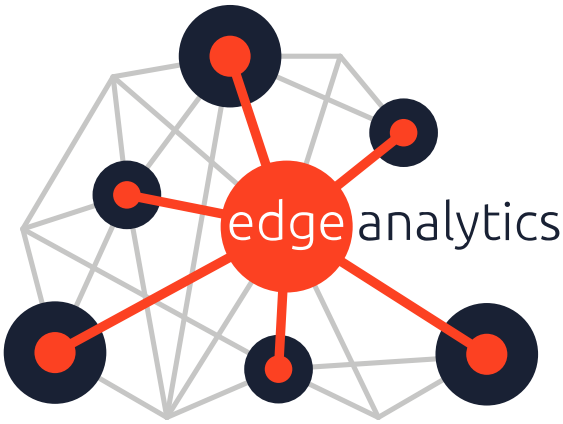


Figure 37: Cardiff - Experian and OE Employment Growth Forecasts, 2021/22–2035/36

C.31 Both OE and Experian employment forecasts estimate high short-term growth, with lower annual growth in the later years of the LDP period. The Experian economic forecast estimates average annual employment growth of +707 per year over the plan period, with annual employment growth expected in each year from 2022/23. The OE economic forecast estimates average annual employment growth of +998, with annual growth in employment in all years of the plan period.

C.32 In running the OE and Experian employment-led scenarios, economic activity rates and commuting ratios are consistent with the trend scenarios, whilst the unemployment rate is consistent with that estimated in the respective employment forecasts.



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