Net Transfer of Immigrants and Natives: A National Transfer Accounts approach

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# Abstract

In Canada, immigration constitutes the main response to population aging. The impact of immigration on various aspects of the labor market has been extensively researched, but its fiscal impact has received less attention. In this study, we apply the National Transfer Account (NTA) method and demographic decomposition to estimate the net fiscal cost of immigration in Canada between 1997 and 2015.

Results show that on a per capita basis between 1997 and 2015, immigrants received about of 1,710$ more than natives in public transfers. Furthermore, accounting for the difference in age structure between the two populations not only increases the net surplus of immigrants to 3640$ but also reveals the labor market imbalances as the source of 85% of the surplus.

Keywords: Immigration, Public Finances, National Transfer Accounts.

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# Introduction

Immigration has been the subject of many debates in industrialized countries (Marois, Bélanger, & Lutz, 2020). These debates focus very often on its potential negative impacts on natives, whether it could lower employment opportunity for natives (Fusaro & Lo´pez-Bazo, 2018; Piché, 2013) or cause a loss of national identity (Castles, 2012). During the last decade, population aging became a major concern. Immigration is now considered as a tool to counter the effects of rising in life expectancy and declining fertility rates.

Population aging has become a dominant policy concern in advanced economies. A declining fertility rates reduces the growth of labor supply and increase the risk of labor shortage. An increasing life expectancy deteriorates the ratio of active to retired people. In Canada, between 2007 to 2016, the working-age population (aged 15 and older) increased by 3.1 million people, while the number of labor market participants increased only by 1.6 million (Fields, Uppal, & LaRochelle-Cote, 2017). As the ratio of working age groups on non-working age groups decreases, government expenditures increase more rapidly than public revenue. In the United States, Lee and Ryan (2001) calculated that population aging will raise the tax costs of current benefit package by about 50%, even with no changes in the per-recipient costs of programs. Budgetary projections in Europe anticipate an increase of public health care expenditures in all countries by an average of 24.07% in 2060, compare to the level in 2013 (Zokalj, 2016). These prospects put a heavy pressure on public finances and call for difficult policies. For example, Kudrna, Tran, and Woodland (2015) suggested that, in order to finance the significant increase in old-age related government expenditure programs, the Australian government would have to either cut non-age-related expenditures by 32% or increase consumption tax rate by 28% for the government budget to be balanced in 2050.

As the pressure brought by population aging on various aspects of the economy builds up, immigration is increasingly being looked upon not only as a source of additional labor supply but also as a possible solution to alleviate the pressure on public finances. For this reason, recent decades have seen a subtle but significant change within the immigration debate from policies that harden "undesirable" immigration to policies that welcome "selected" immigrants. Indeed, population aging has given a new vitality to the immigration debate, but while selected immigrants are tailored to, and absorbed by the labor market, the impacts on public finances has been less documented (Dustmann & Preston, 2007).

Public opinion on immigration has traditionally been negative with most people believing that immigrants do not pay their fair share to the tax system or receive more than they contribute to public finances. A 2008 European Social Survey reveals that 44% of European citizens responded that immigrants receive more than they contribute, with only 15% believing that they receive less (Dustmann & Frattini, 2014). Much empirical research also supports the idea that immigration is costly for receiving countries. This message is echoed in Borjas’s latest book, Immigration Economics, the 30 years summary of the author’s work in the field of immigration (Card & Peri, 2016). In Canada, Grubel and Grady (2012) found that in the fiscal year 2005/2006, the average immigrant costed $6,051, while Javdani and Pendakur (2013) reported about $500. Outside Canada, Chojnicki (2011) found that even though the long-term effect of immigration on the French public finances is slightly positive, the life cycle net contribution is negative for the year 2005. Fehr, Jokisch, and Kotlikoff (2003) stated that even doubling the number of immigrants, an extreme measure by most policy standards, will do little to mitigate the upcoming financial pressure in developed countries.

During the last decades, immigrant’s intake has been increasing in most developed countries (Card & Peri, 2016). In Canada for example, the number of landed immigrants has remained relatively high since the early 1990s, with an average of approximately 235,000 new immigrants per year (Statistics Canada, 2016). In 2017, the country welcomed more than 286,000 permanent residents and the government adopted a historic multi-year levels plan to grow its annual immigration levels to 340,000 by 2020 (2018 Annual Report to Parliament on Immigration). This suggests that Borjas (2014) and others present one side of the story of which the other side is that skilled migrants make a large fiscal contribution, and unskilled migrants may be net contributors if they eventually depart or make few claims on government expenditures while in the country (Rowthorn, 2008). Akbari (1989) found a positive net fiscal transfer of $500 using data from the Canadian census in 1981 while Hering and Klassen (2010) suggest that increasing immigrants intake rather than the retirement age, would significantly improve the fiscal sustainability of the CPP (Canada Pension Plan) and largely solve the financing problems of the QPP (Quebec Pension Plan). Results from Ileri (˙ 2019) and Dungan, Fang, and Gunderson (2013) also suggest that immigration is likely to have a positive impact on the Canadian economy including the lowering of wages inequality and improvement of overall welfare.

In the US, Storesletten (2000) found that selective immigration policies, involving an increased inflow of working-age high and medium-skilled immigrants, can remove the need for future fiscal reform. For instance, an annual intake of 1.6 million (an increase from 0.44% to 0.62% of the population) immigrants would be equivalent to an alternate policy to increase tax revenue by 4.4 percentage points in the US. Akin (2012) for Germany and Dustmann and Frattini (2014) for the United Kingdom, also provides strong evidence that immigrants especially recent ones, has made a substantial contribution to public finances.

Although immigration is highly debated in the context of population aging and its fiscal impacts are attracting increasing attention, the literature has yet to produce nonpartisan results to support current immigration policies in advanced economies and Canada in particular. The reasons are twofold. First, different studies make different assumptions about the consumption of public goods (Grubel & Grady, 2012) Second, the scope of the immigrant population is not consistent across studies and results varies for different cohorts (Grubel & Grady, 2012), subgroup and methodology (Chojnicki, 2011). This is illustrated in Lee and Miller (1998) who found that the overall fiscal impact (taxes paid less costs generated) is on average, $1,400 if only first-generation immigrants are included, -$400 if the second generation is included, and $600 if extended to all descendants of living immigrants. Such a holistic approach is very rare and almost nonexistent for Canada. In this study, we use the National Transfer Account (NTA) method to measure the costs and contributions of immigration between 1997 and 2015. In our study, we choose to retain a consensual definition of immigration, i.e., persons residing in Canada who were born outside of Canada, excluding Canadian citizens born outside Canada. The NTA method takes an intergenerational perspective that accounts for costs and contributions involving the family and the state (Mason & Lee, 2011; United Nations, 2013). This article builds on Mérette and NAVAUX (2019), splits inflow and outflow transfers between immigrants and natives, measures the differences between the two populations, and attempts to uncover the sources of these differences using demographic decomposition.

# Methods, data and measures

This study aims to compare immigrants and natives regarding their cost and contribution to the public finances. This allows accessing the extent to which immigration has been a contributor to public finances and supports its policies in Canada. The 2016 Census enumerated about 7.5 million of immigrants in Canada, accounting for about 22% of the total population. About 61% of immigrants in Canada live in the three metropolitan areas of Toronto, Montreal, and Vancouver. Recent immigrants, those who arrived between 2011 and 2016, are mainly from Asia and belong to the economic category of immigration.

In our study, per capita costs and contributions for immigrants and natives are estimated using the National Transfer Accounts (NTA) method. In the NTA terminology, they are referred to as inflow transfers and outflow transfers respectively, or simply transfers to denote both. Age-adjusted transfers are estimated using the model of continuous change. This section presents an overview of the methods along with the measures of comparison. On a firsthand the section focuses on the NTA methodology. On a second hand, it introduces the methodology used to isolate crude, Age-adjusted and demographic components from NTA age profiles

## National Transfer Accounts

National Transfer Accounts (NTA) constitute an age-based national accounts methodology that originates from the works of (Lee, 1980) and (Mason, 1988). The NTA method introduced age into the System of National Accounts (SNA) by disaggregating national income, consumption, and savings by age and therefore take into account intergenerational transfers made through the State or the family. This article goes further by splitting transfers to and from the state between immigrants and natives.

### Calculating net public transfers for the entire population

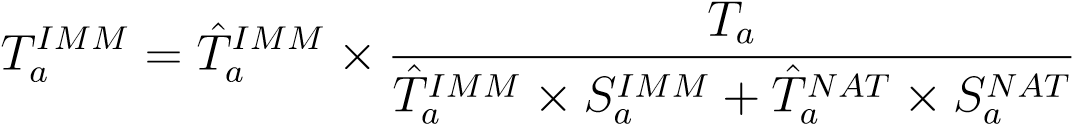
At each age, NTA measures how individuals produce, consume, save, and share resources through the family and the state. NTA reconciles age profiles that are calculated from survey and administrative data with macro-aggregates from national accounts (United Nations, 2013). The NTA equation (1) decomposes the sources through which individuals fund their consumption *Ca*:

 (1)

At each age *a* consumption is funded by labour income, asset income minus saving [*Y Aa*−*Sa*], private inflow transfers minus private outflow transfers , and public inflow transfers minus public outflow transfers . Public inflow transfers includes public consumption (health, education, other consumptions) and public cash transfers (mainly public pensions - Canada Pension Plan, Quebec Pension Plan, Old Age Security pension, and Guaranteed Income Supplement -, family allowances, and unemployment benefits). Public outflow transfersinclude all taxes from individuals (mainly employee contributions, direct taxes from persons, and consumption taxes) and corporations (mainly employer contributions and direct taxes from private and public corporations).

### Allocating public transfers to immigrants and natives

In Canada, National Transfer Accounts for the population at large have been calculated by Mérette and NAVAUX (2019). In this paper, we allocate the components of public inflow transfers and public outflow transfers between immigrants *IMM* and natives *NAT*. Equation (2) calculate how much of the aggregate value of a given transfer *T* is attributed to immigrants .

 (2)

where  and  account respectively for the share of immigrants and the share of natives in the population of age and represents crude value of transfers for immigrants and for natives at age *a*, before readjustment on aggregate *Ta*. As evidenced by equation (3), crude readjusted public transfer for natives denoted is calculated by subtracting the crude readjusted public transfer for immigrants from the crude readjusted public transfer for the population *Ta* of age *a*.

 (3)

### Data sources for public transfers

The share of immigrants and natives of age ( and

) have been calculated from annual population estimates by age and immigration status provided by Statistics Canada specifically for this project. Non-readjusted variables ( and) come from the following sources. Public transfer inflows are calculated for four variables: education, health, cash transfers, and other inflow transfers. Public transfer outflows are composed of five variables: contributions to social insurance plans, direct taxes from persons, direct taxes from corporations and government business enterprises, taxes on products and imports - mainly consumption taxes - and other taxes. Per capita age profiles for other inflows and outflows are considered equals for immigrants and natives.

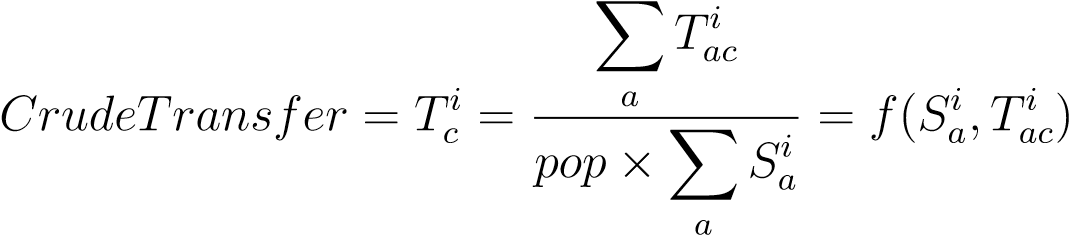
Non-readjusted age profiles for cash transfer, contributions to social insurance plans, direct taxes from persons, direct taxes from corporations and government business enterprises are calculated from the Survey of Labour and Income Dynamics (SLID, from 1997 to 2011) and the Canadian Income Survey (CIS, for 2012 and 2015). SLID and CIS include both a status variable that identifies immigrants and natives. Taxes on products are calculated from a single wave of the Survey of Household Spending (SHS). The 2010 wave of the SHS indicates if the household head is an immigrant or a native. No additional information is provided for other household members. Therefore, it is assumed that the immigration status of household members is equivalent to the household head. Education costs for immigrants and natives aged 15 years and over are estimated from student enrollments by immigration status and by 5-year age groups from census samples published by Statistics Canada in Public Use Microdata Files. We assume that all immigrants and natives are enrolled at school before 15 years old. The annual component of the Canadian Community Health Survey (CCHS) is used to construct the unadjusted age profile of health care cost using the number of total medical visits within a given year.

## Isolating Crude, Age-adjusted and demographic components from NTA age profiles

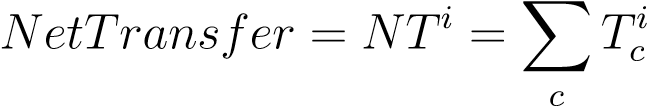
The analytical process includes three phases corresponding to the age-specific transfers, the crude transfers, and the age-adjusted difference in transfers between immigrants and natives. Making the analogy with concepts used in epidemiology, age-specific and age-adjusted transfers are to the crude transfer, what age-specific and age-adjusted mortality rates are to crude mortality rate.

### Measures and analytical strategy: step 1 & 2

Our analysis starts by looking at the age profile of public transfer in light of the life cycle hypothesis of consumption. For each account and sub-account, equations (2) and (3) provide the basis for computing the age-specific transfer time series () for immigrants () and natives ( In the second step of our analysis, crude transfers are analyzed from three different perspectives, including the transfer to population ratios, the net transfers, and the immigrant surpluses. Using the age-specific time series of transfers, crude transfers () are calculated as the per capita transfer for each account *c* and residency status *i*.

 (4)

The transfer to population ratio compares the proportion of transfer allocated to immigrants with their share in the population for each account. Net Transfer, Immigrant Surplus and Net Surplus are defined and calculated as followed. For a given year, Net Transfer (*NTi*) is defined as the sum of all transfers (inflows minus outflows) across all ages, all sub-accounts *c* included. It’s computed separately for each residence status (immigrants or natives) denoted by *i*. Immigrant Surplus (*ISc*) is the difference in transfer between immigrants and natives for a given account or sub-account *c* of inflows and outflows. In equations (5) and (6), *pop* represents the total population. Finally, net surplus (*NS*) is the sum of all immigrant surplus across all accounts or sub-accounts. It can also be viewed as the sum of all Net transfers (immigrants minus natives). Net surplus is positive when immigrants compared to native immigrants received more from public finances than they contribute to it, and negative otherwise. Therefore although null Net surplus signals the absence of inequality in transfer between immigrants and natives, a negative Net surplus is desirable to justify ongoing or increasing immigrants intake on an economic basis.

 (5)

|  |  |
| --- | --- |
| *ImmigrantSurplus* = *ISc* = X*Tci* = *TcIMM* − *TcNAT*  *i* | (6) |
| *NetSurplus* = *NS* = X*ISc* = X*NTi* | (7) |

*c i*

### The Model of Continuous Changes : step 3

In the third and final step, the model of continuous change (Horiuchi, Wilmoth, & Pletcher, 2008) is used to decompose the crude surpluses (Immigrant and Net) and to account for the differences in the age structure of the immigrant and native populations. Age-standardized values are often used to account for such differences. In calculating the age-adjusted difference between two populations for a given characteristic, either one population is mathematically adjusted to have the same age structure as the other; or both populations are mathematically adjusted to have the same age structure as a third population, called the standard population Statistics Canada (2017).

Standardization removes the biased caused by an eventual difference in the age structure of two populations by giving the same age distribution to two populations being compared and thus provides a much accurate representation of the difference in the characteristic they are being compared on. However, a disadvantage of this approach is that it requires choosing an arbitrary standard. Therefore, it has been proposed to decompose the change of crude measure into a direct change in the characteristic of interest and the change that is attributable to a change in the structure or composition of the population (Prskawetz, Zagaglia, Fent, & Skirbekk, 2005). In this study, we apply the model of continuous change (Horiuchi et al., 2008) to decompose the difference in transfers between immigrants and non-immigrant into demographic and fiscal components. This allows extracting age-adjusted transfer from the surpluses for each account. The age-adjusted transfer represents the fiscal components while the difference between the crude and the age-adjusted transfer is the demographic component. The age-adjusted transfers are analyzed side by side with crude transfer and the demographic component for all sub-accounts in section 3.3.

The model of continuous change developed by Horiuchi et al. (2008) allows decomposing the difference between two summary measures resulted from the same process into components, each representing the contribution of the factors underlying the process.

The process is a function, taking values of the factors (the covariates) and returning a summary measure (the dependant variable). Horiuchi et al. (2008) demonstrate that, as covariates changes from states *X*1 to *X*2, so does the summary measure change from *Y*1 to *Y*2 and the difference between *Y*2 and *Y*1 can be decomposed into additive components representing the contribution of the change within each covariate toward the difference *Y*2 − *Y*1.

*f*(*X*2*i*) − *f*(*X*1*i*) = X*Yi* (8)

*i*

The decomposition is based on the assumption that changes in the covariates happen continuously, or gradually, along an actual or hypothetical dimension rather than discretely. It therefore, provides a reasonable justification for the additivity of covariate effects and the elimination of interaction terms, even if the process in question is a nonadditive function of the covariates (Horiuchi et al., 2008, p. 786). This model and its assumption make sense for phenomena where change occurs naturally over time, but it equally applies when the changes occur over a hypothetical underlying dimension (Horiuchi et al., 2008, p. 790). This is the case in this study where covariates and summary values change over a hypothetical immigrant to native dimension. Therefore equation (5) can be rewritten as

*ImmigrantSurplus* = *ISc* = *f*(*SaIMM,TacIMM*) − *f*(*SaNAT,TacNAT*)

= *f*(*XacIMM*) − *f*(*XacNAT*) (9)

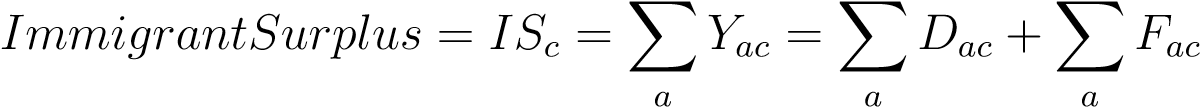
where  is the matrix of *P* = *C* × *A* components of transfer  and population

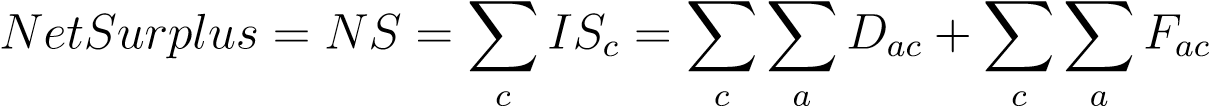
structure  over A ages and C accounts for a given residency status *i*, and *f* represents the function in equation (4) that transform the covariates  into. The difference is decomposed by creating a wrapper function *g* around the R package DemoDecomp (R Core Team, 2018; Riffe, 2018).

*Yac* = *g*(*f,XacIMM,XacNAT*)

= (*Dac,Fac*) (10)

The results is a matrix *Yac* = (*Dac,Fac*) representing the contributions of the change of each element of , with *Dac* the demographic components and *Fac* the fiscal or adjusted components of transfers. It’s important to note here that constrary to  which are constants over the transfer accounts, the *Dac* vary along with the *Tac*. The elements of *Yac* can then be summed up to re build the immigrants surplus for a given account and sub accounts, or net surplus, as well as their respective demographic components *Dc* on one hand and fiscal components or age-adjusted transfer *Fc* on the other hand.

 (11)

 (12)

# Results and analysis

## Age profile of public transfers

Similar to other advanced economies, public transfers in Canada have become a major component of intergenerational transfers, complementing transfers between family members. Through public transfers, working-age individuals transfer income to non-working-age groups, following the life cycle theory of consumptions (Ando & Modigliani, 1963; Friedman, 1957; Mason & Lee, 2011). Figure 1-A shows the age profile of public transfer in Canada for the year 2015 at the individual level. Per capita public transfers are very similar for natives and for immigrants in Canada. They overlap at almost every age. They are equal to approximatively xx,xxx $ on average between 0 and 19 years old for both immigrants and natives. Public transfers inflows decrease after 19 years old to reach a local minimum of xx,xxx$ at xx years old. Thereafter, public transfers inflows increase for immigrants and natives with a slight difference to the benefit of natives between 60 and 70 years old, due to a later retirement of immigrants. After 70 years old, public transfer inflows continue to increase for immigrants and natives at the same rate.

On the other side, public transfer outflows are much lower for immigrants than natives after 15 years old. On average, public transfer inflows of people aged 15+ equals xx,xxx$ for immigrants and xx,xxx$ for natives….

Net transfers : mettre en avant le fait que, à cause des outflows, la contribution nette positive des immigrants dure moins longtemps (de xx ans à xx ans) que pour les natufs (de xx ans à xx ans).

While the per capita profiles are different but pretty close for immigrants and natives in 2015, the aggregate profile illustrated in Figure 1-B shows different patterns for the two populations, largely due to the difference in their population size. For instance, natives are responsible for the bulk of public transfers at all ages, especially for the sub population aged less than 10 and between 60 and 70 years old where the gap between the two population sizes are the largest.

Figure 1 – Public transfer in 2015 for immigrants and for natives

−40

−20

0

20

40

60

80

0

10

20

30

40

50

60

70

80

90

age

thousand canadian dollars

**A: Per capita**

−12

−8

−4

0

4

8

12

0

10

20

30

40

50

60

70

80

90

age

billion canadian dollars

**B: Aggregate**

Canadian Born.InflowsCanadian Born.OutflowsCanadian Born.Net Transfer

Pmt. Immigrant.InflowsPmt. Immigrant.OutflowsPmt. Immigrant.Net Transfer

## Trends in Crude transfers

### Transfer to population ratio

If immigrants are responsible for a relatively small share of public transfers compared to natives, they appear to account for a disproportionated share in regard to their population share (Table 1). In 2015 for instance, immigrants represent about 24.2% of the Canadian population but contribute to only 22.7% of outflows. Furthermore, while their share in inflow transfers (25.2% ) is much closer to their share in the population, there is a significant gap between inflows sub-accounts. For instance, immigrants are only responsible for 14.5% of education costs but account for 29.5% for health expenses. For outflow accounts, the share ranges from 21.7% for sales taxes at one end and 25.4% for social insurance contributions at the other end. In dollar values, net transfer to public finances in 2015 is positive (19 004 million or 0.96% of GDP) for immigrants but slightly negative (7 120 million $ or 0.36% of GDP) for natives. However, as the benefits of immigrations become visible only in the medium and long term (Goldin et al., 2011), a more accurate analysis requires a comparison over many years.

Table 1 – Population and aggregates public transfers, Canada 2015 (millions $)

Absolute numbers Percentage

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Canada | Natives | Immigrants | Natives | Immigrants |
| Population | 35065 | 26575 | 8490 | 75*.*8 | 24*.*2 |
| Inflows Transfers | 638972 | 478204 | 160768 | 74*.*8 | 25*.*2 |
| Cash transfers (Cash) | 228722 | 165925 | 62797 | 72*.*5 | 27*.*5 |
| Education Cost (Education) | 97209 | 83130 | 14079 | 85*.*5 | 14*.*5 |
| Health Expenses (Health) | 154292 | 108837 | 45455 | 70*.*5 | 29*.*5 |
| Other Inflows (Others) | 158749 | 120312 | 38437 | 75*.*8 | 24*.*2 |
| Outflows Transfers | 627472 | 485325 | 142147 | 77*.*3 | 22*.*7 |
| Contributions to social insurance plans (Insurance) | 93238 | 69580 | 23658 | 74*.*6 | 25*.*4 |
| Taxes on Products and Imports (Sales) | 235613 | 184420 | 51193 | 78*.*3 | 21*.*7 |
| Person Income Taxes (Income) | 238391 | 186447 | 51944 | 78*.*2 | 21*.*8 |
| Corporate Taxes (Business) | 68197 | 51040 | 17157 | 74*.*8 | 25*.*2 |
| Other Outflows (Others) | −7968 | -6163 | -1805 | 77*.*3 | 22*.*7 |
| Inflows minus Outflows (Net Transfer) | 11500 | -7120 | 18620 | −61*.*9 | 161*.*9 |

. Source: Authors Calculations

Figure 2 – Transfer share as a ratio to Population share for Immigrants and Natives between 1997 to 2015

0.90

0.95

1.00

1.05

1.10

1.15

1997

2000

2003

2006

2009

2012

2015

year

population share

**A: Immigrants**

0.90

0.95

1.00

1.05

1.10

1.15

1997

2000

2003

2006

2009

2012

2015

year

population share

**B: Natives**

Inflows Outflows

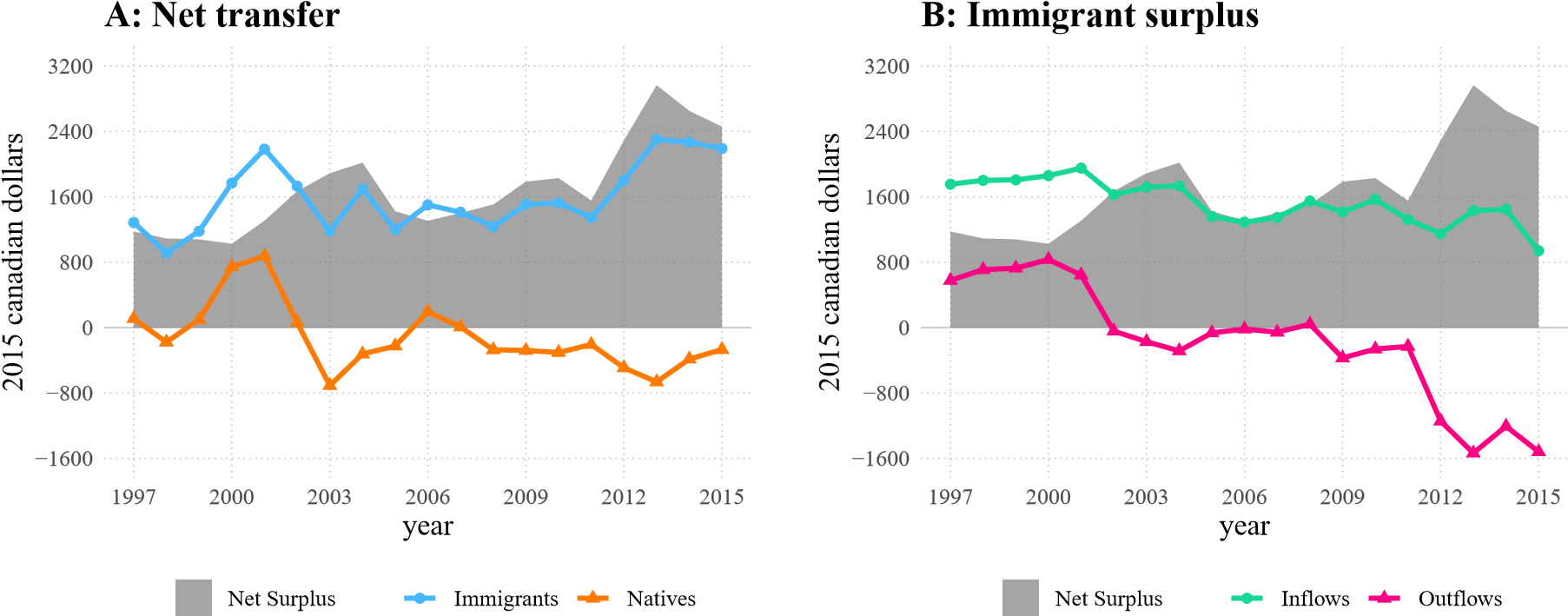
While the aggregate Net transfer is positive for immigrants and negative for natives for the year 2015, this trend is relatively recent as it became apparent only from 2012. Figure 2 shows that the opposite trend was prevailing till 2001, with immigrants contributing about 5% more than their population share. Between 2002 and 2011, immigrants and native contributed to public finances roughly in the same proportion as their population share. While the trend in outflows has reversed throughout the study period for the two populations, the trend in inflows has been much stable, especially for natives who received between one and two percent less public transfer than their population share. For immigrants, the cost was about 10% more till 2001 but decreased gradually to about 5% more than their population. Although aggregate measures provide interesting insights about the relative cost of immigration in Canada, crude values per capita values are better indicators for comparing immigrants and natives, as they remove the effect of the population size.

### Net transfers and Immigrant surpluses

Figure 3 shows the trends in Net Surplus as derived from Net Transfers (A) on one hand and Immigrant Surpluses (B) on the other hand between 1997 and 2015. Excluding the sudden increase from 2011 which increase it to $1710, the average net surplus of transfer has fluctuated only slightly around $1400 since 1997. A positive net surplus of transfer implies that the average immigrant has cost the state more than the average native. However, this overall positive cost says little about the origins of these costs, as it hides important differences in trends within each group and transfer components.

Looking at the trend in Net transfer (Figure 3-A) separately for immigrant and native, it can be observed that Immigrants have had a positive net transfer over the studied period. This positive net transfer implies that immigrants have consistently received more transfers from the state than they contribute to its revenues. Between 1997 and 2011, the average net transfer for immigrants fluctuated around $1400 per year. However, it rose rapidly between 2011 and 2013 to surpass $2100. Although at a much lower level, natives have also seen a positive Net transfer between 1997 and 2002. However, net transfer among native drops and become negative since 2003. Between 2005 and 2015, net transfer among natives has mostly been negative with slight fluctuation around $280, a sign that they contribute more to the public purse than they received from it.

Figure 3 – Difference in Inflows and Outflows transfers for Immigrant and Natives between 1997 to 2015



Putting these observations together it can be concluded that the positive net surplus and its stability between 1997 and 2011 is because immigrants have consistently received more than they contributed while natives have received slightly less than they contributed. But, it is still unclear how inflows and outflows have trended during the studied period and to which one can be attributed the sudden increase in the net surplus of transfer from 2012. These differences can be further understood by analyzing the trend in Immigrant surplus for each transfer components (Figure 3-B ).

Over the studied period, the Immigrant surplus for inflow has been positive, with immigrants receiving about $1400 more than natives on average. It can also be observed that transfers to immigrants have been slowing down compared to natives. For instance, the Immigrant surplus for inflow has dropped by about $700 between 1997 and 2015 and if the surplus for outflows were maintained at its early 2000s level, the net surplus of transfer between immigrants and natives would be close to null by 2015. Instead, while the surplus for inflow decreased slowly and steadily, the surplus for outflow increased drastically between 1997 and 2015. For instance, before 2002 the average immigrant contributes about $700 more than native in outflow transfer. From early 2000 however, the surplus in outflow dropped significantly and between 2002 and 2008, both immigrants and natives contribute about the same amount. The situation reverses between 2009 and 2011 with immigrants contributing slightly less than natives. From 2012 however, the gap in outflow transfer deepened with natives contributing about $1400 more than immigrants.

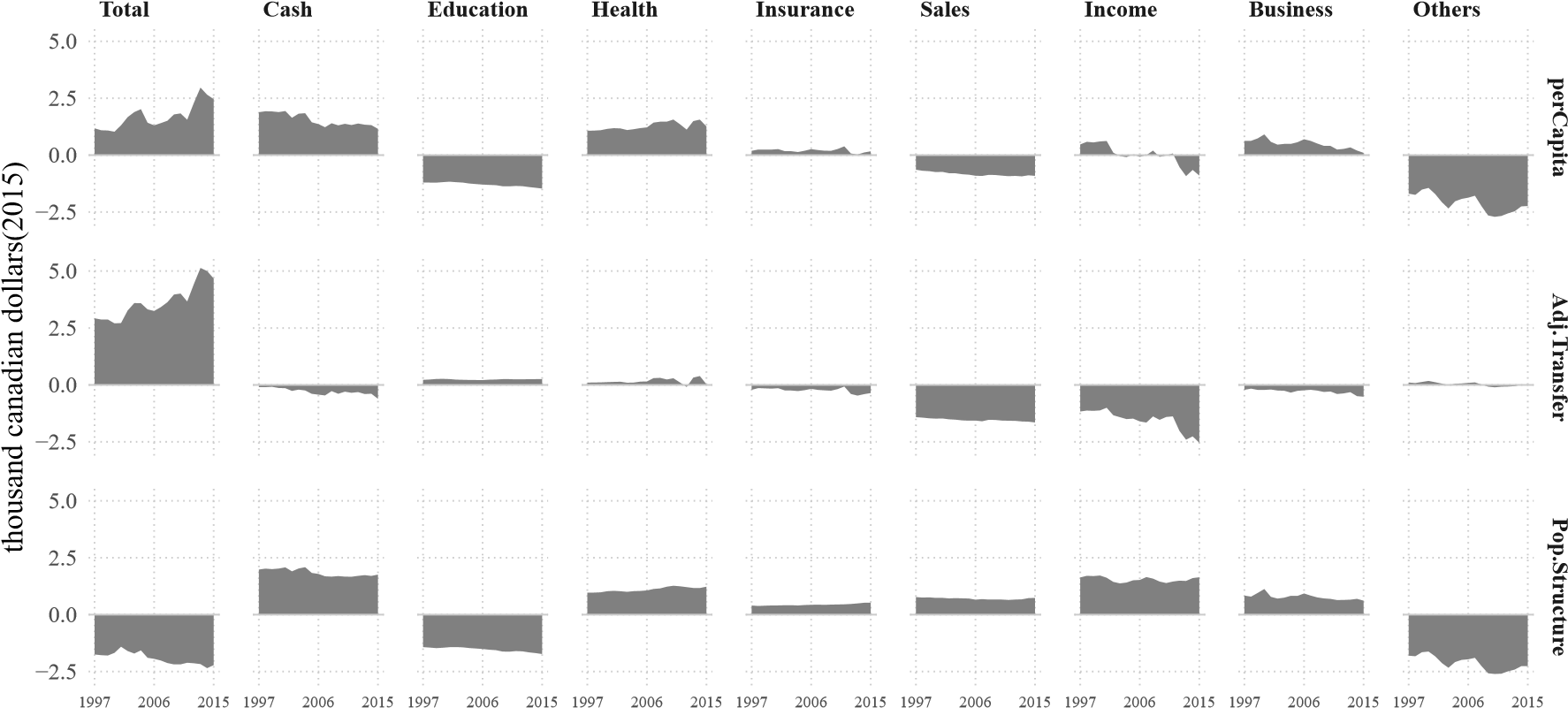
Although Net transfer and Net surplus result in the same net surplus, they illustrate different aspects of the transfer dynamic and reveal two important facts. First, the increase in Net transfer between 2000 and 2004 is mainly due to the increase in native outflows while that of immigrant stagnated. Second, and contrary to the first point, the increase in net surplus between 2011 and 2013 is caused by a decrease in immigrants outflows while that of native stagnated. As outflows are solely dependant on individual labor outcomes, these results suggest that the labor prospect of immigrants has degraded compared to natives during the study period. However, being based on the crude values of transfers, the results do not account for the difference in the age structure of the two populations. Therefore, proper isolation of demographic effect is necessary for an unbiased comparison of transfer differences between immigrants and natives.

## Decomposing the Immigrant Surplus

The immigrant and native populations are different not only in their size but also in their age structure. By dividing total (across all ages) transfer by the total population, per capita comparison between immigrant and natives account for the difference in the population size but not for the difference in age structure. Because public transfers are intergenerational, that is, resources are collected from the working-age population (the outflow transfers) and reallocated to the dependant population, mostly the young and old (the inflows transfers), they are sensitive to the age structure of the population. Therefore the comparison based on per capita values is biased to the extent to which the two populations have different age structures. To account for this difference in age structure, the decomposition discussed earlier is applied to surpluses in each account and subaccount separately. For a given transfer account, the decomposition function takes as inputs the age-specific transfer and the population size, apply the decomposition algorithm, and returns the two components representing the respective contributions of the inputs to the per crude surplus. This allows quantifying how much of the crude surplus is due to a difference in age-specific transfer, rather than a difference in the age structure of the two populations.

Age-adjusted surpluses are the components associated with the age-specific transfers and represent the difference between an immigrant and a native of the same age. There are also referred to as fiscal components. Demographic components on the other hand are associated with the population size and represent the portion of the surplus that results from a difference in the age structure of immigrants and natives populations. It is important to note here that even though the population size is used as inputs, the associated components only reflect the difference in population age structure because the effect of the population size is canceled out in the per-capita calculation. Also, as Net surplus is the sum of all Immigrant surpluses across all accounts (inflows minus outflow), the age-adjusted Net surplus is computed similarly, as the sum of all ageadjusted Immigrant surpluses. Figure 4 presents the trend in the crude and age-adjusted surpluses as well as the demographic components for each sub-accounts throughout the studied period.

Figure 4 – Trends in Crude, Age-adjusted and demographic components for accounts of inflows and outflows between 1997 and 20/15



### Age-adjusted Net surplus

Results show that age-adjusted Net surplus followed the same pattern as per Capita Net surplus but the levels are much higher in absolute values. Furthermore, the overall negative sign for demographic components of net surplus indicates that age structure is much favorable to immigrants, as it reduced the difference between immigrant and natives from the adjusted value to the per capita value. Put another way, if the immigrants and natives population have had the same age structure, the per capita difference would have been much higher than its current value. In dollar value, at equal age, the average immigrant has cost to the state about 3640$ per year, more than the average native, between 1997 and 2016. However, a favorable population structure reduced this surplus by about of 1930$, leading the 1710$ in per capita net surplus. While the demographic effect has increased steadily during the studied period from 1750$ to 2210$, the trends in Adjusted net surplus are much stepper with disruptive increases every few years (early 2000, late 2000, early 2010) from 2930$ in 1997 to 4680$ in 2015. The steady increase of the demographic components over the years reflects the faster aging of the native population compared to the immigrant population which has been purposefully kept young through various economic immigration programs.

These results imply that the difference in age structure between immigrant and native populations accounts for much of their difference in crude surpluses. Therefore, not accounting for the demographic effect leads to conflicting results that confuse our understanding of transfer differential between immigrants and natives, create unnecessary discord in the immigration debates, and lead to inappropriate public policy. The confusion goes even further when comparing the sub-account of inflow and outflow.

### Age-adjusted surpluses in sub accounts

Looking at the adjusted surplus for the sub-accounts, it appears that Income and Sales taxes are the main sources of the net surplus between immigrants and natives. This is expected, as other sub-accounts being tied to public programs are less likely to increase social inequality such as the one seen in the immigrant surplus. Income and Sales taxes sub-accounts on the other hand are directly linked to individual revenue on which public policy has less control and therefore are subject to labor market imbalances. However, this pattern is not observable from the per capita values. In fact, trends in the sub-account of crude net surplus show opposite results with inflow sub-accounts appearing as the major sources of disparities in net transfers. For example, it is intuitive that since most contributions to the public finances are based on a given proportion of the individual’s income, income taxes would reflect a large proportion of the difference between immigrants and natives. On contrary, the crude net surplus for income taxes shows conflicting results being positive between 1997 and 2003, null till 2012, and negative afterward.

The mitigating effect of demographic components is also illustrated in the high level of the per capita health care cost which after accounting for the difference in age structure is reduced to close to zero. This suggests that the per capita difference in health care cost is largely due to the fact there are relatively more immigrants in the age groups where health care costs are higher. Demographics not only affect the size of the immigrant surplus but also change its direction and trend. For example, looking at the per capita surplus, immigrants seem to have paid on average more business taxes than natives. The situation reverses after adjusting for demographic effect. At the same age, not only that immigrants pay less in business taxes than natives, but the trend in immigrant surplus is increasing while per capita measure indicates the opposite. The low business taxes paid by immigrants suggest that they operate smaller businesses than natives. They also contributed toward social security and received cash transfers, slightly less than natives. The opposite applies to education and health care costs where immigrants consume slightly more than natives.

Other sub-accounts of transfer include public goods and services as well as public deficit and debts. By design, the NTA method distributes these costs evenly and no difference is expected between immigrants and natives. This is well reflected in the age-adjusted surplus which is close to zero, the lowest in absolute value among all subaccounts. Therefore the large negative effect (in favor of immigrants) seen in the per capita surplus is mainly due to the difference in age structure between immigrants and natives. When adjusted for these differences, the surpluses in these other accounts compensated each other, revealing the sub-account of sales and Income taxes as the two most important sources of disparities between immigrants and natives.

In summary, Immigrants received quite similar benefits from public programs, but their low revenue doesn’t allow them to contribute equally to public finances, leading to a surplus in the transfer. As a result, differences in sales and Income taxes added up to an age-adjusted surplus of 3090$ which represent 85% of the 3640$ in total age-adjusted surplus. As these taxes are deducted from income which is mainly earned from labor, the labor market stands out as the single most important source of inequality between immigrants and natives. Furthermore, it appears that while both Income and sales taxes are the main contributors to net surplus, Income taxes alone drive its trends. These results stand against expectations of a positive impact of immigration on public finances, especially for recent immigrants for whom economic factors have motivated the admission. Therefore understanding how the labor market becomes the source of so much inequality is an important question and crucial to investigate and address, should Canada intend to benefits from its immigrants.

# Dicussion and final remarks

## Source of income gap

The income gap between immigrants and natives arises as a result of several factors that include the decision to participate, hiring discrimination, and wage discrimination.

The decision to participate in the labor market is partially tied to the individual or household characteristics. Immigrants settling in a new country take some time and there are some personal household or characteristics that make them unable to participate in the labor market in earlier years of their arrival. For example, a woman with young children would prefer taking care of the baby as they come from a culture where babysitting or professional childcare is not well engrained. Some immigrants, both men, and women would prefer going back to school just after their arrival or after facing difficulties in the labor market. As a result of these individual behaviors, labor market participation rates among immigrants that landed 5 years or less is only 70.7% in 2019 against 76.2 for immigrants that landed 5 to 10 years earlier (Statistics Canada, 2020). However, these differences fade away usually in about 5 years after arrival, as they become more integrated into society. When immigrants overcome these personal limitations and decide to participate in the labor market, finding and keeping a job would also require facing hiring discrimination.

Hiring discrimination consists of barriers that make it difficult for immigrants to find and retain adequate jobs. For example, immigrants hardly make it to the interview stage, as recruiters dismiss their application if their name is not English sounding. The common justification for such a decision is that an applicant with a non-English name is very unlikely to satisfy the language requirement of the position. There may be some situations where this assumption holds. But in most cases, such assumption is implicit discrimination, perhaps unintentional (Crandall, 2003; Rooth, 2010), where employers justify name discrimination based on language skill concerns, but incorrectly overemphasize these concerns by disregarding all other offsetting characteristics listed in the resume (Oreopoulos, 2011).

Hiring discriminations directly result in a higher level of unemployment among recent immigrants compared to established immigrants and natives (Oreopoulos, 2011). For instance, in 2019 the unemployment rate among immigrants that landed 5 years or less was 9.9% compared to 6.5% for those landed earlier and 5.5% for natives (Statistics Canada, 2020). Indirectly, hiring discriminations have two consequences. First, Immigrants are forced to take temporary or seasonal positions leading to an unmet desired number of hours. Second, immigrants are pushed toward jobs for which they are massively overqualified. The first situation leads to visible under-employment while the second is characterized as invisible under-employment (International Labour Organization ILO, 1982). Under-employment not only represents a significant wastage of labor supply (Mitchell & Muysken, 2008) but also, according to many (Canadian Labour Congress, 2014; Li, Gervais, & Duval, 2006), “Canada’s real labor market challenge”. n

Measuring visible under-employment, Montcho, Carri`ere, and M´erette (2020) estimate that between 2013 and 2017, the odd of being under-employed for recent immigrants compared to natives, is about 40% among women (20% for men). Even 10 years or more years after arrival, the average immigrant still has 15% more unmet desire of hours compared to natives. Li et al. (2006) also found that immigrants are among the most susceptible to overqualification, as 52% of recent immigrants (compared to only 28% among their native counterparts) with a university degree worked in a job requiring only high school education at some point between 1993 and 2001. Consequently, lowincome rates (that is the percentage of persons living under the poverty line) have risen continuously for each successive cohort of immigrants over between 1980 and 2000 (Picot & Hou, 2003). For example, Immigrants men working in underemployment situations earned 42% less per week in 2000 compared to their counterparts employed full time in jobs requiring a university degree. The gap was 39% for women and 47% for young men (Morissette & Galarneau, 2004).

If underemployment is an important medium to low income among immigrants, it however accounts for a relatively small part of the earning gap between immigrants and natives. For instance, Morissette and Galarneau (2004) found that after controlling for the highest education and job requirement degrees, immigrants working full-time still earned about 20% less than their native counterparts in 2000. This suggests that, even with the same education and job position, differences between immigrants and natives persist as a result of wage discrimination that persists even beyond 10 years after arrival.

Wage discrimination arises when immigrants are paid less than natives for the same type and amount of work. One reason for such discrimination is that employers attach a lower value to educations and work experiences from some countries relative to others. Coulombe, Grenier, and Nadeau (2014) found that although recent immigrants have, by design, more years of schooling and work experiences, lower quality of human capital completely negates this advantage, and is by far the major source of wage gap between immigrants and natives. Using GDP per capita in an immigrant’s country of birth as a proxy for the quality of schooling and work experience acquired in that country, the authors demonstrate that controlling for human capital quality reduced the wage gap by almost 62% for male immigrants and virtually eliminated it for female immigrants. In a slightly different setting, Fortin, Lemieux, and Torres (2016) found that the location of education alone account for up to 70% of the wage difference with the largest (negative) premiums on educational degrees obtained in Asian countries.

More recently, Block, Galabuzi, and Tranjan (2019) point out that employment and earning inequalities are but the tip of the iceberg of an unequivocal racialized economic discrimination in Canada. For instance, non-racialized immigrants do better in the Canadian labor market and do better sooner, than racialized immigrants do. Moreover, income inequality between racialized and non-racialized Canadians extends to second and third generations-and beyond (Block et al., 2019). Therefore, the idea that the earning gap between immigrants and natives reduces over time to eventually disappear is not applicable in the Canadian context, as most immigrants in Canada never reach wage parity with natives. This is because assimilation is neither immediate nor automatic (Hum & Simpson, 2000) or uniform across regions (Nadeau & Seckin, 2010).

## Limitations and future research

This study contributes new results to the immigration debates using relatively new datasets and advanced methods. However, there is room for improvement in various areas including, the effects of a changing demographic structure, extended scope of the immigrant population, the age at arrival, and the healthy immigrant’s effect. As we have seen, omitting the demographic difference between immigrants and natives results in enormous bias in analyzing the difference in transfer between the two populations. Although, we have accounted for this difference for each year, the effect of changing population structure from one year to another, also need to be accounted for, for accurate trend comparison. The bias may be small for consecutive years but important over the years as the population ages and immigration continues.

Demographic effects may also arise from a different composition of the immigrant population. For instance, although this study has gathered data over many years, its transversal nature makes it applicable only to the first generation of immigrants. As pointed out by previous studies (Lee & Miller, 1998), defining the immigrant population is particularly challenging, and enlarging the immigrant population by including more generations of immigrants may lead to different results. The first generation refers to people who were born outside Canada but now living in the country as a citizen or permanent resident. Those born in Canada but have at least one parent born outside the country belong to the second generation while those with both parents and themselves born in Canada belong to the third generation.

Even for first-generation immigrants, the age at arrival could be a source of difference in transfers. For instance, there is a general assumption that immigrants arriving at working age represent a saving in childhood and education expenses which largely occur in the country of origin. For example, Dustmann and Frattini (2014) found that between 1995 and 2011 European and non-European immigrants endowed the UK labor market with human capital that would have cost £14 and £35 billion respectively if it were produced through the British education system. Unfortunately, the age of arrival has not been accounted for in this study due to data limitations. But, results from this study suggest that, immigration has made a similar contribution in Canada, as they represent about 24.2% of the Canadian population but are responsible for only 14.5% of education costs in 2015.

If arriving later implies saving in education costs for the host country, departing earlier is also expected to reduce age-related expenses such as health care since some immigrants return to their home country to spend the last part of their life that is most cost-intensive (Bratsberg, Raaum, & Røed, 2014). However, opposite results have been observed in Canada. For instance, the 24.2% immigrants are responsible for 29.5% of health expenses in 2015. These results also contradict expectations that immigrants are healthier than natives. The so-called Healthy Immigrant Effect (HIE) refers to the fact that recent migrants are in better health than the native population (Ichou & Wallace, 2019; Vang, Sigouin, Flenon, & Gagnon, 2016). This foreign-born health advantage is largely the result of health being one of the most rated criteria for immigration and applicant whose health condition may cause excessive demand on health or social services are more likely to be refused.

## Conclusion

Overall, the average immigrant contributed for about 15830$ per year while receiving about 17420$ per year in average betwen 1997 and 2017. A native on the other has contributed 16000$ but received 15890$. In net, immigrants received about of 1710$ more than native on average between 1997 and 2015 and this surplus is increased to 3640$ when comparing immigrants and natives at the same age. Labor market imbalances are the main the source of this difference accounting for 85% of the net surplus.

Theses results lie somewhere between that of Grubel and Grady (2012) and Javdani and Pendakur (2013) who reported $6,051 and $500 respectively for the fiscal year 2005/2006. Although this alone would make our results much acceptable, their reliability lies more in the NTA method which is more englobing than previous methods regarding transfers included and the scope of the immigrant population. If results from this study clearly show that immigrants are a cost to public finances, they also provide evidence that this situation is a consequence of important discrimination in the labor market. Therefore, rather than debating on whether or not immigrants intake should be increased or reduced, it would be much beneficial to debate on how to enable immigrants to achieve their full potential in the labor market. This may involve adjusting the selection criteria but most importantly addressing the labor market imbalances.

In our opinion, cultural, racial or any form of discrimination does not persist unless there is some economic and social value associated with it. Throughout history, discrimination has allowed the construction of social classes for transferring wealth from the lower classes to the upper classes. These classes have taken many names - proletariat and bourgeoisie, working-class and nobility, the 99 and one percent, etc.- but the social gradient has remained the same because its economic purpose has persisted. While this research and the extensions suggested would provide more insights on the fiscal effect of immigration, more fundamental investigation into the nature and causes of socio-economic inequality is required to reduce these differences. Canada and the world will need agile thought leaders and decision-makers who can assess the building block of our society and engage the changes required for its improvement.

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