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Does Immigration Help Alleviate Economy-Wide Labour Shortages?

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Résumé

La présente étude analyse l'effet de la politique d'immigration expansive du Canada amorcée en 2016 sur la pénurie de main-d'œuvre dans six régions du pays, et tout particulièrement au Québec, qui dispose d'une certaine autonomie de gestion en la matière. J'examine l'évolution de la courbe de Beveridge, c'est-à-dire de la relation classique inverse observée entre le taux de postes vacants et le taux de chômage, avant, pendant et après la pandémie de 2020-2021. Comme l'immigration fait augmenter non seulement l'offre de main-d'œuvre, mais aussi la demande de main-d'œuvre, son effet net sur le taux de postes vacants dans l'ensemble de l'économie est a priori incertain. Pour y voir clair, je présente une analyse statistique des données d'avant et d'après la pandémie dans les six régions du Canada. Elle tend à démontrer que l'hypothèse du « gros bon sens », voulant que plus d'immigration permet d'atténuer une pénurie de main-d'œuvre qui est généralisée dans l'économie, est fausse et constitue un dangereux sophisme de composition.

Abstract

I study the impact of Canada's expansive immigration policy launched in 2016 on labour shortages in six regions of the country, particularly in Quebec, which enjoys some autonomy of management in this area. I look at movements of the Beveridge curve, which draws the classical inverse relation between the job vacancy rate and the unemployment rate, before, during, and after the 2020-2021 pandemic. Since immigration not only expands the supply of labour, but also adds to the demand for labour in the overall economy, its net effect on job vacancies in the aggregate is a priori uncertain. To clarify matters, I present a statistical analysis of pre- and post-pandemic data in the six Canadian regions. Results suggest that the common-sense belief that more immigration contributes to reducing economy-wide labour scarcity is wrong and constitutes a dangerous fallacy of composition.

Keywords: immigration, labour shortages, job vacancies, unemployment, Beveridge curve.

JEL Codes: J11, J21, J23.

Summary

This is a study of the impact of Canada's expansive immigration policy begun in 2016 on labour shortages in various regions of the country, particularly in Quebec, which enjoys some autonomy of management in this area. It opens by looking at movements in labour market tightness and the Beveridge curve before, during, and after the 2020-2021 pandemic. The Beveridge curve draws the classical inverse relation between the job vacancy rate and the unemployment rate over time. It is not rigidly fixed in the unemployment-job vacancy plane but can shift up or down from time to time under the influence of various factors such as the 2020-2021 pandemic and the 2016-2023 immigration policy. These two major developments may have significantly changed the pace of inter-occupational and intersectoral reallocation of labour and the efficiency of matching of jobs offered with available candidates.

The study gives a broad account of the effects of the pandemic but focuses mainly on the impact of Canada's immigration policy. Immigration not only expands the supply of labour, but also adds to the demand for labour in the overall economy, so that its net effect on the gap between supply and demand is a priori uncertain. It could be negative or positive. It is important to determine whether the rising immigration rate since 2016 has produced a significant decline in the job vacancy rate and labour shortages as expected by groups such as business organizations.

To clarify matters, a statistical analysis of pre- and post-pandemic data is presented. It is based on a times series, cross-section pool of data from six Canadian regions over the 24 quarters spanning the two non-pandemic periods from the spring of 2015 to the fall of 2019 and from the fall of 2022 to the fall of 2023. The intent is to use these 144 observations to identify the effects of the unemployment rate and the immigration rate on the job vacancy rate, with due account being taken for possible structural differences in the six regional labour markets.

Results suggest that the common-sense belief that more immigration must reduce economy-wide labour scarcity is wrong and constitutes a dangerous fallacy of composition. On net, the Canadian data strongly reject the popular hypothesis that rising immigration has lowered the economy-wide job vacancy rate. They suggest, on the contrary, that rising immigration has increased it and hence worsened labour scarcity in the aggregate.

The study concludes that a moderate immigration rate instead of the immoderate expansion of the past few years is the only means by which collective well-being of Canadians can be promoted.

1 Introduction

Just before the macroeconomic slowdown began in mid-2022, Canada's unemployment rate was down to 5 percent, its lowest level in the last half-century. Quebec's 4 percent unemployment rate was the lowest since Expo67, 55 years ago. The unemployment rate was also very low in the US in 2022.[1]

This North-American success against unemployment implied that employers found it more difficult to match the right candidates with the jobs they offered, since almost all those who wanted a job already had one. Labour scarcity is the obverse of full employment. It is the problem of labour shortages, not the success in achieving very low unemployment, that currently fills most of the economic, political, and media space. The CEO of Quebec's Conseil du patronat, Karl Blackburn, tirelessly repeats that "labour shortages are the economy's number one challenge." The outgoing leader of Quebec's provincial Liberal Party, Dominique Anglade, said that "the main drag on our economic development is our lack of manpower." And the reputed economic journalist Éric Desrosiers (2023) of *Le Devoir* has authored an entire book on *La crise de la main-d'oeuvre* – the manpower crisis.

These economic, political and media leaders are not wrong. When an economy reaches full employment, labour scarcity inevitably constitutes a serious economic challenge for employers and requires effective means of action. But you would not want to solve the global labour scarcity by having unemployment increase again. Desrosiers' book gives a list of several standard means of meeting this challenge, such as working harder and better, reducing the high school dropout rate, promoting worker retraining, increasing labour force participation of various groups, automatizing production processes, reviewing the organization and productivity of tasks, fostering public and private investment, encouraging intersectoral and interregional worker mobility, and finally, accepting more immigrants.

In this paper the main concern is with this last-mentioned means of action: immigration. I want to estimate to what extent accepting many more immigrants, as Canada and Quebec have done in the past few years, has helped to alleviate the economy-wide labour scarcity the country is now struggling with in normal times, when it is not caught in a slowdown of aggregate economic activity.

My answer will appeal to simple economic logic, but not to it alone. It will lean on empirical evidence extracted from Canadian data. I will conclude that, while immigration provides explicit (and welcome) relief to the specific needs of sectors where the lack of personnel is most acute, it has not eased markets from economy-wide labour shortages. It may instead have made them more widespread and intense. I will hence argue that a moderate immigration rate, to be determined by consensus of the civil society, not the

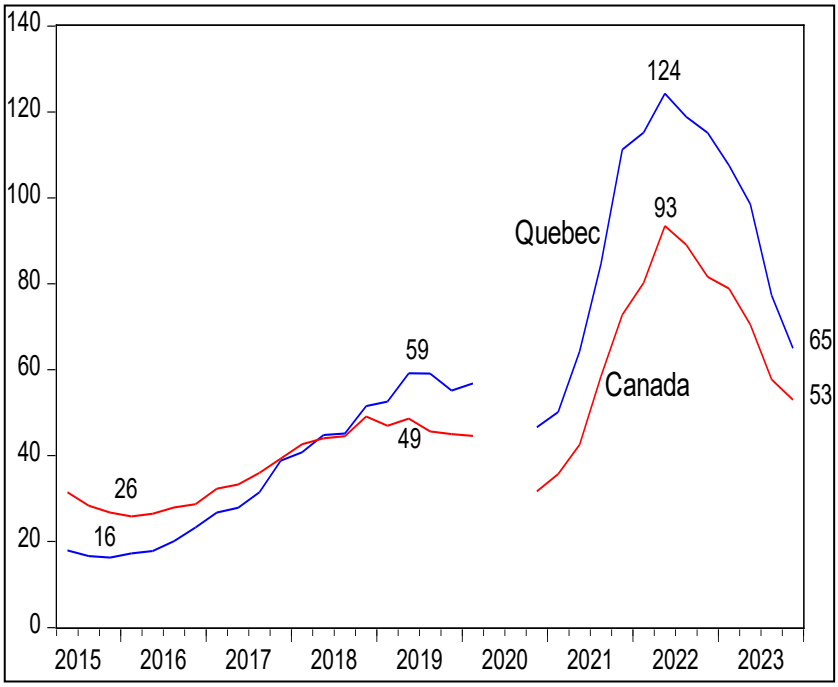
[1] The official rate was 3.5 percent there, which meant 4.5 percent in terms of the Canadian definition.

unbridled rate of the last few years, is the only way for welfare-enhancing immigration policy to go.

2 Labour market tightness

What do we mean by "labour shortages"? There are shortages of labour when employers find it difficult to attract and retain the personnel they need to pursue their activities. Their challenge is the greater the more job openings they must fill and the fewer candidates there are who are looking for jobs. It is customary to define labour market tightness as the ratio between the job vacancy rate (on the demand side) and the unemployment rate (on the supply side). More job vacancies and less unemployed increase labour market tightness. The greater this ratio between demand and supply, the harder labour shortages are felt.[2]

FIGURE 1. Labour market tightness in Canada and Quebec, 2015Q2-2023Q4



Notes: (1) Tightness is the number of job vacancies per 100 unemployed. (2) Quarterly data are averages of the three seasonally adjusted monthly measures of the quarter. (3) The data for spring and summer 2020 are missing.
Sources: Statistics Canada (tables 1410-0287 and 1410-0432); author's calculations.

Figure 1 shows how labour market tightness evolved in Canada and Quebec from the spring of 2015 to the fall of 2023. The data for spring and summer 2020 are not available, due to a 6-month pandemic-related pause in Statistics Canada's Job Vacancy Survey. The number of vacancies per 100 unemployed increased during the five years of prepandemic

[2] Barnichon and Shapiro (2022) have further shown that the job vacancy to unemployment ratio has been a better predictor of inflation than most other indicators of tightness in the past 25 years in the United States.

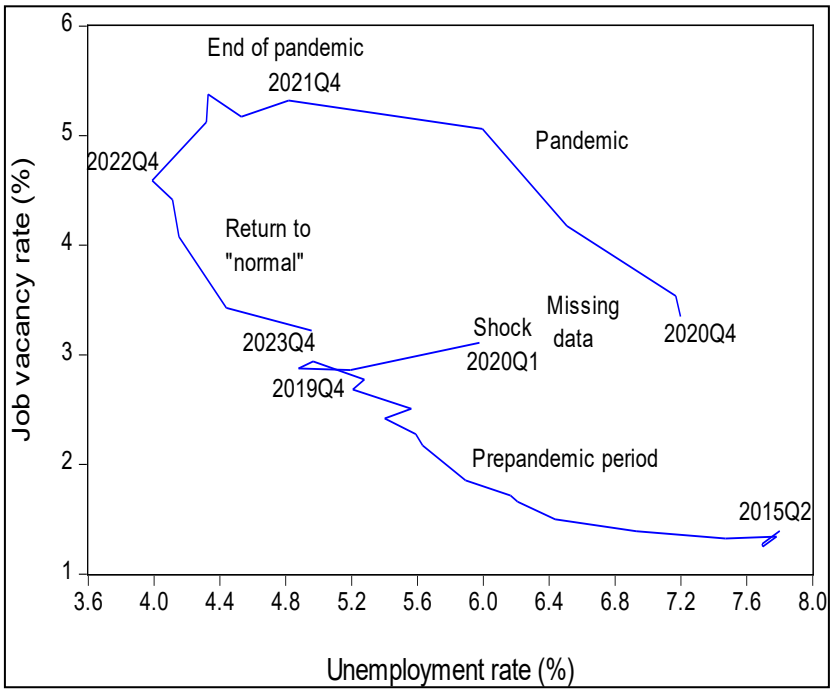
expansion 2015 to 2019, rose even faster with the onset of the postpandemic recovery from the fall of 2020 to the spring of 2022, and then declined thereafter as the economic slowdown induced by tight monetary policy began to slacken labour markets.

3 The Beveridge curve in Canada and Quebec

Understanding the trajectory of the job vacancy-unemployment ratio in figure 1 requires closer examination of the time path of the job vacancy rate and the unemployment rate in the two-dimensional plane.

The classical interpretation goes back to work by William Beveridge in the 1940s. This British economist pointed out that the number of job vacancies and the number of unemployed usually trended in opposite directions through business cycles (Beveridge 1960). When aggregate economic activity was approaching its full potential, there were few unemployed and many job vacancies. Conversely, when activity was moving away from potential, there were more unemployed and fewer job vacancies. Since 1960, this inverse relation between the job vacancy rate and the unemployment rate has been labeled the Beveridge curve. The pressure exerted by aggregate activity on the economic potential, which is inversely associated with the unemployment rate, is viewed as the main factor behind the degree of labour scarcity captured by the job vacancy rate.

FIGURE 2. Unemployment and job vacancies in Quebec, 2015Q2-2023Q4

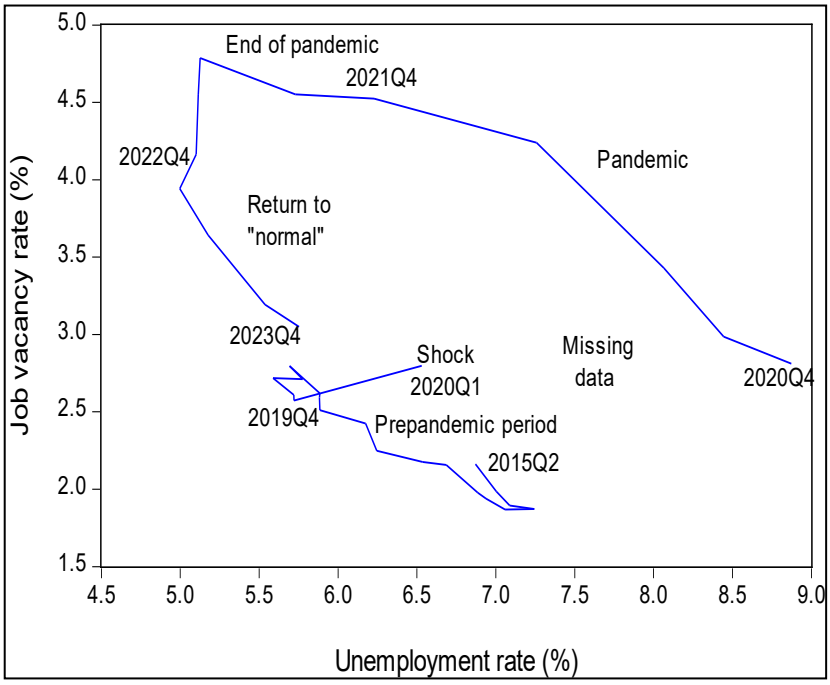


Note: The unemployment and job vacancy rates are both percentages of the labour force.
Sources: Statistics Canada (tables 1410-0287 and 1410-0432); author's calculations.

Nowadays, the Beveridge curve plays a key role in the macroeconomic analysis of labour markets. It has been abundantly studied by researchers, who have identified it in the job vacancy and unemployment data of many countries.[3]

Figures 2 and 3 display the two-dimensional trajectories of the unemployment rate and the job vacancy rate for Quebec and Canada from 2015 to 2023. The lower right of figure 2 draws a Beveridge curve for Quebec from the spring of 2015 (2015Q2) to the fall of 2019 (2019Q4). Over this period, the unemployment rate decreased and the job vacancy rate increased continuously, following a slightly convex path toward the northwest. However, in 2021Q1, the regularity of the curve was shattered by the sudden outbreak of the pandemic. The unemployment and job vacancy rates were both sent to the northeast. From then until 2021Q4, a new Beveridge curve took form. The unemployment rate decreased and the job vacancy rate increased along a path that was more or less parallel to that of 2015Q2-2019Q4, but at a higher level. Then, as the pandemic subsided, the unemployment-job vacancy couple did a loop to the east and was brought back to around where the old prepandemic Beveridge curve was heading in 2015Q2-2019Q4.

FIGURE 3. Unemployment and job vacancies in Canada, 2015Q2-2023Q4



Note: The unemployment and job vacancy rates are both percentages of the labour force.
Sources: Statistics Canada (tables 1410-0287 and 1410-0432); author's calculations.

[3] For instance, Abraham (1987), Blanchard and Diamond (1989), Blanchard (1989), Pissarides (1985, 2000), Shimer (2005), Elsby et al, (2015), Ahn and Crane (2020), Michaillat and Saez (2021), Bok et al. (2022), Blanchard. Domash and Summers (2022), Barlevy et al. (2024). For Canada specifically, see Archambault and Fortin (2001) and Lam (2022).

Figure 3 shows that the trajectory of the Beveridge curve for Canada as a whole was to a large extent similar to that for Quebec. Before the pandemic struck, in Canada as in Quebec the unemployment-job vacancy couple followed a negatively sloped and convex Beveridge curve. The curve was somewhat less continuous in Canada due to the 2014-2015 drop in world oil prices. Then, during the 2020-2021 pandemic, the Canadian curve moved to the northeast just as the curve did in Quebec. Finally, as the pandemic faded away, the Canadian curve also came back west to look like an extension of the prepandemic curve.[4]

4 Reallocation of labour and matching efficiency

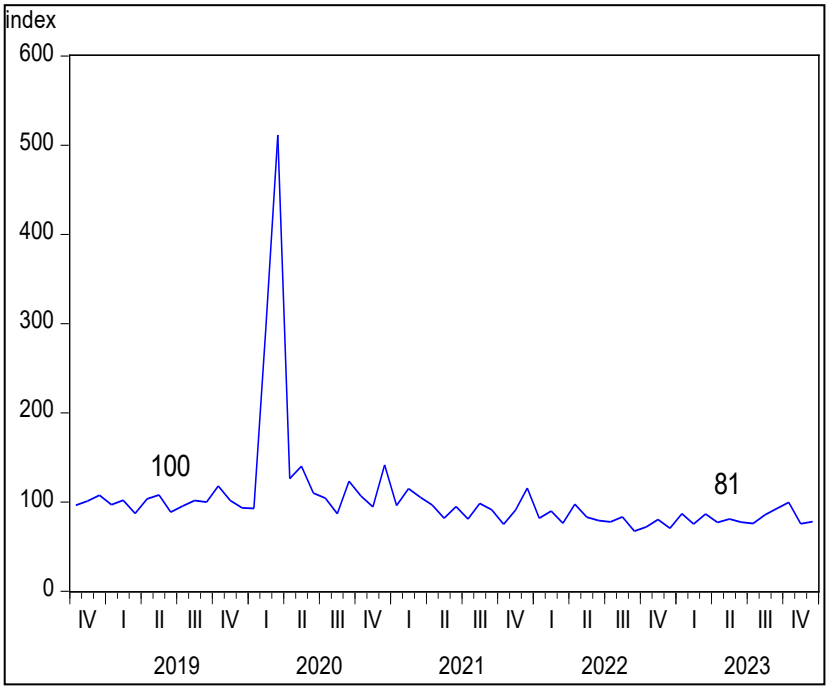
Figures 2 and 3 for Quebec and Canada have shown that the two Beveridge curves drifted markedly to the northeast (more job vacancies as well as more unemployment) during the pandemic but returned close to their prepandemic location once the virus was gone. How are we to understand the initial drift and the end return?

The research literature offers two tools to interpret these events. The first is that the pandemic made the relentless process of labour reallocation between occupations. industries and regions more intense. The second is that the matching process between offered jobs and job seekers was rendered less efficient. Operating jointly in 2020, these two effects generated a jump in the job vacancy rate corresponding to any level of unemployment. Then, as the economy finally got rid of the COVID-19, the reallocation of labour and the matching efficiency moved again, this time bringing back the location of the Beveridge curve approximately to where it had been at the end of the prepandemic period. Figures 2 and 3 have shown visually that this return back home was nearly complete in the fall of 2022 (2022Q4).

Figures 4 and 5 give the details. Figure 4 pictures how the rate of labour reallocation changed monthly from October 2018 to December 2023. This rate is equal to the monthly number of hires and job separations as a percentage of the labour force. It is reported as an index, with the average of the 15 months from October 2018 to the end of the prepandemic period (December 2019) set at 100. Reallocation jumped to a very high level along with the great confinement in the spring of 2020, and later muddled through shallower ups and downs until mid-2022. Labour moved from transport industries or those requiring person-to-person contact to electronic communications and home deliveries. There was also a displacement from traditional businesses to those allowing work from home. Hires and job separations both increased, implying more job vacancies despite the still-high unemployment rate during the recovery from the short recession of 2020. From the summer of 2022 on, the rate of labour reallocation recovered the kind of stability that had prevailed before the pandemic. In the 15 months from October 2022 to December 2023, its average index level declined to 81, which was 19 percent under the average level of 100 for the 15 months from October 2018 to December 2019. This lower reallocation rate put downward pressure on the job vacancy rate relative to its prepandemic level.

[4] Bok et al. (2022) found that the US Beveridge curve was similarly displaced during the pandemic and then had returned close to its prepandemic track by mid-2022.

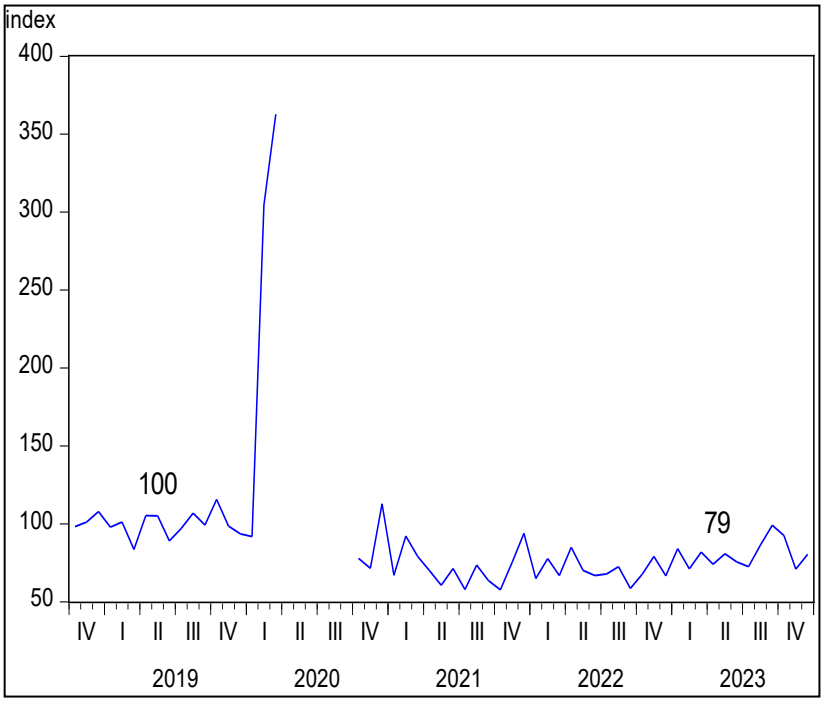
FIGURE 4. Rate of labour reallocation in Quebec, 2018M10-2023M12



Notes: (1) The monthly rate of labour reallocation is the number of hires and job separations as a percentage of the labour force. (2) The calculation follows the method proposed by Shimer (2005) and used by Ahn and Crane (2020). (3) The index is set to 100 for the average of 2018M10-2019M12.
Sources: Statistics Canada (tables 1410-0287 and 1410-0432); author's calculations.

Figure 5 shows how the efficiency of the matching process evolved from October 2018 to December 2023. The relevant indicator is an estimate of the ease with which jobs offered and job seekers can meet fruitfully each month. Just as in the case of labour reallocation, its average from October 2018 to December 2019 is set to 100 in index form. The lack of data on job vacancies from April to September 2020 cannot hide the fact that the efficiency of matching increased sharply at the onset of the great confinement, likely due to the large number of layoffs and job absences that were just temporary. However, as soon as fall 2020, the matching efficiency index was back down below its prepandemic average of 100. The meeting between jobs offered and job seekers became more difficult. The physical distance between vacant positions and available candidates and the gap between the demand and the supply of skills both increased. There were more illnesses, work from home was more popular, and life at home was often reorganized, all of which may have led to a decline in job search intensity. Therefore, it took more time to match job offers with job seekers. All in all, figure 5 shows that over the 15 months from October 2022 to December 2023 the matching efficiency index finally settled down at an average of 79, which was 21 percent under the average level of 100 for the 15 months from October 2018 to December 2019. This loss of matching efficiency exerted upward pressure on the job vacancy rate relative to its prepandemic level.

FIGURE 5. Efficiency of job matching in Quebec, 2018M10-2023M12



Notes: (1) Job matching is between jobs offered and job seekers. (2) The calculation follows Blanchard, Domash et Summers (2022). (3) The index is set to 100 for the average of 2018M10 to 2019M12.
Sources: Statistics Canada (tables 1410-0287 et 1410-0432); author's calculations.

To sum up, the rough-hand comparison offered by figures 4 and 5 between the pre- and postpandemic periods in Quebec suggests that the rate of labour reallocation fell 19 percent and that the efficiency of job matching declined by 21 percent. Applying the same estimation methods to the entire Canadian economy leads to similar results. On average over the 15 months from October 2022 to December 2023, the rate of labour reallocation and the efficiency of job matching in Canada were down by 12 percent and 18 percent, respectively, compared to the 15 months from October 2018 to December 2019. These approximations for Quebec and Canada suggest that, on net, the upward pressure on the job vacancy rate was possibly somewhat more intense over 2022M10-2023M12 than 2018M10-2019M12. But the estimated changes are small and subject to errors. They do not invalidate the visual impression given by figures 2 and 3 that the Beveridge curves in Quebec and Canada had broadly returned to their prepandemic positions beginning with the fall of 2022. Nevertheless, to clarify matters there is need for a more specific examination of the possible impact of rising immigration on the job vacancy rate. I present such an analysis below.

The pandemic shock of 2020-2021 produced a major disturbance in labour markets. This example is useful because it helps understand that the location of the Beveridge curve in the two-dimensional plane of figures 2 and 3 is not immutable. The curve can move

upward or downward depending on circumstances. The job vacancy rate does not only react (inversely) to changes in the unemployment rate, as Beveridge realized, but also to "third factors" that from time to time entail positive or negative changes in the size of reallocation of labour and the efficiency of matching jobs and workers. The pandemic is just one example of such disturbances. Many others have been identified by the research literature in the past.[5]

Canada's expansive immigration policy is the other major occurrence that shocked labour markets in recent years. Just as the pandemic did, it could affect the unemployment rate on one hand, and the rate of labour reallocation (figure 4) and the efficiency of job matching (figure 5) on the other. My main purpose now is to assess the magnitude of these potential effects of the immigration policy on movements of unemployment and job vacancies in the two-dimensional Beveridge plane.

5 Accepting more immigrants and alleviating labour shortages

Canada's immigration policy has many purposes, but one of the most important is easing the burden of employers facing labour shortages. The goal is to decrease the job vacancy rate permanently.

How did this immigration policy develop and what is it made of? It followed a 2016 recommendation by a report to the federal minister of Finance Bill Morneau prepared by his Advisory Council on Economic Growth chaired by business consultant Dominic Barton. The Barton report asserted that a bigger Canada would be richer and more influential internationally. It suggested that the annual number of permanent immigrants to Canada be increased from 300,000 in 2016 to 450,000 in 2021. Emphasis was put on bringing more "top talent" to Canada. The government agreed to increase immigration, but with no exclusive focus on high-skilled labour. The current federal target is admitting 500,000 permanent immigrants in 2025 and later.

Furthermore, the government allowed uncapped increases in temporary immigration in every province, including Quebec. Temporary immigrants are people born outside Canada to whom the federal government grants temporary permits of residence in the country. These new "non-permanent residents", as they are called by Statistics Canada, include holders of study or temporary work permits, asylum seekers, and their family members. The number of temporary immigrants residing in Canada has increased at an accelerating pace since 2015 because in each (non-pandemic) year the number of new permits granted has exceeded the number of expired permits by a rising margin. In early January 2024, the accumulated number of non-permanent residents on Canadian territory was up to 2.7 million, or 6.5 percent of the country's total population. In Quebec, they were 560,000, or 6.2 percent of the provincial population.

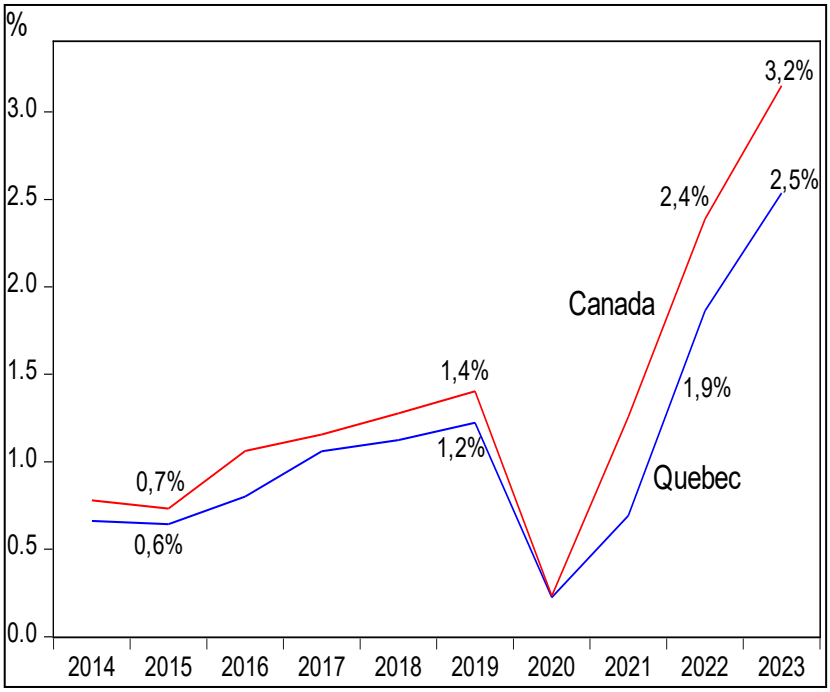
[5] Michaillat and Saez (2021) found that the US Beveridge curve moved several times between 1951 and 2019. Archambault et Fortin (2001) observed a few lateral displacements of the Canadian curve between 1969 and 1998.

The Barton report received enthusiastic support from Canadian and Quebec trade and business organizations. They have since led an unrelenting campaign for a rapid expansion of immigration. They expect that it will help to alleviate labour shortages.

Figure 6 summarizes trends in Canadian and Quebec immigration rates since 2014. The immigration rates increased sharply everywhere, although somewhat less in Quebec, where permanent (but not temporary) immigration was capped. Immigration declined markedly during the pandemic, but it accelerated again afterwards, winding up to the 2022 and 2023 summits.

There are three notable facts to keep in mind concerning the current demographic profile in Canada and Quebec. First, the growth rate of the population of all ages in 2023 (3.2 percent in Canada and 2.5 percent in Quebec) was the highest in the last 150 years, with the exception of a few years of the 1950s when the baby boom babies were born. Second, the population explosion comes almost exclusively from immigration. The contribution of the natural increase is very small given that births barely exceed deaths. With its immigration rate of 3.2 percent in 2023, Canada is by far the country with the highest immigration rate among the 25 largest advanced OECD countries. Third, immigration to Canada and Quebec has been leaning much more on temporary than permanent immigration. In 2023, temporary immigration accounted for 63 percent of total immigration in Canada and 77 percent in Quebec.

FIGURE 6. Immigration rate to Canada and Quebec, 2014-2023



Note: The immigration rate is equal to the total number of new permanent and temporary immigrants accepted each year as a percentage of the beginning-of-year population.
Source: Statistics Canada (tables 1710-0009 and 1710-0040).

The question under scrutiny here is whether the accelerated expansion of immigration just illustrated by figure 6 has been able to decrease the job vacancy rate, and hence to reduce labour shortages. It is natural to answer this question affirmatively because it looks so consistent with "common sense". It is indeed hard to find a defect in the assertion that immigration is going to ease labour shortages in the overall economy. What is seen on surface is that the arrival of new immigrant workers increases the supply of labour to employers that hire them, and therefore remedies their lack of personnel. It is then natural to infer from this, once the new hires of all these fortunate employers are added together, that labour scarcity will be eased throughout the economy. This is how economic pressure groups can argue for a higher and higher immigration rate.

6 The effect of immigration on labour supply and demand

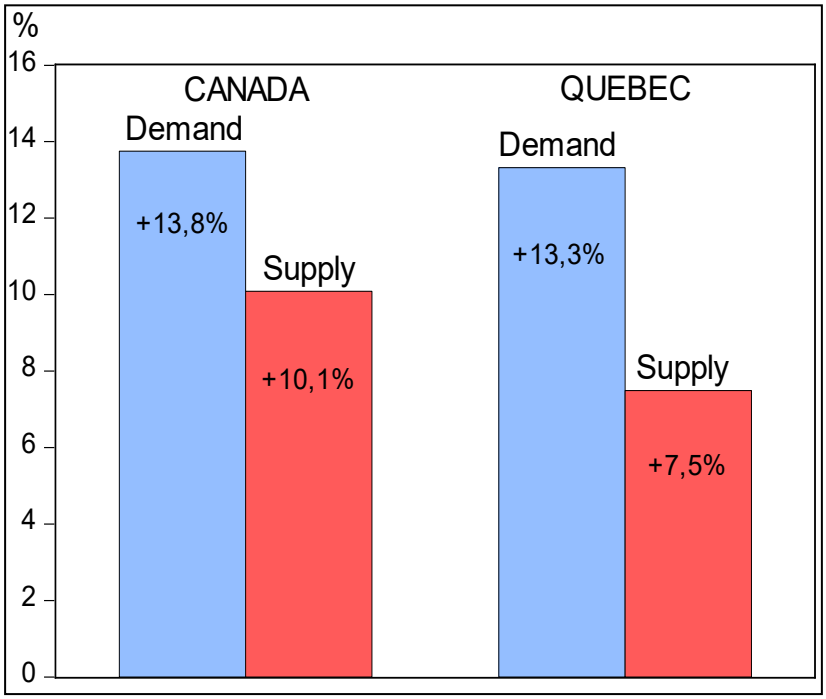
However, it is a serious logical error to believe, just by looking at immigration solving the problem of lack of personnel of employers that hire newcomers, that it will necessarily solve the problem of labour scarcity in the aggregate economy.

The error is to focus narrowly on the increase in the supply of labour, which benefits employers of new immigrants and is obvious to the naked eye, while neglecting the simultaneous increase in the demand for labour that is generated by immigration. This increase in demand sometimes spreads in diffuse and unnoticed ways throughout the economy, but it may also strike hard at industries if the growth rate of population is very high as in Canada in 2022 and 2023. The current multi-crisis of housing, health, education, social services, and construction bears testimony.

With more immigrants in the workforce, their employers can produce more goods and services and generate more income for themselves, their employees, and their suppliers. However, to make a judgment on the full ensuing effect of immigration on labour scarcity in the overall economy, one must take account that the additional income will be spent on various new consumer and investment goods. Immigrants need to spend on food, clothing, housing, transportation, personal care, and leisure. Employers and their chains of suppliers will be able to invest more in construction, machinery and intellectual property. The demand for goods and services will consequently increase overall. Greater labour demand will follow.

In other words, the hiring of immigrants initially adds to the supply of labour, but it also ends up adding to the demand for labour once the new income generated is respent everywhere in the economy and a multiplier effect on total GDP is generated. On net, it is a priori uncertain whether the supply increases more than the demand, in which case labour is made les scarce, or whether it is the demand that increases more than the supply, in which case labour is made scarcer.

FIGURE 7. Cumulative increases in labour demand and supply in Canada and Quebec from 2016 to 2023.



Note: Labour demand is the sum of employed persons and job vacancies; labour supply is the total labour force.
Source: Statistics Canada (tables 1410-0327 and 1410-0432).

Figure 7 is an attempt to clarify the matter. It pictures the cumulative increases in labour demand and supply in Canada and Quebec between 2016 and 2023. Labour demand is the sum of total employment plus job vacancies, and labour supply is equal to the entire labour force (people who hold a job or are looking for one). The figure shows that, over this seven-year period with rising immigration, the outcome in the two regions is that demand increased more than supply. It seems consistent with the view that rising immigration would have promoted labour demand more vigorously than labour supply. Unfortunately, such a quick look at data is no proof that this view is correct because immigration is but one factor among many others that may have contributed to increase labour demand. The correct answer must rely on a finer statistical analysis of the data. I will proceed to this kind of exercise below.

However, it is important beforehand to ask how it is logically possible that, before and after the pandemic, the rapid expansion of immigration in Canada might have produced a lasting reduction in labour shortages. I will try to answer this question by describing the evolution of labour markets arising from the "consolidated" Beveridge curves pictured in figures 2 and 3, which are made of their out-of-pandemic legs from spring 2015 to fall 2019 and from fall 2022 to fall 2023.

7 The effect of immigration on unemployment

Absent a pandemic, rising immigration may alleviate labour shortages permanently in two ways. First, it could lead to higher unemployment. This would have labour markets slide southeasterly along the Beveridge curve. The larger number of job seekers would allow employers to fill the jobs they offer more rapidly, so that the job vacancy rate would decline. This is not what is generally hoped for. We want to achieve a permanent reduction in labour scarcity without suffering a permanent increase in unemployment. Nevertheless, having a look at the direct impact rising immigration can potentially have on unemployment is clearly worthwhile.

There are two potential effects: structural and short-term. Structurally, it is well-known that the unemployment rate of recent immigrants (those who landed less than five years ago, plus the temporary immigrants) is higher than that of the long-settled group (the natives, plus the immigrants who landed more than five years ago). In 2023, for example, the unemployment rate for the "old" group was 4.2 percent in Quebec and 5.1 percent in Canada; for the "recent" group, it was 9.2 percent in Quebec and 8.7 percent in Canada. Consequently, the rising demographic weight of recent immigrants by itself has raised the average unemployment rate of the total labour force relative to that of the old group. But simultaneously from 2015 to 2023, the excess unemployment of recent immigrants over the old group declined, which had the opposite effect of lowering the national unemployment rate. It turns out that the net impact of those two opposite effects just about offset each other: in Quebec as in Canada as a whole, the gap between the unemployment rate of recent immigrants and that of the total labour force has barely changed. It has in fact increased by 0.1 percentage point or less. Seen in this light, rising immigration has not had any meaningful direct effect on structural unemployment. Furthermore, recent research on Canadian labour markets has not found any significant change in the level of the national unemployment rate consistent with stable inflation that could be attributed to rising immigration (Dion and Dodge 2023).

The other potential effect of rising immigration on unemployment is short-term and arises from its impact on shelter costs. The phenomenal increase in the number of new residents since 2021 has contributed to the sharp upward pressure on demand for housing. The supply of housing has not been able to match the increase in demand because the construction industry is already slowed down by tight regulations and needs time to train more qualified workers and improve technology and work organization. The resulting increase in the excess demand for housing has contributed to the large increase in the cost of rented and owned accommodation that is part of the consumer price index the Bank of Canada has been struggling to stabilize.

The Bank recently pointed out that "a larger increase in newcomers than in the past is adding pressure to the structural supply constraint in housing", that "shelter costs remain the biggest contributor to above-target inflation", and that the persistence of high shelter inflation will "act as a material headwind against the return of inflation to the 2 percent target." (Bank of Canada 2024) For instance, from April 2023 to April 2024 the consumer price index excluding shelter increased by only 1.2 percent, but the all-items index including shelter increased by 2.7 percent due to the 6.4 percent increase in shelter costs

raising the all-items average above the Bank's target of 2 percent. In other words, according to the Bank's statement, the upward pressure on shelter costs from the rapid growth in population will likely prolong the current period of high interest rates meant to reduce inflation. This would keep the national unemployment rate at a higher level for a longer period.

It would be rash to look for a quantitative estimate of the importance and duration of this short-term effect of the higher immigration rate on unemployment. But it should be kept in mind that the decline in the job vacancy rate that would follow from the southeasterly sliding of labour markets along the Beveridge curve does not come without economic and social costs. To tolerate more unemployment to ease labour scarcity is an orientation that macroeconomic policy should try to avoid.

8 The effects of immigration on labour reallocation and matching efficiency

The other way rising immigration may alleviate labour shortages permanently is if it can shift the entire position of the Beveridge curve downward in unemployment-job vacancy plane. It would then be feasible to achieve a lower or higher job vacancy rate for any given level of the unemployment rate. It is entirely possible that the higher immigration rate in Canada, just as the pandemic, has been one of these "third factors" that can generate a vertical shift of the Beveridge curve. This could occur if the reallocation of labour between occupations, industries and regions, and the efficiency of matching between available jobs and workers, would change in some way to be determined

Concerning labour reallocation, rising immigration in Canada and Quebec has stimulated the occupational and sectoral demand for labour in construction, education, health, and social services. As for matching efficiency, more immigration has increased the geographic concentration of labour supply and demand in large metropolitan areas. It may have modified the structure of supply and demand for occupational and language skills. Recent analyses by Statistics Canada's researchers have found that the educational attainment of the new (particularly temporary) immigrants has declined (Morissette 2023) and that they are more present in low-wage occupations and industries such as agriculture, accommodation, food, and business support services (Lu and Hou 2023).

9 Statistical analysis of the effect of immigration on the job vacancy rate

All these changes in labour reallocation and matching following the rise in Canadian immigration and affecting skills, occupations, industries, geography, language, educational attainment, work experience, or else, may have modified the ability of employers to fill their job vacancies. But the direction and size of the end effect of the higher immigration rate, other than through its impact on the unemployment rate, are a priori unclear. To get at it, I have done a statistical analysis of the out-of-pandemic Canadian Beveridge curve spanning the 19 quarters from spring 2015 to fall 2019 and the five quarters from fall 2022 to fall 2023.

The sample I have analyzed is a times series, cross-section pool of data from six Canadian regions over the 24 quarters from these two out-of-pandemic periods. There are therefore 144 quarterly regional observations. The six regions include the four largest provinces (Quebec, Ontario, Alberta, and British Columbia), the Atlantic region (Newfoundland and Labrador, Price Edward Island, Nova Scotia and New Brunswick) and the Prairie region (Manitoba and Saskatchewan).

The interest in a regional perspective naturally comes from the fact that Canada's immigration policy applies to every region of the country. Breaking down the data into six regions is also motivated by the fact that there are only 24 out-of-pandemic quarters in the sample. It would not be appropriate to rely on aggregate Canadian data alone. There would then be only 24 available observations to estimate the effects of more than ten explanatory variables on the national job vacancy rate. The statistical results would be fragile and unreliable. In contrast, a set of 144 observations made of 24 quarters from six regions increases the chances of identifying the effects of each explanatory variable on the job vacancy rate while respecting established statistical standards.

The estimated equations exploit these 144 pooled observations to offer an "explanation" of the job vacancy rate based on the unemployment rate, the immigration rates of the current and a few earlier quarters, a set of dummy variables meant to capture the structural differences between the six regional labour markets, and another set of four dummy variables for the seasons (winter, spring, summer, fall). Estimating the slope of the Beveridge curve with data from periods where the curve seems reasonably stable is a procedure that Michaillat and Saez (2021), for example, have used in their recent study of the optimal unemployment rate in the United States.

The proposed innovation here essentially consists of adding the current and a few lagged values of the immigration rate to the list of explanatory variables and summing up their total cumulative effect on the job vacancy rate after 12 to 18 months. The full impact new immigrants have on labour supply and demand is not entirely concentrated in the very quarter of their arrival, but likely spread over a number of quarters. The estimated equations aim at evaluating the response of the job vacancy rate of a given quarter not only to the change in the immigration rate in this current quarter, but also to the changes that took place in a few earlier quarters.

An important query concerns the possibility that estimates of the effects of the unemployment rate and the immigration rate on the job vacancy rate be statistically biased due to their joint endogeneity with the job vacancy rate.

The unemployment rate is clearly jointly endogenous with the job vacancy rate. These two variables react in concert to fluctuations in global economic activity. However, it is well-known that the job vacancy rate is prompter to adjust, and that the unemployment rate is slower. Layoffs and hires take a few months to respond, while job vacancies react almost immediately to macroeconomic disturbances. Blanchard and Diamond (1989) showed that this differential speed of reaction generated counterclockwise loops in the US unemployment-job vacancy plane. Archambault and Fortin (2001) confirmed that this

lopsided behaviour was also present in Canadian data. As an explanatory factor of the quarterly Beveridge curve, the unemployment rate is to that extent shielded from the kind of simultaneous feedback loop with the job vacancy rate that could bias its estimated impact.

The immigration rate is similarly jointly endogenous with the job vacancy rate. It may influence the job vacancy rate, but it may conversely react positively to fluctuations in employers' demand for labour. However, whenever present, the adjustment of immigration to employers' needs is far from instantaneous. It is subjected to slow economic, political, and administrative processes. Therefore, the quarterly fluctuations in the job vacancy are not accompanied by immediate changes in the immigration rate. There is no reason to worry that the estimated effect of the immigration rate on the job vacancy rate in the Beveridge curve suffer from statistical bias.

Table 1 lays out three equations estimated by weighted least squares.[6] They differ according to the estimation period (the 19 prepandemic quarters from 2015Q2 to 2019Q4, or the 24 quarters including the five additional postpandemic quarters from 2022Q4 to 2023Q4), and to the number of quarterly current and lagged values of the immigration rate that are included (four or six). The fixed effects for the six regions and the four seasons are kept in the three equations.[7] The sample variances and covariances of the estimated coefficients are robustly estimated.[8] All data are from Statistics Canada's publicly available tables on labour markets and population (series 14-10 and 17-10).

TABLE 1
Estimated equations for the effects of the unemployment rate and the immigration rate on the job vacancy rate with a pool of six Canadian regions observed through the 24 out-of-pandemic quarters from 2015T2 to 2019T4 and 2022T4 to 2023T4

Dependent variable: Job vacancy rate (log)			
Method: Weighted least squares			
Sample	2015T2-2019T4	2015T2-2019T4 avec 2022T4-2023T4	
Total pool observations	114	144	144
Degrees of freedom	98	128	130
Estimated coefficients			
Unemployment rate (log)	-1.23 (0.17)	-1.46 (0.15)	-1.46 (0.16)
Immigration rate			
Current	-0.73 (1.40)	4.51 (1.63)	4.20 (1.16)

[6] The variance of errors is the same for every quarter in a given region, but it may differ across regions. This is implemented with the *cross-section heteroscedasticity* estimation procedure of EViews software.
[7] To save on space, their estimated coefficients are not reported in table 1. They are available upon request.
[8] The estimation of variances and covariances accommodates arbitrary serial correlation and time-varying variances of errors. This is implemented with the *White period robust covariances* estimation procedure of EViews.

1-quarter lag	-2.26 (1.05)	2.43 (2.37)	2.12 (2.46)
2-quarter lag	0.79 (2.17)	2.54 (1.10)	2.46 (1.18)
3-quarter lag	-0.81 (2.00)	0.22 (1.57)	-0.15 (1.47)
4-quarter lag	1.95 (1.42)	-0.88 (1.42)	…
5-quarter lag	3.71 (1.28)	-0.52 (2.26)	…
Total cumulative effect	2.65 (3.08)	8.30 (1.61)	8.63 (1.59)
95% confidence interval for total cumulative effect	(-3.4, +8.7)	(+5.1, +11.5)	(+5.5, +11.8)
Regional fixed effects	yes	yes	yes
Seasonal fixed effects	yes	yes	yes
Robust standard errors	yes	yes	yes
Statistics			
R-squared statistic	0.91	0.91	0.91
Sum of squared residuals	0.69	1.26	1.27
Standard error of regression	0.07	0.10	0.10
Mean dependent variable	-3.84	-3.74	-3.74
Standard deviation dependent variable	0.26	0.32	0.32

Note: The job vacancy and unemployment rates are ratios of the seasonally adjusted numbers of job vacancies and unemployed to the labour force. They appear as logarithms in the equations to capture convexity in the Beveridge curve. The immigration rate is the ratio of the total number of permanent and temporary immigrants accepted during the quarter to the beginning-of-quarter population, the result being multiplied by 4 to annualize. The numbers in parentheses are the robust standard errors of the corresponding estimated coefficients. Additional equations have been estimated with or without regional fixed effects, with or without seasonal fixed effects, with or without robust standard errors, and with or without weighted least squares. They all give results that are very similar to those reported in the table for the effect of the unemployment rate and for the total cumulative effect of the immigration rate on the job vacancy rate. The full results are available upon request.

The coefficient of multiple determination (R-squared statistic) is 91 percent for each of the three equations in table 1, indicating that their explanatory power is generally good. The partial relation between the job vacancy rate and the unemployment rate is estimated with precision. On average, a change of 1 percent in the number of unemployed is accompanied by a change of 1.23 percent to 1.46 percent in the number of job vacancies in the opposite direction. The estimated Beveridge curve is negatively sloped and convex.

The effect of the immigration rate on the job vacancy rate is distributed over a period of up to six quarters. No constraint is imposed a priori on the lag structure of the quarterly effects. In the first equation, which deals with prepandemic data of 2015Q2-2015Q4 alone, the estimated total cumulative effect of the immigration rate after six quarters has a large standard error. Its 95 percent confidence interval from -3.4 percent to +8.7 percent reported in table 1 means that on average a 1 percentage point increase in the immigration rate was followed by an increase of 8.7 percent in the number of job vacancies at one extreme or by a decrease of 3.4 percent at the other extreme. Tests of hypotheses based on such a large interval are not very powerful. They make it hard to determine with any confidence whether

the impact of the immigration rate on the job vacancy rate was positive, null, or negative in the prepandemic period.

Adding the postpandemic data of 2022Q4 to 2023Q4 in the second and third equations increases the sample size by 25 percent, from 114 to 144 quarterly regional observations. In these recent quarters, immigration underwent two major changes. First, as reported by figure 6, it expanded phenomenally. Before the pandemic, the total (permanent and temporary) immigration rate had gained 0.7 percentage point, going from 0.7 percent of population in 2015 to 1.4 percent in 2019. After the pandemic, its gain was more than twice as large at 1.8 points, reaching up to 3.2 percent of population in 2023. Second, from 2019 to 2023 the rise in immigration was largely carried by a vast expansion of temporary immigration. In those four years, the increase in the number of temporary immigrants accounted for 82 percent of the increase in the total number of immigrants accepted in Canada.

The larger sample, the accelerated expansion of immigration, and the stronger contribution of temporary immigration increase the probability that the second and third equations of table 1 can better identify the effect of immigration of job vacancies, provide more powerful tests of hypotheses, and give a more reliable indication of the impact of temporary immigration than the first equation[9]. The 95 percent confidence intervals reported in table 1, which go from +5.1 percent for the second equation to +11.8 percent for the third, allow to strongly reject the hypothesis that a higher immigration rate led to a decline of the job vacancy rate under usual statistical decision standards. These estimates indeed mean that an increase of 1 percentage point in the immigration rate at any given unemployment rate was followed by an increase of between 5.1 percent and 11.8 percent in the number of job vacancies.

The evidence presented here cannot be interpreted as raising doubts on the fact that immigration helps to solve the problem of lack of personnel in individual cases where it is the most acute and urgent. What it does show is that it is presumptuous to believe that rising immigration necessarily alleviates an economy-wide shortage of labour. On the contrary, the statistical analysis above reveals that it may aggravate, not alleviate, the job vacancy rate in the overall economy, particularly if temporary immigration is the main source of the migratory expansion, as was the case in Canada in 2019-2023. More immigration then raises the demand for labour more than the supply and tightens labour markets instead of easing them. In the graphical terms of figures 2 and 3, it is moving the Beveridge curve upward in unemployment-job vacancy plane. I do not study here how rising immigration specifically affects the volume of labour reallocation between occupations, industries and regions and the efficiency of matching jobs and workers. Future research will have to investigate.

10 The fallacy of composition and its consequences

The broad conclusion is that in recent years rising immigration has not helped Canada to solve its economy-wide problem of labour shortage. The strong migratory expansion of

[9] The third equation is a parsimonious version of the second. It allows the current and lagged effects of immigration on job vacancies to be spread over four instead of six quarters. The probability value of this restriction is 89 percent.

2022 and 2023 had the opposite effect of aggravating labour scarcity in an economy that was already functioning at full potential and minimal unemployment. This conclusion runs contrary to the confidently held view of business organizations, which have been conducting an unceasing campaign in favour of a continual increase in permanent and temporary immigration.

Their purpose is understandable. It is a natural response to the pressure of members who have a hard time recruiting the personnel they need. By filling the vacancies, immigration is one of the means that allow these employers to produce more and to increase profitability.

However, in economics everything depends on everything. The direction and importance of a phenomenon that are confirmed at a microeconomic level in particular businesses or government organizations can be different, and sometimes even opposite, at the macroeconomic level once all spillovers into the rest of the economy are considered. Already in his 1955 introductory textbook, the American economist Paul Samuelson gave a severe warning against the risk of "fallacy of composition" in economics. He defined this error as the belief that "what is true of a part is, on that account alone, alleged to be also true on the whole."

In the case of immigration, the fallacy of composition consists of believing that the advantages accruing to employers that hire immigrants can simply be added up and said to extend to the whole economy. What the present study has uncovered is that this belief, which is apparently based on "common sense", is wrong. It is contradicted by the recent experience of Canadian regions. It is true that immigration eases up the dearth of personnel in those firms who hire newcomers (which is clearly a good thing). But it is also true, conversely, that it worsens the shortage of labour in industries that must cater to the additional demand for goods and services generated by the addition to total GDP. The induced increase in demand for labour in the aggregate economy can exceed the initial expansion of supply, so that on net labour shortages increase globally. Said otherwise, the proof extracted from Canadian regional data suggests that rising immigration has tended mostly to redistribute the shortage of labour across the economy and has not led to a significant global reduction of labour scarcity. It seems instead to have made it worse.[10]

The fallacy of composition has an extension in the popular saying that "immigration spurs economic growth." This belief is a product of the widespread confusion between total GDP and per capita GDP. By making more brain and brawn available to private and public employers, immigration does increase the overall size of the economy as measured by total GDP. But this is no proof that it supports the central societal objective of increasing the average standard of living of Canadians, which is measured by per capita GDP. A bigger Canada is not the same thing as a richer Canada. To witness, while Canada's total GDP (in constant dollars) increased by 4.9 percent from 2019 to 2023, its per capita GDP meanwhile declined by 1.4 percent. Its 2023 level was 5.3 percent below

[10] Note the fact, illustrated by figures 1 to 3, that labour market tightness and the job vacancy rate declined in Canada and Quebec from fall 2022 to fall 2023. This was due to the slowdown of aggregate activity induced by higher interest rates.

the 40-year long-term trend (McCormack and Wang 2024). The decline in GDP per capita means that total GDP has not been able to sustain the increase in population. This has translated into a fall in the average income of Canadians. A detailed analysis of Canadian data by researchers in the economics of immigration recently confirmed that Canada's immigration policy has contributed to this drop in average income (Doyle, Skuterud and Worswick 2023).

Furthermore, the unrelenting support of business organizations for more immigration may have fuelled an explosive feedback loop. As the data suggest, after Ottawa and Quebec went along and accepted an increasing number of immigrants, labour shortages did not decline, but likely intensified, against expectations. Business organizations interpreted this outcome as evidence that immigration was still too low. Hence, they kept demanding for more with renewed fervor in a new round of lobbying. This may partly explain that Ottawa and Quebec allowed the immigration rate to continue to increase explosively after the pandemic in 2022 and 2023.

The vision of a lobby, even if it is well-intentioned, is always limited by blinkers. The problem is not only that the vision of immigration promoted by business organizations (as an offset to labour scarcity) is fallacious, but also that it is reductionist. To take account solely of the hoped-for benefits accruing directly to employers that hire immigrants is particularly dangerous, because immigration is a global and transformative phenomenon. The purpose of immigration is not only to serve the profitability of businesses. It is of concern to the whole society for reasons that are economic, but also demographic, cultural, social, and humanitarian. Society is morally obligated to welcome and integrate all immigrants well, which requires much time and money. It must also make sure that the pace of immigration is not so fast that it provokes serious economic disequilibria in sectors that must absorb the induced increase in demand, such as construction, housing, health, education and social services. One must honestly recognize that immigration procures important benefits to a particular group, but also that it brings benefits and costs that are collective nature. The overall rate and the composition of immigration must therefore not be set to serve only the interests of this particular group, but established on the basis of all the costs and benefits they bring to society as a whole.

11 Final remarks

Based on Canadian regional data, the present study on the effect of immigration on labour scarcity has shown that a high immigration rate does not necessarily reduce economy-wide labour shortages but may on the contrary amplify them. This result complements that of researchers who have found that Canada's expansive immigration policy has contributed to the recent decline in per capita GDP (Doyle, Skuterud and Worswick 2023). It should also be put in perspective with research by American sociologist Robert Putnam (2007) that showed, based on data from 41 US communities, that "in the short run immigration and ethnic diversity tend to reduce social solidarity and social capital" and that "residents of all races tend to hunker down." Canada is presently at risk of confirming Putnam's worries. While five years ago surveys were finding that the percentage of Canadians who thought that there was "too much immigration to

Canada" was less than 30 percent, a recent Léger Recherche poll (2024) has found that 65 percent of respondents answering the question now think that there is too much immigration to the country.

The current state of knowledge on the effects of the Canadian immigration policy does not make it possible to determine precisely what the optimum rate and composition of permanent and temporary immigration are. But it indicates clearly that the optimum immigration rate is not the maximum rate. A moderate immigration rate instead of the immoderate expansion of the past few years is clearly the way to go. A moderate rate is needed to offset labour shortages in specific areas where they are the most acute. This kind of manageable immigration rate could be made entirely consistent with the hope expressed by Putnam himself that over time the initial fragmentation be overcome and new forms of social solidarity and encompassing identities be created.

At the time of writing (May 2024), Prime Minister Justin Trudeau had just admitted that temporary immigration had recently increased at an unsustainable rate in Canada. And Minister of Immigration Marc Miller said he wanted to reduce the cumulative population of temporary immigrants residing in Canada from 6.5 percent of the total population in early 2024 to 5 percent in 2027. Achieving this goal would require that the annual rate of temporary immigration be negative over the next three years (fewer entries than exits annually). The population of Canada would then grow by 0.8 percent per annum on average from 2024 to 2027, which would be four times slower than the 3.2 percent growth in 2023. This sudden turnaround of the government is a first step toward moderation. It remains to be seen if and how it will be implemented.

References

Abraham, Katharine. 1987. "Help wanted advertising. job vacancies and unemployment." *Brookings Papers on Economic Activity* (1):207-248.

Ahn, Hie Joo, and Leland Crane. 2020. "Dynamic Beveridge curve accounting." Finance and Economic Discussion Series 2020-27. Board of Governors of the Federal Reserve System, Washington, March.

Archambault, Richard, and Mario Fortin. 2001. "The Beveridge curve and unemployment fluctuations in Canada." *Canadian Journal of Economics* 34 (1):58-81.

Bank of Canada. 2024. *Monetary Policy Report*. Ottawa, January.

Barlevy, Gadi, Jason Faberman, Bart Hobijn and Ayşegül Şahin. 2024. "The shifting reasons for Beveridge curve shifts." *Journal of Economic Perspectives* 38 (2):83-106.

Barnichon, Régis, and Adam Shapiro. 2022. "What's the best measure of economic slack?" *Economic Letter*, Federal Reserve Bank of San Francisco, February.

Barton, Dominic. 2016. *The Path to Prosperity: Resetting Canada's Growth Trajectory*. Report of the Advisory Council on Economic Growth to the Minister of Finance of Canada, October.

Beveridge, William. 1960. *Full Employment in a Free Society*. Second edition. London: Allen & Unwin.

Blanchard, Olivier. 1989. "Les courbes de Beveridge et de Phillips comme outils d'analyse du chômage." *L'Actualité économique* 65 (3)396-422.

Blanchard, Olivier, and Peter Diamond. 1989. "The Beveridge curve." *Brookings Papers on Economic Activity* (1)1-67.

Blanchard, Olivier, Alex Domash and Lawrence Summers. 2022. "Bad news for the Fed from the Beveridge space." *Policy Brief*. Peterson Institute for International Economics, July.

Bok, Brandyn, Nicolas Petrosky-Nadeau, Robert Valetta and Mary Yilma. 2022. "Finding a soft landing along the Beveridge curve." *Economic Letter*. Federal Reserve Bank of San Francisco, August.

Desrosiers, Éric. 2023. *La crise de la main-d'œuvre: un Québec en panne de travailleurs*. Montreal: Somme Toute Le Devoir.

Dion, Richard, and David Dodge. 2023. "Labour force growth and labour market gap in Canada: 2011 to 2032." Working paper. Ottawa: Bennett Jones, May.

Doyle, Matthew, Mikal Skuterud and Christopher Worswick. 2023. "The economics of Canadian immigration levels." Working Paper No. 58. Canadian Labour Economics Forum, June.

Elsby, Michael, Ryan Michaels and David Ratner. 2015. "The Beveridge curve: a survey." *Journal of Economic Literature* 53 (3):571-630.

Lam, Alexander. 2022. "Canada's Beveridge curve and the outlook for the labour market." *Staff Analytical Note* No. 2022-18. Ottawa: Bank of Canada, November.

Léger Recherche. 2024. « Perception en matière d'immigration au Québec et au Canada ». *Report*. Montréal, February.

Lu, Yuqian, and Feng Hu. 2023. "Foreign workers in Canada: distribution of paid employment by industry." *Economic and Social Reports*. Catalogue No. 36-28-0001. Ottawa: Statistics Canada, December.

McCormack, Carter, and Weimin Wang. 2024. “Canada’s gross domestic product per capita: perspectives on the return to trend.” *Economic and Social Reports*. Catalogue No. 36-28-0001, April.

Michaillat, Pascal, and Emmanuel Saez. 2021. “Beveridgean unemployment gap.” *Journal of Public Economics Plus* 2, December.

Morissette, René. 2023. “Unemployment and job vacancies by education, 2016 to 2022.” *Economic and Social Reports*. Catalogue No. 36-28-0001. Ottawa: Statistics Canada, May.

Pissarides, Christopher. 1985. “Short-run equilibrium dynamics of unemployment, vacancies, and real wages ». *American Economic Review* 75 (4):676-90

Pissarides, Christopher. 2000. *Equilibrium Unemployment Theory*. Cambridge MA: MIT Press.

Putnam, Robert. 2007. “E Pluribus Unum: Diversity and community in the twenty-first century: The 2006 Johan Skytte Prize Lecture.” *Scandinavian Political Studies* 30 (2):137-174.

Samuelson, Paul. 1955. *Economics: An Introductory Analysis*. New York: McGraw-Hill.

Shimer, Robert. 2005. “The cyclical behaviour of equilibrium unemployment and vacancies.” *American Economic Review* 95 (1):25-49.

Shimer, Robert. 2012. “Reassessing the ins and outs of unemployment.” *Review of Economic Dynamics* 15 (2):127–148.