INSTITUT C.D. HOWE INSTITUTE

COMMENTARY
NO. 518

Comparing Outcomes: The Relative Job-Market Performance of Former International Students

With Canadian post-secondary institutions increasingly searching for talent and tuition fees from international students, the labour-market performance of former international students merits comparison with that of foreign-born-and-educated graduates as well as their Canadian-born-and-educated counterparts. Our findings have implications for education and immigration policymakers.

Mikal Skuterud and Zong Jia Chen

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Commentary No. 518
August 2018
Education, Skills and Labour Markets

$12.00
ISBN 978-1-987983-73-9
ISSN 0824-8001 (print);
ISSN 1703-0765 (online)

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The Study In Brief

Canada is increasingly looking to international students as a source of post-secondary tuition revenues and new immigrants. We compare the labour-market performance of former international students (FISs) who studied at Canadian institutions through the first decade of the 2000s to their Canadian born-and-educated (CBE), as well as to their foreign born-and-educated (FBE) counterparts.

We find FISs outperform FBE immigrants by a substantial margin, but underperform CBE graduates from similar post-secondary programs. We also find evidence of a deterioration in FIS outcomes relative to both comparison groups.

The contribution of our analysis is threefold. First, in comparing FIS and FBE immigrants, we obtain evidence that giving preference to Canadian-educated applicants in the Express Entry immigration system is optimal.

Second, in comparing FISs with CBE individuals graduating from similar academic programs, the results are consistent with FISs experiencing job search frictions, discrimination, and language difficulties, thereby requiring better immigrant settlement policies.

Finally, with three cohorts of FISs spanning the first decade of the 2000s, we find that there has been a deterioration in the labour-market performance of FISs as post-secondary institutions and governments have reached deeper into foreign student pools to meet their student and immigration demands. We argue that this deterioration is most consistent with a trade-off that has occurred, as the quality and supply of international students has not kept pace with the growth in demand. As Canada moves to increase its reliance on international students, monitoring the relative labour-market performance of FISs is critical.

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Following significant provincial funding cuts to universities and colleges throughout the 1990s, these institutions in all provinces were forced to increase their reliance on tuition revenues (Martin 2009).

This provided a solution while enrolments were increasing, but recent domestic demographic shifts have resulted in a decline in the typical post-secondary entry-aged population (18-20 years old).

As a result, institutions are increasingly looking to the tuition fees of foreign students to balance their budgets, which unlike domestic fees, are not capped by provincial governments.[1] As Canada competes against other jurisdictions to attract international talent, immigration policies can help boost student enrolment. Mechanisms such as a pathway to Canadian permanent residency or policy changes that give preference to professional candidates with Canadian educational credentials are highly complementary to post-secondary institutions' recruitment efforts.

In theory, the federal government's preference for international students is well justified. Canadian-educated immigrants are less likely to experience credential recognition issues. The skills they have acquired are more likely to be relevant to the Canadian workplace. Their time spent studying in Canada should help them to acculturate more easily to Canadian society. This includes acquiring superior English and French skills, as well as social networks that can help in job searches following graduation. Canadian education may also provide opportunities to gain Canadian work experience through work-integrated learning programs such as co-ops.

But, overall, the evidence is mixed on how former international students (FISs) perform in the labour market. Studies have consistently found little to no evidence that immigrants' foreign credentials are discounted relative to their Canadian credentials (Ferrer and Riddell 2008; Skuterud and Su 2012; Bonikowska, Hou and Picot 2015).[2] Sweetman and Warman (2014) find some evidence of higher earnings among FISs, who immigrated to Canada as principal applicants under the federal government's Skilled Worker Program (FSWP), when compared to principal applicants under the FSWP who only had foreign education, four years after landing, using weekly and hourly earnings. Finally, Hou and Lu (2017) link administrative immigration and tax data to show significantly higher average earnings among FISs than among foreign born-and-educated (FBE) immigrants, both in the short run and 10 years after

* This research was supported by the Government of Ontario through the Ontario Human Capital Research and Innovation Fund.

The authors thank Parisa Mahboubi, Andrew Heisz, Arthur Sweetman, members of the Human Capital Policy Council and anonymous reviewers for comments on an earlier draft. The authors retain responsibility for any errors and the views expressed.

1 International students contribute to national income in more ways than through tuition (Roslyn Kunin & Associates, Inc. 2017). However, this *Commentary* is primarily interested in the admissions policies of post-secondary institutions and their impact on the academic quality of their international students.

2 The Express Entry point system's initial decision to treat foreign and Canadian education the same, known as the Comprehensive Ranking System, was based on this evidence.

arrival. However, this earnings advantage is small in comparison to the gap relative to the Canadian born-and-educated (CBE) comparison group.

In this *Commentary*, we exploit data from the Canadian National Graduates Survey (NGS), a nationally representative survey of post-secondary graduates from a Canadian public institution, to compare the labour-market performance of three graduating cohorts (2000, 2005 and 2009/2010) of FISs who have transitioned to permanent residency with their CBE counterparts graduating at the same time with similar credentials in similar fields of study. In addition, using data from the Labour Force Survey (LFS), we extract a sample of FBE immigrants with a post-secondary education whose landing years in Canada correspond to the graduating years of the FIS in our NGS sample. We then compare labour-market outcomes among similarly educated FIS and FBE immigrants from comparable regions.

Consistent with the findings of Hou and Lu (2017), we find that FISs outperform FBE immigrants by a substantial margin, but lag behind their CBE counterparts. However, the FIS gaps we identify relative to the CBE comparison group are modest. In fact, we find essentially no shortfall in the average earnings of male FISs and CBE post-secondary graduates and only small gaps for women when we exclude education level and field of study. However, when we compare FIS and CBE graduates from similar academic programs, the gaps become larger and tend to be largest for women with college diplomas in fields outside of math and computer science and for Chinese men and South-Asian women. The gaps between FIS and CBE graduates are also higher at the bottom end of the earnings distribution. Moreover, we find some evidence, particularly among women, that the relative performance of FIS has tended to deteriorate over a decade relative to both FBE and CBE comparison groups.

The contribution of our analysis is threefold. First, in comparing FISs and FBE immigrants, we obtain evidence that giving preference to Canadian-educated applicants in the Express Entry immigration system is optimal.[3]

Second, in comparing FISs with CBE individuals graduating from similar academic programs, we obtain evidence on the challenges FISs experience, thereby informing immigrant settlement policies. Of particular importance are: (i) job search frictions, as FISs are likely to have weaker social networks; (ii) discrimination in recruitment by Canadian employers against FISs with foreign names (Oreopoulos 2011); and (iii) English/French language difficulties, which will present communication challenges in the job search process and in the workplace. However, note that in comparing FISs to CBE individuals from the same academic programs, credential recognition issues, emphasized in much of the current literature, cannot be a contributing factor.

Finally, with three cohorts of FISs spanning the first decade of the 2000s, we find that there has been a deterioration in the labour-market performance of FISs as post-secondary institutions and governments have reached deeper into foreign student pools to meet their student and immigration demands. As Canada moves to increase its reliance on international students, monitoring the relative labour-market performance of FISs is critical.[4] Since FBE immigrants from the same countries are likely to be similarly affected by weak social networks, discrimination and language difficulties, evidence that FIS labour-market

3 The Express Entry system gives priority to applicants deemed most likely to succeed economically.

4 There is evidence that Australia experienced a reduction in immigrant quality following a 2000 policy revision that favoured international students. This change spurred the growth of a vocation education sector that targeted foreign students with questionable quality standards (Birrell, Hawthorne, and Richardson 2006; Hawthorne 2010).

outcomes are declining relative to both comparison groups is arguably most consistent with a trade-off in the average labour-market quality of FISs, as their share of post-secondary graduates and immigrants has increased.[5]

International Shares of Graduates

According to Statistics Canada's Post-Secondary Information System (PSIS), the international student share of post-secondary student enrolments and graduates increased steadily from about 3 percent in 1999 to slightly more than 10 percent by 2014.[6] Figure 1 reveals a shift toward greater foreign student enrolment within both colleges and universities. Although universities relied more on foreign students than colleges did throughout this period, recent years have seen a larger shift within colleges. Among male college students, the increase has been particularly dramatic, doubling from 6 percent to 12 percent between 2010 and 2014. As post-secondary institutions reach deeper into the foreign student applicant pools, the question is whether there has been any trade-off in the average quality of graduating foreign students.

There exist three pathways to permanent immigration in Canada: economic, family and humanitarian. Figure 2 shows the share of new permanent residents who had held a student visa in any of these broad immigration categories. The FIS share of new permanent residents was stagnant at 6 percent to 7 percent between 2005 and 2010, but has been increasing steadily since to 11 percent by 2016. This increase appears to be entirely driven by economic-class immigration, as the FIS share of humanitarian immigration decreased over the period from 13 percent to below 5 percent, while the family-class category remained relatively stable between 6 percent and 9 percent. By 2016, 15 percent of economic-class immigrants were FISs, which was twice as large as the FIS share five years earlier. This increase is entirely consistent with shifts in immigrant selection policy favouring FISs.

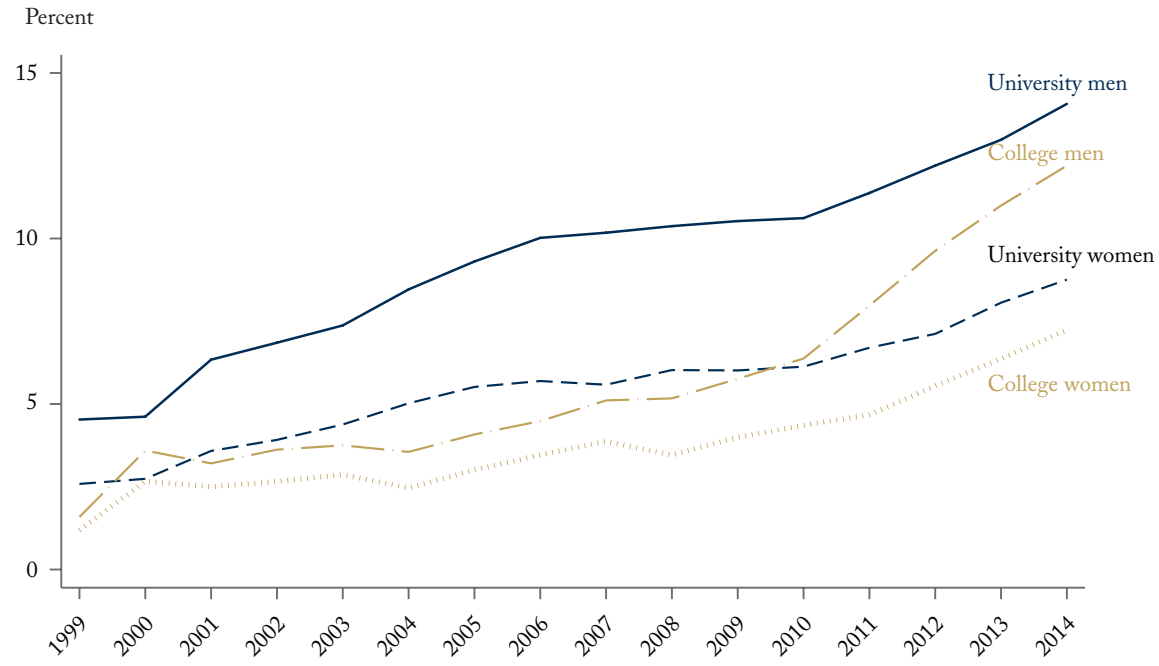
Within the economic-class stream, there now exist three main pathways: the Federal Skilled Worker Program (FSWP), which is the historical point system; the Canadian Experience Class (CEC) program, which targets immigrants with Canadian work experience; and Provincial Nominee Programs (PNP) within each province. However, the trend in the international student share of immigrants varies across these pathways. Figure 3 shows an important shift since 2005 away from the FSWP toward both the CEC and PNP. In recent years, each of these three programs accounted for roughly one-third of FIS immigration within the economic-class stream.

There is good reason to believe that the major immigration hurdle for FISs is satisfying Canadian work-experience requirements. The challenge reflects, at least in part, the hesitancy of employers to recruit workers with a precarious immigration status. In this respect, the Ontario and BC PNPs are particularly attractive to international students as both waive the job-offer requirement for those with Master's or Doctoral degrees (although BC requires the graduate degree be in a STEM field). According to our NGS data (described in the following section), roughly one-half of foreign students who graduated in 2010 and subsequently transitioned to permanent residency held graduate degrees. More generally, the PNP and CEC programs have become more attractive as the

5 By quality we refer to any attributes that no doubt affect their labour-market outcomes but are unobservable in the data, such as immigrants' poorer English/French language skills.

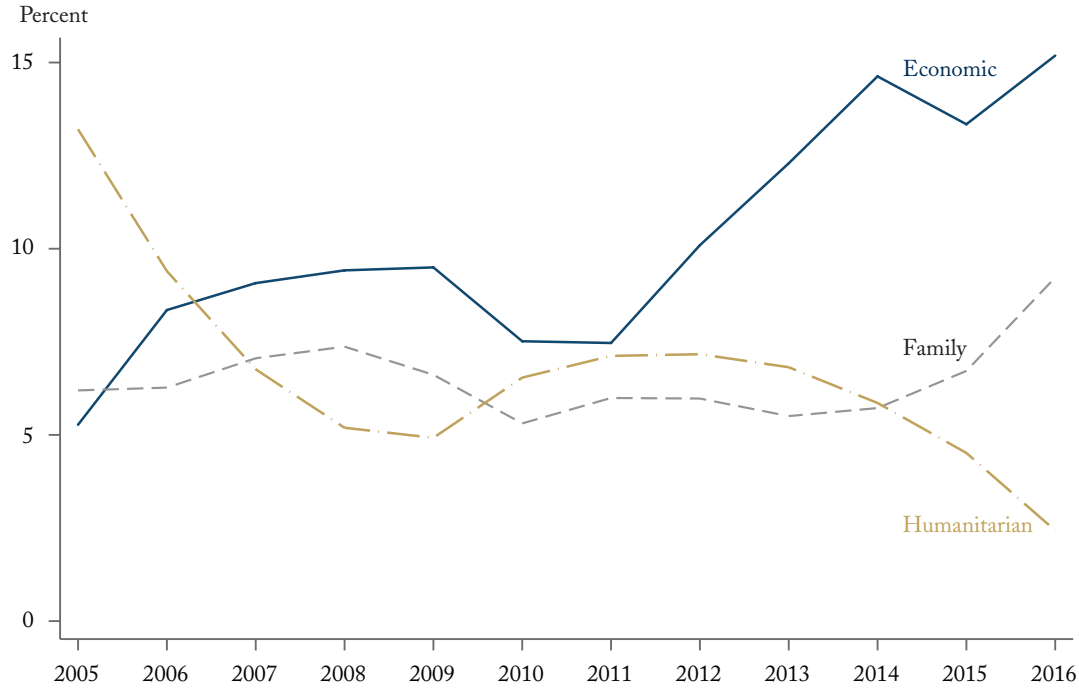
6 The PSIS data are based on post-secondary institution reporting provided to Statistics Canada. (See CANSIM tables 473-0031 and 473-0032)

Figure 1: Percentage Share of International Students among Post-secondary Graduates by Gender and Education Level, 1999-2014



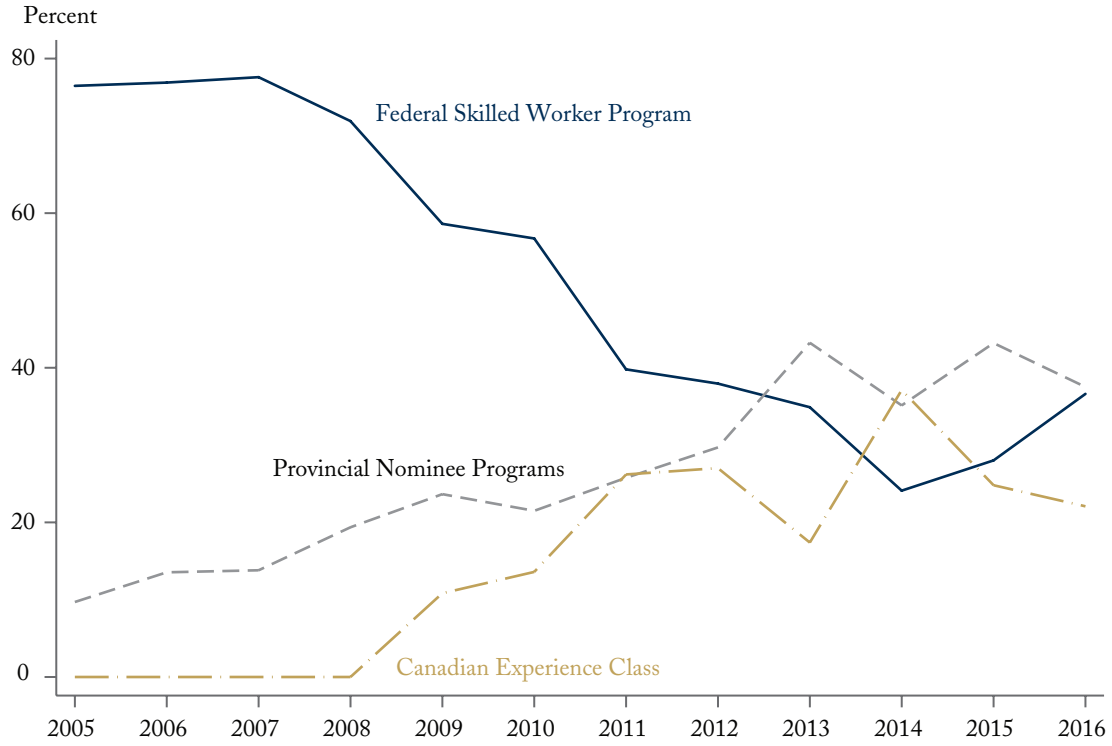
Source: Post-secondary Information System, Statistics Canada, CANSIM tables 477-0031 and 477-0032.

Figure 2: Percentage Share of FISs among New Permanent Residents by Broad Immigration Category, 2000-2016



Source: Immigration, Refugees and Citizenship Canada. Available on the Open Government Data Portal as Admissions of Permanent Residents who have ever held a Study Permit by Intended Province/Territory of Destination and Immigration Category, 2005-October 2016.

Figure 3: Distribution of FIS across Economic-class Immigration Programs, 2005-2016



Notes: The programs are the Federal Skilled Worker (FSW) Program, Provincial Nominee Programs (PNP) and the Canadian Experience Class (CEC) Program. Shares do not sum to one. A decreasing share (14% in 2005 to 4% in 2016) entered through other economic-class programs, including business-class programs such as the investor program.

Source: Immigration, Refugees and Citizenship Canada. Available on the Open Government Data Portal as "Admissions of Permanent Residents who have ever held a Study Permit by Intended Province/Territory of Destination and Immigration Category, 2005-October 2016."

selection criteria are simplified, thereby reducing application costs and processing times.

The increasing FIS share of total immigration may not only reflect the increase in foreign students graduating from Canadian post-secondary institutions, but could also reflect an increased probability that they transition to permanent residency. Certainly, as PNPs and the CEC program ease the transition to permanent residency, we would expect an increase in the FIS transition rates to permanent residency. In addition to the PNPs and CEC program, the federal government since 2003 has gradually increased the length of time that foreign students are permitted to remain in Canada following graduation, enabling them to acquire Canadian work experience, a vital step for many on the path to permanent residency.

As of April 2008, the Post-Graduation Work Program (PGWP) provides open work permits for up to three years to all international students graduating from a recognized Canadian post-secondary institution, with no restrictions on the type of employment obtained. While the impact of this extension on the labour-market earnings of

international students is theoretically ambiguous, the PGWP should unambiguously increase the likelihood of transitions to permanent residency.[7]

To obtain evidence on the permanent residency transition rates of international students, Lu and Hou (2015) examined administrative immigration data linking temporary visas and permanent landing records. Their analysis suggests that 27 percent of foreign students who received their first study permit in the early 1990s had transitioned to permanent residency within the following 10 years. In comparison, 20 percent of international students arriving in the late 1990s and 25 percent in the early 2000s became permanent residents.

Combining our data on FIS graduates who were permanent residents at the time of being sampled in the NGS with PSIS data on total international student graduates (reported in Figure 1), we estimate that 44 percent, 25 percent and 35 percent of the 2000, 2005 and 2010 post-secondary graduation cohorts had transitioned to permanent residency by the time they were surveyed. However, while the 2000 and 2005 cohorts sampled individuals two years following graduation, the 2010 cohort sampled them three years after graduation, which could account for all of the increase for the most recent cohort relative to the 2005 cohort. Therefore, both our data and that of Lu and Hou (2015) do not suggest that transition rates to permanent residency have been rising, which implies that all of the increase in FIS immigration reflects the large increase in the number of international students graduating from Canadian post-secondary institutions.

Assessing the FIS Relative Labour-Market Performance

We compare the earnings outcomes of FISs to both CBE graduates and FBE immigrants. Our analysis on FISs and CBE individuals is based on data from the four cycles of the NGS. The 2002 and 2005 cycles surveyed individuals who graduated in 2000; the 2007 cycle surveyed 2005 graduates; and the 2013 cycle surveyed 2009/2010 graduates. The FIS sample includes respondents who held a study permit while pursuing post-secondary education and reported being a landed immigrant when surveyed.[8] The CBE comparison group finished their highest level of schooling in Canada.[9]

The NGS does not sample graduates of foreign post-secondary institutions. To obtain a sample of FBE immigrants, we instead relied on the monthly Labour Focus Survey (LFS) between 2006 and

7 Prior to 2003, foreign students were able to remain in Canada for one year following graduation. The impact of extending these work permits on foreign student wage rates is ambiguous because on the one hand it should increase reservation wages – the lowest wage offer a student will accept. This is because individuals have more time to obtain job offers, so that the likelihood of obtaining an acceptable wage offer increases. However, on the other hand, it is also possible that the overall cost of having to return to one's home country increases with time spent away. For example, the psychological costs of returning home may increase as deeper roots have been planted in Canada. If foreign students are unsuccessful in finding a suitable job in the first year after graduation, they may opt to stay in Canada and continue searching under the new policy of extended work permits. This may lead them to accept lower wages in order to remain.

8 We omitted FISs without permanent residence, because we are primarily interested in the outcomes of FISs who transition to permanent residency, as opposed to international students who return home.

9 In addition to college and university graduates, the NGS samples individuals who have completed a trade or vocational degree. However, we exclude these individuals from our analysis. In addition, we restrict our sample to individuals who were under the age of 65 at the time of graduation.

Table 1. FIS Percentage Difference in Hourly Earnings between CBE and FBE Immigrants

	Unadjusted		Adjusted			
			Unconditional		Conditional	
	CBE	FBE	CBE	FBE	CBE	FBE
Men	12.6***	30.5***	-1.2	35.2***	-14.6***	29.5***
Women	1.2	31.4***	-6.7*	35.3***	-14.8***	29.4***

Note: *, **, *** indicate statistical significance at the 90%, 95% and 99% confidence levels, respectively. Adjusted results that account for differences in age (quadratic), months since labour-market entry, national-level unemployment rate and region of residence provide two sets of estimates for our analysis: (i) estimates that are "unconditional" on education level, field of study (in the FIS-CBE comparison) and region of origin (in the FIS-FBE comparison); and (ii) estimates that are "conditional" on these variables.

Source: Authors' calculations based on the 2002, 2005 and 2009/2010 cycles of Canadian National Graduates Survey (NGS) and the Labour Force Survey (LFS) between 2006 and 2013.

2013 and included only FBE individuals who entered the Canadian labour market at similar times as Canadian-educated immigrants.[10]

Differences in Hourly Earnings Outcomes

On average, hourly earnings of male and female FISs exceed that of FBE immigrants by roughly 30 percent (Table 1). This is a substantial advantage, which is also evident in FISs being more likely employed. However, the average hourly earnings of FISs and CBE women are almost identical, while male FISs have significantly higher hourly earnings than CBE men.

Differences in individual characteristics explain part of these results. For example, with regard to the large performance advantage of FISs over FBE immigrants, FISs are more likely to have graduate degrees than FBE immigrants. They are also typically younger and are more likely to come from Africa and East Asia, and less likely to come from Eastern Europe and South Asia.

In comparison to CBE graduates, FISs have an even larger education advantage. Specifically, 90 percent of male and 84 percent of female FISs have university degrees, compared to 60 percent of male and 72 percent of female CBE post-secondary graduates. FISs are an average of three years older. Finally, they are more likely to have studied mathematics and engineering and less likely to have diplomas and degrees in education and health. In particular, education differences can entirely explain the earnings difference for males.

When we exclude education level, field of study (in the FIS-CBE comparison) and region of origin (in the FIS-FBE comparison), adjusting for variations in other characteristics such as

10 To reduce sampling costs, the LFS surveys the same households for six consecutive months. To avoid the complications in variance estimation that this resampling creates, we restrict our FBE immigrant sample to the first month in which individuals are observed in the LFS (the "birth rotation").

age and time of labour market entry,[11] FISs still consistently outperform FBE immigrants and have outcomes that are roughly similar to CBE graduates.[12] In fact, among men, hourly FIS earnings are indistinguishable from CBE graduates, while female FISs lag CBE graduates by 7 percent. Of course, FISs have substantially higher post-secondary educational levels, on average, than FBE immigrants and CBE graduates. The question is to what extent their performance advantage over FBE immigrants and parity with CBE graduates (at least male FISs) reflects this educational advantage.

The "conditional" estimates in Table 1 indicate that both male and female FISs underperform Canadians graduating from similar programs in hourly earnings outcomes. Most notably, the hourly earnings of male and female FISs are, on average, 15 percent below those of CBE graduates. They are also less likely to be employed. This is an important finding, which is consistent with discrimination against racial minorities, but also with immigrants having weaker English/French language skills (Mahboubi 2017).

Factoring in educational background, or even region of origin, does little to change the differences relative to FBE immigrants. Our conditional estimates in Table 1 consistently point to substantial performance advantages of FISs over FBE immigrants. A potential explanation for these substantial advantages is that FISs may have more Canadian work experience. Indeed, Hou and Bonikowska (2006) find evidence of an earnings advantage among immigrants who held temporary work permits prior to formal landing.

Unfortunately, neither the NGS nor LFS identify previous work experience as an earnings factor. However, it seems that this cannot account for the differences, since we are comparing FISs and FBE immigrants with similar labour market entry, where entry is defined as month of school completion for FISs and months of landing for FBE immigrants. It is unclear whether FISs graduating from Canadian post-secondary institutions in the 2000s were more likely to work in Canada before graduating than FBE immigrants were to work on temporary work permits before landing.

We also investigated how earnings gaps vary across education levels, fields of study and FIS countries of origin. The FIS-CBE earnings gaps become larger and tend to be largest for women with college diplomas, in fields outside of math and computer science, and among Chinese men and South-Asian women. The advantage of Canadian over foreign education for immigrants is substantially larger for university-educated than for college-educated women, while there is little advantage difference across education levels for men.

Furthermore, occupation and employment type are also different across comparison groups, which can provide a better understanding of earnings differences. We looked at four types of occupation: non-routine cognitive, routine cognitive, non-routine manual and routine manual.[13] In examining these variables, we consider whether FISs are more or less likely to be employed in cognitive non-routine occupations, which include managers, professionals and various technical occupations in engineering and computing, as opposed to

11 Labour-market entry is defined as the month of school completion for the FIS sample and the month of landing for the FBE sample.

12 For Details of the model identification, see Chen and Skuterud (2017 and forthcoming).

13 Autor, Katz and Kearney (2006) argue that non-routine cognitive jobs experienced the greatest real wage growth through the 1990s because these jobs are complementary with computerization, whereas jobs with routine tasks tend to be substitutes.

routine jobs – and whether this has been changing over time.[14] Taking into account differences in characteristics and education, we found that FISs are more likely to be employed in non-routine cognitive jobs relative to FBE immigrants, but they are also less likely to have these jobs than CBE graduates. FISs also have lower or similar part-time job rates relative to FBE and CBE individuals.

Earnings differentials over time

Figures 4 and 5 present the FISs "unexplained" hourly earnings differences relative to their CBE and FBE counterparts for the seven observed program completion cohorts (1999, 2000, 2004, 2005, 2008, 2009 and 2010). Trends in both the "unconditional" and "conditional" gaps imply deteriorating FIS hourly earnings when compared to both the CBE and FBE groups, entering the labour market during 1999 and 2010. In other words, the positive earnings gap between Canadian-educated and foreign-educated immigrants has declined, while the negative gap between Canadian-educated immigrants and non-immigrants has increased over time.

Unfortunately, we are unable to determine to what extent the performance gaps of FISs relative to their Canadian-born counterparts reflect something about FISs themselves, such as their relative English-French language skills, as opposed to something about their relative labour-market experiences. For example, they are more likely to face labour-market discrimination or have weaker social networks to access in their job-search efforts. However, the recent deterioration in FIS outcomes in comparison to both Canadian born-and-educated graduates and foreign-educated immigrants suggests that it reflects something about FISs as opposed to changing labour-market conditions or immigration policies.

Indeed, there is no clear reason why Canadian born-and-educated graduates or foreign-educated immigrants would not have been similarly adversely affected by changing labour-market conditions. These results appear more consistent with a tradeoff in the average labour-market quality of foreign students as post-secondary institutions and governments reached deeper into the pools of international students through the 2000s to meet their need for more tuition revenue and new immigrants.

However, the wage gap trends are modest and for men, statistically insignificant in all cases.[15] Trends for female FISs, on the other hand, are larger. Specifically, the trend lines suggest that the FIS earnings gap relative to CBE graduates grew by about 1 percent to 1.5 percent per year through the 2000s, while the earnings advantage relative to FBE immigrants has been declining by roughly the same amount.[16]

Gaps in earnings quantiles

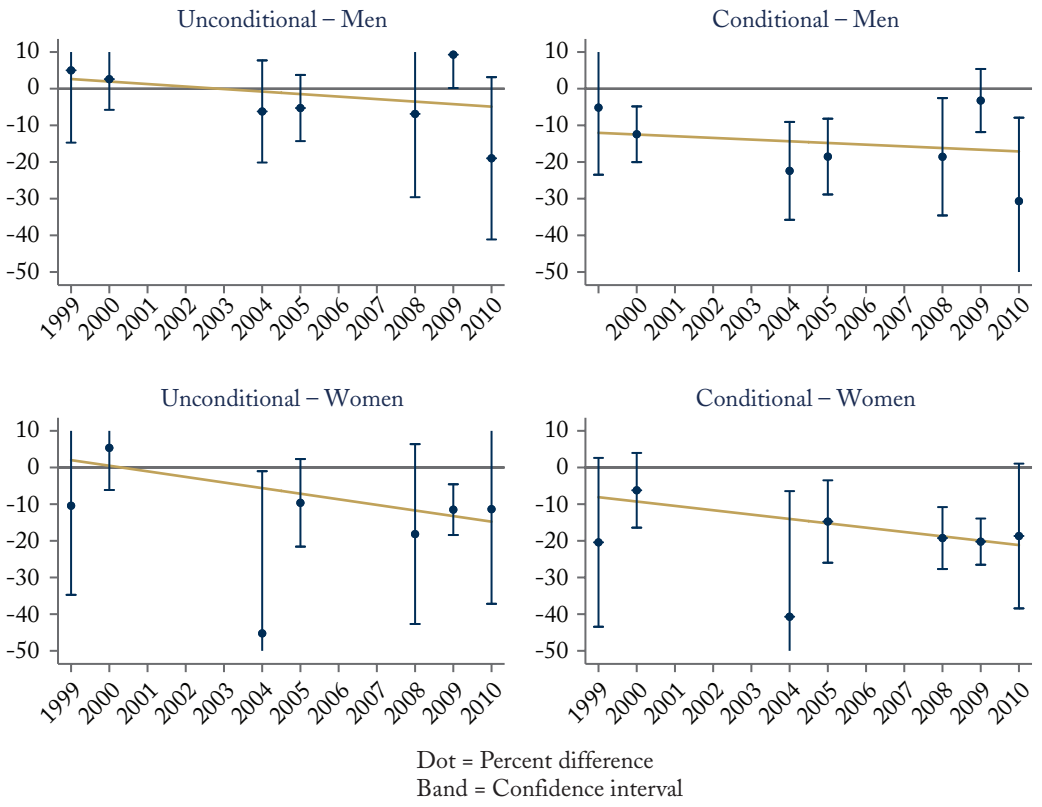
We complete our analysis by estimating quantile regressions. Figures 6 and 7 plot the results for the CBE and FBE comparisons, respectively. For men, the results point to FIS-CBE earnings gaps that

14 For the connection of occupation codes to occupation types, see Table A.1. in Cortes et al. (2014).

15 While the 2008 and 2009 FBE cohorts have particularly poor mean outcomes relative to both comparison groups, their sample sizes are small, so these poor outcomes may reflect statistical noise.

16 We explored the role of compositional shifts in the changing gaps. For women, more than half of the increasing CBE-FIS gap is not explained by the variables used in the analysis, such as education level and field of study. Moreover, none of the decreasing FIS-FBE advantage is explained by these variables. As a result, these changes over time are unexplained in our analysis.

Figure 4: Time Trends in FIS-CBE Hourly Earnings Differentials, Percent



Notes: Dots indicate the mean values of the unexplained earnings difference across program completion cohorts of FIS. Bands indicate the 95%-confidence intervals of the sample means. The red line indicates the estimated linear time trends.

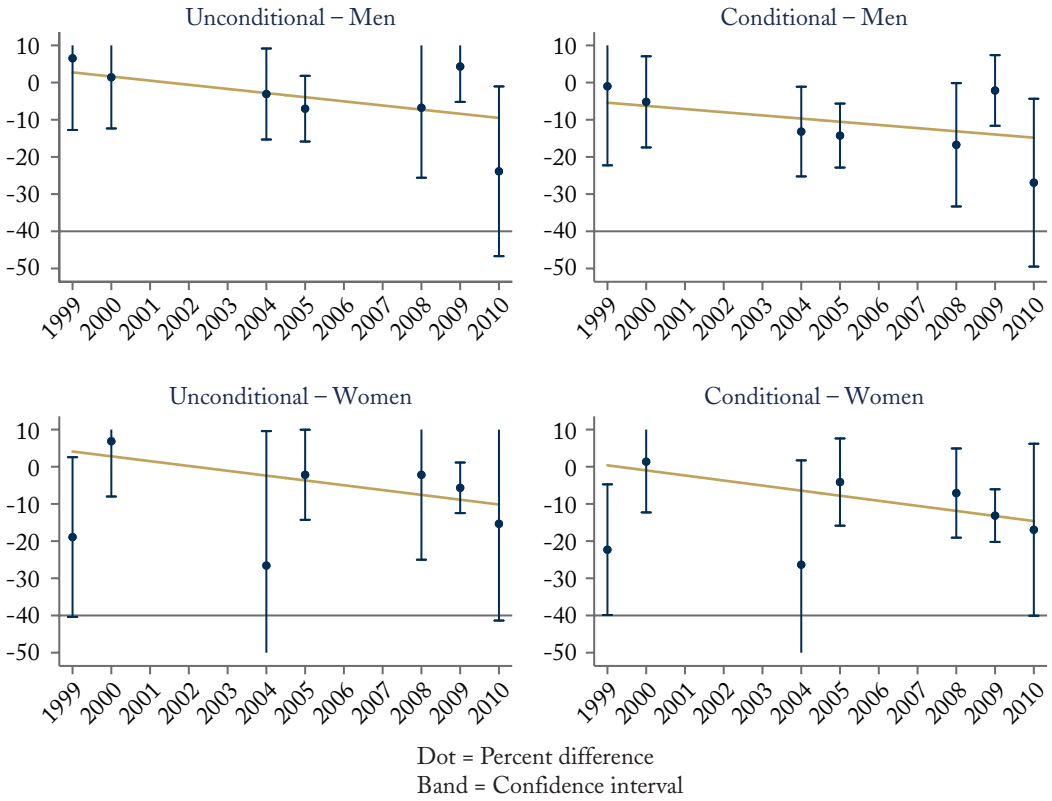
Taking into account for differences in age (quadratic), months since labour-market entry, national-level unemployment rate and region of residence, Figure 4 shows two sets of estimates: (i) estimates that are "unconditional" on education level and field of study ; and (ii) estimates that are "conditional" on these variables.

Source: Authors' calculations based on the 2002, 2005 and 2009/2010 cycles of the Canadian NGS.

decrease in magnitude as we move up the earning levels. Below the 10th percentile, the gaps that are "unconditional" on education level and field of study are roughly 5 percent and the "conditional" gaps are roughly 20 percent. In comparison, median earnings are roughly equivalent for FIS and CBE graduates when we do not factor in education (level and field) and are slightly larger than 10 percent when we do. This changes little as we move from the 50th to the 99th percentile, as the unconditional gap is essentially constant and the conditional gap is slightly smaller than 10 percent above the 90th percentile.

The results for women in Figure 6 similarly point to declining FIS-CBE gaps as we move up the earnings scale. The exception is the movement from the first to the 20th percentile where the gaps grow as one moves up the scale. In other words, female FISs face smaller FIS-CBE gaps at the first percentile than at the 20th. This U-shaped pattern is particularly evident in the conditional earnings results. There is also some (weaker) evidence of increasing gaps at the very top end of the earnings distribution, particularly in the conditional estimates.

Figure 5: Time Trends in FIS-FBE Hourly Earnings Differentials, Percent



Notes: Dots indicate the mean values of the unexplained earnings difference across program completion cohorts of FIS. Bands indicate the 95%-confidence intervals of the sample means. The red line indicates the estimated linear time trends.

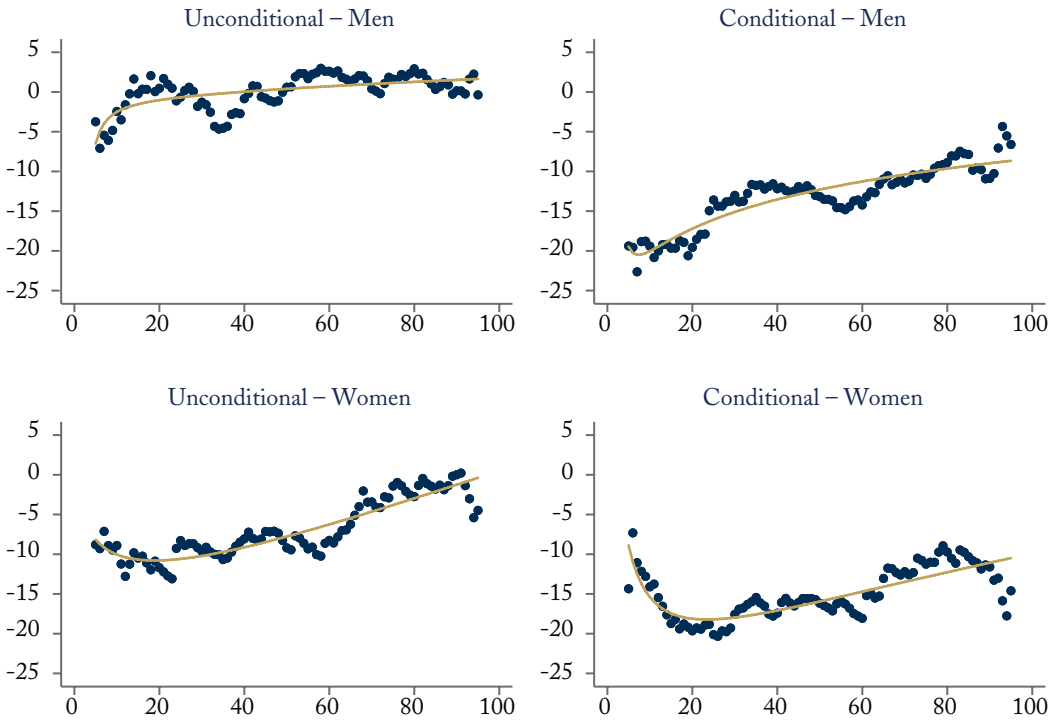
Taking into account for differences in age (quadratic), months since labour-market entry, national-level unemployment rate and region of residence, Figure 5 shows two sets of estimates: (i) estimates that are "unconditional" on education level and region of origin; and (ii) estimates that are "conditional" on these variables.

Source: Authors' calculations based on the 2002, 2005 and 2009/2010 cycles of the Canadian NGS.

In Figure 7, we plot the quantile regression results based on the FBE comparison group. In all cases, the inverted U-shaped patterns imply smaller FIS-FBE earnings advantages in the tails of the distribution than in the middle. In other words, the difference in FIS and FBE earnings at the 10th and 90th percentiles of their respective distributions are small relative to the differences in their median earnings.

Finally, we have tried estimating the quantile regressions by allowing the FIS differential to vary across program completion cohorts. The results suggest that, if anything, the deterioration in the labour-market outcomes of female FISs has been driven by changes at the upper end of the earnings distribution, not the lower end. That is, the relatively small FIS-CBE earnings gaps at the upper end of the earnings distribution in Figure 6 have tended

Figure 6: FIS-CBE Differentials in Hourly Earnings Quantiles, Percent



Notes: Dots are the estimated differences in FIS hourly earnings at the fifth through 99th percentiles. Taking into account for differences in age (quadratic), months since labour-market entry, national-level unemployment rate and region of residence, Figure 6 shows two sets of estimates: (i) estimates that are "unconditional" on education level and field of study ; and (ii) estimates that are "conditional" on these variables.

Source: Authors' calculations based on the 2002, 2005 and 2009/2010 cycles of the Canadian NGS.

to grow over time, while the relatively small FIS-FBE earnings advantages at the upper end of the distribution in Figure 7 have tended to become even smaller.[17]

Conclusions

Combining data from Canada's National Graduate Survey and Labour Force Survey, we compare the labour-market performance of FISs to both CBE graduates and FBE immigrants entering the Canadian labour market at the same time. The results of our analysis indicate that FISs clearly outperform their foreign-educated counterparts by substantial margins. The implied advantage of Canadian over foreign post-secondary education is evident for men and women and across education levels, although it is larger at higher education levels and in the middle of the earnings distribution. These results suggest that the federal government's decision to give immigration preference to

17 These results are available from the authors upon request.

Figure 7: FIS-FBE Differentials in Hourly Earnings Quantiles, Percent

Notes: Dots are the estimated differences in FIS hourly earnings at the fifth through 99th percentiles. Taking into account for differences in age (quadratic), months since labour-market entry, national-level unemployment rate and region of residence, Figure 7 shows two sets of estimates: (i) estimates that are "unconditional" on education level and region of origin; and (ii) estimates that are "conditional" on these variables.

Source: Authors' calculations based on the 2002, 2005 and 2009/2010 cycles of the Canadian NGS and LFS between 2006 and 2013.

Canadian-educated applicants in its Express Entry system is justified, particularly for applicants with university degrees.

However, we also find that the labour-market outcomes of FISs lag behind their CBE counterparts graduating from similar academic programs. The performance gaps we identify tend to be larger for college-educated women, in fields outside of math and computer science, and among Chinese men and South-Asian women. The gaps are also larger at the lower end of the hourly earnings distribution than at the top.

The critical question for policymakers is to what extent these gaps reflect pre-market differences in labour-market productivity, such as English/French language disparities, as opposed to market challenges due to weaker job-search networks or employer discrimination. Although the driving factors have very different implications for policy, identifying their relative importance is extremely difficult. The fact that FIS-CBE gaps are largest at the lower end of the hourly-earnings distribution suggests that something more than discrimination is playing a role since we would expect immigrants with the weakest language skills to face the largest gaps. Therefore, language training through immigration settlement services for FISs with the weakest language skills may improve their labour-market outcomes.

Finally, we find some evidence, particularly among women, that the relative labour-market performance of FISs has tended to deteriorate over time. The fact that this deterioration is evident in comparison to both CBE graduates and FBE immigrants suggests to us that it reflects something about FISs as opposed to changing labour-market conditions since there is no clear reason why CBE graduates and FBE immigrants would not have been similarly adversely affected by changing labour-market conditions. The most obvious explanation for this deterioration, in our view, is a trade-off in the average labour-market "quality" of foreign students as post-secondary institutions and governments have reached deeper into pools of prospective international students through the 2000s to meet their need for more tuition revenue and new immigrants. Although our results do not provide a clear explanation of the greater deterioration among women, one possible explanation could be that women are more heavily concentrated in programs where language skills are more important.

REFERENCES

Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2006. The Polarization of the U.S. Labor Market. *American Economic Review*, 96: 189-194. May.

Bonikowska, Aneta, Feng Hou, and Garnett Picot. 2015. "Which Human Capital Characteristics Best Predict the Earnings of Economic Immigrants?" Analytical Studies Branch Research Paper Series. Statistics Canada. No. 368.

Chen, Zong Jia, and Mikal Skuterud. 2017. "The Relative Labour Market Performance of Former International Students: Evidence from the Canadian National Graduates Survey." IZA Institute of Labor Economics. Available at: https://www.iza.org/publications/dp/10699/the-relative-labour-market-performance-of-former-international-students-evidence-from-the-canadian-national-graduates-survey.

Chen, Zong Jia, and Mikal Skuterud. Forthcoming. "The Relative Labour Market Performance of Former International Students: Evidence from the Canadian National Graduates Survey." *Canadian Public Policy*.

Cortes, Guido Matias, et al. 2014. "The Micro and Macro of Disappearing Routine Jobs: A Flows Approach." Unpublished manuscript.

Ferrer, Ana, and Craig Riddell. 2008. "Education, credentials, and immigrants." *Canadian Journal of Economics*. 41(1): 186-216.

Hou, Feng, and Aneta Bonikowska. 2016. "Selections Before the Selection: Earnings Advantages of Immigrants Who Were Former Skilled Temporary Workers in Canada." *International Migration Review*. Fall: 1-29.

Hou, Feng, and Yuqian Lu. 2017. "International Students, Immigration and Earnings Growth: The Effect of a Pre-Immigration Host-Country University Education." *IZA Journal of Migration*. Forthcoming.

Lu, Yuqian, and Feng Hou. 2015. "International Students Who Become Permanent Residents in Canada." *Insights on Canadian Society*. Statistics Canada. Catalogue no. 75-006-X.

Mahboubi, Parisa. 2017. *The Power of Words: Improving Immigrants' Literacy Skills*. Commentary 486. Toronto: C.D. Howe Institute. August.

Martin, Roger. 2009. "Who Killed Canada's Education Advantage." *The Walrus*. November 12.

Oreopoulos, Philip. 2011. "Why Do Skilled Immigrants Struggle in the Labor Market? A Field Experiment with Thirteen Thousand Resumes." *American Economic Journal: Economic Policy*. 3: 148-171.

Roslyn Kunin & Associates, Inc. 2017. "Economic Impact of International Education in Canada – An Update."Global Affairs Canada: http://www.international.gc.ca/education/assets/pdfs/Economic_Impact_International_Education_in_Canada_2017.pdf.

Skuterud, Mikal, and Mingcui Su. 2012. "The Influence of Measurement Error and Unobserved Heterogeneity in Estimating Immigrant Returns to Foreign and Host-Country Sources of Human Capital." *Empirical Economics*. 43: 1109-1141.

Sweetman, Arthur, and Casey Warman. 2014. "Former Temporary Foreign Workers and International Students as Sources of Permanent Immigration." *Canadian Public Policy* 40(4): 391-407.

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