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National Reference Metadata in Euro SDMX Metadata Structure (ESMS)

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Eurostat metadata

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1.1. Contact organisation	Central Statistics Office of Ireland
1.1.1. Responsible party	Census Division

1.1.2. Responsible party role	Point of Contact
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<p>There is a requirement, as per Commission Implementing Regulation (EU) 2018/1799, to deliver Census data for the reference year 2021 to Eurostat. In September 2020, the Irish Government decided to postpone the scheduled April 2021 Census to April 2022 following a recommendation from CSO related to the impact of the Covid-19 pandemic. The CSO however has agreed that the office will still meet its legal requirement. It will base the Eurostat requirements on Census 2022 data, using administrative and other sources to appropriately adjust the data to reference year 2021. A (preliminary) headcount of usual residents at the 1 km² grid level (there are approximately 73,000 such square kilometres in Ireland) is required by Eurostat by 31st December 2022. The data was produced in the following manner:</p> <p><i>Initial preliminary Census estimate for April 2022</i></p> <p>As part of the field operation for the 2022 Census, the CSO introduced a new smartphone-based application that allowed field staff to capture information about every dwelling in the country. This</p>	

application facilitated the production of a preliminary population publication less than 12 weeks (June 23rd) after census night (April 3rd). The information includes data on the number of de facto occupants. This information is provisional, and the final file will not be completed until all collected paper forms are fully processed, which is expected to be around the end of January 2023. The provisional data should however be a very strong indicator of the final results.

The preliminary Census de facto population estimate was 5,123,536 persons, available at the 1 km² grid level. As we need the population on a usual resident basis, it was decided to adjust this estimated de facto population at the 1 km² grid level by applying the arithmetic differences between the 2016 usual resident and de facto population counts at that level to the de facto population for 2022. A ratio model, where rates of change of de facto to usual resident counts are applied instead of differences, was also considered but this led to more extreme adjustments, mainly where there was a large change in the population count of a cell between 2016 and 2022. This reduced the usual resident population to 5,101,268 for April 2022, a fall of 22,268 persons.

Temporary Absent Dwellings

Census also provided data on the temporarily absent dwellings dataset (at 1 km² grid level), containing a count of persons usually resident in the State but whose entire household were abroad on census night and therefore not included in the de facto population count. This covers 33,365 temporarily absent dwellings with 50,749 temporarily absent persons across 9,138 grid cells. This category was not present in the 2016 figures so it was decided to include these absent persons as they meet the definition of usual residents and will be present in the final transmission, due March 2024. The resulting usually resident population count for 3rd April 2022 was estimated as 5,152,671 persons.

Table 1: De facto to usual residents April 2022

2016 De Facto Population	4,761,865
2016 Usual Residents Population	4,739,597
2022 De Facto Population	5,123,536
2022 Usual Residents Population	5,101,268
2022 Temp. Absent Dwellings (person count)	50,749
2022 Usual Residents Population (incl. temp. absent persons)	5,152,671

Note that in a small number cases (80 grid cells), adjustments resulted in a negative cell value, but these were set to zero.

Final preliminary estimate

The CSO then adjusted this figure of estimated usual residents for 3rd April 2022 back to the 3rd December 2021 reference point by performing a reverse cohort-survival model.

- Firstly, there are an estimated 21,528 births, some 12,405 deaths and approximately 63,595 inward and 25,730 outward migrants for the four-month period December 2021 to March 2022. This affects a total of approximately 123,000 persons, or about 2.4% in a total population of around 5.15 million persons. These population changes were ‘reversed’, as indicated below.
- Secondly, we also ‘reversed’ those persons who moved from their address within Ireland after December 3rd 2021 to their Census April 3rd 2022 address. Based on the selection method approximately 85,000 persons were moved to their previous address, representing about 1.7% of the population.

The steps in the process were:

Births

We took the actual November 2015 to April 2016 births from Census 2016 with the variables grid reference, gender and NUTS3 as the sampling frame for the selection of births. Then, using data from table 19 in the Q1 2022 Vital Stats quarterly release (Table VSQ19 on Statbank), we derived the number of Q1 2022 births at NUTS3 by gender level. We also included a proportion of Q4 2021 births, taking one-third to represent December 2021. There are 21,528 births in total for the four-month period we are interested in (16,121 for Q1 2022 plus a third of the value of Q4 2021 which is 5,407), see table 2.

Then, using the SAS procedure surveyselect, we selected, at random, the required number of births per strata from the frame and totalled up per grid reference. The resulting figure is the number of people removed from the Census 2021 grid totals, as these figures represent those born during December 2021 to March 2022.

Table 2: Number of births by NUTS3 and sex, Dec. 2021 – Mar. 2022

	Male	Female	Both sexes
Border	800	780	1,580
West	978	867	1,845
Mid-West	1,032	956	1,988
South-East	883	853	1,736
South-West	1,448	1,446	2,894
Dublin	3,468	3,361	6,829
Mid-East	1,745	1,621	3,366
Midland	666	624	1,290
Total	11,020	10,508	21,528

Deaths

We took the entire Census 2016 data with the variables grid reference, gender, NUTS3 and broad age group (0-14, 15-29, 30-49, 50-64, 65-84 and 85+) as the sampling frame for the selection of people to add back in who died between December 2020 and March 2022. This stratification results in 96 cells. This frame serves as a proxy for the distribution of deaths across the 1km grid square strata. Next, we obtained the Q4 2021 and Q1 2022 mortality data stratified by gender, NUTS3 and age group, provided by the Vital Stats statistician. The total number is 12,405 deaths for the four-month period of interest (9,535 for Q1 2022 plus one third of the value for Q4 2021 which is 8,626), see tables 3 and 4.

Then using the SAS procedure surveyselect, we selected, at random, the required number of deaths per strata from the frame and total up per grid reference. The resulting figure is simply the number of people added to the Census 2021 grid figures as summarised at the grid level, as they represent those who died during December 2021 to March 2022.

Table 3: Number of deaths by sex and NUTS 3 region, Dec. 2021 – Mar. 2022

Males	Females	Both sexes
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Border	593	485	1,078
West	694	563	1,257
Mid-West	694	609	1,303
South-East	650	590	1,240
South-West	1,010	895	1,905
Dublin	1,610	1,739	3,349
Mid-East	804	731	1,535
Midland	393	345	738
Total	6,448	5,957	12,405

Table 4: Number of deaths by sex and age group, Dec. 2021 – Mar. 2022

	Males	Females	Both sexes
0-14	43	36	79
15-34	87	54	141
35-54	409	326	735
55-64	637	471	1,108
65-74	1,217	873	2,090
75+	4,055	4,197	8,252
All ages	6,448	5,957	12,405

Inward and outward migrants

The processing of the inward and outward migrants essentially follows the same methodology in that we used Census 2016 as a sampling frame for the inclusion of those who emigrated in December 2021 and March 2022 and the exclusion of those who immigrated in the same period.

We took the Census 2016 with the variables grid reference, gender, NUTS3, broad nationality (Irish, UK, EU14 excl. IE, EU15 to 27 and Rest of the World) and broad age group (0-14, 15-29, 30-49, 50-64, 65-84 and 85+) as the sampling frame for the selection of migrants. Using the Q4 2021 and Q1 2022 migration data, we got the required inward and outward movers. The Population and Migration statistician provided the data at an individual level for our purposes. There are 63,780 inward migrators (53,403 in Q1 2022 and 10,377 taking one-third of the Q4 2021 values) and 25,730 outward migrators (19,779 in Q1 2022 and 5,951 taking one-third of the Q4 2021 values), see tables 5 to 7.

Then, using SAS procedure surveyselect, we selected, at random, the required number of inward and outward migrants per strata from the frame and sum over grid reference. Given that there will be more inward than outward migrants, the resulting figures will generally be negative i.e., the population will fall.

Ukrainian refugees

There are no official statistics, but it was estimated that there were more than 23,000 Ukrainian refugees present in the State in April 3 2022. It is difficult to know the exact numbers captured by the Census until the full final dataset is available. Ukrainian refugees were to be counted as immigrants and usual residents (UR) on the census form unless an individual classed themselves as a visitor, in which case they were de facto (DF) residents.

From the point of view of the procedure being described here, Ukrainians who are classified as de facto resident should be removed as we go from de facto to usual residents for April 3 2022.

However, as we are adjusting the figures from DF to UR using the 2016 patterns, an outlier event such as the Ukrainian refugee crisis will not be captured and hence not removed from the data.

If Ukrainian refugees are classed as usual residents, they should be removed once we reverse the inward migrants for Q1 2022, but only if they have been captured by migration estimates for Q1 2022 by the demography statistician. In the event however, some 27,000 Ukrainian immigrants are included in the migration data provided by Demography (table 7) for Q1 2022 and these are removed from the 3rd April 2022 population count in the production of 3rd Dec 2021 estimates.

Intra-Ireland movers

As there was no intra-Ireland movers data available from Census 2022 at the time of the preparation of the preliminary estimates, we decided to take a proportion of the population of one-year movers from Census 2016 as the basis for the December 2021 to March 2022 four-month estimation.

We first needed to estimate the annual and then four-monthly number and distribution of such movers. A comparison of 2011 and 2016 Census one-year movers shows a reasonably stable pattern:

Table 5: Persons who lived at a different address in Ireland one year previously

County	2011	2016	Abs change	% change
Carlow	3,088	3,037	-51	-1.7
Dublin	95,434	89,796	-5,638	-5.9
Kildare	12,979	13,253	274	2.1
Kilkenny	4,861	4,679	-182	-3.7
Laois	4,130	4,173	43	1.0
Longford	2,114	1,958	-156	-7.4
Louth	6,318	6,111	-207	-3.3
Meath	9,616	9,712	96	1.0
Offaly	3,796	3,635	-161	-4.2
Westmeath	5,112	4,804	-308	-6.0
Wexford	7,409	7,658	249	3.4
Wicklow	7,569	8,080	511	6.8
Clare	6,133	5,524	-609	-9.9
Cork	30,521	29,795	-726	-2.4
Kerry	6,710	6,391	-319	-4.8
Limerick	10,841	10,411	-430	-4.0
Tipperary	7,509	7,086	-423	-5.6
Waterford	5,859	5,868	9	0.2
Galway	16,345	15,694	-651	-4.0
Leitrim	1,542	1,489	-53	-3.4
Mayo	6,280	6,121	-159	-2.5
Roscommon	3,311	3,141	-170	-5.1
Sligo	3,680	3,605	-75	-2.0
Cavan	3,465	3,476	11	0.3
Donegal	6,100	5,524	-576	-9.4

Monaghan	2,517	2,530	13	0.5
State	273,239	263,551	-9,688	-3.5

We also looked at the 'CensusAnalysis' data set which contains the pseudonymised Census of Population 2016 data along with GeoDirectory and DEASP variables. The Census analysis file contains some 4,507,626 COP records which were successfully matched to a PPSN. Overall, it has 4.953 million records while Census 2016 showed 4.761 million de facto residents and 4.739 million usual residents. There are 4.544 million records with a flag for a usual resident one year ago, of which 252,259 lived elsewhere in Ireland (versus 263,600 in the table above). Focusing on the 4.953 million records, an analysis of those who lived elsewhere in Ireland a year ago shows:

- On average, some 74.6% of all movers lived in the same county a year previously while some 25.4% moved from a different county.
- The importance of data on the rental sector can be seen from the fact that while they make up only 17.8% of all dwellings, they account for 58.8% of all households where the reference person moved within the state in the previous year.
- Some 4.2% of the intra-Ireland movers (10,580 persons) are now living in a communal establishment approximately half of these over 65 years old.

Other data sources for intra-Ireland movers were examined, including:

- **Admin Census:** it is unlikely that this will be available for intra-Ireland movement estimation, particularly for the preliminary estimates.
- **Building Energy Ratings (BES):** Basically, a subset of the GeoDirectory data. It is also only annual data and there are no names attached to the properties. It is therefore unsuitable for our purposes.
- **Child benefit:** Seems to be an annual file only (analysis tier) and therefore unsuitable for our purposes. There are no addresses, although the PPSNs of the child and parent are available on the source tier.
- **Consolidated income tax data 11, 12 and P35L:** This data appears to be at least two years in arrears. The PPSN is available on the source tier, but the data mainly covers various types of income and tax. No address data as far as can be seen (analysis tier) and therefore is unsuitable for our purposes.
- **Central Records System (CRS):** A central repository of basic personal data on individuals held on different systems within Department of Social Protection (DSP), together with income and social insurance contributions data (P35 data) which are supplied by the Revenue Commissioners. All the Irish addresses have county codes but little else (although the source

tier may have more variables). This does not seem suitable for our needs. In any event, any useful features should be captured by the Personal Activity Register (PAR) covered below.

- **Driver data:** This is an annual file of those persons with drivers' licenses and their address. As the Eircode is missing from 58% of all records, this data cannot be used as a measurement of quarterly changes.
- **DSP:** This is an annual dataflow. There seems to be no location data on it, but any useful features should be captured by the Personal Activity Register (PAR) covered below.
- **ESB data:** There are two data flows associated with this. The first is ESB customers/consumption data. This however is annual data only and therefore is not suitable for measuring quarterly address changes. There is also a flow associated with ESB new connections which gives connections per quarter per county. It does not cover existing dwellings unless electricity connection is being replaced. There were some 24,000 observations for Q1 2020 to Q4 2020 inclusive once non-private dwellings are excluded.
- **eStamping:** The eStamping regime was introduced at the beginning of 2010 and relates to transactions of property. An analysis of the data shows that the county of the property being transacted is available, as is the address of the buyer. The total flow for 2019 (as a test case) was approximately 70,000 properties but there was no distinction between commercial and private dwellings. Based on feedback from those who have examined the data in more detail, there are some limitations. Firstly, the data might show that 15 people in Dublin bought a house in Clare in a particular quarter, but it could be the same person who just bought 15 properties. Finally, just because someone bought a property in Limerick and gave an address in Leitrim does not mean they are moving from Leitrim to Limerick.
- **Gas consumption:** Quarterly consumption data is available, but only about 34% of dwellings have natural gas, as per the 2016 Census results so probably not suitable by itself for measuring quarterly/four-month address change.
- **GeoDirectory:** This is not suitable as there is no information on the occupants of these new houses and there is no information on changes of occupancy for already-existing dwellings.
- **LFS:** The quarterly LFS collects information on those who have moved dwellings in the last three months, but without giving the county of their old address. The figures are affected by the fact that the absolute numbers underpinning the estimation of movers is very small, i.e., there were only 136 households with intra-Ireland movers in 2018 and 118 in 2019, making it unsuitable for our purposes.
- **Mobile Phone data:** Analysis of this data is only just beginning but it is very unlikely to yield any usable results which could be used for this project, at least for the preliminary sending.
- **Occupied Residence Frame (ORF):** This dataflow is based on Local Property Tax (LPT) data and Residential Tenancies Board (RTB) data. The former covers owner-occupied property data and the latter tenant-occupied property.

- The most significant exclusion from the LPT is that there is no obligation for purchasers of new and previously unused properties on or after 01st January 2013 to file an LPT return as they are exempt from local property tax until the next valuation period. This has likely led to an under-coverage of occupied residential properties.
- The Residential Tenancies Board maintains a national register of tenancies and all private residential landlords, Approved Housing Bodies (who are not-for-profit housing providers, often referred to as Housing Associations) and landlords of Student Specific Accommodation must register their tenancies with the RTB.
- The overall number of movers is much less than that indicated by Census (approximately 20,000 versus 66,400 dwellings). However, the Census figures obviously exclude all newly rented accommodation created since April 2016, so the ORF is almost certainly an undercount.
 - **Personal activity register (PAR):** summarises each person's annual activity in key public administration systems, including births, benefits, education, and employment. However, looking at the variables, there does not seem to be any address data available.
 - **PECADO:** This is not suitable in its current state as it is really a file of persons active at any stage over the entire reference year.

Ultimately a decision was taken that the 2016 Census data on intra-Ireland movers would be used as the basis for estimating movers for the preliminary census data reverse cohort model.

The next issue was the fact that the Census data represents movement over a full year whereas we only need to measure movement for a four-month period. One solution is to take a proportion of the full year to represent the four-month movers, but there is no data available in Census to decide on this. The obvious proportion is 33% but we examined other sources of data to see if a better allocation method could be used:

- **eStamping:** Over the year of 2019 the quarterly distribution of transactions was 21% in Q1 2019, 24% in Q2, 29% in Q3 and finally 26% in Q4.
- **Occupied Residence Frame (ORF):** The ORF data in relation to private and AHB renters shows the following number of movers where the same property was occupied by different people from one quarter to another. In this case, the movers from Q1 2019 to Q2 2019 was 23.9% of the movers from Q1 2019 to Q1 2020 overall.

If we look at treating the address as the key id variable and the number of movers where the same property was occupied by different people from one quarter to another, the movers from Q1 2019 to Q2 2019 was 24.1% of the movers from Q1 2019 to Q1 2020 overall, very similar to the percentage when using the property_id variable as the id key.

- **Residential Tenancy Board (RTB):** There was an analysis of the RTB data from Q1 2019 to Q1 2020 inclusive. When we use the CSO PPSN as the identifier, we find that, where the same PPSN was in both quarters, the Q1 2019 to Q2 2019 movers were approximately 25% of the Q1 2019 to Q1 2020 movers.

We concluded there was little in the data which suggested anything other than a 33% allocation from the annual movers for the four-month period. Given the structure of movers, the basic process for moving people is:

- Select a proportion of the overall number of movers (approx. 252,259 persons) to represent those who moved address.
- Take the Census 2016 data of intra-Ireland movers with the variables such as grid reference, county of residence a year ago, gender, NUTS4 (county), age, occupancy type etc.
- Then, using SAS procedure surveyselect, select at random the required number movers per strata from the frame and sum over grid reference. These are deleted from their current grid and added to their previous grid.

An issue here is that while all relevant persons will obviously have a full current address as per Census, we only have the county of the previous address. In order to allocate these previous addresses to specific locations or grid references, we apportion them out in the county of their previous residence in proportion to the relevant population, i.e., by ownership type, location, family type, gender, broad age group, broad nationality etc.

One final wrinkle is that these intra-Ireland movers may move as family units or individually so moving them all individually would be incorrect. The specific steps used were:

- 33% of the Census 2016 movers or 85,220 people were randomly selected at dwelling level from all intra-Ireland movers, to keep groups together.
- Next, the four-month selection of movers are grouped by the number of movers per dwelling: (1) Individuals, (2) pairs/couples, (3) groups of three or more where at least one mover is a child and (4) groups of three or more where all movers are adults.
- Communal dwellers: 3,433 of movers are currently in (communal) dwellings and aged 15 or over. 91% of these individuals are Irish and occupancy status is missing for most. These movers are allocated a previous location by selecting from all individuals in the census, stratified by county and age group (15 to 64 and 65+) in order to give them a grid reference in their previous county.
- Private Dwellers, individuals: There are 24,524 such movers. These movers are allocated a previous location by selecting from all private dwelling individuals (except for movers) in the census, stratified by county, occupancy status (own and rent), broad nationality (Irish and non-Irish), gender and broad age group (under 18, 18 to 65 and 65 and older), resulting in 495 strata, in order to give them a grid reference in their previous county.
- Private Dwellers, groups of 2/couples: There are 25,080 such movers. The groups of two that lived in different counties to each other one year previous (2,461) or were flagged as having no relationship with the family nucleus (4,159) were moved as individuals. These were stratified by the same variables described above. The remaining movers (18,460) were moved together by sampling at the dwelling level by selecting from all private dwellings,

stratified by county and occupancy status (owners make up 32.5% of the data while 67.5% consists of renters) in order to give them a grid reference in their previous county.

- Private Dwellers, groups of 3 or more (at least one child): There are 27,325 such movers. 95% of these are part of the family nucleus. It would be a fair assumption to say that most of these groups can be moved together. This entire group was moved at dwelling level, stratified by county and occupancy status. Owners make up 41.9% of the data while 58.1% consists of renters.
- Private Dwellers, groups of 3 or more (all adults): There are 4,858 such movers. 60.0% of movers have no relationship with their group/family nucleus. Owners make up 16.9% of the data, while 83.1% consists of renters. This group has the highest proportion of renters, and a higher proportion that are aged 18 to 29 years (69.1%) compared to the other groups (31.3% on average). A reasonable assumption is that this group includes movers that rent together/house share but are not related/in a relationship. For the groups where at least one person lived in different counties to each other one year ago, these were moved individually (1,200 movers). The remaining movers (3,658 movers) were moved at dwelling level as above (stratified by county and occupancy status).

After the previous locations were selected for all movers, they were summed over all groups at grid level and added to the 2022 Census grid-level population data to represent those moving to their previous location.

Final results

At the overall level, the 2022 usual residents population estimate of 5,152,671 for April 2022 was adjusted to 5,105,683 persons for Dec 3rd 2021. The following is a summary of the changes:

Table 6: Summary of grid-cell adjustments by variable

			Sum	Count	N
Variable	Minimum cell adjustment	Maximum cell adjustment	(individuals adjusted)	(grid cells adjusted)	(no. of cells)
Births	-67	0	-21,528	7,371	58,906
Deaths	0	35	12,405	5,978	58,906
Inward migration	-587	0	-63,595	11,811	58,906

Outward migration	0	307	25,730	6,333	58,906
Intra-movers (moved from)	-451	0	-85,220	9,967	58,906
Intra-movers (moved to)	0	456	85,220	11,710	58,906
Net intra-movers	-121	188	0	16,185	58,906
Net overall adjustments	-299	138	-46,988	24,298	58,906

While there are approximately 73,000 cells or square kilometres in Ireland, only 58,906 have any persons in them. The 'Sum' column represents the total number of people at each step. i.e. there were 21,528 births, some 12,405 deaths etc. The overall downward adjustment to the total population is 46,988 individuals, due to the number of births and inward migration being higher than those for deaths and outward migration. The overall adjustment to the total population due to the intra-movers sums to zero individuals, as expected. Also note that 92% of the cells were only adjusted by +/- 5 individuals and 96% were adjusted by +/- 10 individuals.

The net overall adjustment variable (which could be positive or negative) was added to the 2021 census grid level usual resident preliminary population count. In a small number of cases there were now negative cell values (a total of 78 people over 51 cells). It was decided to set these cell values to zero, giving us a net overall downwards adjustment of 46,910. Note that any small differences between the input data sources and the final adjustment numbers can be explained by rounding error (when taking a proportion of quarterly data to represent December 2021 at stratum level) or from off-setting negative cell values to zero. The 2022 Usual Residents Population estimate of 5,152,671 was adjusted to 5,105,761 people with a reference date of Dec 3rd 2021.

The overall population changes were approximated at county level by assigning each grid cell to a county which included at least part of the cell, adjusting for cases where a cell was in more than one county. This was for the single purpose of creating table 7 to provide a rough guide to the distribution of grid cell adjustments. The results show:

Table 7: Summary of population adjustments by county

County	2022 UR Population	Overall net adjustment		<i>Intra-movers</i>		<i>Net movers</i>
		Population adjustment	Percentage adjustment	<i>Move from</i>	<i>Move to</i>	

Dublin	1,455,185	-10,064	-0.69	29,825	31,308	1,483
Cork	585,872	-6,223	-1.06	9,720	9,844	124
Galway	274,837	-2441	-0.89	4,920	5,017	97
Kildare	248,827	-3545	-1.42	4,327	4,147	-180
Meath	222,842	-2887	-1.30	3,210	2,856	-354
Limerick	204,825	-1840	-0.90	3,386	3,429	43
Tipperary	169,038	-961	-0.57	2,261	2,213	-48
Donegal	167,268	-1220	-0.73	1,654	1,740	86
Wexford	164,003	-1641	-1.00	2,429	2,210	-219
Wicklow	158,558	-1833	-1.16	2,768	2,648	-120
Kerry	153,581	-1339	-0.87	1,938	1,905	-33
Louth	140,943	-1706	-1.21	1,986	1,935	-51
Mayo	137,068	-880	-0.64	1,828	1,724	-104
Clare	128,524	-958	-0.75	1,726	1,722	-4
Waterford	126,767	-1461	-1.15	1,811	1,829	18
Kilkenny	106,004	-1320	-1.25	1,465	1,289	-176
Westmeath	97,136	-1099	-1.13	1,560	1,518	-42
Laois	91,950	-936	-1.02	1,358	1,157	-201
Offaly	82,677	-587	-0.71	1,124	1,074	-50
Cavan	81,297	-942	-1.16	1,110	963	-147
Roscommon	70,906	-525	-0.74	976	860	-116
Sligo	70,110	-620	-0.88	1,117	1,140	23
Monaghan	65,155	-667	-1.02	791	777	-14
Carlow	62,698	-601	-0.96	897	921	24
Longford	47,060	-439	-0.93	578	546	-32
Leitrim	35,522	-253	-0.71	455	448	-7
Unclassified	4,018	0	0.00	0	0	0
Total	5,152,671	-46,988	-0.91	85,220	85,220	0

The largest number of net overall adjustments (-46,988 individuals) occurs in Dublin (-10,064), Cork (-6,223) and Kildare (-3,545). It is also important to remember that this measures county level changes only.

3.1.1. Resource title

The 2021 EU 1 km² grid level.

3.1.2. Resource abstract

There is a requirement, as per Commission Implementing Regulation (EU) 2018/1799, to deliver Census data for the reference year 2021 to Eurostat. In September 2020, the Irish Government decided to postpone the scheduled April 2021 Census to April 2022 following a recommendation from CSO related to the impact of the Covid-19 pandemic. The CSO however has agreed that the office will still meet its legal requirement. It will base the Eurostat requirements on Census 2022 data, using administrative and other sources to appropriately adjust the data to reference year 2021. A (preliminary) headcount of usual residents at the 1 km² grid level (there are approximately 73,000 such square kilometres in Ireland) is required by Eurostat by 31st December 2022. The data was produced in the following manner:

As part of the field operation for the 2022 Census, the CSO introduced a new smartphone-based application that allowed field staff to capture information about every dwelling in the country. This application facilitated the production of a preliminary population publication less than 12 weeks (June 23rd) after census night (April 3rd). The information includes data on the number of de facto occupants. This information is provisional, and the final file will not be completed until all collected paper forms are fully processed, which is expected to be around the end of January 2023. The provisional data should however be a very strong indicator of the final results.

The preliminary Census de facto population estimate was 5,123,536 persons, available at the 1 km² grid level. As we need the population on a usual resident basis, it was decided to adjust this estimated de facto population at the 1 km² grid level by applying the arithmetic differences between the 2016 usual resident and de facto population counts at that level to the de facto population for 2022. A ratio model, where rates of change of de facto to usual resident counts are applied instead of differences, was also considered but this led to more extreme adjustments, mainly where there was a large change in the population count of a cell between 2016 and 2022. This reduced the usual resident population to 5,101,268 for April 2022, a fall of 22,268 persons.

3.1.3. Resource type
Spatial data set
3.1.3.1. Additional information if 'spatial data set' is marked
A (preliminary) headcount of usual residents at the 1 km ² grid level (there are approximately 73,000 such square kilometres in Ireland).
3.1.4. Resource locator
<p>The CSO also produced 1 km² grid for 2011 and 2016 Grid Square data is available on the CSO website at the below URL. The 2022 Preliminary Grid Square data is not available on the CSO website yet, however when the final results are available, these will be published on the website</p> <p>The grid data for 2022 final results will become available on the CSO website in due course.</p> <p>Annexes: CSO Census 2011 Grid Data CSO Census 2016 Grid Data</p>
3.1.5. Unique resource identifier
The dataset has 75,122 unique IDs in the form of a spatial co-ordinate reference called "SPATIAL".
3.1.6. Coupled resource
3.1.7. Resource language
English
3.1.8. Keyword value
Population Distribution
3.1.9. Originating controlled vocabulary
Not applicable in this publication.
3.1.10. Metadata language
English
3.2. Classification system

All data presents in this data set is for Ireland "IE" and the spatiel dimension contains the identified of the 1 km2 grid cell to which the data refers. Ireland only produces data for total usual residents in 2021, there are no additional attribute data available at present.
3.3. Coverage - sector
Not applicable in this publication.
3.3.1. Topic category
Society
3.3.2. Spatial data service type
Download Service
3.4. Statistical concepts and definitions
For the purpose of the 1 km2 grid cell, the CSO produce only the total usual resident count. There has been no statistics for age, sex or any other attribute data included in this publication.
3.4.1. Statistical concepts and definitions - Total population
For census purposes, the total population of the country consists of all the persons falling within the scope of the census in EU on usual residents. Usual residence means the place where a person normally spends the daily period of rest, regardless of temporary absences for purposes of recreation, holidays, visits to friends and relatives, business, medical treatment or religious pilgrimage. Persons usually resident in the place of enumeration but absent, or expected to be absent, at the time of the census for less than one year shall be considered as temporarily absent persons and thus included in the total unsually population. In contrast, persons living or expected to live outside the place of enumeration for one year or more shall not be considered temporarily absent and shall therefore be excluded from the total population. This is regardless of the length of visits that they may pay to their families from time to time. Persons who are enumerated but do not meet the criteria for usual residence in the place of enumeration, i.e. do not live or do not expect to live in the place of enumeration for a continuous period of at least 12 months, are considered temporarily present and are therefore not counted in the total usually resident population.Unless otherwise stated in this report.
3.4.2. Statistical concepts and definitions - Sex
Not applicable in this publication.
3.4.3. Statistical concepts and definitions - Age

Not applicable in this publication.
3.4.4. Statistical concepts and definitions - Employed person
Not applicable in this publication.
3.4.5. Statistical concepts and definitions - Place of birth
Not applicable in this publication.
3.4.6. Statistical concepts and definitions - Place of usual residence one year prior to the census
Not applicable in this publication.
3.5. Statistical unit
For the Grid Square submission, data are available at for total population only. The grid reference spatial data is produced for EPSG:3035 - ETRS89 / LAEA Europe.
3.6. Statistical population
The CSO adjusted the Census 2022 preliminary results of estimated usual residents for 3 rd April 2022 back to the 3 rd December 2021 reference point by performing a reverse cohort-survival model.
3.7. Reference area
For the Grid Square submission, data are available at for total population only.
3.7.1. Geographic bounding box
For the Grid Square submission, data are available at for total population only.
3.7.2. Spatial resolution
1000 Unit:m
3.7.3. Coordinate Reference System
EPSG:3035 - ETRS89 / LAEA Europe
3.8. Coverage - Time
The CSO adjusted the Preliminary Census 2022 results usual residents for 3 rd April 2022 back to the 3 rd December 2021 reference point by performing a reverse cohort-survival model. Data refer to the situation in the reporting country at the census reference date.

3.9. Base period

Not applicable.

4. Unit of measure

[Top](#)

Counts of statistical units.

5. Reference Period

[Top](#)

The CSO adjusted the Census 2022 preliminary results of estimated usual residents for 3rd April 2022 back to the 3rd December 2021 reference point by performing a reverse cohort-survival model.

5.1. Temporal extent

The CSO adjusted the Census 2022 preliminary results of estimated usual residents for 3rd April 2022 back to the 3rd December 2021 reference point by performing a reverse cohort-survival model.

6. Institutional Mandate

[Top](#)

6.1. Institutional Mandate - legal acts and other agreements

Section 8 of the Statistics Act 1993 establishes the Central Statistics Office to exercise the functions of the Statistics Act. The Census was taken under Section 26 of the Statistics Act 1993 and the [Statistics \(Census of Population\) Order, 2020](#) provides for the census to be held on 3 April 2022. It details the information to be provided and the persons required to provide it (<https://www.irishstatutebook.ie/eli/2020/si/637/made/en/print>).

6.2. Institutional Mandate - data sharing

There is information for Official Statistics and Data Protection Legislation available on the CSO website at the following URL.

Annexes:

[Information for Researchers](#)

7. Confidentiality	Top
7.1. Confidentiality - policy	
<p>The Statistics Act, 1993 Part V, Paragraph 32 guarantees that all information collected in the Census is only used for statistical compilation and analysis purposes. Paragraph 33 guarantees that no Census data which could identify an individual will be released. Paragraph 35 guarantees that the confidentiality requirements pertaining to a Census of Population will expire 100 years after the relevant Census. All staff working on the Census must become Officers of Statistics, thereby making a legal commitment to protecting the confidentiality of Census information. This is covered under Part 2, Paragraphs 20 to 22 of the Statistics Act, 1993. The penalties associated with breaches of confidentiality are contained in Part 6, Paragraphs 38 to 45. The Statistics Act, 1993 can be accessed online via the following link:</p> <p>Annexes: The Statistics Act, 1993.</p>	
7.2. Confidentiality - data treatment	
<p>All information supplied to the CSO is treated as strictly confidential. The Statistics Act, 1993 sets stringent confidentiality standards: <i>Information collected may be used only for statistical purposes, and no details that might be related to an identifiable person or business undertaking may be divulged to any other government department or body.</i> These national statistical confidentiality provisions are reinforced by the following EU legislation:</p> <ul style="list-style-type: none"> • Council Regulation (EC) No 223/2009 on European statistics for data collected for EU statistical purposes. <p>Further details are outlined in the CSO's Code of Practice on Statistical Confidentiality.</p>	

8. Release policy	Top
8.1. Release calendar	
<p>The schedule of census release dates was released in Q1 2023. The Census 2022 Preliminary Results we published in June, 2022.</p>	

Annexes: CSO Census Result 2022 Publication schedule
8.2. Release calendar access
https://www.cso.ie/en/census/census2022/census2022publicationschedule/
8.3. Release policy - user access
In line with the Community legal framework and the European Statistics Code of Practice Eurostat disseminates European statistics on its website respecting professional independence and in an objective, professional and transparent manner in which all users are treated equitably.
8.3.1. Conditions applying to access and use
https://inspire.ec.europa.eu/metadata-codelist/ConditionsApplyingToAccessAndUse/noConditionsApply
8.3.2. Limitations on public access
https://inspire.ec.europa.eu/metadata-codelist/ConditionsApplyingToAccessAndUse/noConditionsApply

9. Frequency of dissemination	Top
Decennial	

10. Accessibility and clarity	Top
10.1. Dissemination format - News release	
<p>Census 2022 Preliminary Results are available on the CSO website at the following URL: https://www.cso.ie/en/csolatestnews/presspages/2022/censusofpopulation2022-preliminaryresults/. The 2016 Grid Square data is available on the CSO website here: https://www.cso.ie/en/census/census2016reports/workplacezonesand1kmpopulationgrids/. The 2022 Preliminary Grid Square data is not available on the CSO website yet, however when the final results are available, these will be published on the website</p>	
Annexes:	

[Census 2022 Preliminary Results.](#)
[CSO Census 2016 Grid Data](#)

10.2. Dissemination format - Publications

The Census 2022 results will be published from Tuesday, May 30th beginning with a summary report. A series of themed reports, Small Area Population Statistics (SAPS) and Place of Work, School, College - Census of Anonymised Records (POWSCAR) will follow as set out in the schedule below. The thematic releases will be accompanied by detailed statistical tables. Releases will be available on the CSO website from 11am on the day of publication. An update on 2024 releases will be provided at a later date. If you have any queries, please contact census@cs.ie or 1800 236 787.

Annexes:

[CSO Census Result 2022 Publication schedule](#)

10.3. Dissemination format - online database

The CSO Census Dissemination format for the final 2022 results and other outputs will be available on the following website: <https://data.cso.ie/>. The final 2022 grid 1km2 data will be published on the CSO website, similarly to how it was published for 2011 and 2016 (example of this is available here: The 2016 Grid Square data is available on the CSO website here: <https://www.cso.ie/en/census/census2016reports/workplacezonesand1kmpopulationgrids/>).

10.4. Dissemination format - microdata access

For more information to the CSO Research Microdata Files and the Research Microdata File register please see the following links:

Annexes:

[CSO RMF register](#)

[CSO Microdata Policy](#)

10.5. Dissemination format - other

All Census 2022 Final Results will be published on the CSO website from May 30th, 2023 onwards on the following URL

Annexes:

[CSO Census webpage](#)

10.6. Documentation on methodology

The methodological note for the 1 km² data is published in detail in section 3.1 of this webpage. The preliminary Census de facto population estimate was 5,123,536 persons, available at the 1 km² grid level. As we need the population on a usual resident basis, it was decided to adjust this estimated de facto population at the 1 km² grid level by applying the arithmetic differences between the 2016 usual resident and de facto population counts at that level to the de facto population for 2022. A ratio model, where rates of change of de facto to usual resident counts are applied instead of differences, was also considered but this led to more extreme adjustments, mainly where there was a large change in the population count of a cell between 2016 and 2022. This reduced the usual resident population to 5,101,268 for April 2022, a fall of 22,268 persons.

10.7. Quality management - documentation

There is further detail on the methodological note and the quality management of the data in section 3.1 of this report. Section 3.1 sets out the detail on how the Census 2022 Preliminary Results were used to estimate the 1 km² data for the year 2021.

11. Quality management

[Top](#)

11.1. Quality assurance

Please note that the Census 1 km² grid level data is based on the Census 2022 Preliminary results. This data is provisional and is subject to change, the background notes is available on the CSO website here: <https://www.cso.ie/en/releasesandpublications/ep/p-cpr/censusofpopulation2022-preliminaryresults/backgroundnotes/>. A Census of Population was taken on the night of Sunday, 3 April 2022, in accordance with the Statistics (Census of Population) Order 2020. This report contains provisional results which are based on summaries returned for each of the 5,100 census Enumeration Areas. These results are provisional and will be superseded by the official Census 2022 results which will be released in 2023. There is a requirement, as per Commission Implementing Regulation (EU) 2018/1799, to deliver Census data for the reference year 2021 to Eurostat. In September 2020, the Irish Government decided to postpone the scheduled April 2021 Census to April 2022 following a recommendation from CSO related to the impact of the Covid-19 pandemic. The CSO however has agreed that the office will still meet its legal requirement. It will base the Eurostat requirements on Census 2022 data, using administrative and other sources to appropriately adjust the data to reference year 2021. A (preliminary) headcount of usual residents at the 1 km² grid level (there are approximately 73,000 such square kilometres in Ireland) is required by Eurostat by 31st December 2022. There is further detail available in section 3.1 data description above.

11.1.1. Lineage
Please see further detail on the methodological note and the quality management of the data in section 3.1 of this report.
11.1.2. Conformity, specification
Please see further detail on the methodological note and the quality management of the data in section 3.1 of this report.
11.1.3. Conformity, degree
Please see further detail on the methodological note and the quality management of the data in section 3.1 of this report.
11.2. Quality management - assessment
Please see further detail on the methodological note and the quality management of the data in section 3.1 of this report.

12. Relevance	Top
12.1. Relevance - User Needs	
The census data disseminated by Eurostat are addressed to policy makers, researchers, media and the general public.	
12.2. Relevance - User Satisfaction	
No user satisfaction surveys are carried out. User inquiries are handled by the Eurostat User Support service.	
12.3. Completeness	
Depends on the availability of data transmitted by the National Statistical Institutes.	

13. Accuracy	Top
13.1. Accuracy - overall	
Enumerators had to account for all dwellings in their area either with a completed census form or a Reconciliation Form accounting for the reason a completed census form was not returned. They	

were required to continuously call back to households which were occupied on census night to get a return from the householder. Enumerators also received a terminal bonus on the successful completion of their enumeration work. This acted as a cash incentive to ensure that they pursued householders to the fullest extent possible. The CSO is currently in the process of finalising the processing phase of Census 2022 Final Results, so it is not yet possible to conclude on the entire Census 2022 approach in detail at present. This will become available when the final Census dataset is created.

13.2. Sampling error

Not applicable to this publication.

13.3. Non-sampling error

Not applicable to this publication.

14. Timeliness and punctuality

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14.1. Timeliness

14.1.1. Date of publication

There is a requirement, as per Commission Implementing Regulation (EU) 2018/1799, to deliver Census data for the reference year 2021 to Eurostat. In September 2020, the Irish Government decided to postpone the scheduled April 2021 Census to April 2022 following a recommendation from CSO related to the impact of the Covid-19 pandemic. The CSO however has agreed that the office will still meet its legal requirement. It will base the Eurostat requirements on Census 2022 data, using administrative and other sources to appropriately adjust the data to reference year 2021. This data was not published on the CSO website. However it is based on the Preliminary Census 2022 Results which is available on the CSO website here:

Annexes:

[Census 2022 Preliminary Results](#)

14.1.2. Date of last revision

31/12/2021

14.1.3. Date of creation

31/12/2022

14.2. Punctuality

All publications delivered on schedule to date.

15. Coherence and comparability

[Top](#)

15.1. Comparability - geographical

For the purposes of the grid data, the geography is comparable. However, this is based on the preliminary 2022 result. For the Census 2022 final results, there are many geographical boundary changes. This will be published in detail when the Census 2022 Final results are being published.

15.1.1. Geographic information - data quality

Please note there will be further detail available on the CSO website when the Census 2022 final Results are published. This is not applicable to the Census grid data submission.

15.2. Comparability - over time

For the purposes of this publication, the CSO produces data for total usual residents population in 2021 for the grid data submission, there are no additional attribute data available at present. However, it should be noted that for the Census 2022 Final Results there will be detailed cross tabular analysis output in 2023 for new census questions. A list of the new questions can be found at the URL below. There have been a number of question changes in Census 2022, a detailed list of the changes and the new questions are set out in the 2018 Pilot report at the URL below. Questions that have minor changes can be compared, however many questions have significant questions which are no longer comparable.

The Census 2016 and 2022 form are available online at the URL below.

Annexes:

[New questions for Census 2022](#)

[Census 2022 Pilot Report](#)

[Census form 2016](#)

[Census form 2022](#)

15.3. Coherence - cross domain

This is not applicable to the grid dataset, however it will be possible to compare Census 2022 Final Results with external sources with the same reference period.

15.4. Coherence - internal

This is not applicable to the grid dataset, however it will be possible to compare Census 2022 Final Results with external sources with the same reference period.

16. Cost and Burden

[Top](#)

To be confirmed as the CSO is currently processing Census 2022 data.

17. Data revision

[Top](#)

17.1. Data revision - policy

There is no policy to revise Census data. In cases where an error was discovered in published data the data is corrected and a note of the correction was highlighted on the CSO web site.

17.2. Data revision - practice

There is further information on the CSO General Revisions Policy at the following link:

Annexes:
[CSO Revision Policy](#)

18. Statistical processing

[Top](#)

18.1. Source data

There is further information in section 3.1. Data description on the source data.

18.2. Frequency of data collection

There is further information in section 3.1. Data description on how the data was compiled for this data submission. The Census of Population in Ireland is collected every 5 years, however following a Government decision, taken in consultation with the Central Statistics Office (CSO), the Census due

to take place in April 2021 is postponed for one year. Further information on the postponement FAQ is available on the CSO website here:

Annexes:

[Census 2021 Postponement FAQ](#)

18.3. Data collection

Data was collected by means of a conventional census, i.e. through questionnaires distributed to and collected from every household in Ireland for 10 weeks, to be completed on the night of 3rd April 2022 (Census Night). Under Irish legislation - Statistics Act 1993 and Statistics (Census of Population) Order 2020 - participation in the census was compulsory for every household in the State on Census Night. The Order also required the managers of communal establishments to co-operate with and facilitate the distribution and collection of individual forms to persons who spent Census Night in the establishment

18.4. Data validation

There is further information in section 3.1. Data description on how the data was validated. Census 2022 Final results are still being processed and the grid square data was produced based on the preliminary figures.

18.5. Data compilation

There is further information in section 3.1. Data description on how the data was compiled.

18.6. Adjustment

There is further information in section 3.1. Data description on how the Census 2022 Preliminary Results was rebased to have a reference year of 2021.

19. Comment

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The CSO adjusted the Census 2022 preliminary results of estimated usual residents for 3rd April 2022 back to the 3rd December 2021 reference point by performing a reverse cohort-survival model. The CSO Census 2022 Preliminary Results are available on the CSO website at the following URL.

Annexes:

[Census 2022 Preliminary Results background notes](#)

Related metadata

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Annexes