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#### **Post pandemic migration flows**

## **Evaluating Canada's adjusted estimates of emigration in the context of the COVID-19 pandemic**

**Note by Statistics Canada\***

### *Abstract*

International travel restrictions around the world following the COVID-19 pandemic substantially altered Canadian's migration trends. It is assumed that this situation led to a marked decrease in the number of emigrants leaving Canada. Statistics Canada relies on demographic models based on administrative data from previous years (Canada Child Benefit data - CCB) to estimate preliminary numbers of emigrants. These models rely on the assumption that recent trends are continuing, which is less appropriate given the abrupt changes in trends stemming from the pandemic. Consequently, Statistics Canada decided to adjust its usual emigration models for 2020 and 2021 by using U.S. visa data. Many new data sources on emigration covering the year 2020 are now available. They allow the evaluation of the adjustment for the first months of the pandemic. This presentation aims at showing the very first results of Canada's evaluation of its adjustment to emigration due to the pandemic. The key result is that the adjustment seemed to have underestimated emigration during the first months of the pandemic.

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## I. Introduction

1. The Demographic Estimates Program (DEP) of Statistics Canada computes monthly estimates of the number of emigrants. These data are disseminated on a quarterly basis. They are used to calculate official population estimates with the cohort-component method. Population estimates have wide-ranging applications, notably to determine the amounts payable under various federal-provincial-territorial fiscal arrangements according to a per capita funding formula as well as in the provincial readjustment of federal electoral boundaries.
2. In order to meet key users' needs, preliminary estimates of emigration are released approximately 3 months after the end of the reference period. Then, final estimates are made available around 2 years after the end of the reference period when more complete data sources become available. The production of estimates of the number of emigrants relies on administrative data that are not necessarily optimal in terms of timeliness, completeness and coverage. The models used in production processes make it possible to produce reliable and accurate estimates of emigration despite these constraints.
3. The abrupt decline in international travel stemming from the COVID-19 pandemic invalidated some of the assumptions of the models used to produce preliminary estimates of the number of emigrants. As a result, Statistics Canada adjusted its usual method to consider the impacts of the pandemic.
4. The context of the pandemic and the use of an adjusted method added a level of uncertainty to the estimates. Many new data sources on emigration covering the year 2020 are now available. They allow the evaluation of the adjustment for the first months of the pandemic.
5. This note aims at showing the very first results of Canada's evaluation of its adjustment to emigration due to the pandemic. Section 2 summarizes the usual method used to produce preliminary estimates of the number of emigrants as well as the adjustment that was developed to consider the impacts of the pandemic. Then, section 3 presents the key results of the evaluation by comparing the adjusted data with many other data sources.

## II. Estimating Canadian emigration in the context of the pandemic

6. Estimating Canadian emigration with accuracy is challenging since it is not mandatory for Canadian citizens to report their departure from the country (Bérard-Chagnon, 2018). For the purposes of demographic estimates, emigrants are defined as Canadian citizens or immigrants who have left Canada to establish a permanent residence in another country (sometimes referred to as permanent emigration). Statistics Canada's preliminary estimates of emigration are computed using Canada Child Benefit program (CCB) data (Statistics Canada, 2016). This program, administered by the Canada Revenue Agency (CRA), is a tax-free monthly payment made to eligible families to help with the cost of raising children under 18 years of age. Demographic models are then used to correct CCB data and to estimate the number of emigrants aged 18 and over. Although CCB data are very timely, they are deemed to be complete enough to be used only 2 years after the end of the reference period. As a result, preliminary estimates of emigration for a given period are computed using CCB data covering the same period but 2 years before. For example, using the usual method, preliminary estimates of emigration for 2019/2020 were computed in summer 2020 using 2017/2018 CCB data. Final estimates for 2019/2020 were computed in summer 2022 using 2019/2020 CCB data, that is when these data are deemed to be complete enough.

7. Preliminary estimates of emigration are based on the assumption that recent trends are continuing. This key assumption was less appropriate given the abrupt changes in trends stemming from the pandemic
8. In this context, Statistics Canada adjusted its usual method. The adjustment for the preliminary estimates of emigration was developed using data on American visas issued by the U.S. consulates in Canada. These data include visas issued to permanent residents, workers, students and other temporary residents; they exclude visas issued to visitors and tourists. These data have several benefits for the purposes of calculating demographic estimates. They are monthly, publicly available, very timely and reactive to the changes stemming from the pandemic. Moreover, the U.S. is by far the main country of destination for Canadian emigrants, meaning that the data from that country provide a relatively representative picture of Canadian emigration. Visa data also have some limitations. They refer to the date when the permit was issued, not when the permit holder crossed the border. Also, American citizens and permanent residents are not included in these data since they can emigrate to the U.S. without a visa.
9. The methodology of the adjustment was published on Statistics Canada's website (Statistics Canada, 2020). In short, the adjustment, starting in March 2020, was computed by applying monthly ratios of past numbers of emigrants from the DEP and from U.S. visas to 2020-2021 monthly visa data.
10. The adjusted method led to a marked decrease in emigration during spring and summer 2020, followed by a gradual return to expected levels of emigration starting in fall 2020. Adjusted estimates of emigration were close to those produced using the usual method in 2021.

### **III. Evaluating adjusted estimates of emigration in the context of the COVID-19 pandemic**

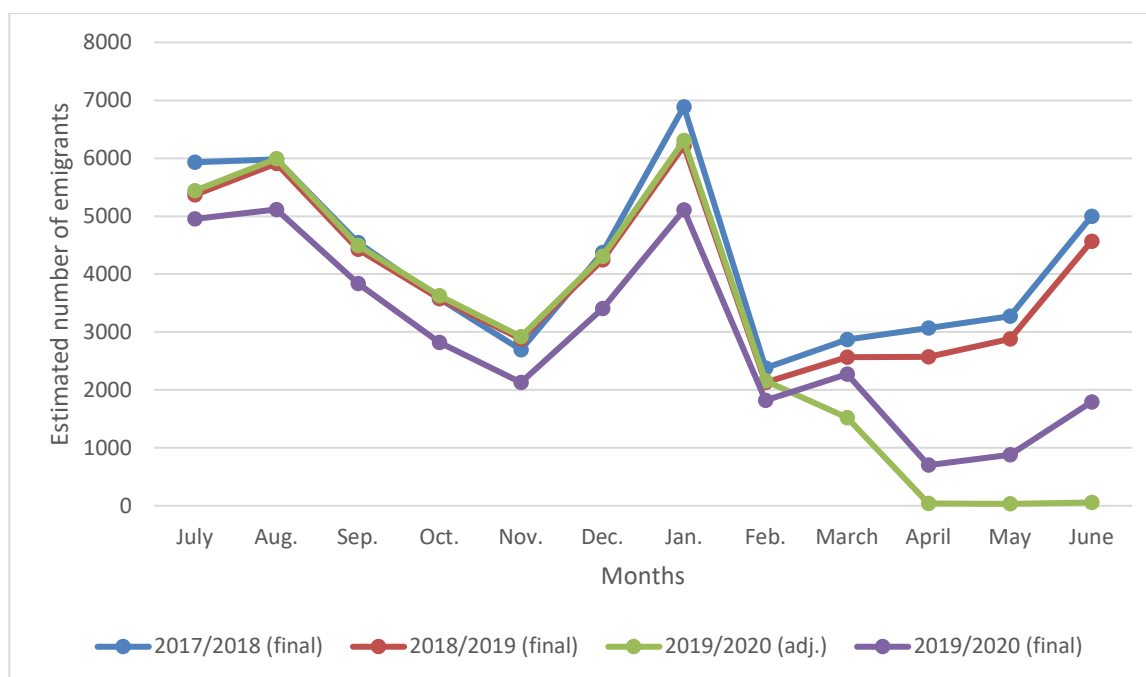
11. The context of the pandemic and the adjustment applied to the usual method added uncertainty to the estimates of emigration, which already carry a certain level of uncertainty. Consequently, evaluating the accuracy of the adjusted estimates is important to inform users in a transparent fashion, to get a clearer picture of the impact of the pandemic on international migration, and to reflect on the use of alternate sources to measure Canadian emigration.
12. Estimates of the number of emigrants up to June 2020 are now final and were disseminated in September 2022. Moreover, many new data sources on emigration covering the year 2020 are now available. They allow for the evaluation of the adjustment for the first months of the pandemic. This section presents key results of this evaluation.

#### **A. Comparing adjusted estimates of emigration with the final estimates**

13. As mentioned earlier, final estimates of emigration for 2019/2020 were disseminated in September 2022. Although these final estimates also have a certain degree of uncertainty, they allow the measurement of the accuracy of the adjusted estimates. The following chart compares the estimated number of emigrants from July 2019 to June 2020 using the usual method (final estimates) and the adjusted method. Final estimates of emigration for 2017/2018 and 2018/2019 are also shown to provide contextual numbers on recent trends.

Figure 1

Estimates of the number of emigrants using the final method and the adjusted method (2019/2020 only), Canada, 2017/2018 to 2019/2020



Note: the 2019/2020 adjusted series (green line) is computed by using the usual preliminary method (July 2019 to February 2020) and the adjusted method (March 2020 to June 2020).

Source: Statistics Canada, Demographic Estimates Program.

14. The key result emanating from this chart is that, for spring 2020, the adjusted method (green line) estimated a lower number of emigrants than the final estimates (purple line). The adjusted method suggests a marked decrease in emigration starting in April 2020 compared with previous months and years as tight restrictions on international travel were put in place around the world. Final estimates of emigration (purple line) also indicate a decline in the number of emigrants in the first months of the pandemic but to a lesser degree. They also indicate a certain reprisal of emigration starting in June.

## B. Compared adjusted estimates of emigration with those of alternate data sources

15. Given the specific challenges of measuring Canadian emigration with accuracy, Statistics Canada regularly compares its estimates of the number of emigrants with those of alternate data sources. This exercise can be done since many data sources covering the year 2020 are now available.

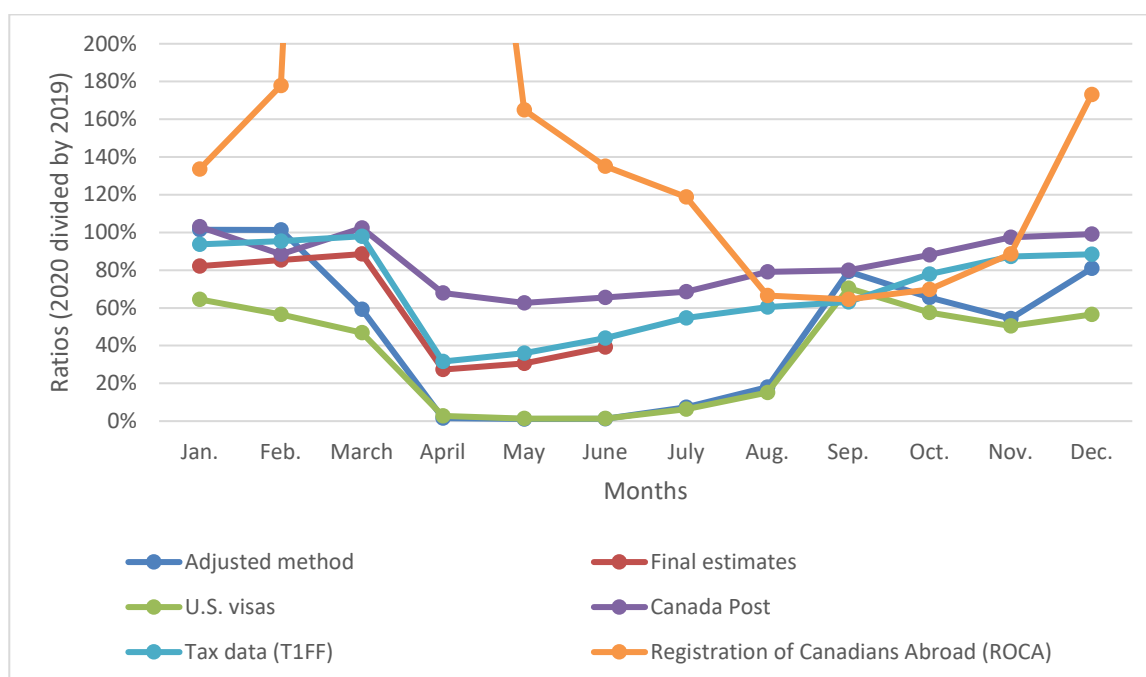
16. The sources compared here are the following:

- i. U.S. visas: already described in section 2.
- ii. Canada Post: these aggregate data come from Canada Post's mail forwarding program. They contain monthly counts of private households that requested mail forwarding after a move outside Canada.

- iii. Tax data (T1FF departure dates): for tax purposes, Canadian tax filers must indicate the day of their departure if they sever their social and economic ties to the country. These filers can be defined as emigrants despite conceptual differences (Bérard-Chagnon, 2018).
  - iv. Registration of Canadians Abroad (ROCA): this free service allows the Government of Canada to notify nationals travelling abroad in the event of emergencies abroad or at home. Travellers indicate the start and end dates of their trip abroad. Emigrants are defined as registered individuals who returned from a trip of more than 12 months abroad. Coverage of ROCA is assumed to be very low as this service is optional.
17. Since these sources have different concepts, universes and levels of coverage, the raw numbers can vary substantially from one source to the other. To circumvent this, we calculated monthly ratios between 2020 and 2019 for each source. A ratio of 100% means that for a given source and month, the 2020 numbers are the same as the 2019 ones. The following chart compares the adjusted method and the final estimates with the other data sources.

Figure 2

Monthly ratios of the number of emigrants (2020 divided by 2019) by data source, Canada



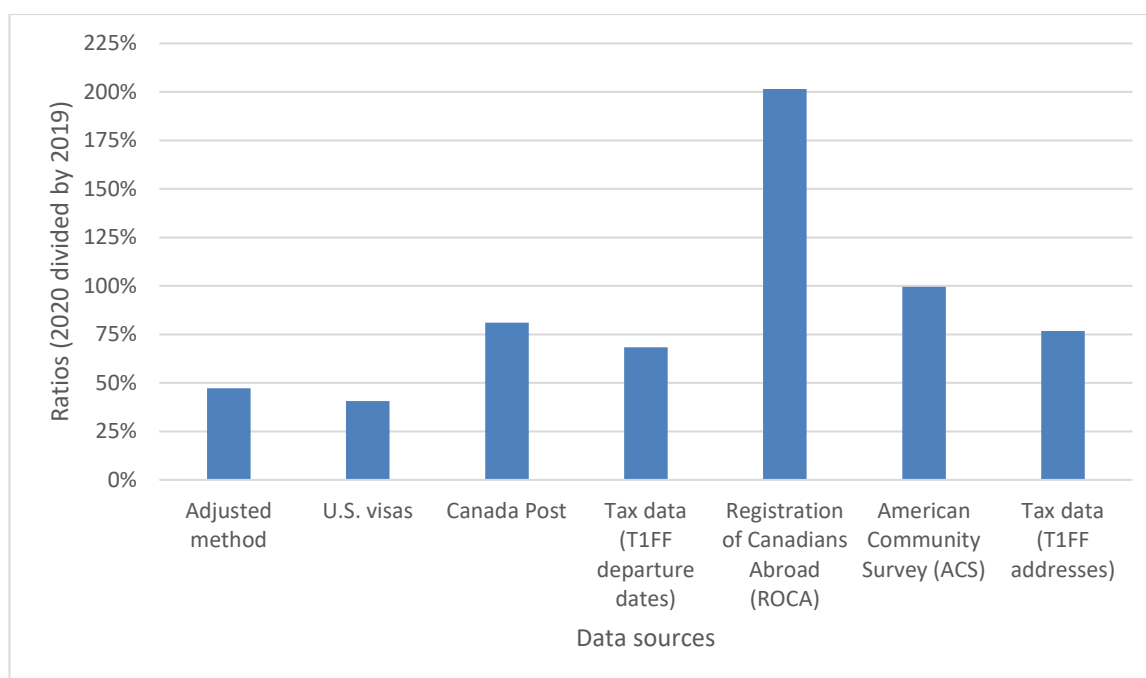
Note: ROCA's ratios in March and April 2020 (orange line) fall outside the limits of the chart to ease the view for readers. The numbers of emigrants from that source in 2020 was 10 times that of 2019 for March and 5 times that of 2019 for April.

Sources: Statistics Canada, Demographic Estimates Program (adjusted method, and final estimates), and Centre for Income and Socio-Economic Well-being Statistics (T1FF departure dates), U.S. Department of State, Bureau of Consular Affairs (U.S. visas), Canada Post, Global Affairs Canada (ROCA).

18. This chart shows 3 key results. First, all sources except ROCA show a decrease in the number of emigrants from 2019 to 2020 for the summer (ratios below 100%). U.S. visa data display the strongest decrease by far as almost no visas were delivered by American consulates in Canada in the first months of the pandemic. Since the adjusted method is based on visa data, the adjustment is also showing a similar decrease. This result could be explained by the implementation of travel restrictions across Canada, the start of wide-spread teleworking as well as the closure of daycares and schools. Note that visa numbers were already lower in January and February 2020, hinting that the number of visas delivered in Canada was already decreasing before the start of the pandemic.
19. Second, as noted earlier, final estimates of emigration also show a decrease in 2020 compared with 2019. This decline falls in the middle of those of the sources examined here. The reduction shown by the final estimates in 2020 is very close to that observed with tax data (T1FF). This was expected to some extent as the final estimates are also based on tax data (although a different file – the CCB).
20. Third, although the number of emigrants in 2020 stayed below those of 2019, all sources converge towards an increase of the number of emigrants in fall 2020. In December 2020, the number of emigrants ranged from 56% of 2019 (U.S. visas) to 99% (Canada Post). The data from Canada Post generally propose numbers of emigrants in 2020 that are closer to those of 2019. The reasons behind these results are unclear at the moment.
21. Note that ROCA numbers are less stable than those of other sources. The number of emigrants from that source in 2020 was 10 times that of 2019 for March and 5 times that of 2019 for April. These numbers also stayed above the levels of 2019 for most of 2020. Since ROCA is an optional emergency service, its coverage is low and can fluctuate rapidly depending on international issues. Despite this, these data were kept in this chart as a reminder that potential new data sources can still show inconsistent results, which is a relevant finding on its own to advance our understanding of the measurement of Canadian emigration.
22. Some alternate sources cannot be broken down by month. They can still be compared with StatCan's estimates by computing yearly ratios. The results are shown in the chart below. The 2 new sources are:
  - i. American Community Survey (ACS): this mandatory survey replaced the census long-form questionnaire in the U.S. Canadian emigration to the U.S. can be derived by using data on the place of residence 1 year ago (ROYA).
  - ii. Tax data (T1FF addresses): in addition to departure dates (see above), tax data can inform on the emigration of tax filers by comparing their postal addresses on 2 consecutive years. An emigrant is defined as a filer who changed from a Canadian postal address to a postal address abroad.

Figure 3

Yearly ratios of the number of emigrants (2020 divided by 2019) by data source, Canada



Note: StatCan's final estimates are not shown here because they are only available for the first 6 months of 2020. This makes them less comparable to the other sources, which cover all of 2020.

Sources: Statistics Canada, Demographic Estimates Program (adjusted method), and Centre for Income and Socio-Economic Well-being Statistics (T1FF departure dates and T1FF addresses), U.S. Department of State, Bureau of Consular Affairs (U.S. visas), Canada Post, Global Affairs Canada (ROCA), U.S. Census Bureau (ACS).

23. These results show 2 things. First, the 2 new sources added to the evaluation, the ACS and the T1FF addresses, paint a different picture of the impact of the pandemic on Canadian emigration. The ACS suggests that emigration to the U.S. almost stayed constant in 2019 and 2020, a result that differs from those of most sources. The pandemic disrupted data collection for the ACS, which could have impacted the numbers shown here. T1FF addresses propose a decrease of about 25%, which is close to what is observed with T1FF departure dates and Canada Post. Second, when added to the other sources, these 2 new sources reinforce the assumption that the decline proposed by the adjustment (around 50% for 2020) is sharper than expected.

## IV. Conclusion

24. The COVID-19 pandemic led to abrupt changes in Canadian international migration patterns. These changes impacted the plausibility of key assumptions made to estimate preliminary numbers of emigrants. Consequently, Statistics Canada decided to adjust its usual method to consider the impacts of the pandemic using U.S. visa data. Many new data sources on

emigration covering the year 2020 are now available. They allow for the evaluation of the adjustment for the first months of the pandemic.

25. The first evaluation of the adjustment suggests that the preliminary numbers of emigrants were lower than those of other sources. Even if most sources showed a decline in emigration in 2020 compared with 2019, these decreases are not as sharp as that of the adjusted method. Following these results and as part of the usual process of computing demographic estimates, the adjustment was revised in summer 2022 and new estimates were disseminated in September 2022.
26. The interpretation of these results must consider the context in which the adjustment was developed. Preliminary estimates are released approximately 3 months after the end of the reference period, which require very timely data. Only U.S. visas, Canada Post and ROCA data were available at the time of computing the adjustment and they were all recently acquired by Statistics Canada for the purposes of calculating the adjustment. Visas were notably chosen over the 2 other sources because they go further back in the past than Canada Post data (2017 versus 2019), a significant benefit to assess their accuracy and stability as well as to build demographic models, and because they were deemed more stable than ROCA data, as shown in the results. The methodology of the adjustment was released in a technical supplement on Statistics Canada's website (Statistics Canada, 2020).
27. Despite the differences found between the adjusted estimates and other sources, the development of the adjustment generated many benefits for the measurement of Canadian emigration. New data sources were acquired and are still used as part of the certification process of the estimates. These acquisitions also deepened our understanding of potential sources to measure emigration. They fostered collaboration with national and international partners.
28. More broadly, given the added uncertainty brought by the pandemic the measurement of Canadian emigration and its impacts on demographic trends, this work reinforced the relevance of finding and acquiring new data sources, of developing robust certification processes that include many sources as well as their strengths and flaws and of reporting methodology and key evaluation results to data users in a transparent fashion.

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