

Measuring Emigration

Challenges and Opportunities



UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

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Challenges and Opportunities



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Preface

Migration is both a powerful driver and an important consequence of economic, political and social change. As such, it must be measured and understood effectively. While international migration statistics have traditionally focused on immigration, reliable information on emigration is equally essential. Emigration shapes population size and composition, affects labour markets, and contributes to long-term demographic change. Understanding who leaves a country, and in what numbers, is vital for evidence-based policymaking and the appropriate allocation of resources. Yet measuring emigration remains a persistent challenge for the statistical community, as demands for timely, accurate and internationally comparable data continue to grow.

Prepared by the Conference of European Statisticians Task Force on Measuring Emigration, this publication provides guidance on data sources, methods for evaluating and communicating emigration statistics, and the use of mirror statistics – that is, the use of immigration records from destination countries to estimate emigration from countries of origin. It also offers recommendations to national statistical offices on improving the production of emigration statistics, validating emigration estimates, and strengthening data sharing and international cooperation.

The publication is intended to support national statistical offices and other producers of migration statistics, while helping users better understand how emigration data are compiled and evaluated.

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Acronyms and Abbreviations

CES	Conference of European Statisticians
NSO	National Statistical Office
OECD	Organisation for Economic Co-operation and Development
UNECE	United Nations Economic Commission for Europe
UNSD	United Nations Statistics Division

Summary

Importance of emigration statistics

1. International migration statistics have traditionally focused on immigration, but accurate data on emigration is equally important. Emigration influences population size and structure, labour markets, and long-term demographic change. Nations need to understand the scale and characteristics of people leaving, both to inform policy and to support international cooperation when populations and labour markets are trans-national.

2. Recognizing this, as well as the challenging nature of measuring emigration, the Conference of European Statisticians (CES) established the Task Force on Measuring Emigration in 2023. The Task Force sought to review current practices, highlight innovative methods, and provide recommendations for improving the quality, timeliness and comparability of emigration statistics.

Current approaches to measuring emigration

3. To understand the emigration measurement landscape, the Task Force invited countries to participate in a survey gathering information across several themes. Across 11 responding countries, the Task Force found wide variation in how emigration is measured.

- (a) **Data sources.** Countries combine multiple sources such as censuses, household surveys, border-crossing records, population registers, and tax or social security data. Each has strengths and limitations;
- (b) **New and alternative sources.** Several countries are experimenting with tax data, linked administrative datasets and machine learning models to produce faster or more detailed estimates;
- (c) **Breakdowns produced.** Most countries can report emigrants by age, sex, and citizenship. Far fewer can report by country of destination, occupation, or reason for emigration – leaving important policy gaps;
- (d) **Timeliness.** Producing official statistics can take from 1 month (Latvia) to 3 years (Canada). Some countries use modelling to release provisional figures while waiting for final data;
- (e) **Methods used in estimation emigration.** Australia, New Zealand, and the UK use statistical models and machine learning to classify migrants provisionally. Canada combines several administrative datasets with adjustment factors to improve coverage and uses modelling across their outputs.

4. Overall, the integration of multiple data sources may improve timeliness without compromising quality.

Mirror statistics: Using immigration data to measure emigration

5. One approach is the use of mirror statistics – using immigration records from destination countries to estimate emigration from the origin country. Immigration data are often more reliable because migrants are usually well captured by the arrival jurisdiction. Additionally, where registers are involved, there is a high chance that immigrants register in their new country but they are less likely to deregister at home.
6. Findings include:
 - (a) **Usage:** 9 of 11 countries already use mirror statistics in some form; 10 want to expand their use;
 - (b) **Barriers:** Inconsistent definitions of migration, lack of timely data, lack of international frameworks for sharing individual-level data and limited data-sharing agreements hinder wider adoption. Limitations in the published disaggregation can also be a barrier;
 - (c) **Case Studies:**
 - (i) *Italy* provides detailed immigration statistics to help other countries (e.g. Romania, Albania, Poland) improve their emigration estimates;
 - (ii) *New Zealand* collaborates closely with Australia, sharing aggregate data established from linked border-crossings data to track flows;
 - (iii) *Poland* uses mirror statistics to estimate the number of Polish citizens abroad, revealing underestimation in national data.
7. International cooperation and harmonisation of definitions would enable expanding the value of mirror statistics.

Evaluating and communicating quality

8. Measuring emigration is inherently uncertain. To build trust, countries increasingly focus on evaluation and transparency:
 - (a) Many compare national data with external sources (e.g. Canada with U.S. records, Albania with Italian statistics, Mexico with the American Community Survey);
 - (b) Some, like Mexico, New Zealand, and the UK publish uncertainty ranges or confidence intervals for their estimates, particularly for provisional estimates;
 - (c) Others, like Australia and Italy, uses regular population censuses or integrated demographic registers to validate estimates;
 - (d) Clear communication of limitations, revisions, and methodological choices helps users interpret migration data responsibly.

Key recommendations

9. The task force has made the following key recommendations:
- (a) **Use multiple sources:** No single dataset captures emigration well; combining registers, surveys, tax data, and border data gives a fuller picture;
 - (b) **Explore new data:** Administrative and “signal” data (tax, health, education) can improve timeliness; future work may include mobile phone, social network or financial data;
 - (c) **Leverage mirror statistics:** Share immigration data across borders, starting with key partner countries, to strengthen emigration estimates;
 - (d) **Link datasets:** Integrating sources can improve accuracy and enable more detailed breakdowns;
 - (e) **Report on uncertainty:** Publishing confidence intervals, revisions, or quality notes helps build trust with users;
 - (f) **Promote international collaboration:** Harmonised definitions and data-sharing agreements are essential for consistent global migration statistics.

Chapter 1 Introduction

1.1 Importance and policy relevance

10. High quality emigration statistics are important for policymaking. Emigration remains a fundamental component of the population equation and demographic change. Countries have an interest in the volume and attributes of their emigrants and diaspora.

11. Emigration estimates feed into population estimates, labour market statistics and characteristics. It is important for countries to understand the level and demographic of people leaving, so the policies reflect the current population, and resources can be allocated appropriately.

12. The COVID-19 pandemic highlighted the importance of understanding emigrant populations from the perspective of the source jurisdictions. As borders closed, and populations that had limited access and rights in host countries were exposed, source jurisdictions did not have good information on their citizens living outside their borders, to offer sufficient support or pathways back to the source nation.

1.2 Rationale and mandate for action

13. In the early 2000s the Bureau of the Conference of European Statisticians recognized the need to promote and use harmonized concepts and definitions of migrants. A joint UNECE/Eurostat Task Force on Measuring Emigration Using Data Collected by the Receiving Country was set up in 2005, to develop guidelines on how to measure emigration through data on stocks and flows in host countries. The main output of the work of the task force are the [Guidelines for Exchanging Data to Improve Emigration Statistics](#), published in 2010.

14. In addition to exchanging data, in order to produce better statistics on emigration and overcome the related problems, researchers and national statistical offices (NSOs) have developed over time various techniques, including residual methods, indirect estimation, sampling methods, and statistical modelling. In 2013, a CES working group on migration statistics¹ produced a review of those methods², discussing the relative strengths and limitations of each approach.

15. Since then, more administrative data have become available in many countries. Some countries have been able to make use of new data sources³. Administrative data or new data sources, for instance, can be used to identify emigrants who have not communicated their departure. Data integration and other methods suitable for measuring emigration data have advanced considerably. In Canada, where there is no population register, emigrants are estimated by using data from the Child Tax Benefit programme and the Canada Revenue Agency, but also from the United States Department of Homeland Security regarding emigration to the United States.

¹ [Task force on improving migration and migrant data using household surveys and other sources](#) (also known as “Suitland Working Group”).

² Jensen E. 2013. [A review of methods for estimating emigration](#). Working paper 101. United States Census Bureau.

³ UNECE 2022. [Use of new data sources for measuring international migration](#). Geneva: United Nations.

16. Considering the high policy relevance of emigration statistics, the progress made in the last few years, and the fact that there is still room for improvement in this field, it is timely to review the data sources and methods available for the production of emigration statistics, to identify good practices that could lead to improvement.

17. At its October 2022 meeting, the UNECE Group of Experts on Migration Statistics discussed topics for future work and expressed strong support for launching new methodological work on measuring emigration.

1.3 Work carried out by the Task Force

18. In February 2023, the Bureau of the Conference of European Statisticians (CES) discussed future work on migration statistics and agreed to establish a Task force on measuring emigration. In October 2023, the terms of reference of the task force were approved by the CES Bureau and the task force was established with the objectives to:

- (a) Collect information and material on existing experience and plans in NSOs and other government agencies for measuring emigration, focusing on new data sources and innovative methods, on cooperation initiatives between countries, and on emigrants (not including the children of emigrant parents);
- (b) Identify examples from outside official statistics to estimate migration that could be potentially relevant for NSOs for measuring emigration;
- (c) Analyse and review the collected material, and provide guidance to NSOs for measuring emigration in an internationally comparable way;
- (d) Compile the examples into an online reference tool and develop a mechanism for updating it with new examples.

19. The task force started its work by recognizing the activities being carried out by the United Nations Expert Group on Migration Statistics on the revision of the 1998 International Recommendations on International Migration Statistics and discussing which definition of emigration should be used by the task force. The task force agreed to use the definition of long-term emigration (12 months or more) from the 1998 recommendations. The task force recognizes that this definition is not in line with the new Recommendations on Statistics of International Migration and Temporary Mobility, which were endorsed by the United Nations Statistical Commission in March 2025⁴.

20. Then, the task force designed a questionnaire to collect from its members detailed information about availability and use of data sources relevant for measuring emigration, experiences using data linkage, use of mirror statistics, assumptions needed to estimate emigration in administrative data, and evaluation of emigration statistics.

21. The questionnaire (see annex) was completed by 11 countries (Albania, Australia, Canada, Hungary, Italy, Latvia, Mexico, New Zealand, Poland, the United Kingdom, and the United States). The information collected was analysed by the task force. The main results of this analysis, with some recommendations formulated by the task force based on the responses from the 11 countries, are presented in this report as described in the next section.

⁴ United Nations (2025), [Recommendations on Statistics of International Migration and Temporary Mobility \(unedited version\)](#).

22. The work of the task force was presented at the meeting of the UNECE Group of Experts on Migration Statistics (Geneva, 7–8 May 2024). In the discussion, participants noted the rapid pace of change in technology, data sources and statistical methodology, and welcomed the efforts of the task force to assess the current situation across the region and develop updated guidance on these topics. It was also noted that there is a greater emphasis on timeliness than there had been in the past, as well as greater attention to quality assessment. The growing need for flexibility, such as being able to adapt a methodology rapidly to account for new phenomena or to cover events spanning very small time periods, was noted. The value of alternative methods (both sources and statistical approaches) is being more proactively explored, including not only administrative sources but also longitudinal perspectives, modelling, and the use of machine learning and artificial intelligence.

1.4 Overview of the guidance

1.4.1 Chapter 2: Data and methods

23. This chapter focuses on the data sources used by responding countries to produce their emigration statistics, the various breakdowns that are published, and the methodologies used in estimating emigration. Because the methodology considerations are driven by both the required quality and breakdown of estimates, but also by the timeliness requirements of publication, the various publication timelines of respondents are also presented.

24. It also includes information about the production timelines as well as breakdowns of the variables produced for emigration estimates, as well as information about the various data combination techniques and estimation models used by various countries.

1.4.2 Chapter 3: Use of mirror statistics

25. The chapter presents the responses to the section of the questionnaire concerning the use of mirror statistics, including insights into how countries use them and from which countries the mirror data are collected. It then provides a detailed overview of the main barriers that have limited the use of mirror statistics for measuring emigration across countries. The chapter continues with a discussion of the key results and conclusions based on the questionnaire. Based on these findings, a set of recommendations and guidelines are provided on how mirror statistics can be used to measure emigration or to evaluate estimates of emigration.

26. The chapter concludes with three case studies — from New Zealand, Poland and Italy — that offer practical examples and insights. These case studies illustrate the diverse applications of mirror statistics: to measure emigration flows, to measure population stocks of citizens residents abroad, and to support the use of mirror statistics through international data exchanges.

1.4.3 Chapter 4: Evaluation and communication

27. This chapter explores the approaches used by the NSOs to evaluate and communicate the quality of their long-term emigration estimates. It provides an overview of the methods employed to assess the accuracy and reliability of emigration data, discusses the challenges NSOs face, and how they address these issues through regular evaluations or other indicators of uncertainty or confidence intervals.

28. This chapter also provides a summary of how NSOs communicate the quality of their emigration estimates. It offers practical insights into the diverse methods used to communicate migration data to help ensure that users can properly interpret and trust the data.

Chapter 2 Data and methods

2.1 Data sources

29. This section covers the data sources each NSO uses to estimate emigration applying the UN definition. All 11 NSOs surveyed follow the UN definition of a (long-term) migrant to estimate emigration which, by definition, excludes short-term movements.

30. Of the 11 country responses, a variety of data sources were used, with 5 responding that they use an 'Other administrative database' (Table 1). However, each country uses multiple data sources (Table 2).

Table 1

Data sources used to estimate emigration flows by country

Data source	Country
Population Census	Albania, Italy, Poland, Mexico, United States
Household sample survey	Albania, Mexico, United States
Border sample survey	United Kingdom
Population register	Italy, Latvia, Poland
Permits of stay register, aliens register	Albania, Hungary, Poland
Passenger cards system, flight data	Australia, United Kingdom
Other administrative database	Canada, Hungary, Italy, New Zealand, United Kingdom

31. The respondents were asked to provide a detailed description of the data that they use.

32. Albania uses a population census to produce an estimate of the number of individuals who have emigrated between the two censuses. A household sample survey is used which includes data collected from the migration section of the labour force survey combined with population projection rates. Data on Asylum Seekers and the acquisition or loss of citizenship in Albania are provided by the Department for Border and Migration at the General Directorate of State Police, Directorate of Policies for Asylum, Foreigners and Citizenship at the Ministry of Interior.

33. Australia uses administrative data supplied by the Department of Home Affairs. This data contains unit record data of all border crossings and are sequenced for each person to determine durations in and out of Australia. The 12 months threshold to be considered resident does not have to be continuous and is measured over a 16-month period.

34. To estimate emigration from Canada to the United States, data from the Office of Immigration Statistics of the US Department of Homeland Security (DHS) provides information on Canadians who acquire long-term residency rights in the United States. For estimating emigration to countries other than the United States, Canada relies on tax data.

35. Hungary uses data from the National Health Insurance Fund to estimate the emigration of Hungarian citizens. Estimates of emigration of foreign citizens are based on data from the National Directorate-General for Aliens Policing (NDGAP). This includes registration certificates and settlement permits of foreign citizens from EU and EEA countries, as well as third-country citizens.

Table 2
Order of importance of data sources by country

<i>Country</i>	<i>Order of importance</i>		
	1	2	3
Albania	Population Census	Household surveys	Permits of stay register, aliens register
Australia	Passenger cards system, flight data	Medicare data (secondary source for state or territory of residence)	
Canada	Tax data from Canada Child Benefit (CCB) program from Canada Revenue Agency (CRA)	T1 Family File (T1FF) tax data from CRA	Immigration Statistics of U.S. Department of Homeland Security (DHS)
Hungary	Register of National Directorate-General for Aliens Policing	National Health Insurance Fund	
Italy	Population Register	Population Census	Other administrative database
Latvia	Population estimation	Population register	Mirror statistics
Mexico	Population Census	Household sample survey	
New Zealand	Border crossings passport data	Other country (Australia) data on migrant arrivals (from New Zealand)	
Poland	Population Register	Population Census	Permits of stay register; aliens register
United Kingdom	Passenger cards system, flight data	Other administrative database (tax data)	Border sample survey
United States	Household Survey (American Community Survey)	Population Census	

36. Italy uses a population register to count the number of immigrants and emigrants in the reference year. The data used to determine migration flows are derived from the change of residence of the resident population. Data on residence permits refer only to non-EU citizens, so are used as a signal of life to capture the over- or under-coverage component of the census population.

37. Latvia uses the population register to count the number of immigrants and emigrants in the reference year. For migration adjustments, if the country is not known, mirror statistics are used.

38. Mexico uses the Population and Housing Census, or specialized surveys such as the National Survey of Demographic Dynamics (ENADID); using specific questions that allow the identification of people who have changed their place of residence. Topics about Recent International Emigration ask whether any household members migrated to another country in a reference period (e.g., in the last 5 years).

39. New Zealand receives a daily supply of all border crossings into and out of New Zealand and applies a 12/16-month rule, meaning the UN 12-month threshold does not need to be a consecutive 12 months, but can be cumulative over a 16-month window. Australian migrant arrival data is used to estimate migrant departures from New Zealand to Australia (historically, the main country of destination for emigrants).

40. Poland uses as one of the main sources a permit of stay, aliens and population register to estimate emigration.

41. The United Kingdom uses passenger cards system/flight data to link an individual's visa to their travel into and out of the UK. They also use a database of everyone in the UK who has a National Insurance number which details their interactions with the tax and benefits system. A border sample survey is also used but becoming decreasingly used given its limitations.

42. United States use an indirect (residual) method, so emigration is not directly derived from a single survey question/section.

43. Respondents to the questionnaire did not include countries that produce emigration statistics using comprehensive population register data. While such countries (e.g. Denmark, Finland and Sweden) also use additional administrative data sources to identify persons who may have left the country without submitting a change of address notification, they do not need to rely on combining multiple data sources, statistical modelling or data obtained from destination countries.

2.1.1 Alternate or new data sources

44. Of the 11 country responses, 5 responded that they have considered alternative or new data sources to estimate emigration, with 4 of these considering tax data (Table 3).

Table 3

Alternative data sources being explored to estimate emigration by country

<i>Country</i>	<i>Data Source</i>
Canada	Population Census
	Household sample survey (Census Undercoverage Study (CUS))
	Passenger cards system, flight data
Hungary	Population register
	Permits of stay register, aliens register
	Other administrative database (Education Office, National Tax and Customs Office)
Poland	Other administrative database (Tax data)
United Kingdom	Other administrative database (Tax data)
United States	Other administrative database (Tax data)

2.1.2 Linked data

45. Australia indicated that Medicare data is linked to the travel data as a secondary source for state or territory of residence through probabilistic linking using name, date of birth and sex.

46. New Zealand and Poland indicated that they use linked data sources to estimate emigration.

47. New Zealand uses border-crossings passport data – linking arrivals and departures to ascertain precise duration of stay and absence – with the key linking variables being passport number, date of birth, and name (although all 3 are not needed to enable a link).

48. Poland used data received from main destination countries to estimate Polish emigrant stocks. These were linked on macro level using aggregated data on mirror statistics from destination countries.

2.1.3 Outputs based on the various data sources

49. Based on the available data sources, various countries output different variables at different detail levels. This section summarises both the variables, detail levels, and the desired expansions to those details.

2.1.4 Emigration statistics by variable

50. Various breakdowns of emigration statistics are produced by countries, but all would like to expand the available breakdowns (Table 4). Where countries currently produce a breakdown and have indicated they also want to produce that breakdown, we have interpreted that to mean that they currently produce a limited version of that variable but would like to expand on that (i.e., more detail).

Table 4

Current and desired breakdowns of emigration statistics by country

<i>Breakdown</i>	<i>Currently produce</i>	<i>Do not currently produce but want to (or want to expand breakdown)</i>
Demographics (age/sex)	Australia, Canada, Hungary, Italy, Latvia, Mexico, New Zealand, Poland, United Kingdom	Albania, United States
Country of destination	Hungary, Italy, Latvia, Mexico, New Zealand, Poland	Albania, Australia, Canada, Hungary, New Zealand, United Kingdom, United States
Country of birth	Australia, Hungary, Italy, Latvia, Mexico, Poland	Albania, Canada, New Zealand, United Kingdom, United States
Citizenship	Australia, Hungary, Italy, Latvia, New Zealand, Poland	Albania, Canada, Mexico, United States
Nationality	Australia, Italy, United Kingdom, United States	Albania, Hungary, Mexico, United States
Skill type (occupation or education level)	Italy	Albania, Hungary, Latvia, Mexico, New Zealand, Poland
Reason for emigration	Mexico, United Kingdom	Albania, Hungary, Poland

Note: In some countries 'nationality' and 'citizenship' are synonymous, but in others they can be different. For example, people may be citizens of the United Kingdom but separately identify as English, Scottish, Welsh, etc.

51. Australia, New Zealand and United Kingdom indicated that they use additional data sources to provide the above breakdowns.

52. In New Zealand, citizenship and age/sex come from passport data collected at the New Zealand border, while the country of destination (Australia) relies on data collected at the Australian border (supplied by the Australian Bureau of Statistics). This is the only country of destination that New Zealand currently produces estimates for, and therefore they would like to be able to produce estimates for other countries of destination.

53. In the United Kingdom, nationality and age/sex come from passenger cards/flight data, while reason for emigration relies on data from the IPS (a border sample survey).

54. In Mexico, the demographic variables, country of birth and destination, as well as the reasons for emigration are recorded through the population census and the National Survey of Demographic Dynamics (ENADID). Mexico is the only country that collects information on reasons for emigration, although still is not possible to integrate in these sources of data information about citizenship and nationality.

2.2 Methods used in estimation emigration

2.2.1 Production timelines

55. The time lags in the production of initial estimates from a given reference month ranged from 1 to 5 months (Table 5). They ranged from 5 months to 3 years to produce final estimates.

Table 5

Reported elapsed time from end of reference period to production of emigration estimates by country

<i>Country</i>	<i>Initial estimates produced</i>	<i>Final estimates produced</i>
Albania	Not produced	Unknown
Australia	6 months	18 months
Canada	3 months	3 years
Hungary	3 months	7 months
Italy	3 months	9 months
Latvia	1 month	5 months
Mexico	6–8 months	1 year
New Zealand	1.5 months	17.5 months
Poland	Not produced	1 year
United Kingdom	5 months	2 years
United States	Not produced	Unknown

2.2.2 Use of statistical modelling

56. Of the 11 country responses, 5 responded that they “combine data sources using statistical modelling”, namely Albania, Canada, Latvia, New Zealand and Poland. The other 6 responded that they “use data sources individually” (Australia, Hungary, Italy, Mexico, United Kingdom and United States).

57. However, as a point of clarification, Australia, Canada, New Zealand and United Kingdom use statistical modelling to produce initial emigration estimates. Of these countries, only Canada uses statistical modelling in the production of final emigration estimates.

58. In Australia estimates of overseas migration are required less than six months after the reference quarter to produce quarterly Estimated Resident Population (ERP) statistics. At that time, complete traveller histories for the 16 months following a reference quarter are not available. To

obtain the required estimates in the absence of complete duration information, preliminary overseas migration estimates are initially modelled using past traveller migration propensities. See [Measuring Net Overseas Migration in Australia](#).

59. The number of long-term emigrants in Canada is estimated using three different data sources:
 - (a) Office of Immigration Statistics (U.S. Department of Homeland Security);
 - (b) Canada Child Benefit (CCB);
 - (c) T1 Family File (T1FF).
60. The first source is used to directly estimate emigrants to the United States.
61. The number of emigrants moving to countries others than the United States is based on CCB data. CCB data must be adjusted using four factors because it is not universal and does not provide direct information on the number of adult emigrants.
62. For more information see '[Data quality, concepts and methodology](#)' and '[Emigrants](#)'.
63. Although CCB data is very timely, its level of completeness data is initially significantly lower. As a result, to avoid underestimating emigration, we assume a constant emigration rate, derived from the most recent final emigrant estimates (which are usually 2 years old). This method assumes that emigration patterns remain stable over time, allowing data from the previous year to inform the preliminary estimates for subsequent periods.
64. In New Zealand, the migrant status of people crossing the border is not immediately known, so a machine-learning model is used to probabilistically classify border-crossings and produce provisional migration estimates. See '[An outcomes-based approach to measuring migration – method overview](#)'.
65. In the United Kingdom, historical tax data is used to estimate how many people living in the UK (and interacting with the tax system) will subsequently depart long-term. Where flight data is used, visa expiry dates give an indication of the proportion of departures that will return to the UK within 12 months versus those who will depart long-term (emigrate).

2.3 Discussion

66. Measurement of emigration relies on a variety of sources, with each of them having their own strengths and limitations. All countries surveyed used multiple data sources to estimate and improve their emigration statistics, which use a combination of both conventional and non-conventional data sources.
67. For alternative data sources, countries are mainly exploring the use of other administrative databases. Administrative data have not been collected for statistical purposes, and there are often coverage and measurement issues. However, estimates using administrative data can often produce more timely estimates. Nowcasting techniques using 'signal' data can also meet the ambition for even timelier estimates.
68. The benefits of using administrative data include being able to link data sources together. Linked data helps identify new patterns and trends and can help develop further insight into migration statistics. This is an area where some countries are beginning to explore.

69. Other non-conventional data sources, such as commercial data sources, were not listed as currently being explored to estimate emigration.

70. Various breakdowns of emigration statistics are produced by countries, but all would like to expand the available breakdowns. Demographic information, including age and sex, are produced by most countries. No responding countries currently produce estimates by reason for emigration and over half the countries would like to produce country of destination, highlighting a data gap.

71. Producing timely estimates of emigration using the UN definition can be challenging. Definitionally, 12 months or more need to pass before being able to classify someone as emigrating long-term. Statistical modelling can help countries produce provisional estimates of emigration. However, when travel and migration patterns change, it is difficult to reliably and timely estimate international migration using past trends alone (e.g., as experienced by multiple countries during and after the COVID-19 pandemic).

2.4 Recommendations

72. The task force has made the following recommendations:

- (a) For a better understanding of migration movements, it is recommended to use **multiple data sources** to estimate emigration. Integration of data from different sources, such as the population census, administrative data, including border records, and mirror statistics, can enhance the richness of data and reduce coverage or accuracy problems.
- (b) Explore the use of **alternate or new data sources**. New non-conventional data sources can be useful for producing migration statistics when used in combination with conventional sources. Countries should explore the use of non-conventional data sources such as mobile phone, credit card, and social network data and share their findings.
- (c) **Linked data** can provide further insight into emigration patterns. When using administrative data sources, countries should explore how these could be used by linking to other sources and how this could improve the quality and richness of breakdowns produced.
- (d) Reach out to further countries to understand if any produce a breakdown by **reason for emigration**. Investigate alternative or new data sources that may be able to provide this data that could be modelled or linked to current emigration statistics.
- (e) **Timely migration statistics** are important for policy and planning. Countries should explore how modelling can improve the timeliness of estimates while still ensuring accuracy and learning from countries who already model their estimates.

Chapter 3 Use of mirror statistics

73. Mirror statistics involves using immigration data from destination countries to estimate emigration figures from origin countries. Indeed, immigration statistics are often considered more reliable than emigration statistics for several reasons. In countries relying on traditional data sources such as field-based censuses or surveys, measuring emigration is particularly challenging since emigrants are absent from the country during data collection. This makes it necessary to rely on proxy questions asked of households about absent members, a limitation not faced in collecting immigration statistics. Furthermore, in countries using administrative or register-based data sources, migrants typically have stronger incentives to register in their destination country than in deregistering from their country of origin. In addition, countries themselves often have stronger motivation to monitor and support people within their borders (immigrants) than those outside their borders (emigrants).

74. High-quality immigration statistics by various breakdowns (e.g. country of previous residence, age, sex) are increasingly available in many countries, providing an underutilised potential to improve emigration measurement.

75. Integrating mirror statistics into an annual statistical production process and publication schedule can be challenging for NSOs. Several barriers contribute to this underutilisation, such as inconsistencies in migration definitions and duration of stay across countries, as well as variations in data sources and discrepancies in the timing of event recording between origin and destination countries (UNECE and Eurostat, 2010⁵). Additionally, some estimates rely on proxies, such as country of birth or citizenship, instead of previous residence and there are further difficulties with capturing individuals with dual citizenship. The issue of conceptual differences is often a barrier for countries trying to use mirror statistics, as methods cannot be easily harmonised. The absence of robust data-sharing frameworks further limits access and the effective use of mirror statistics.

76. The conclusions and recommendations in this section rely on the responses from 11 countries to the questionnaire, therefore a limited sample cannot be considered representative of global practices.

3.1 Responses to the questionnaire

77. This section summarises the experience and interest of the task force members in using mirror statistics to estimate emigration or to evaluate estimates of emigration. It covers how countries use mirror statistics, which other countries they collaborate with, and their interest in using mirror statistics or sharing their own data to facilitate the use of mirror statistics in other countries in the future.

3.1.1 Experience using mirror statistics

78. Of the 11 countries that participated in the questionnaire, 9 (Albania, Canada, Hungary, Italy, Latvia, Mexico, New Zealand, Poland and United States) use mirror statistics to estimate emigration or to evaluate estimates of emigration, while 2 countries do not (Australia and United Kingdom).

⁵ UNECE and Eurostat, 2010. [Guidelines for exchanging data to improve emigration statistics](#). Geneva: United Nations.

3.1.2 Use of mirror statistics

79. Of the nine countries that use mirror statistics, two use them to estimate emigration, four use them only to evaluate estimates of emigration, and three use them for both estimating emigration and evaluating estimates of emigration ([Table 6](#)).

80. **Latvia** specified that mirror statistics are used to estimate emigration by country.

Table 6

Countries who use mirror statistics to estimate and evaluate emigration estimates

<i>Country</i>	<i>Use mirror statistics to estimate emigration</i>	<i>Use mirror statistics to evaluate estimates of emigration</i>
Albania	x	x
Australia		
Canada	x	x
Hungary		x
Italy		x
Latvia	x	
Mexico		x
New Zealand	x	
Poland	x	x
United Kingdom		
United States		x

3.1.3 Working with other NSOs

81. Eight countries provided information on the countries they work with or whose data they use as part of their use of mirror statistics ([Table 7](#)).

82. More specifically, **Canada** uses data from the U.S. Department of Homeland Security to estimate emigration and uses data from the American Community Survey (ACS) from the U.S. Census Bureau to evaluate the estimates of emigration.

Table 7

Countries who work with or use data as part of their use of mirror statistics

<i>Country</i>	<i>Data sources</i>
Albania	ISTAT (Italy), Eurostat
Canada	U.S. Department of Homeland Security, U.S. Census Bureau
Hungary	Statistics Austria
Latvia	EU countries
Mexico	U.S. Census Bureau
New Zealand	Australian Bureau of Statistics
Poland	European Countries
United States	Canada, Mexico

83. **Mexico** evaluates the quality of the emigration statistics through a statistical evaluation process, which integrates the verification of data consistency and the detection of possible systematic errors with other external sources such as those collected in censuses and surveys of other countries, especially the United States (American Community Survey, ACS).

3.1.4 Estimating and evaluating estimates of emigration

84. Ten out of eleven countries responded positively to the question regarding whether they have the ambition to use mirror statistics in the future to estimate or evaluate estimates of emigration.

3.1.5 Data sharing

85. All ten countries that provided a response responded positively regarding whether they would be willing to share data with other countries to facilitate this work.

3.1.6 Insights on mirror statistics from other parts of the questionnaire

86. Some insights into the use of mirror statistics can also be drawn from other parts of the questionnaire. In the questions on data sources and their relative importance, only three countries (Canada, Latvia and New Zealand) mention mirror statistics, all ranking it last in importance. Latvia also note that mirror statistics are used only when the country is unknown. This suggests that, even in countries that use mirror statistics, it often remains a secondary data source.

87. **New Zealand** reports that they produce data by country of destination only for Australia, using mirror statistics. However, they also express an interest in producing estimates for other countries of destination, which highlights the interest in expanding the use of mirror statistics.

88. In another section of the questionnaire, **Poland** notes that when comparing migration stocks and flows using mirror statistics, it becomes evident that emigration data for Poland is underestimated. This highlights the importance of mirror statistics to evaluate the quality of emigration statistics.

3.1.7 Reasons for not currently using mirror statistics

89. The gap between the interest in using mirror statistics and their actual use deserves particular attention. For countries that express an ambition to use mirror statistics but have not yet done so, it is valuable to explore the specific reasons and barriers that limit their use. These may consist of the lack of international frameworks for data-sharing, including individual-level data, inconsistencies in definitions of international migration and duration of stay, and differences in data sources and methodologies across countries.

90. The **United Kingdom** lists as main reasons for not using mirror statistics the lack of coherence between different concepts and definitions used by countries, the different reference periods, and the different data collection processes and methods used by countries.

91. **Hungary** identifies two primary reasons why they do not use mirror statistics to estimate emigration, which are that they are not available in time and they lack sufficient details. Furthermore, integrating mirror statistics into their current methodology is not straightforward.

92. Concerning timeliness, **Hungary** explains that the data-producing and publishing system does not allow for annual retrospective revisions to be made to past data. Preliminary data are published in March and the final data in June, and new mirror statistics would not be available before then.

93. Regarding the data breakdowns needed, **Hungary**'s migration data are based on administrative data sources. Because mirror statistics are not available at an individual level, they have not been built into the methodology. The additional methodological issue is that, due to the absence of a statistical population register in the Hungarian Central Statistical Office, immigration and emigration data are produced at the municipal level, and they are part of the official population change data at the municipal level. Unfortunately, mirror statistics are not available at the Hungarian municipal level.

94. As a result, **Hungary** does not use mirror statistics to correct the data. Instead, a macro-level mirror statistics validation is used. Mirror statistics are received from Statistics Austria, since more than half of Hungarian emigrants move to Austria. This helps to verify the consistency of the data and consider the reasons for any inconsistencies, along with potential corrections.

95. Finally, **Hungary** notes that if mirror statistics data were received at the individual level, they could be used in the current methodology. As this data is highly sensitive, it would be necessary to enter into a data exchange agreement that is firmly grounded in legal principles to obtain individual-level data.

3.2 Discussion of responses on mirror statistics and conclusion

96. The responses reveal both significant interest in and recognition of the potential value of mirror statistics. Of the eleven countries that responded to the questionnaire, eight currently use mirror statistics, and ten have expressed an ambition to use them in the future to estimate or evaluate emigration statistics. Furthermore, all countries that responded to the question have indicated a willingness to share data with other countries to facilitate this work.

97. The first takeaway is therefore that there is a broad interest in expanding the use of mirror statistics to improve or evaluate their emigration statistics and to share their data with other statistical offices, fostering the broader application of mirror statistics in other countries.

98. Another interesting finding is that all countries currently using mirror statistics collect data only from countries or international organisations within their own geographical region. Indeed, Canada, Mexico and the United States exchange data between themselves; New Zealand takes data from Australia; and Albania, Hungary, Latvia and Poland take data from European countries. While it is true that most emigration flows often occur with neighbouring countries or those within the same geographical region, migration is a global phenomenon. This highlights the need to establish connections between countries in different regions to facilitate data exchanges and promote the broader use of mirror statistics. Indeed, it may be more challenging for countries to establish collaborations to exchange data with countries from a different region of the world. Achieving this would therefore likely require a global framework for sharing detailed migration flows data.

99. Another takeaway is that increased harmonisation of definitions and methodologies across countries would be very beneficial in facilitating the use of mirror statistics. This includes the population definitions used, the duration of stay criteria applied, and the identification of the date of migration.

100. At the same time, the availability of more granular data would also facilitate the incorporation of mirror statistics in the data production of national statistical offices. Additionally, the sharing of individual-level data, in line with national legislation on data sharing and privacy, would make it easier for countries to use mirror statistics.

101. In conclusion, the findings reveal a strong and increasing interest in the use of mirror statistics. A global initiative to support data exchanges between countries, along with further international alignment of migration flows definitions and data sources, may address some of the challenges related to the use of mirror statistics, and facilitate their use.

3.3 Recommendations and guidelines for using mirror statistics to produce, improve or evaluate estimates of emigration

102. Given the strong interest in using mirror statistics, this section outlines a concise set of guidelines for countries looking to begin or expand their use.

103. The first step is to define the objectives for using mirror statistics. They typically fall into one of three categories:

- (a) To evaluate the quality of the emigration statistics produced;
- (b) To improve the accuracy, coverage and granularity of the emigration statistics produced;
- (c) To start producing emigration statistics.

104. Countries that already produce emigration statistics may decide to use mirror statistics if comparisons reveal substantial differences. Mirror statistics may also be used to improve estimates of migration and population stocks.

105. The next step is to identify destination countries of emigrants from which to collect mirror statistics. It is recommended to begin with countries that are primary destinations for emigrants.

106. Identify available immigration data sources for each destination country. This may include data from national statistical offices, international organisations, research institutions and innovative data sources.

107. For each data source, determine the granularity of available data, including breakdowns by country of previous residence, age, sex, country of birth, country of citizenship and time of the immigration event.

108. A crucial step is to examine the metadata of the data sources available to understand differences in definitions and coverage between national and mirror data sources. Key factors to assess include:

- (a) Data sources used (e.g. administrative or register data sources, censuses, household sample surveys, border sample survey);
- (b) Duration of stay criteria and whether this is based on intended or actual duration of stay;
- (c) Population definitions (e.g. usual resident population, registered population, legal population etc.);
- (d) Reference time and timing of event recording;
- (e) Coverage and accuracy (e.g. inclusion of asylum seekers, refugees, irregular and undocumented migrants).

109. Based on this assessment, evaluate the degree of comparability between mirror data and national data. Determine whether mirror data can be directly integrated, or if adjustments or partial incorporation are more appropriate.

110. If emigration statistics are already produced, compare your figures to the corresponding immigration statistics from destination countries. This analysis should also be done across available demographic breakdowns.

111. If no significant discrepancies are found, the comparison may simply be repeated during the next data production cycle, to evaluate if new discrepancies have arisen. However, such alignment is uncommon unless bilateral data exchanges are already in place. If there are significant differences, or if emigration estimates are not currently produced, the next steps focus on the incorporation of mirror data in the data production system.

112. If useful, it can be considered moving from accessing public data to implementing data exchange frameworks with destination countries of emigrants. Establishing direct data exchanges with other national statistical offices, potentially with support from regional or international organisations, can improve timeliness of mirror data availability and data granularity, subject to national legal frameworks. Additionally, agreements to share individual-level data for the purpose of improving the measurement of migration flows can also be established, provided that they comply with national legislation on data protection and privacy.

113. Develop a methodology to incorporate mirror statistics into the data production system. If emigration statistics already exist, two main approaches are possible:

114. Fully replace emigration estimates when mirror statistics are available, depending on the country of destination of emigrants;

115. Adjust and correct existing emigration estimates in line with the mirror statistics available.

116. Countries may develop complex data integration methods to integrate mirror statistics in their data production system. More information on how data integration can improve international migration statistics and relevant examples of national practice can be found in a recent report of the United Nations Expert Group on Migration Statistics ⁶ and in the UNECE guidance on data integration for measuring migration⁷.

117. Where mirror statistics do not cover all destination countries of emigrants or data breakdowns, proportional adjustment can be applied based on comparisons between national estimates and mirror data for available breakdowns. For countries without existing emigration estimates, it is especially important to source data from as many destination countries as possible.

118. If population stocks are calculated using the demographic balancing equation, it is recommended that any corrections to emigration flows data are reflected in the population stocks estimates. Under-coverage of emigration flows can lead to over-estimation of population stocks, which can also lead to biased demographic indicators (Monti et al., 2020; Mussino et al., 2025⁸).

⁶ United Nations Expert Group on Migration Statistics, 2025. [Task force 3: data integration for disaggregated statistics on international migration. Final report.](#)

⁷ UNECE, 2019. [Guidance on data integration for measuring migration.](#) New York and Geneva: United Nations.

⁸ Available at: [Full article: Over-coverage in population registers leads to bias in demographic estimates and Invisible Emigrants: A Research Note Uncovering Population Over-Coverage Bias in Socio-Demographic Rates.](#)

119. For countries relying on administrative or register data sources, it is also important to consider whether return migration is recorded for individuals who emigrated without notifying their departure. If this is not the case, mirror statistics may also help to improve immigration estimates by estimating returning nationals.

120. Mirror statistics can also support the production of stocks of native or native-born populations resident abroad. Similar principles and limitations that apply to migration flows can be considered. Additionally, it is important to underline that many emigrants may naturalise in their destination country, and dual citizenships are often not reported in official statistics.

3.4 Recommendations and guidelines for supporting other countries in using mirror statistics

121. National statistical offices can also support other national statistical offices' efforts to improve emigration data by facilitating the use of their own immigration statistics. The production of high-quality immigration statistics by single country of previous residence and other data breakdowns is indeed crucial to support the use of mirror statistics by other countries.

122. Therefore, it is essential that countries make full use of available data sources to produce immigration statistics with the most detailed demographic data breakdowns possible. . For a consistent application of mirror statistics, it is recommended that countries collect information on the last country of residence, in addition to country of birth.

123. These data should also be made easily accessible and publicly available, with detailed metadata, to facilitate their use by other countries.

124. Care and consideration should be taken to ensure that all data sharing adheres to Statistical Disclosure Control protocols.

125. Metadata should clearly describe the definitions, sources, coverage and accuracy of the data produced, allowing other countries to assess their comparability and usefulness.

126. If contacted by other national statistical offices, statistical offices are encouraged to **share immigration statistics** with the available breakdowns to enable timely use of mirror statistics. When data sharing platforms are available, national statistical offices may share their migration flows data, including provisional estimates, on such platforms as early as possible each year. If data-sharing frameworks are in place, data may also include additional data breakdowns or individual-level data not publicly disseminated due to confidentiality or other reasons.

127. Finally, international and regional organisations have an important role in facilitating collaborations, supporting data sharing infrastructures, and promoting the use of mirror statistics globally.

128. Developing legal frameworks for monitoring migration flows among countries of the EU and between other countries, including arrangements for the secure and legally compliant sharing of individual-level data, could be explored further as one possible avenue for improving the comparability and quality of migration statistics in the future.

3.5 Case studies

129. The following three case studies from New Zealand, Poland and Italy provide practical insights into the use of mirror statistics.

130. The first case study, from New Zealand, is an example on the use of mirror statistics to improve emigration flow statistics. This case illustrates a data exchange framework with the country where most emigrants migrate to, and with a high level of harmonisation of statistical definitions and concepts.

131. The second case study, from Poland, shows how mirror statistics can improve estimates of nationals living abroad. It is a case where more data sources with varying degrees of definitions are used.

132. The third case study, from Italy, offers the perspective of a data provider. It shows how countries can support efforts in improving global emigration estimates by producing and sharing detailed immigration statistics that can serve as mirror statistics for other countries.

3.5.1 Case study: New Zealand

133. In this case study, the exchange of international migration data between Australia and New Zealand, specifically the Australian Bureau of Statistics (ABS) and Statistics New Zealand (Stats NZ), is presented as an example of mirror statistics.

3.5.1.1 Background

134. For many decades, both countries used arrival and departure cards to measure both international travel (inbound and outbound short-term movements across the border) and international migration (changes in the country of residence). The identification of migrants was largely based on self-response (intentions-based migration measurement), aligned with a 12-month threshold.

135. Each country's arrival card remains an integral data source for measuring international travel, and for some attributes of international migrant arrivals (such as country of previous residence). Both countries are also digitising their arrival cards, with the New Zealand Traveller Declaration able to be completed digitally from mid-2023, and the Australia Travel Declaration developing from late 2024.

136. Australia discontinued its departure card in June 2017, and New Zealand in November 2018. Removing the respective departure cards had no statistical benefits, but did align with wider government goals to streamline the departure process for travellers. For New Zealand, it also coincided with the development of a transparent and objective method for estimating migration (outcomes-based migration measurement), rather than relying on the stated intentions of travellers on passenger cards. As Australia was already using this outcomes-based method, this gave the two countries very close alignment of their international migration estimates.

3.5.1.2 Harmonious 12/16-month rule

137. Official measures of migrant arrivals, migrant departures, and net migration in both countries now rely on the linking of arrivals and departures to measure precisely how long people spend in the

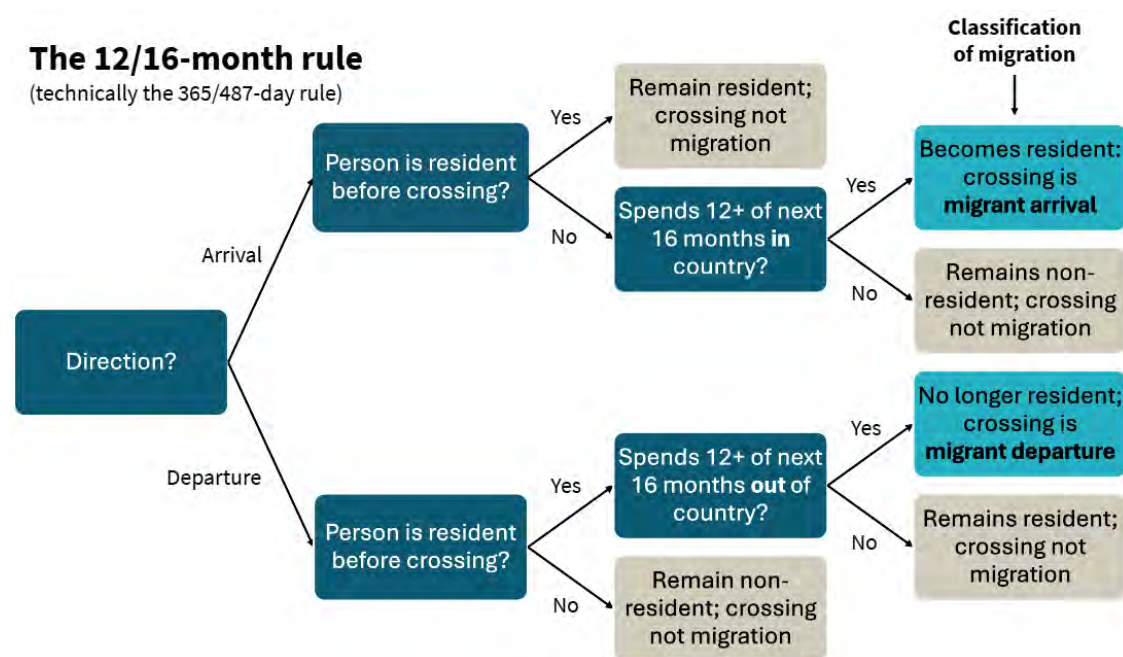
country or elsewhere. Both countries use a 12/16-month rule to classify border crossings as short-term or long-term ([Figure 1](#)):

- A migrant arrival is a resident of another country who arrives in the country and cumulatively spends 12 out of the next 16 months in the country;
- A migrant departure is a resident who departs the country and cumulatively spends 12 out of the next 16 months out of the country.

138. In both Australia and New Zealand, a resident is someone living in that country, irrespective of their citizenship or visa status. For example, New Zealand residents comprise both New Zealand citizens and non-New Zealand citizens.

Figure 1

The 12/16-month rule



Source: Statistics New Zealand.

139. The 12/16-month rule is broadly consistent with international guidelines on measuring international migration. Importantly, both Australia and New Zealand experience significant numbers of travellers making repeat visits over a period of several years. For example, international students may spend 9 months in the country in each of several years, with the remaining 3 months of the year in other countries.

140. The 12/16-month rule does not require a 12-month threshold to be reached in 12 consecutive months. It therefore enables people, such as international students, who spend most of the year in the country in successive years, to be counted as migrants and subsequently in official population estimates. This is preferable to such sub-populations not being counted in official statistics, given the implications for service provision, infrastructure, housing, and labour markets.

141. The exact application of the 12/16-month rule is not identical between the two countries. However, they share a largely harmonious concept which makes mirror statistics feasible. This is

underpinned by high quality and complete administrative data on virtually all arrivals and departures into and from each country (from and to the rest of the world).

3.5.1.3 Information gap

142. Without a departure card, both countries have no immediate source of information on where migrant departures are going. From a policy perspective, this may seem unimportant. Migration policies are invariably focused on targeting, processing, and managing migrant arrivals. Few policies are focused on people living in other countries.

143. However, a broader understanding of migration flows including migrant departures is important for understanding cyclic migration, return migration, and population dynamics including the implications for future population change. Moreover, policies aimed at attracting migrants to address labour market needs may also want to consider policies to retain people before they depart, especially if they are native citizens.

144. Australian and New Zealand citizens enjoy virtually unrestricted travel between the two countries. However, the two countries and economies are unequal in size, with Australia's population of 27.2 million at June 2024 about 5 times larger than New Zealand's 5.3 million. This contributes to a historical imbalance in the respective trans-Tasman flows.

145. Of migrants departing New Zealand from the 1980s, the proportion going to Australia (at least initially) ranged between about 35 and 65 percent. Moreover, of New Zealand citizen migrants departing New Zealand, the proportion going to Australia ranged between about 40 and 80 percent.

146. Australia is therefore the single most important destination for migrants departing New Zealand. However, the converse does not apply, with less than 10 percent of migrants departing Australia heading to New Zealand in 2024 (based on mirror statistics). Many of the migrants that do depart Australia for New Zealand are return flows of New Zealand-born and/or New Zealand citizens.

147. Where migrants departing New Zealand are going to, is of high public interest in New Zealand, particularly when these are New Zealand citizens (and mainly New Zealand-born). Their concentration in the young working ages (e.g., 18–30 years) can also heighten concerns around a so-called 'brain drain', although the rhetoric is not always evidence-based. Fluctuations in migrant departures of New Zealand citizens have a significant impact on New Zealand's overall net migration balance.

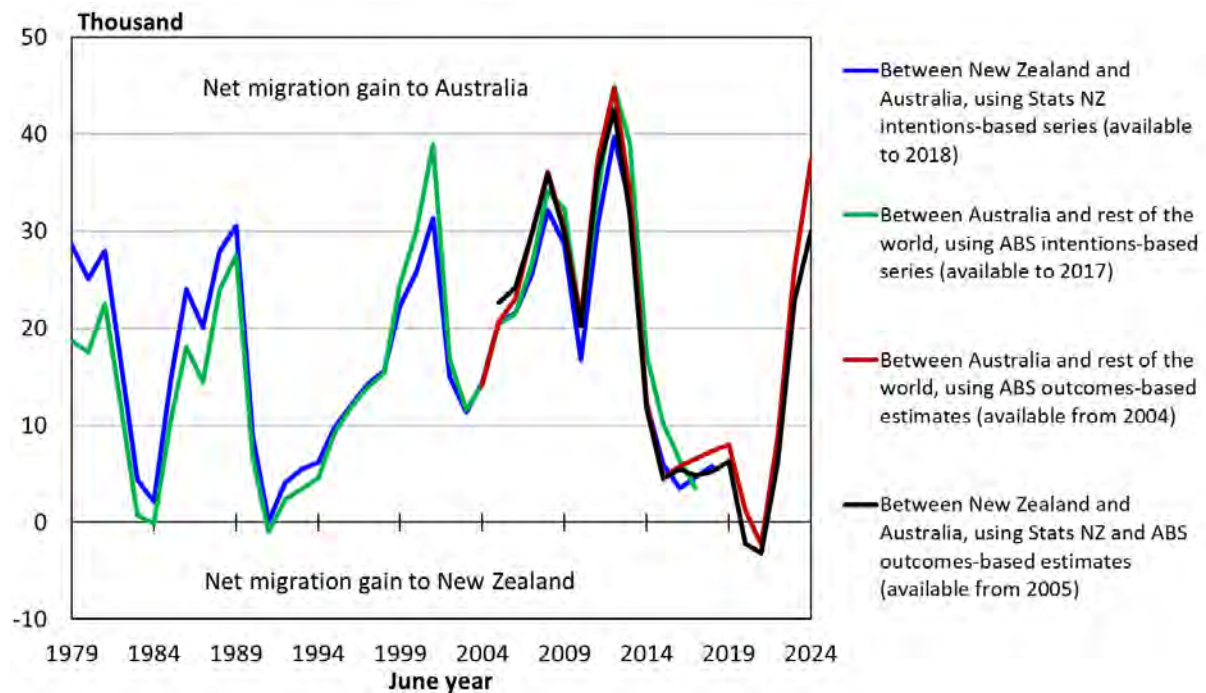
3.5.1.4 Data sharing

148. In the absence of a data source to inform the destination of migrant departures, where does one look? The answer can lie in the data of other countries.

149. A harmonious migration concept between Australia and New Zealand is an important start. Migrants departing New Zealand for Australia can be assumed to equate to migrants arriving in Australia from New Zealand. When both countries operated departure cards, there was general consistency between the intentions-based net migration statistics ([Figure 2](#)), notwithstanding inevitable differences in self-reported travel intentions. With the implementation of outcomes-based migration estimates, there is evidence of continued general consistency. (Published ABS data of net migration of New Zealand citizens is not by country of next/previous residence, although most of these migrant arrivals and migrant departures will be between Australia and New Zealand).

Figure 2

Annual net migration of New Zealand citizens into Australia by alternative data source



Source: Drawn by the author based on data from Statistics New Zealand and the Australian Bureau of Statistics.

150. But data sharing agreements do not happen in a vacuum. They are easier to implement on the back of collegial working relationships built up over many years. This is true of the ABS-Stats NZ relationship, with frequent and open exchange of information, ideas, and data at multiple levels of the organisations.

151. Stats NZ also did not seek access to unit record level. It is not necessary to track the longitudinal migration history of individuals beyond the New Zealand borders, as interesting as this may be from a labour market or demographic perspective.

152. Aggregate macro-level data is sufficient to fill the immediate information gap of knowing how many migrants are departing for Australia (and by subtraction, to the rest of the world), and some limited attributes of the migrants. These attributes are citizenship (New Zealand, non-New Zealand), country of birth (New Zealand, non-New Zealand), and country of previous residence (New Zealand, not specified). Stats NZ makes a simple allowance for country of previous residence 'not specified' in both the Australian and New Zealand migrant arrivals data before publishing the Australian data (Infoshare: Estimated migrant arrivals to Australia by CLPR, citizenship and birthplace) and deriving estimates of net migration with Australia (see 'Migration with Australia' section in the monthly International migration release).

3.5.1.5 Differences in measurement

153. Despite the harmonious migration concept used, there are some differences in data granularity between the two countries.

154. First, the Australian migration estimates are published quarterly with quarterly granularity, while the New Zealand estimates are published monthly with monthly granularity.

155. Second, the initial Australian migration estimates are published about 5½ months after the reference quarter, while the New Zealand estimates are published about 1½ months after the reference month.

156. This does mean the Australian migration estimates lag the New Zealand estimates by several months. This does require some explanation in the Stats NZ dissemination of the combined data. For example, initial reporting of New Zealand's December 2024 overall migration (including arrivals from Australia) is available in mid-February 2025, but initial reporting of New Zealand's December 2024 migration with Australia (including departures to Australia and net migration with Australia) is not available until late June 2025.

157. Finally, there is no independent verification available of the mirror statistics. When both countries operated departure cards, departures from one country to the other could be compared with arrivals from one country to the other.

3.5.1.6 Summary

158. The exchange of aggregate migration data between Australia and New Zealand provides official statistics on the destination of migrant departures, especially from a New Zealand perspective.

159. There are opportunities for data sharing and mirror statistics bilaterally and multilaterally. What makes this possible in the Australia and New Zealand case study are:

- (a) Harmonious migration measures (using a 12/16-month rule) underpinned by high quality and complete administrative data on arrivals and departures in both countries;
- (b) Collegial working relationships between the respective national statistical agencies at multiple levels;
- (c) Use of macro-level (aggregate) estimates rather than unit record level data.

3.5.2 Case study: Poland

3.5.2.1 Definitions

160. In this section, the term “temporary emigrant” refers to person who stay abroad or are willing to stay abroad for longer than 12 months while retaining a permanent address of a resident in Poland. The term “permanent emigrant” refers to person who have officially deregistered from permanent residency in Poland, becoming a resident of a foreign country. Every time when terms “temporary” and “permanent” are used in this section it refers to Polish perspective, informing about deregistration or maintaining a permanent address in Poland. Furthermore, temporary emigrants are still enumerated in Polish Censuses, while permanent emigrants aren't.

3.5.2.2 Introduction

161. The analysis aimed to provide methods and results of estimations on temporary emigrants with Polish citizenship for selected European countries. These are emigrants who usually maintain connections like paying remittances, and still have a reasonably high probability of returning to the country of origin. Statistics on temporary emigrants are published on the Statistics Poland website and are used, for example, by financial institutions in Poland, but also played a key role in quality assessing the 2021 Census in terms of measuring emigrants with Polish citizenship.

162. Traditionally, mirror statistics are used for analyzing flows by comparing emigration numbers from the origin country with immigration numbers from the receiving country. **In this case study, the approach is different – the mirror statistics method is applied to stock data.**

163. The application of mirror statistics to stock data is challenging. This is because the receiving country traditionally measures (e.g. in the national census) the stock of people by citizenship, according to the definition of the resident population. This definition includes both types of stay/absence: permanent and temporary (at least 12 months). The Polish census counts temporary emigrants, but does not try to count people who have officially deregistered from permanent residence in Poland. Conversely, the deregistered population should be included in the number of residents reported by the receiving countries.

3.5.2.3 Methodology

164. Numerous data sources (Table 8) were used to estimate the number of Polish residents temporarily staying abroad for at least 12 months.

Table 8
Data sources

<i>Data Sources</i>	<i>Descriptions</i>
Statistics Poland, the 2021 Census	Emigrants for a temporary residence for at least 12 months
Statistics Poland, the 2002 Census	Emigrants for a temporary residence for at least 12 months
Statistics Poland	Emigration for permanent residence (2002 to 2021)
Eurostat	Results from censuses round 2001 in Europe
Eurostat	Results from censuses round 2021 in Europe
National Statistical Institutes	Residents with Polish citizenship
UK's Office for National Statistics	Data on immigration and emigration to/from EU countries aggregates; visa data
The Migration Observatory at the University of Oxford	Permanent or Temporary: How long do Migrants stay in the UK?

165. To apply mirror statistics, it was necessary to develop an algorithm to estimate the total distribution of temporary immigrants among residents with Polish citizenship reported by selected European countries at the critical moment of the 2021 Census in Poland (31 March 2021). The number of temporary immigrants with Polish citizenship in a given country was estimated by multiplying the total distribution by the number of residents with Polish citizenship reported by foreign statistical offices in subsequent years.

166. Description of the algorithm (Figure 3):

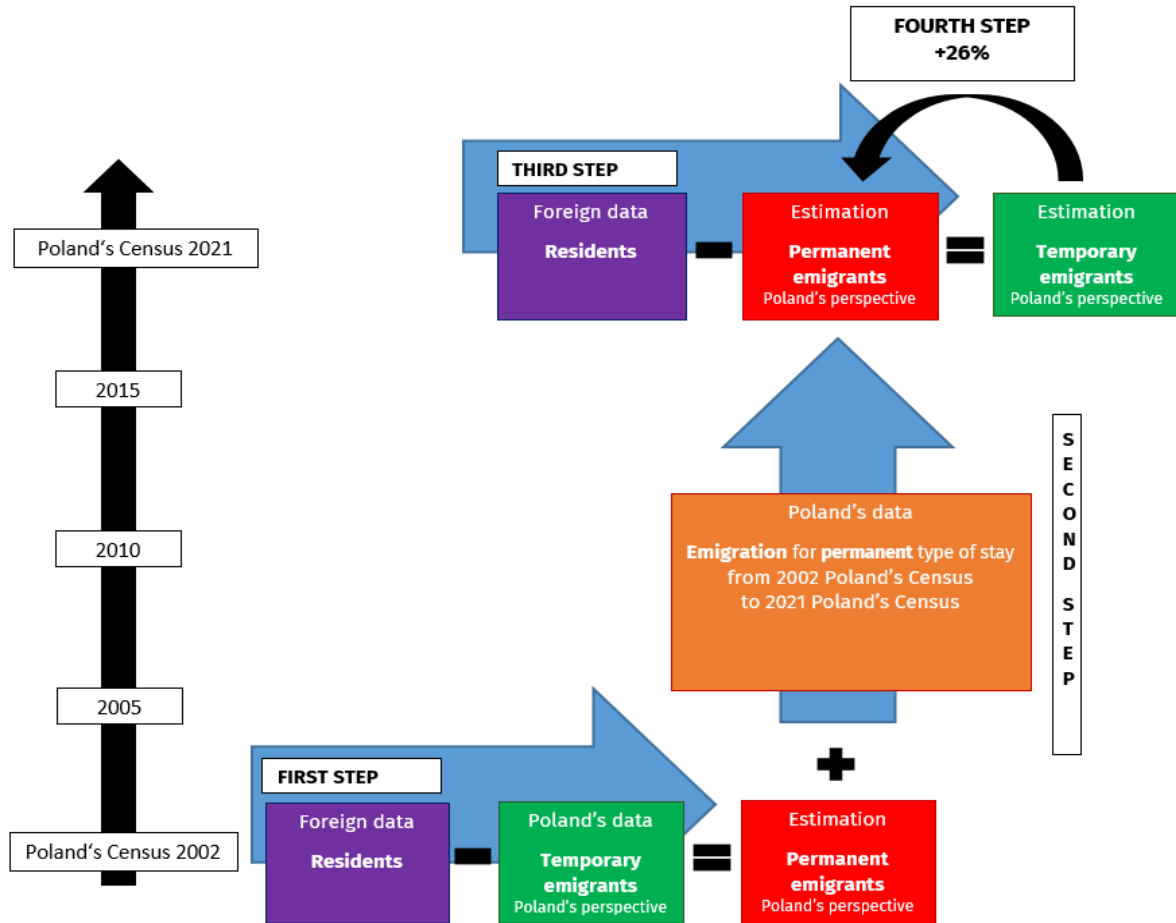
- (a) In the first step, the initial stock (at the critical moment of the 2002 Census in Poland⁹) of emigrants with Polish citizenship with permanent type of stay was determined. For this purpose, the number (for the given country) of Polish emigrants with temporary residence determined in the 2002 Poland's Census was subtracted from the appropriate number of residents with Polish citizenship reported by the given country;

⁹ The starting point of the analysis was established by the assumption that in the 2002 Poland's Census the number of residents with Polish citizenship abroad (especially in Europe) was measured with high accuracy. This is because it was conducted before Poland joined the European Union, i.e. before the borders were opened. The Census was conducted as a full study using direct interviews. Residents with Polish citizenship also complied with the legal regulations regarding the registration of emigration and returns from emigration.

- (b) The minimum number of emigrants from Poland with permanent residence (at the critical moment of the 2021 Census in Poland – 31 March 2021) was estimated by adding to the initial stock (point a) the summed amounts for subsequent years (2002–2021) of permanent emigrations, i.e. those who deregistered from Poland with the intention of permanent residence abroad (official Polish administrative data). Return immigrations to Poland was not taken into account due to the assumption that the reported emigrations is underestimated. Therefore, there is no point in further reducing these numbers with returns;
- (c) In the third step, the stock (at the critical moment of the 2021 Census) of Polish emigrants with temporary stay was calculated. For this purpose, the previously estimated minimum number of emigrants with Polish citizenship with permanent residence (point b) was subtracted from the appropriate number of residents with Polish citizenship reported by the given country;
- (d) A correction for underestimation of permanent residents with Polish citizenship was introduced. The correction resulted in an increase in permanent emigrants (calculated in point b) by reducing (26%) number of temporary emigrants (calculated in point c) for all analyzed countries. The size of this correction was estimated based on the Migration Observatory at the University of Oxford publication: Permanent or Temporary: How long do Migrants stay in the UK?
- (e) Finally, the frequency of temporary emigrants among residents (at the critical moment of the 2021 Census) was calculated – dividing the reduced (in point d) number of temporary emigrants by the number of residents reported by individual countries.

Figure 3

Algorithm to estimate number of temporary immigrants among residents with Polish citizenship reported by selected European countries at the critical moment of the 2021 Census in Poland (31 March 2021)



Source: Drawn by the author based on a model developed by the author.

3.5.2.4 Results

167. In [Table 9](#) and [Figure 5](#) are presented results of estimation of temporary immigrants with Polish citizenship in 2023 based on:

- Balance method using only Polish data sources;
- Mirror statistics approach using foreign data on the number of residents with Polish citizenship.

168. In addition, [Table 9](#) contains number of residents with Polish citizenship in 2023 reported by country and frequencies of temporary status among residents obtained using the algorithm presented above. In the case of the UK, due to the lack of relevant data, the number of residents with Polish citizenship since 2022 has been estimated. For this purpose, the results of current research by the UK's Office for National Statistics on the migration of total residents originating from EU countries and UK visa data on returns and entries were used. The scale of emigration of Polish citizens was estimated based on the total number of emigrants from EU countries using the indicator (proportion) of the share of visas issued to Polish citizens among the total number of return visas for citizens of EU

countries. The scale of immigration of Polish citizens was estimated analogously, but on the basis of entry visas to the UK. The number of residents with Polish citizenship in the UK was calculated by adding the balance of migration (based on the estimated volumes of immigration and emigration – described above) to their stock in 2021.

169. For all countries (except France¹⁰), the mirror statistics approach shows higher number of Polish immigrants (with temporary status of stay) than analogous results obtained solely from Polish data (Table 10). The highest number of Polish immigrants (with temporary status of stay) resided in United Kingdom (440 thousand), Germany (436 thousand), Netherlands (128 thousand), Norway (80 thousand) and Ireland (68 thousand) (Figure 4).

Table 9

Estimations of temporary immigrants with Polish citizenship in selected European countries (population in thousand) on 31 December 2023.

Country	Based on balance method using Polish data	Based on mirror statistics using foreign data		
	Temporary emigrants ^a	Temporary status immigrants ^b	Residents ^c	Proportion of temporary status among residents ^d
	[A]	[B=C*F]	[C]	[F]
United Kingdom	412	440	723	61%
Germany	337	436	742	59%
Netherlands	94	128	194	66%
Ireland	63	68	104	65%
Norway	52	80	111	72%
Belgium	41	48	68	70%
France	36	23	53	43%
Italy	36	47	73	64%
Sweden	30	31	57	54%
Austria	22	34	68	50%
Spain	20	29	59	49%
Switzerland	19	27	47	59%
Denmark	17	29	48	61%

^a Based on the 2021 Census data corrected by administrative data on migrations.

^b Based on [Statistics Poland's estimates](#) calculated by number of residents and frequencies.

^c [Eurostat data](#).

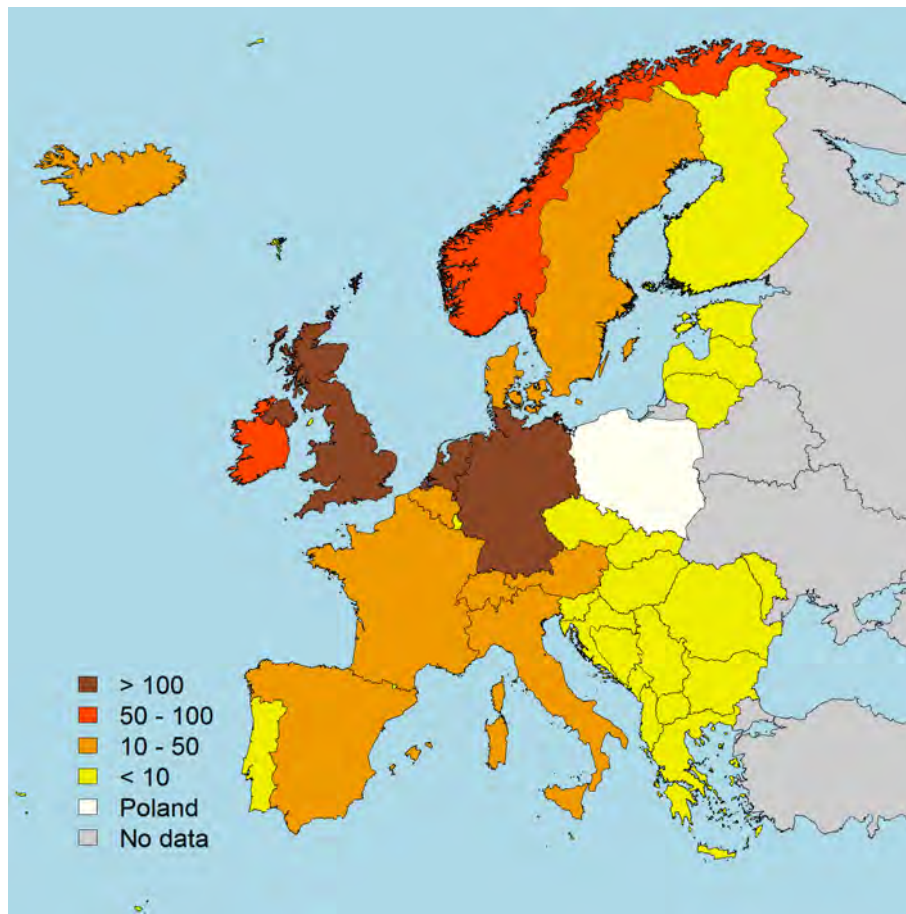
^d Statistics Poland's estimates based on domestic and foreign data sources.

Source: Author's estimates; Eurostat data.

¹⁰ According to a [document prepared by the OECD and the European Commission](#), France is classified as one of the countries with the longest duration of immigrants' stay, i.e. the dominant immigration in France is for permanent residence. It seems that the currently developed model for dividing residents into people with permanent and temporary status of stay does not work well in this case.

Figure 4

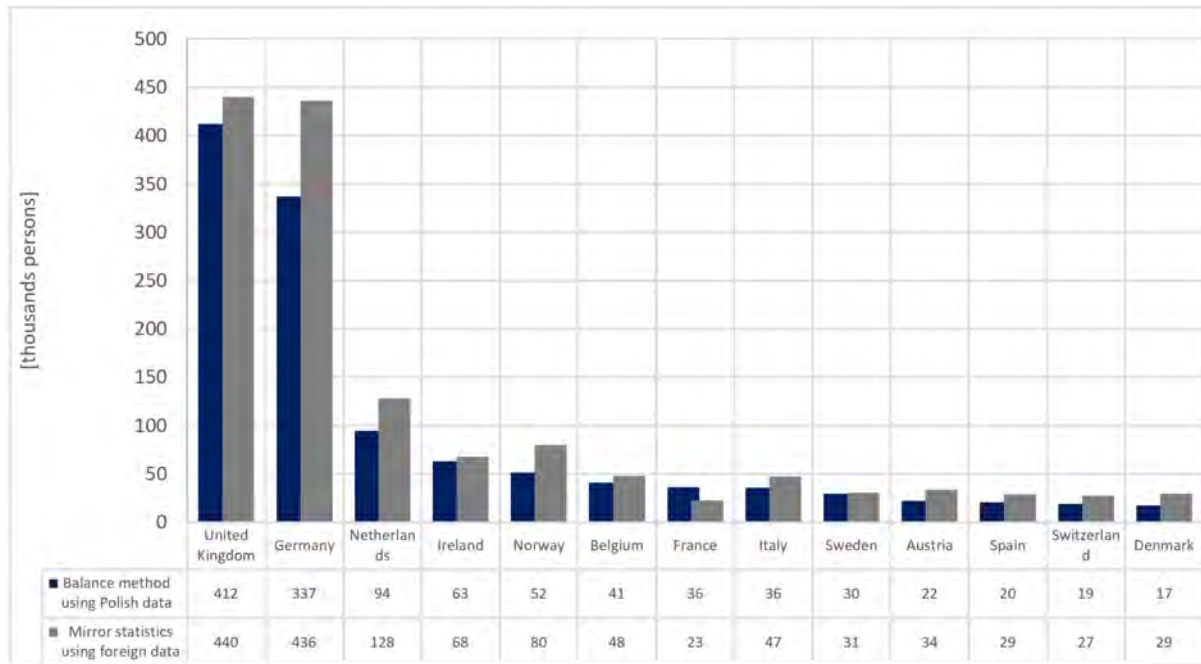
**Polish immigrants with temporary type of stay (for at least 12 months) on 31 December 2023
(population in thousands)**



Source: Map based on data estimated by the author.

Figure 5

Estimations of temporary immigrants with Polish citizenship on 31 December 2023



Source: Estimates by the author.

Table 10

Number of immigrants with Polish citizenship with temporary status in selected European countries on 31 December 2023 (population in thousands).

Country	Temporary emigrants Polish data [A]	Temporary immigrants Mirror statistics [B]	Difference [D=B-A]	Relative difference [D/A * 100%]
United Kingdom	412	440	28	+7%
Germany	337	436	99	+29%
Netherlands	94	128	34	+36%
Ireland	63	68	5	+8%
Norway	52	80	28	+54%
Belgium	41	48	7	+17%
France	36	23	-13	-37%
Italy	36	47	11	+31%
Sweden	30	31	1	+3%
Austria	22	34	12	+53%
Spain	20	29	9	+41%
Switzerland	19	27	8	+45%
Denmark	17	29	12	+68%
Total	1179	1420	241	+20%

Source: Estimates by the author.

170. The largest absolute increase in the number of immigrants – by utilizing mirror statistics – was observed in the following countries ([Figure 5](#) and [Table 10](#)): Germany (+99 thousand), Netherlands (+34 thousand), United Kingdom and Norway (+28 thousand). In case of countries analyzed in the table 10 (put together) estimation based on Polish data showed 1.18 million temporary emigrants. With the inclusion of mirror statistics this number amounted to 1.42 million. It means that for every 100 departures for temporary residence for at least 12 months, as many as 83 persons are captured solely by Poland's data. [Table 10](#) contains also relative differences, which were expressed in relation to results obtained using balance method based only on Poland's data. The largest percentage increase in the number of immigrants identified by use of mirror statistics was observed for: Denmark (+68%), Norway (+54%) and Austria (+53%).

171. Official statistics on migration are based on data from national registers. The scale of underestimation in national registers' data is presented in [Table 10](#). It should be noted that the results of the estimate prepared by Statistics Poland reflect the trend and directions of Poles' departures and should not be treated as precise data, but rather as approximate estimates.

3.5.2.5 Conclusions

172. Applying mirror statistics to stock data is laborious and requires the use of many data sources, both in terms of time series (historical) and spatially (from many foreign countries). The reason for using multiple datasets is the requirement to harmonise the definition of population, which varies between countries.

173. Applying mirror statistics reveals a significant underestimation of national Polish data on emigration. For most analyzed countries, this underestimation exceeds 30%, reaching over 50% for some countries of destination. However, for the countries analyzed in total ([Table 10](#)) based on mirror statistics, 83 percent of Polish temporary emigrants were captured by Poland's data.

174. When conducting international migration analyses in Poland, a working assumption is that rates of missed notification of emigrants do not depend on the country of relocation (e.g., it is just as common for people not to notify departure if they are going to Belgium or Germany). This simplified approach was verified by quality assessment of Poland's 2021 Census. This is also illustrated in [Figure 5](#), which shows the share of Polish residents living in selected European countries. The share based solely on Polish data is similar to the corresponding share derived from foreign data, even though the Polish data underestimates the overall volume of emigration.

175. Precise estimations of demographics and socio-economic statuses of emigrants requires utilization of multiple data sources. Foreign data provide a better indication of the size of immigrations, while Poland's data (on officially reported emigrations) provides good estimation of the share of emigrations from particular administrative units in Poland (e.g. distribution of emigrations of persons with Polish citizenship to Germany by province), as well as other socio-demographic characteristics of emigrants that are not well measured in receiving countries. Poland's data on emigration (officially registered departures) is an essential component of Statistics Poland's annual population balancing.

3.5.2.6 Challenges

176. Developing an algorithm for classification of residents into people with permanent and temporary type of stay:

177. Applying methods for classifying countries according to living conditions with objective to estimate the length of stay immigrants,

178. Including data on the length of stays immigrants in selected European countries.

179. Move toward greater use of these estimations in official statistics. The purpose of these works is to estimate more realistic data on emigrants to help population number and structure adjustments. Adjusted data can be used to improve calculations on variety of indicators regarding social-economic conditions in Poland.

3.5.3 Case study: Italy

180. International migration plays a crucial role in shaping population changes and dynamics, raising awareness among policymakers, researchers and international organizations about the urgent need for accurate and reliable statistics. However, what constitutes reliability for one country may no longer be consistent when cross-checked against migration statistics from other countries. This challenge becomes even more evident within the European Union, where the free movement of people often involves cross-border movements that may be underestimated in official statistics.

181. In Italy, data on migration statistics are compiled from administrative data on changes in residence recorded in the centralized population register (ANPR – Anagrafe Nazionale della Popolazione Residente, managed by the Ministry of the Interior) which Istat accesses on a regular basis (Figure 6).

182. In a first step, data are subject to standard control and correction procedures. The core variables collected are date and place of birth, sex, nationality, level of education, country of origin and destination. In general, the quality of the data is quite high.

183. In a second step, the information is integrated into a demographic data system (Midea-Anvis, Micro-DEmographic Account – Virtual Statistical register of the population) which, in addition to migrations, incorporates all data on population change (births, deaths, acquisitions of citizenship). Midea-Anvis is a system based on demographic counting of individual data. All data (registered at individual level) are integrated with each other and with respect to the population of the last census, to verify the stock-flow coherence of the information acquired.

184. The last step is to compare Midea-Anvis with a large set of administrative archives (AIDA, Integrated Archive of Administrative Data), thus giving rise to the new edition of the permanent census. Each administrative archive in AIDA provides life signals on habitually resident people who have spent a large part of their time in Italy over the last three years. The comparison between AIDA and Midea-Anvis produces three distinct datasets:

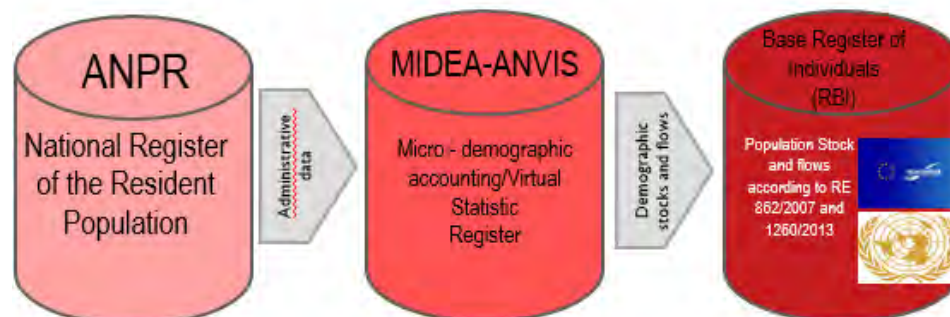
- (a) People present in Midea-Anvis and confirmed as residents through the life signals system in AIDA;
- (b) People not present in Midea-Anvis but with strong life signals in AIDA (under-coverage);
- (c) People present in Midea-Anvis but without life signals in AIDA (over-coverage).

185. The set of people identified at points I and II gives rise to the census population and the longitudinal coherence between two successive censuses and flows is thus ensured. In this way it is possible to provide consistent population and migration statistics, as well as demographic outputs fully consistent with the concepts and definitions set up by the EU Regulations (862/2007 and 1260/2013). The persons included in point III (over-coverage) will be subject to future checks aimed at identifying, within this aggregate, individuals present in the population register who may have emigrated because they show no signs of life. In any case, the quality of the census data is guaranteed

because both over-coverage and under-coverage are included in the calculation through a statistical adjustment of the population.

Figure 6

General overview of the data production system



Source: Drawn by the author.

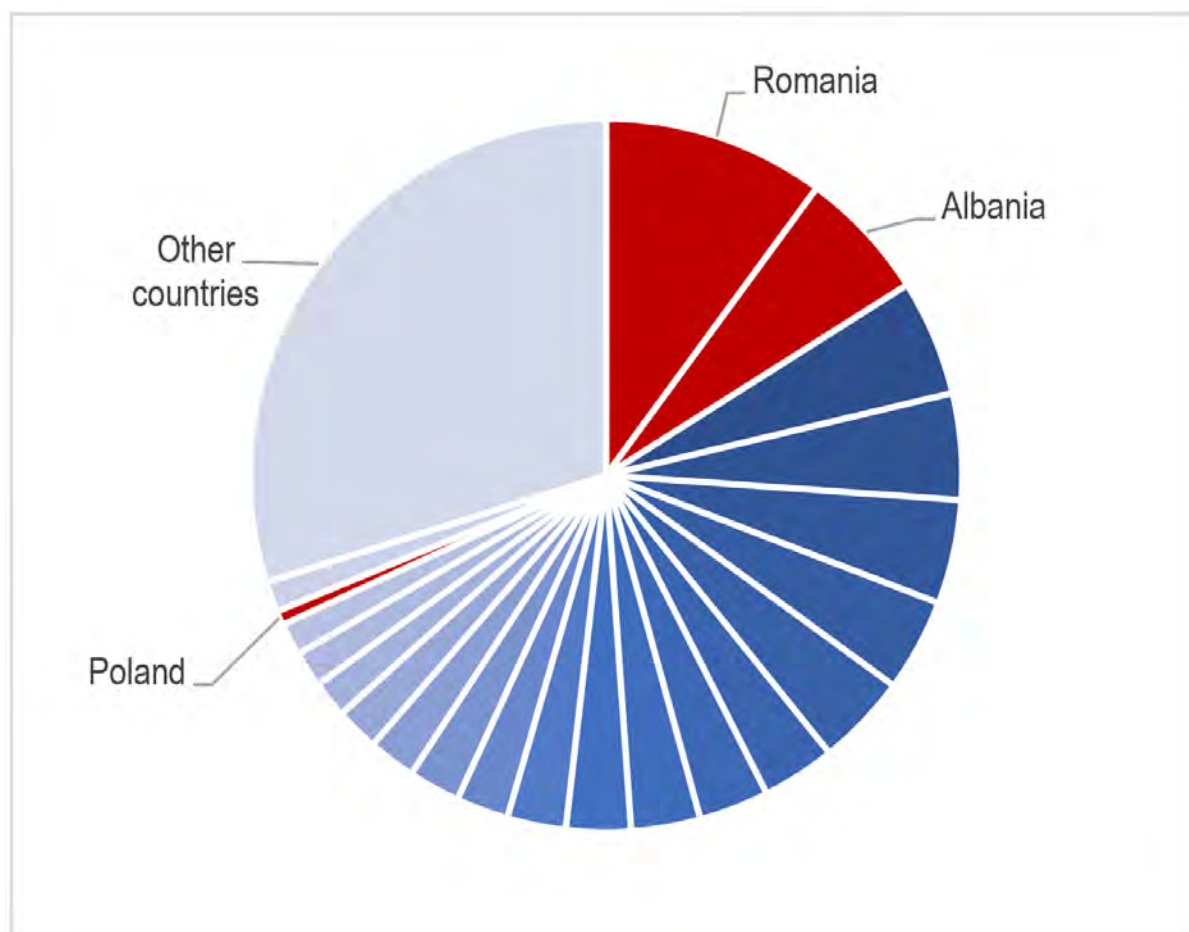
186. The quality of Italian migration data has a positive international impact, as Italy participates in a project aimed at exchanging data and methodological information on migration statistics among national statistical institutes. Given that immigration statistics are generally more accurate than emigration statistics, Italy shares its immigration data with countries that are significant origins of foreign migration flows, such as Romania (since 2013), Albania (since 2017), and Poland (2025) (Figure 7). Occasionally, other countries like Slovenia, Serbia, and Spain have also been involved.

187. Informal agreements reached during working groups or participation in task forces have played a key role in fostering collaboration. These gatherings allowed statisticians from different countries to build relationships, facilitating the exchange of data and strengthening international cooperation in migration statistics.

188. Italy provides Romania and Albania with data on migration flows in aggregate form. The requested breakdowns are usually by sex, age, citizenship and country of birth. When these variables are properly combined, it is possible to obtain accurate estimates of size and structure of the flows. Therefore, it is possible to evaluate the number of people who migrate to Italy, or to build a profile by sex and age. Italy also provides the Polish statistical office with data on population structure and duration of stay for estimating stock of migrants from Poland to Italy.

Figure 7

Immigration flows to Italy by country of origin (Years: 2014–2024)



Source: Drawn by the author based on data from the Italian National Institute of Statistics.

189. To meet the needs of other countries, Italy uploads data on international migration statistics to a platform, 'Exchange of data and best practices for international migration statistics', through a limited-access CIRCABC group among EU member states. The data on this platform are used only for validation and development, not for publication.

190. From the point of view of Italy, the currently proposed disaggregation by EU platform (total immigration and emigration flows by country of previous/next residence) is not sufficient, as it only allows for estimating the level of outflows and does not provide important information on the demographic structure of the flows which is essential for determining a quality estimate of mirror statistics. Other disaggregation, such as sex or age, are needed.

191. However, further initiatives in this direction to improve the quality and consistency of the migration statistics and to facilitate the exchange of data between countries are welcome. In addition, these initiatives could also stimulate appropriate discussions aiming at developing a legal framework for monitoring migration flows among countries of the EU and between other countries. This important issue is crucial to the availability of consistent mirror statistics: without a common legal framework at international level, it will be difficult to fully align mirror statistics, despite efforts.

Chapter 4 Evaluation and communication

192. Evaluation and communication are essential aspects of producing official statistics. They ensure that official statistics are reliable, accurate, well-understood and trusted by users and stakeholders.

193. The evaluation and communication of emigration statistics are especially important given the increasing complexities of migration trajectories and the greater uncertainty usually associated with these statistics. As discussed previously, many NSOs rely on indirect sources and methods to measure long-term emigration or are faced with underreporting challenges in population registers.

4.1 Evaluation of the quality of emigration statistics

194. The accuracy and reliability of long-term emigration estimates are critical for understanding population dynamics. In addition to ensuring the production of good quality emigration statistics, evaluation also identified the limitations of statistics to help prioritize research and development and to help users interpret the statistics.

195. This section explores the practices of the 11 NSOs in assessing the quality of their long-term emigration estimates. NSOs employ various methods to evaluate the quality of their estimates, with approaches differing significantly across countries. While some NSOs actively compare their estimates to external data sources for validation, others rely solely on internal methodologies.

196. It also highlights the notable and various efforts to quantify uncertainty in their estimates using external data sources, such as diaspora statistics, mirror data, and household surveys, to identify discrepancies and enhance accuracy.

197. Many NSOs compare their estimates of long-term emigration to other data sources to evaluate the quality of their estimates. These include **Albania, Australia, Canada, Hungary, Latvia, Mexico, New Zealand, Poland and the United States**. In contrast, other NSOs, such as **Italy and the United Kingdom** do not use external data sources for comparison.

198. **Albania** compares its long-term emigration estimates annually with mirror statistics from Italy and Eurostat, using indicators such as citizenship, age, and sex. These comparisons, along with household surveys, help identify discrepancies and improve the accuracy of emigration estimates. The data sources are used individually or combined to adjust the estimates using an indirect method, which is also applied to adjust the back series for the intercensal period. Additionally, population projections and mirror statistics are used to model migration by age, ensuring the reliability of the estimates. The comparisons are conducted every year to evaluate and enhance the quality and accuracy of emigration estimates by identifying discrepancies and inconsistencies in the data.

199. **Australia** assesses its emigration estimates using census counts and the population rebasing process. Every five years, Australia conducts a census to rebase its population estimates, which helps correct any errors that may accumulate during the intercensal period. Since international migration, including emigration, is a key driver of population growth, any inaccuracies in migration data could lead to larger intercensal differences. However, historical data shows that absolute intercensal differences have averaged only around 0.25% of the population across the last seven censuses, highlighting the high reliability of migration estimates. Additionally, the primary source of migration data comes from border crossing information, which is rigorously quality-assured before being used in the estimates. Furthermore, preliminary migration estimates are continuously compared with final,

directly calculated data as it becomes available, ensuring that any discrepancies are quickly identified and addressed.

200. **Canada** compares its estimates with multiple international and Canadian data sources, including U.S. visa data, the American Community Survey (ACS), Canada Post's movers file, the Registration of Canadians Abroad (ROCA), tax data, the residual method, and the Census Undercoverage Study. Trends, levels, and potential biases are regularly analysed using Power BI dashboards, while considering the concepts, the strengths and the limitations of each source. Canada also provides a regularly updated methodological guide. Specific studies are also conducted to evaluate different elements of emigration statistics, such as the accuracy of the adjustments made to consider the impacts of the COVID-19 pandemic.

201. To assess the accuracy of its emigration estimates, **Hungary** compares its macro-level data with mirror statistics from countries of destination. By evaluating the quality of its data against these external sources, along with analysing migration trends, Hungary ensures that discrepancies or inconsistencies are identified.

202. **Latvia** compares its long-term emigration estimates annually with mirror statistics from Denmark, Finland, Sweden, Norway, Spain, the Netherlands, Austria, Iceland, Germany and Ireland. These mirror statistics, along with population estimates, are used to calculate long-term emigration estimates. Initially, emigration estimates are broken down by country of residence. Information for each emigrant, such as the country of residence, is derived from the Register of Natural Persons of the Office of Citizenship and Migration Affairs (OCMA). In the case where an individual has no record of residence in another country (meaning their record indicates Latvia as their country of residence), they are assigned the same country as similar emigrants based on demographic characteristics. When analysing long-term international emigration and immigration with the OCMA, the data at individual level is compared with the corresponding population data. In cases where data discrepancies are observed, adjustments are made based on case studies.

203. **Mexico** assesses its emigration estimates through a statistical quality assessment process, which involves verifying data consistency and identifying potential systematic errors. This process includes cross-referencing internal sources by evaluating their consistency and historical trends, as well as comparing them with external sources, such as censuses and surveys from other countries, particularly the American Community Survey (ACS). Key indicators used for these comparisons include the emigration level, distribution by sociodemographic characteristics, destination country, duration of stay abroad, and the main reasons for emigration. These comparisons are conducted regularly, between each census or survey period, to ensure the data is updated and accurate. To further assess the quality of emigration estimates, —particularly in specialized surveys such as the National Survey of Demographic Dynamics (*ENADID*, by its Spanish acronym)—precision statistics are applied to evaluate the reliability of the published figures. These include the standard error, coefficient of variation, and 90% confidence intervals.

204. **New Zealand** uses diaspora data from other countries to assess coherence, with high-level comparisons. For instance, the Australian Bureau of Statistics (ABS) reports on New Zealand-born people living in Australia, reflecting migration trends, and with an age-sex breakdown which is valuable for understanding the diaspora's composition. Overall, these comparisons suggest no need for adjustments or methodological reviews. Additionally, New Zealand publishes uncertainty estimates and highlights revisions between provisional and final emigration (flow) estimates. This includes standard errors from model uncertainty in its provisional estimates, using the XGBoost model with a rolling training window for sampling. Provisional estimates are accompanied by 95 per cent confidence intervals, reflecting the level of uncertainty in the data, and historical revisions to these estimates are tracked over time. As more border-crossing data becomes available, provisional

estimates are updated monthly, enhancing the accuracy of migration figures. Final estimates, which are derived from linking border arrival and departure data, do not include confidence intervals, as they are considered to have negligible uncertainty. However, small errors may still occur due to data linkage issues.

205. **Poland** applies mirror statistics to identify underreporting in emigration figures. The analyses are based on data regarding residents with Polish citizenship in selected European countries, which are the main destinations for Polish emigrants (such as the United Kingdom, Germany, the Netherlands, Norway, Ireland, Belgium, the Czech Republic, Spain, Italy, Iceland, Greece, France, Denmark, Switzerland, Sweden, and Austria). It is important to note that for most of this data, no distinction is made between the type of stay (long-term or short-term).

206. The **United States** has been conducting research using mirror statistics with Mexico and Canada, and with other countries for US-born emigrants.

207. Countries that do not use external data sources for comparison in assessing the quality of their emigration estimates use other ways to evaluate the quality of their estimates. For instance, **Italy** evaluates the quality of its emigration estimates using the cancellation data from the central population register (ANPR), which tracks demographic events continuously. They rely on an integrated framework for micro-demographic accounting and statistical population registers, to produce more accurate migration statistics. This system aligns with EU regulations and improves the consistency of migration data. Specifically, the system ensures the consistency of individual migration trajectories, treating untraceable cases as emigrations when appropriate, thus enhancing the reliability of outflow estimates.

208. The **United Kingdom** provides a composite measure of uncertainty is provided for net migration. To measure uncertainty, they quantify uncertainty associated with the individual steps in this statistical system, for example, adjustments, modelling, and survey-based components. This uses a simulation methodology that is outlined in this ["Measuring uncertainty in international migration estimates"](#) working paper. The final stage combines simulated samples to create an uncertainty interval for immigration, emigration, and net migration. Simulated samples are produced for three main national groupings: EU, non-EU, and British nationals. However, these samples currently capture only some of the uncertainty sources. The simulated estimates for immigration and emigration are summed in the order returned by the simulation, introducing additional uncertainty to the composite measure. They acknowledge that the current uncertainty intervals do not account for all sources of uncertainty, and ongoing research intends to include more sources into the measures for administrative-based migration estimates.

209. **Mexico, New Zealand** and the **United Kingdom** are the only consulted NSOs that produce estimates of uncertainty or confidence intervals for long-term emigration.

4.2 Communication of quality

210. Effective communication about the quality of emigration statistics is essential for ensuring transparency, helping users interpret the data appropriately and fostering trust in official statistics.

211. The consulted NSOs adopt various strategies to convey the methodologies, quality, limitations, and reliability of their emigration statistics, adapting their approaches to meet the needs of diverse stakeholders and national contexts.

212. This section examines how NSOs communicate the quality of their emigration estimates in a transparent fashion. It highlights various practices such as publishing uncertainty measures, methodological documentation, and quality assessments.

213. International migration is the most challenging component to measure in **Albania**, as a population register has not yet been established. To address this, the country relies on the best available proxy data, primarily gathered from the migration module of the labour force survey, combined with population projection rates. A [technical guide](#) is also publicly available.

214. **Australia** communicates concepts, data sources and estimation methods through the [Overseas Migration methodology](#). Additionally, the [methodology used for final rebased population estimates](#) is available, providing a framework to evaluate emigration estimates during the intercensal period. To further assist users in assessing the accuracy of emigration estimates, preliminary modelled estimates are compared with the final, directly calculated estimates once they are available. Each revision is then published, enabling users to directly compare the updated estimates with previous versions.

215. **Canada** releases comprehensive methodological documents to communicate the methods used and the quality of its estimates [at the provincial/territorial level](#) and for [sub-provincial areas](#). Following each census, a [detailed methodological document](#) is also released. In addition, ad hoc studies, such as the [Technical Supplement: Production of Demographic Estimates for the Second Quarter of 2020 in the Context of COVID-19](#), are published to inform users on specific topics related to emigration statistics. Methodological documents and presentations are also produced for provincial and territorial focal points, though these are for internal use only.

216. **Hungary** communicates the quality and estimation methods through the [Meta data information](#). Additionally, Hungary provides detailed explanations in various studies, such as [The migratory impact of COVID-19: The role of time and distances in the migration decisions of Hungarians during the COVID-19 pandemic](#). These resources offer valuable insights into the methodologies and data quality used in Hungary's estimation processes.

217. **Italy** ensures the quality of its emigration estimates through certified statistical processes that align with [European Reference Standards](#). These processes provide detailed data quality cards for all statistical processes, which include quantitative indicators such as non-response rates, timeliness, and the length of the time series. These cards allow users to assess the quality of the statistical process and the data produced. Additionally, Italy's integrated MIDEA-ANVIS system fits into this [quality path](#) by guaranteeing high-level demographic statistics. This approach ensures that emigration estimates are based on robust statistical methods, promoting transparency and trust in the data produced.

218. **Latvia** publishes all information related to data quality on [the Official statistics portal](#). Documentation outlining the [methodology on long-term migration](#) is available, along with, a detailed document that describes the [methods used to produce population statistics and long-term emigration estimates](#).

219. **Mexico** communicates the quality and reliability of its long-term emigration estimates to the public and data users through [technical notes](#), tables of results with their respective precision statistics, [methodological documents](#), metadata based on microdata.

220. To help users in assessing the quality of these estimates, **New Zealand** provides comprehensive documentation, including [Migration Data Transformation](#), which outlines the methodology for shifting from intentions-based statistics to more accurate outcomes-based estimates. Additionally, each monthly release ([International migration: monthly report](#)) highlights revisions and explains how data accuracy improves as migration patterns become more certain. By consistently offering uncertainty

measures and detailed methodological explanations, New Zealand ensures that users can interpret emigration data with a clear understanding of its limitations and reliability.

221. **Poland** offers quality assessments through publications on emigration data and census results. A dedicated document has been published that discusses the methodology and provides an evaluation of the quality of the estimates. The document is not fully translated into English, [a summary](#) in English is included.

222. The **United Kingdom** provides user guides and updates on methods and assumptions. Extensive documentation on the quality of data sources, including the [quality assurance of administrative data](#), is made available to users. A [technical user guide](#) is published, explaining the methods, assumptions, and adjustments used. Additionally, a [research progress update](#) is published alongside each long-term international migration report to inform users about the latest research and any changes to the methods.

223. The **United States** publish emigrants estimates as part of the Net International Migration estimates and are not available separately to data users.

4.3 Discussion and recommendations

224. Evaluation and communication are fundamental to producing high quality long-term emigration estimates, given the reliance on indirect measurement methods and the increasing complexity of international migration patterns. Transparent communication and rigorous quality assessment are essential to help ensure data reliability, support accurate interpretation, and foster trust among users and stakeholders.

225. While practices differ across countries, the collected experiences of NSOs reveal a range of approaches. The analysis carried out by the task force serve to highlight important lessons and identify existing limitations, with the goal of improving both the evaluation and communication of emigration statistics. From that perspective, the following points need to be considered:

226. The **integration of multiple data sources** for validation. By combining administrative records, survey data, and other indirect indicators, NSOs can validate their statistics to produce more reliable estimates. This validation includes the strengths and limitations of each data source and, as a result, enhances the credibility of emigration estimates and allows for ongoing quality monitoring. It is recommended to pursue multiple data source validation strategies and consider adopting interactive tools, such as dashboards, to enhance monitoring and improve the validation process;

227. The **use of external validation sources such as mirror statistics and diaspora data** from key destination countries to cross-check and improve their emigration estimates. These comparative methods help identify underreporting or data inconsistencies that can have a bigger impact on emigration data from the source country. Countries should be aware of the risks when using mirror statistics to evaluate their emigration estimates as circular validation may occur. However, it is recommended to promote the use of such international data sources to validate and refine emigration statistics;

228. **Clear and accessible communication of data quality** is another essential component. Most NSOs offer some form of methodological documentation, although the level of detail and accessibility varies. Publishing clear technical guides, metadata, and visualization tools, allows users to better

assess the quality and limitations of the statistics. This also includes regularly discussing with users to ensure the relevance of these products;

229. The importance of publishing **quantitative uncertainty measures** such as confidence intervals, precocity errors or explanatory notes. These indicators can provide users critical insight into the reliability of emigration estimates and improve transparency. It is recommended to expand and systematize the publication of uncertainty measures even if they are preliminary as these indicators improve transparency and foster better informed decision-making in a timely manner;

230. Since emigration involves at least two countries, **international collaboration** also plays an increasingly important role in strengthening the evaluation and communication of emigration statistics. Case studies demonstrate that regular exchange of experiences, data sharing and alignment of methodologies and best practices among NSOs can support continuous improvement and innovation. It is recommended to engage in peer collaboration, both regionally and internationally. This fosters knowledge exchange and supports the identification of gaps and opportunities for improvement in a context where international migration is increasingly complex.

231. **Innovation and flexibility** in the evaluation and communication of emigration statistics should be encouraged. Increasing the use of existing practices such as dashboards, increased social media presence, and clearer, more concise messaging for the public, can enhance accessibility and engagement.

232. With the emergence and accelerating uptake of Generative AI the consumption of official statistics, including migration statistics, will increasingly be via AI layers. These may be through AI incorporated into search engines, or the public and customers of the statistics directly using Large Language Model (LLM) driven AI tools for sourcing their data and information. Ways to make emigration outputs “AI ready” should be explored, with particular attention given to the fact that LLMs typically consume textual information (including the likes of written outputs) more readily compared to standard data outputs.

233. In conclusion, a continued emphasis on external validation, uncertainty quantification, methodological transparency, international collaboration and innovation will be essential to improving the quality, reliability and usability of emigration statistics.

Chapter 5 Recommendations and continuation of work

5.1 Recommendations

234. The following recommendations are made for a better understanding of migration movements:

- (a) Use **multiple data sources** to estimate emigration. Integration of data from different sources, such as the population census, administrative data, including border records, and mirror statistics, can enhance the richness of data and reduce coverage or accuracy problems..
- (b) Explore the use of **alternate or new data sources**. New non-conventional data sources can be useful for producing migration statistics when used in combination with conventional sources. Countries should explore the use of non-conventional data sources such as mobile phone, credit card and social network data and share their findings.
- (c) **Linked data** can provide further insight into emigration patterns. When using administrative data sources, countries should explore how these could be used by linking to other sources and how this could improve the quality and richness of breakdowns produced.
- (d) Reach out to further countries to understand if any produce a breakdown by **reason for emigration**. Investigate alternative or new data sources that may be able to provide this data that could be modelled or linked to current emigration statistics.
- (e) **Timely migration statistics** are important for policy and planning. Countries should explore how modelling can improve the timeliness of estimates while still ensuring accuracy and learning from countries who already model their estimates.

235. The following recommendations are made for the validation of emigration estimates:

- (a) The **integration of multiple data sources** for validation. By combining administrative records, survey data, and other indirect indicators, NSOs can validate their statistics to produce more reliable estimates. This validation includes the strengths and limitations of each data source and, as a result, enhances the credibility of emigration estimates and allows for ongoing quality monitoring. It is recommended to pursue multiple data source validation strategies and consider adopting interactive tools, such as dashboards, to enhance monitoring and improve the validation process.
- (b) The **use of external validation sources such as mirror statistics and diaspora data** from key destination countries to cross-check and improve their emigration estimates. These comparative methods help identify underreporting or data inconsistencies that can have a bigger impact on emigration data from the source country. Countries should be aware of the risks when using mirror statistics to evaluate their emigration estimates as circular validation may occur. However, it is recommended to promote the use of such international data sources to validate and refine emigration statistics;
- (c) National statistical offices can also support other national statistical offices' efforts to improve and validate emigration data by **facilitating the use of their own immigration statistics**. The production of high-quality immigration statistics by single country of

previous residence and other data breakdowns is indeed crucial to support the use of mirror statistics by other countries.

- (d) The importance of publishing **quantitative uncertainty measures** such as confidence intervals, precocity errors or explanatory notes. These indicators can provide users critical insight into the reliability of emigration estimates and improve transparency. It is recommended to expand and systematize the publication of uncertainty measures even if they are preliminary as these indicators improve transparency and foster better informed decision-making in a timely manner;

236. The following recommendations are made for data sharing:

- (a) If contacted by other national statistical offices, statistical offices are encouraged to **share immigration statistics** with the available breakdowns to enable timely use of mirror statistics. When data sharing platforms are available, national statistical offices may share their migration flows data, including provisional estimates, on such platforms as early as possible each year. If data-sharing frameworks are in place, data may also include additional data breakdowns or individual-level data not publicly disseminated due to confidentiality or other reasons.
- (b) These data should also be made **easily accessible and publicly available**, with detailed metadata, to facilitate their use by other countries.
- (c) **Metadata** should clearly describe the definitions, sources, coverage and accuracy of the data produced, allowing other countries to assess their comparability and usefulness.
- (d) Ensure that all data sharing adheres to **statistical disclosure control protocols**.
- (e) Since emigration involves at least two countries, **international collaboration** also plays an increasingly important role in strengthening the evaluation and communication of emigration statistics. Case studies demonstrate that regular exchange of experiences, data sharing and alignment of methodologies and best practices among NSOs can support continuous improvement and innovation. It is recommended to engage in peer collaboration, both regionally and internationally. This fosters knowledge exchange and supports the identification of gaps and opportunities for improvement in a context where international migration is increasingly complex.
- (f) Developing legal frameworks for monitoring migration flows among countries of the EU and between other countries, including arrangements for the secure and legally compliant sharing of individual-level data, could be explored further as one possible avenue for improving the comparability and quality of migration statistics in the future.

5.2 Continuation of work

237. Countries interested in implementing the recommendations contained in this guidance should continue to exchange experiences internationally, for instance at the [meetings of the Group of Experts on Statistics on Population and Migration](#) organized annually by UNECE. In particular, countries should convene two to three years following the completion of this task force's mandate to exchange experience and review progress.

Annex: Questionnaire used to collect information from task force members

All countries represented on the task force, plus some additional countries, were requested to provide answers to the following questionnaire, developed by the task force.

UNECE Task Force on Emigration

This task force is working to improve estimates of emigration and to understand how different National Statistics Office's (NSO's) estimate emigration. The objective of the Task Force is to develop guidance to NSO's on data sources and methods for measuring emigration.

The work of this Task Force is focussing on the UN Definition of long-term emigration: "A person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months), so that the country of destination effectively becomes his or her new country of usual residence. From the perspective of the country of departure, the person will be a long-term emigrant and from that of the country of arrival, the person will be a long-term immigrant"

It should be noted that UN Statistics Division has [initiated revisions to the 1998 definition of long-term migration](#) referred to above. This acknowledges that increases in levels and changing patterns of international migration have raised the demand for accurate and timely data.

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Data Sources
Info
This section covers the data sources your NSO uses to estimate long-term emigration (applying the UN definition).
[Single select]
Q1: Does your NSO follow the UN definition of long-term migration to estimate emigration?
[1] Yes
[2] No
[IF Q1 = 2]
Q2: If No, how does your NSO define long-term emigration?
[Open textbox]
Q3: What data source or data sources are used to estimate long-term emigration (applying the UN definition) from your NSO?
[Select all applicable]
[1] Population Census
[2] Household sample survey
[3] Border sample survey
[4] Population register
[5] Permits of stay register, aliens register
[6] Passenger cards system, flight data

[7] Other administrative database
[If multiple data sources in Q3 are selected] Q4: If your NSO uses multiple data sources please list the order of importance of the data sources used.
[Open textbox]
Q5: Please provide any further relevant details of the data sources you use, including a detailed description of other administrative databases used.
[Open textbox]
[IF Q3 = 1/2/3] Q6: If you use either Population Census, Household Sample Survey or Border Sample Survey data, please provide details of the questions asked.
[Open textbox]
[Single select] Q7: Has your NSO considered any alternative or new data sources to estimate long-term emigration?
[1] Yes
[2] No
[IF Q7 = 1] Q8: If yes, what data sources has your NSO considered? [Select all applicable]
[1] Population Census
[2] Household sample survey
[3] Border sample survey
[4] Population register
[5] Permits of stay register, aliens register
[6] Passenger cards system, flight data
[7] Other administrative database
[8] Other commercial data sources
Q9: Please provide information about why these data sources were not suitable?
[Open textbox]
[Single select] Q10: Has your NSO used any linked data sources to estimate long-term emigration?
[1] Yes
[2] No
[IF Q10 = 1] Q11: If yes, what linked data sources do you use?
[Open textbox]
[IF Q10 = 1] Q12: If yes, how are these sources linked?
[Open textbox]

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Methods
Info
This section covers the methods your NSO applies to the data sources covered in section 1 to estimate long-term emigration (applying the UN definition).

[Single select] Q1: Does your NSO use each data source individually or combine data sources using statistical modelling to estimate emigration?
[1] Use data sources individually
[2] Combine data sources using statistical modelling
[IF Q1 = 2] Q2: If you use statistical modelling, please provide details of the model used and links to any published information.
[Open textbox]
[Single select] Q3: Does your NSO produce initial estimates of emigration that are later revised or updated?
[1] Yes
[2] No
[IF Q3 = 1] Q4: If yes, how long after the end of the reference period are initial estimates produced?
[Open textbox]
[IF Q3 = 3] Q5: If yes, how long after the end of the reference period are final estimates produced?
[Open textbox]
[Single select] Q6: Does your NSO have to apply additional assumptions or use additional modelling techniques to produce initial estimates of emigration?
[1] Yes
[2] No
[IF Q6 = 1] Q7: If yes, please provide details of these assumptions or modelling techniques.
[Open textbox]
Q8: Does your NSO produce emigration estimates by any of the following breakdowns? [Select all applicable]
[1] Nationality
[2] Citizenship
[3] Country of Birth
[4] Country of destination
[5] Demographics (age/sex)
[6] Skill type (occupation or education level)
[7] None of the above
[If any Q8 options selected] [Single select] Q9: Do you have to use different data sources to provide these breakdowns?
[1] Yes
[2] No
[IF Q9 = 1] Q10: If yes, what additional data sources do you use?
[Open textbox]

[If any Q8 options selected]
[Single select]
Q11: Do you have to apply different methods to produce these breakdowns?
[1] Yes
[2] No
Q12: Which of the following breakdowns does your NSO have an interest in producing breakdowns for but are currently unable to?
[Select all applicable]
[1] Nationality
[2] Citizenship
[3] Country of Birth
[4] Reason for emigration
[5] Country of destination
[6] Demographics (age/sex)
[7] Skill type (occupation or education level)
[8] None of the above

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Evaluation of Emigration Statistics
Info
This section covers how your NSO evaluates your long-term emigration estimates. This could be evaluating their quality against other signal data on emigration or producing uncertainty estimates to evaluate their quality.
[Single select]
Q1: Do you compare your estimates of long-term emigration to other data sources to evaluate the quality of the estimates?
[1] Yes
[2] No
[IF Q1 = 1]
Q2: If yes, please provide details of the data sources used and how this demonstrates quality.
[Open textbox]
[Single select]
Q3: Do you produce estimates of uncertainty or confidence intervals around the estimates of long-term emigration from your country?
[1] Yes
[2] No
[IF Q3 = 1]
Q4: If yes, please provide details on what measures of uncertainty or what confidence intervals are provided.
[Open textbox]
[IF Q3 = 1]
Q5: If yes, please provide details on the methods used to produce these estimates of uncertainty or confidence intervals.
[Open textbox]
Communication of emigration statistics
Info

This section covers how your NSO communicates your long-term emigration estimates.
Q6: How do you communicate the quality of your estimates of long-term emigration to users of your statistics?
[Open textbox]
Q7: Please provide evidence of published material if available.
[Open textbox]

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Mirror Statistics
Info
This section covers your use of mirror statistics for your long-term emigration estimates and your interest in using mirror statistics in the future.
[Single select]
Q1: Does your NSO have any experience using mirror statistics to estimate emigration or to evaluate estimates of emigration (applying the UN definition)?
[1] Yes
[2] No
[IF Q1 = 1]
Q2: If yes, how do you use mirror statistics?
[Select all applicable]
[1] To estimate emigration
[2] To evaluate estimates of emigration
[3] Both
[IF Q1 = 1]
Q3: If yes, which other NSOs do you work with or use data from as part of this use of mirror statistics?
[Open textbox]
[Single select]
Q4: Does your NSO have the ambition to use mirror statistics in the future to estimate or evaluate estimates of migration?
[1] Yes
[2] No
[IF Q4 = 1]
[Single select]
Q5: If yes, would you be willing to share data with other NSOs to facilitate this work?
[1] Yes
[2] No

Measuring Emigration Challenges and Opportunities

Prepared by the Conference of European Statisticians Task Force on Measuring Emigration, this publication provides guidance on data sources, methods for evaluating and communicating emigration statistics, and the use of mirror statistics – that is, the use of immigration records from destination countries to estimate emigration from countries of origin. It also offers recommendations to national statistical offices on improving the production of emigration statistics, validating emigration estimates, and strengthening data sharing and international cooperation.

The publication is intended to support national statistical offices and other producers of migration statistics, while helping users better understand how emigration data are compiled and evaluated.

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