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IZA DP No. 16515

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ABSTRACT

Are Immigrants Particularly Entrepreneurial? Policy Lessons from a Selective Immigration System*

Firm ownership is a dening feature of immigrant adaptation: 41% of immigrants own a firm at some point in their first 10 years post-arrival. We use Canadian data linking immigrant arrival records with individual and firm tax data to examine the process of entering firm ownership for immigrants. Higher immigrant firm ownership rates are mainly due to nonincorporated firm ownership, which looks like a last resort. Human capital plays no role in the opening of preferable, incorporated firms. Immigrants are not more entrepreneurial in terms of opening incorporated firms with employees, and standard policy levers appear to have limited effects.

JEL Classification: J61

Keywords: immigration, entrepreneurs, human capital

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1 Introduction

Immigrants are often viewed as particularly entrepreneurial in the sense of being more likely than the native born to open firms that employ others. Azoulay et al. (2022), for example, working from US data, conclude that, 'immigrants appear to 'create jobs' (expand labor demand) more than they 'take jobs' (expand labor supply) in the US economy.'(p.72) and call them 'highly entrepreneurial.'(p.84) This perception may come, in part, from the impression that firm ownership is an important element of the immigrant experience. Our Canadian administrative data allows us to provide concrete evidence on that impression, revealing that 26% of immigrants own a firm of some kind - incorporated or unincorporated, with or without employees - in their 10th year after arrival, and 41% have owned at least one firm at some time since arrival. Thus, firm ownership is a defining feature of the adaptation of immigrants to their new economy. In comparison, in the same data, 24% of our mainly native born comparison group own a firm of some kind in a given year. The perception that immigrants may be particularly entrepreneurial may arise also from evidence that the very process of migrating tends to select people who have lower risk aversion (Jaeger et al. (2010),Gibson and McKenzie (2011)), though that conclusion becomes more nuanced when considered at the family level (Dustmann et al. (2023)). In addition, the fact that immigration in receiving countries such as Canada and the US are disproportionately highly educated and a perception that highly educated people are more likely to open firms points to a further reason to expect that immigrants are entrepreneurial.(Kerr and Kerr (2020))

Importantly, those perceptions appear to drive policy decisions, as most major immigrant receiving countries have policies targeted at bringing in immigrant entrepreneurs (Fairlie and Lofstrom (2013)). For example, Canada's immigrant assessment system has included Investor and Entrepreneur classes since 1978 and the US has the E2 Visa for immigrants setting up and investing a significant amount of money in a new business.

In this paper, we re-examine the question of whether immigrants are, on average, more entrepreneurial than the native born. In policy terms, we are interested in whether increasing the level of immigration in general and (following on the last claim that more educated immigrants are particularly expected to open more firms with employees) increasing the number of skilled immigrants, in particular, would disproportionately increase the number of firms with employees and the employment rate. In pursuit of answering these questions, our Canadian context brings two key advantages. The first is the rich data environment we work in, linking together the administrative records at time of arrival for all immigrants obtaining permanent residency between 2000 and 2013, the personal tax records for all those immigrants and for a comparison group consisting mainly of the native born, and firm tax

records for all firms in Canada over the same years. From the arrival records, we obtain education, age, marital status, gender, and language skills at time of arrival as well as entry class. But the main advantage of this data is in measuring firm ownership. The firm tax records - which pertain to incorporated firms - include a schedule for privately held firms that lists all owners with at least a 10% share in the equity of the firm. From the personal tax records we get a record of whether individuals own a non-incorporated firm. Thus, firm ownership is clearly assigned for the whole population of immigrants who enter Canada in our data period. This makes the data superior to survey data such as the Survey of Business Ownership in the US, which can have incomplete response rates and self-reported ownership status. It is also superior to US administrative data in which ownership has to be imputed.(Kerr and Kerr (2016))

The second advantage of our Canadian context is the immigrant selection environment. During our period, immigrant admission centred on a point system in which applicants submitted information on skills such as education, experience, and language and were assessed for entry based on points assigned to each. In addition, there were dedicated admission classes for entrepreneurs. We use the information the government collects for the point system to investigate whether governments could increase the entrepreneurship rate of the immigrant inflow by shifting toward immigrants with more human capital, as some of the discussions of why immigrants are predicted to be more entrepreneurial suggest. We also examine whether immigrants admitted specifically because they are expected to open firms are, in fact, more entrepreneurial. Together these allow us to assess whether there are some clear levers available to increase the entrepreneurship rate, using information from one of the most selective immigration systems in the world.

We use our data to examine the time until an immigrant first opens a firm. Levine and Rubinstein (2017) argue that it is important to delineate between incorporated and nonincorporated firms because the former are more likely to be based on an entrepreneurial idea while the latter may be a refuge of last resort for people who can't find regular employment. We carry that distinction throughout our analyses and provide evidence that the state of owning a non-incorporated firm (which we denote as PNO - for Primarily Nonincorporated Owners) looks more like a (failed) labour market state than an entrepreneurial initiative. Most importantly, we show that rates of movement from owning a non-incorporated firm to owning an incorporated firm with employees are low. We define becoming an entrepreneur as moving into the ownership of an incorporated firm with employees (which we denote as the INC+ state). Thus, starting a nonincorporated firm is not, in general, part of a path toward entrepreneurship.

Our analysis proceeds in two steps. In the first, we show patterns of movement into firm ownership of the different types with time in Canada and compare them with rates of firm ownership among the native born. We also show transition rates among states defined by the different types of firm ownership along with employment and nonemployment. Even these simple plots are informative. As we mentioned earlier, immigrants have high firm ownership rates, but we show that PNO firms make up the majority of immigrant firm ownership and almost completely account for the immigrant advantage in firm ownership, especially right after arrival. Immigrant ownership rates of INC+ firms are well below those of the native born just after arrival, rising to match them only after 9 years in the country. While immigrant rates of ownership of these entrepreneurial firms are slightly higher by 13 years after arrival, the overall conclusion from these data is that immigration does not provide a mechanism for substantially altering the general level of entrepreneurship in the receiving economy, even in the context of an immigration system that is highly selective. We also find that the majority of immigrants entering under the Entrepreneur assessment class never open a firm, that many of the firms they did open did not last, and that by a decade after arrival, only 8% of immigrants who ever owned an INC+ firm had entered through the Entrepreneur class. This both highlights the difficulty in trying to directly assess entrepreneurial capability and focuses attention on the question of whether selection on more general human capital skills is associated with higher entrepreneurial rates.

In our second step, we estimate a competing risks model that characterizes the time until a newly arrived immigrant opens one of three types of firms (INC+, incorporated without employees - denoted INC0, and PNO). We examine the effects of two key sets of determinants on these processes. The first are the skill related factors that the government observed at time of immigrant entry. This includes the immigrant class, language proficiency and, for entrants in the skilled class, the set of assessed skills: primarily education, language, and age. The second set consists of earnings and employment transitions after arrival. The first set of covariates allows us to ask whether any information gathered by the government at time of application can predict entrepreneurial success. The second set of covariates is useful in understanding the path taken toward entrepreneurship.

Based on the estimates from the competing risks model, we show that human capital has only a weak relationship to opening an INC+ firm and a negative relationship to opening a PNO firm. That is, Canada's skills related selection system is not selecting for entrepreneurial success (with a possible caveat related to Knowledge-based firms, discussed below). The estimated effects of earnings and employment transitions after arrival reveal that the more successful a person was in terms of earnings in the previous two years, the less likely they are to open a PNO firm. This fits with owning a PNO firm being more like an employment

state of last resort than an entrepreneurial venture - a conclusion that is supported by relative movements across employment, unemployment and firm ownership states with time in the economy.[1] Immigrants who own a PNO firm are 3 times more likely to move to unemployment in the following year than they are to open an INC+ firm, which is the opposite pattern to that for an immigrant who currently owns an incorporated firm with no employees. To the extent that higher earnings are a reflection of greater human capital, these results also fit with the conclusion that traditional human capital is, if anything, negatively related to becoming self employed. Thus, selecting for human capital may not be predictive of entrepreneurial success but it is related to finding applicants who are less likely to fall into the weak labour market state of PNO. The result that PNO (the dominant firm ownership mode for immigrants) is effectively a weak labour market state is important for policy decisions given recent calls to consider counting Canadian experience in self-employment prior to PR application as evidence of entrepreneurial ability.((Hiebert, 2020) citing conversations with the Economic Council of Canada)

Our finding that immigrants are not substantially more entrepreneurial than the native born stands in contrast to the opposite claims made in several papers in the literature on immigrant entrepreneurs.[2] Most notably, Azoulay et al. (2022) use US administrative, survey, and scraped Fortune 500 data to argue that immigrants open more firms of all sizes, per capita, and that, by implication, the distribution of entrepreneurial ability is rightward shifted relative to that for the native born. They argue that this points to immigration bringing employment and wage benefits to the US economy. Similarly, earlier papers point to greater firm ownership rates for immigrants as evidence of greater entrepreneurial contributions.(e.g., Schuetze and Antecol (2005) and Lofstrom (2002))

In part, our different conclusion stems from our differentiation between incorporated and nonincorporated firms since most earlier papers either don't make that distinction or actually focus on nonincorporated firm ownership for data reasons. Our data also show that immigrants own firms at a higher rate, but they don't open INC+ firms - the types of firms governments are hoping they will open - at much higher rates. Differences in conclusions

[1]These results fit with those in Georgarakos and Tatsiramos (2009) and Blume et al. (2009) which use panel data, from the US and Denmark, respectively, to examine immigrant entrepreneurship. Both find patterns suggestive of owning a firm being a stepping stone in a process of full integration into the host economy but both focus mainly on firm death and growth rather than firm creation. Also, neither paper distinguishes between incorporated and nonincorporated firm ownership, a distinction that we find is important and that could explain patterns in their data such as Georgarakos and Tatsiramos (2009) 's finding that immigrant firm owners tend to be both more educated and more likely to be unemployed just before starting a firm. Hammarstedt and Miao (2018) investigate immigrant entrepreneurship using rich employer-employee matched data from Sweden but their focus is on who immigrant entrepreneurs employ.

[2]Fairlie and Lofstrom (2013)provide a comprehensive review of these results and others related to immigrant entrepreneurship.

may also come from our ability to directly observe ownership in a complete population of immigrants. We see this as the main source of why our conclusions differ from those in Azoulay et al. (2022), for example. We can't completely rule out the possibility that our different conclusions relative to some US papers comes from the US being a particularly attractive destination for more entrepreneurial immigrants (Kerr and Kerr (2020)) relative to Canada. But we view what we see as the most reliable results in Azoulay et al. (2022) as not being very far from our conclusion that immigrants are not substantially more entrepreneurial.

One important caveat to our conclusion relates to STEM workers and science and tech firms. There is a set of papers that focus on whether immigrants are more innovative in a sense captured by measures of patent filing, scientific citations and opening tech firms.(e.g., Hunt and Gauthier-Loiselle (2010), Brown et al. (2019), Peri et al. (2015), Blit et al. (2020) Saxenian (2002)) and This could be an alternative definition of being "entrepreneurial" (though one doesn't need to open a firm to make these types of contributions). That literature tends to focus on STEM workers and related industries and finds that immigrants make positive innovative contributions in those areas.In the Canadian context, for example, Picot and Ostrovsky (2017) find that immigrants entering in the Skilled class are approximately twice as likely as native born individuals to open an incorporated firm in a Knowledge-based industry, something they attribute to Skilled class immigrants being much more likely to have a STEM university degree. Our results have nothing direct to say about innovative contributions of that kind. Our conclusions are simply that immigrants, in general, do not appear to be particularly entrepreneurial in the sense of opening firms with workers and that attempts to select entrepreneurial immigrants either directly or through a focus on human capital have not been successful in the Canadian context at least.

Our paper proceeds in six sections including the introduction. In the second section, we describe the Canadian immigrant selection system in our time period. In section three, we describe the data and present basic patterns. In section four, we set out our competing risk specification, with the results presented in section five. Section 6 contains conclusions.

2 Canadian Immigration Policy

Whether immigrants become entrepreneurs in a host economy is partly dependent on who is selected for entry into the economy. The Canadian immigrant selection system in the years of entry for the immigrants we study (2001 to 2013) consisted of three broad classes. The least selected of these were the Refugee Class and the Family Class, both of which permitted entry on humanitarian grounds (i.e., without direct relation to the skills of the entrants). The third

main class was the Economic Class, who were selected based on anticipated contributions to the economy. Over our sample period, 54% of immigrants gaining Permanent Resident (PR) status were in the Economic Class, with 27% entering in the Family Class and 12% entering as Refugees. The Economic Class was further subdivided into the Business Class (making up 8% of the Economic Class in 2013), entrants nominated by the provinces (the Provincial Nominees Program, making up 12% of the Economic Class) and the Federal Skilled Worker Class (making up 79%).

The Business Class is of special interest for us because it constituted an attempt to select directly for entrepreneurs and investment. It was composed of three sub-classes, with the Entrepreneur Class having the most direct focus on entrepreneurial ability. The requirements for an entrant in this class were specified as:
'An entrepreneur must establish or buy a business in Canada . . . The entrepreneur is expected to participate actively in managing the business. The business must contribute to the Canadian economy and create one or more jobs in Canada in addition to the jobs created for the entrepreneur and his family. The entrepreneur is admitted on the condition that these requirements are met within two years of landing, and is expected to meet regularly with an immigration officer to monitor compliance with the terms and conditions.' (Citizenship and Immigration Canada web page from 2001 as quoted in Ley (2003))

In comparison, entrants in the Investor Class had to have a net worth of at least $800,000 and had to provide $400,000 which was given to a provincial government to invest. The third class was the Self-Employed Class, which was targeted at groups such as artists and professional athletes and with the stipulated requirement being: 'Self-employed applicants must be able to establish or buy a business in Canada which will provide employment for themselves and will make an economic or cultural contribution to Canada.' (Citizenship and Immigration Canada web page from 2001 as quoted in Ley (2003))

The Federal Skilled Worker Class (FSWC) was assessed for entry using the point system. Under this system, applicants are awarded points based on education, experience in their occupation in the source country, Canadian working experience, language abilities, their intended occupation in Canada, and age. Over time, the specific weights attached to each have varied. Provincial Nominees are immigrants who are nominated by provinces based on a match between their intended occupation and perceived labour shortages in a province. For the most part, they are also officially assessed under the point system but the points awarded for being a Provincial Nominee have often been high enough to virtually guarantee admission on their own.

The Economic Class groups are further sub-divided into Principal Applicants (PAs) and

accompanying family. In the FSWC in 2008 (roughly the middle of our sample period), approximately 40% were PA's and the remainder were accompanying family. PA's made up 26% of the entrants in the Entrepreneur Class in 2008, suggesting they were more likely to come to Canada with family members. (CIC, 2014) In our empirical work, we differentiate between PA's and non-PA's in each class.

In 2008, in a Budget Bill, the Conservative government of the day began to shift immigration policy in a new direction. In part, this involved an increased emphasis on trying to fill worker gaps denoted by businesses, in part it involved starting to hand more authority to the provinces, and in part it involved setting up a formal mechanism for temporary foreign workers to make the transition to PR status. All of these elements have grown increasingly important in recent years. In 2015, the government began the roll-out of a new Express Entry system that essentially eliminated skilled worker backlogs and codified the importance of having experience in the Canadian workforce. But the general structure of three main classes (Family, Refugee, and Skilled Worker) at the federal level remains and the latter class still focuses on a combination of Canadian experience and foreign acquired skills.

Beginning in 2014, the federal government closed the Entrepreneur and Investor Classes and replaced them with the Start-up Visa program. The new program was intended to bring in entrepreneurs who already have a business and will move it to Canada or will start a new venture in Canada. To be successful, an applicant must have secured the endorsement of an angel investor group, a venture capital company or a business incubator and show that they have sufficient funds to start the enterprise in Canada.[3] Because this involves showing that a company will actually be started (or moved), it seems likely that the rates of opening a business should be higher than what we document for the Federal Entrepreneur Class. But in 2019, only about 500 people entered through the Start-up Visa out of a total inflow of approximately 341,000.[4] Thus, our key point that the main focus for understanding whether immigrants are particularly entrepreneurial should be on the non-business class entrants remains.

[3]More details on the eligibility requirements for a Start-up Visa can be found at `http://www.cic.gc.ca/english/helpcentre/answer.asp?qnum=645&top=6`

[4]The Start-up Visa entrants are for Canada excluding Quebec. Quebec maintained the old system with Entrepreneur, Investor, and Self-employment Classes. Source: `https://www.cic.gc.ca/opendata-donneesouvertes/data/EN_ODP-PR-ProvImmCat.xlsx`

3 Data and Core Patterns

At the heart of our investigation is a rich Canadian dataset matching workers and firms. This data is a version of the Canadian Employer-Employee Dynamics Database (CEEDD), which links together worker and firm tax records. In our special version, we further link in administrative data from the immigrant admission process. Our version of the CEEDD contains the universe of records for the years 1982 to 2013, inclusive, for the immigration data and for the period, 2001 to 2013, inclusive, for the linked firm and worker data. Here, we provide an overview of our data. A more complete description can be found in Green et al. (2016).

Firms are identified in the CEEDD using a unique identifier known as the Business Number (BN)[5] while workers are identified by their unique government identifier - the Social Insurance Number (SIN). BN's correspond to enterprise rather than establishment level units, thus a given BN may comprise several establishments. It is important to note that we are interested in whether individuals become firm owners rather than when a firm starts and so we track individuals not firms over time. On the worker side, the key forms are their personal income tax records (T1), the Financial Declaration, and the Business Declaration. From the T1, we get information on age, gender, earnings from paid work, income from unemployment insurance, and location of residence, which we code at the Census Division level.[6] The financial and business declaration files are constructed from tax forms filed by owners of nonincorporated businesses, and so it is from the personal tax records that we observe the creation of nonincorporated firms. As we will see, these nonincorporated firms rarely have employees and often do not have a BN, but we can still observe their existence.

All personal tax records are compared to the Immigration Database (IMDB), which contains the administrative records for all permanent resident arrivals to Canada starting in 1980, in order to identify immigrants. In order to administer the point system and other parts of the immigrant assessment system, the Canadian government gathers considerable data on new entrants. Among other data, the IMDB provides information on year of arrival,[7]

[5]Not all businesses have a BN. However, they are required to have one if they have employees, sell goods and services (and, therefore, have to charge the value added tax), or import or export goods and services. Thus, using the BN captures all firms in active economic activity.

[6]Census Divisions are geographic regions defined by Statistics Canada that are intermediate between provinces and municipalities. They are defined as groups of neighbouring municipalities grouped together for purposes of regional planning and managing common services. There are 293 Census Divisions in Canada.

[7]The year of arrival in our data is the year in which an individual becomes a permanent resident, which is not necessarily the year they first arrived in Canada. Since we are interested in immigrant firm ownership and non-permanent residents would have difficulty in borrowing money and with other legal arrangements to start a firm, we view the date of permanent residence as the relevant starting point.

age at arrival, source country, education at arrival, gender, marital status, and class of entry. We select individuals who filed a T1 at least once in our sample period and who are age 18 to 69 in a given year. We also provide some comparable results for a comparison group consisting mainly of the native born. Because our immigrant data begins in 1980, we cannot separate immigrants who arrived before that date from the native born. Using data from the 2011 National Household Survey, immigrants who arrived before 1980 made up 7% of the total of those immigrants plus the native born in that year. Thus, our comparison group consists primarily of the native born.

For incorporated firms, the key administrative record is the T2 - the corporate income tax form. As part of this form, privately owned firms are required to file a Schedule 50 which lists all shareholders with at least 10% of common or preferred shares. The listing includes the shareholders' SIN's and it is through those that we can identify owners of incorporated firms, linking them to their individual tax records for all years and immigrant arrival records if they are immigrants who arrived after 1980.[8] As we discuss below, this clear labelling of the owners of firms is an improvement relative to some other similar data in other countries and may account for our different results. We follow immigrants from the time they enter the Canadian economy and say that they have become incorporated firm owners the first time they show up on a Schedule 50, even if the firm already existed or if there are multiple owners.[9] Finally, all firms with employees are linked to the Longitudinal Employment Analysis Program (LEAP) database which contains the firm's industry code as well as its total payroll and total number of employees.[10]

The first step in our analysis is to determine the divisions of firm types we want to consider. Levine and Rubinstein (2017) examine the cognitive and non-cognitive traits that predict entrepreneurship, arguing strongly for the importance of separating incorporated from non-incorporated spells. They show that people who open incorporated firms tend to be rule breakers with high cognitive abilities while those who open non-incorporated firms have neither of these qualities. They hypothesize that risk takers incorporate exactly because they are taking a risk on a business idea and incorporation acts as a safe-guard

[8]It is possible for firms to own shares in other firms. In those cases, we use the Schedule 50's of the owning firms to find the people who ultimately own them.

[9]For our data for immigrants entering in 2000, by 5 years after arrival, 78% of incorporated firm owners by this definition were sole owners and another 20% had only one partner.

[10]We want to focus on immigrants as entrepreneurs and so are not interested in ownership of shares in publicly traded firms. However, if firms start as privately owned but quickly go public then we could miss their existence in our data, which contains only privately owned corporations and nonincorporated firms. Fortunately, going public is very rare. Between 0.04% and 0.1% of privately owned firms go public in any year.Green et al. (2016) For privately owned incorporated firms started by immigrants after 2001, either 0, 1, or, rarely, 2 firms go public per year in our data period.

for their own assets and for the firm. Non-incorporated firm owners tend to look more like this is a choice of last resort rather than trying to pursue an innovative business idea. In addition, distinguishing between whether or not the firm provides employment is potentially important. The preference given to immigrant applicants who intend to open businesses in the immigration systems of most developed countries, including Canada, is supported by the claim that these immigrants will generate jobs - both for themselves and others. Some firms, though, are set up for tax related reasons and do not provide employment.

Based on this discussion, we see four potentially relevant firm ownership categories: incorporated firms with and without employees; and nonincorporated firms with and without employees. The CEEDD data on incorporated firms starts in 2001 but full collection of data on nonincorporated firms does not begin until 2004. We drop both incorporated and non-incorporated firms with zero net income on the assumption that such firms are dormant.[11] For nonincorporated firms started by the 2004 immigrant entry cohort, only 2.7% had an employee other than the owner by 5 years after arrival.Green et al. (2016) Given this, we do not divide nonincorporated firms into those with and without employees. In contrast, the split between having and not having employees among incorporated firms is nearly even (51% have employees), and we investigate both types of incorporated firms.

In assigning individuals to categories, we first categorize the person as an incorporated firm owner if she shows up as an owner on a Schedule 50 filed by a firm. Some of these owners may also be employed or own a non-incorporated firm but, given the substantial effort and cost of opening an incorporated firm, we see ownership of such a firm as a key defining event and list them only as firm owners. This will bias our incorporated firm owner numbers upward. We label the state of owning an Incorporated Firm with Employees as INC+ and the state of owning an Incorporated Firm with No Employees as INC0. Next, we categorize people as Primarily Nonincorporated Owners (PNOs) if their business income on their T1 tax form is greater than their employment income. The employed state (EMPL) includes all people who do not own an incorporated firm and who have earned income from a job that is greater than any nonincorporated business income. And, finally, if an individual does not own an incorporated firm and does not report either earned or business income in a year then we classify them as nonemployed (NEMPL).

In Table 1, we present the transition matrix for moves among states between year 5 and year 6 after arrival for the 2001 entry cohort. We focus on those years as being in the middle of our 13 year sample and still capturing some of the early post-arrival adjustments, but we will discuss transition rates from some other years for comparison. The table is read

[11]This means we include firms with negative income since they may be active but performing poorly.

with each row corresponding to a person's state in year 5 and the row entries showing the probability a person moves to the state in the column dimension by year 6. For example, the probability a person in the NEMPL state in year 5 remains in that state in year 6 is 0.75.

Several key patterns are evident in this matrix. First, the probabilities associated with staying in and moving between the employed and nonemployed states are high. Approximately, 93% of nonemployed in year 5 are still either employed or nonemployed in year 6, with about 1 in 5 of them moving into employment. The high rate of transition into employment is a reflection of early immigrant adaptation to their new economy, with the transition rate being 0.21 between year 1 and 2. On the other hand, the rates of transition into ownership of an incorporated firm of either type from employment or nonemployment is relatively low, being below 1% in all cases. These rates in Table 1 are all increases relative to earlier years after arrival, with the transition rate from EMPL to INC+ between years 1 and 2 being 0.004, half of the rate between years 5 and 6. Flows into nonincorporated firm ownership happen at a higher rate, with the flow rate from NEMPL to PNO being approximately 0.06 and very similar to the flow from employment to nonemployment. Moreover, the probability of a PNO person moving into either employment or non-employment is three times or more higher than the probability that they open an incorporated firm. Combined, these facts fit with characterizations of this own-account, non-incorporated firm ownership calling to mind more another employment state than being an entrepreneur. Echoing results in Gendron-Carrier (2018), who also works with Canadian tax data but not differentiating by immigrant status, only 14% of the new firm starts by individuals who were nonemployed in the previous year are incorporated firms compared to 34% among those who were previously employed. This, too, suggests that the PNO state is a lower quality labour force state.

The flows among the firm ownership states are interesting in their own right. The rates of movement from PNO to both types of incorporated firm ownership are higher than the comparable rates for employed and nonemployed individuals but they are still relatively low, suggesting that starting a nonincorporated firm is not typically part of a path to opening an incorporated firm - even one with no employees. There are, on the other hand, relatively high rates of movement between INC+ and INC0, with 1 in 5 incorporated firms with employees moving to having no employees in a year. This, too, appears to be part of immigrant adjustments after arrival, with the rate of flow from INC+ to INC0 being 0.32 between year 1 and 2. In other estimates not shown here for our predominantly native born comparison group, that same rate is only 0.08 for all age groups but 0.21 for people aged 25 to 29 in 2001. If we view the latter as effectively a cohort of native born entering the labour market in about 2001 then the latter rate suggests that some of the high rate of movement between INC+ and INC0 is just a reflection of newly started firms. The even higher rate just after arrival

Table 1: One Year Transition Matrix for Employment and Firm Ownership States

Year 5 State		**Year**	**6**	**State**	
	NEMPL	EMPL	PNO	INC0	INC+
NEMPL	**0.75**	0.18	0.059	0.003	0.007
EMPL	0.063	**0.90**	0.025	0.005	0.008
PNO	0.093	0.13	**0.74**	0.015	0.027
INC0	0.024	0.058	0.018	**0.83**	0.074
INC+	0.043	0.078	0.048	0.19	**0.64**

One year transition rates, averaged across all pairs of years with the initial year between 2001 and 2005. States: INC+: incorporated firm ownership with employees; INC0: incorporated firm ownership, no employees; PNO: nonincorporated firm ownership, income primarily from firm; ENO: nonincorporaed firm ownership, income primarily from employment; EMPL: Employed; NEMPL: Nonemployed.

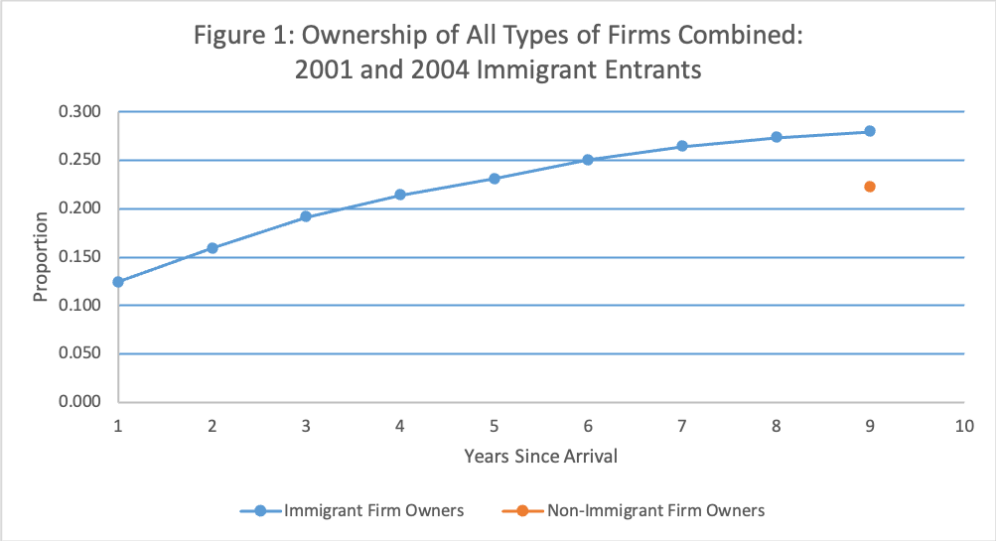
for immigrants then reflects something special about immigrants such as lack of information about markets, etc..

There is a possibility that incorporated firms without employees are not 'real' - that they are shells created for tax purposes. They are certainly much smaller in terms of net income than incorporated firms with employees. But the high rates of flow between ownership of an incorporated firm with and without employees suggests that we should not dismiss all incorporated firms without employees as just tax shelters. We take the approach of keeping incorporated firms without employees but treating INC0 and INC+ as separate states in our specifications.

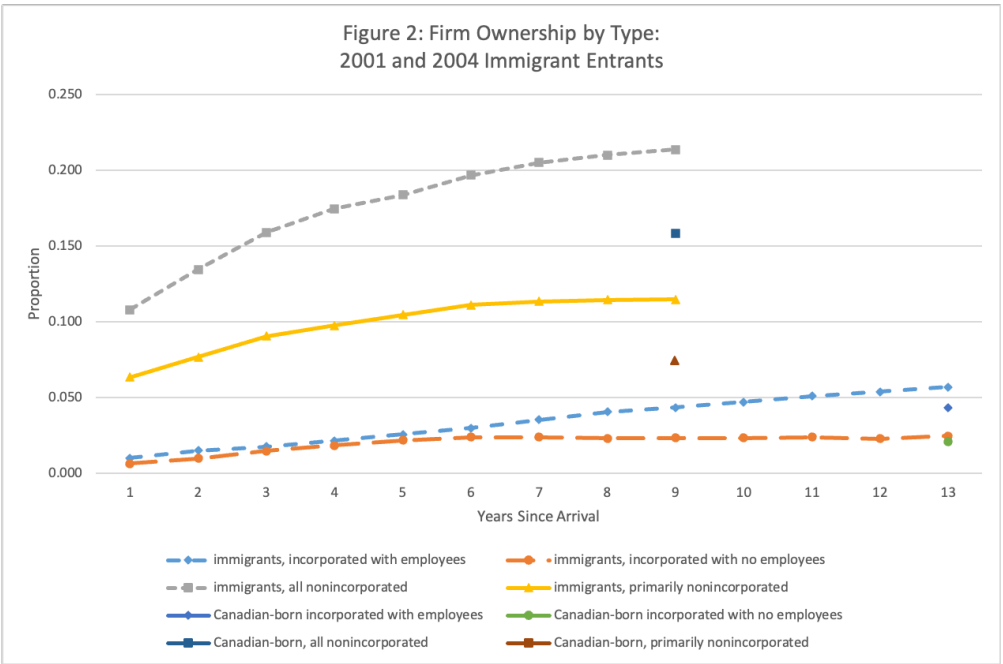
3.1 Patterns

As shown in figure 3.1, total firm ownership - defined as the sum of the INC+, INC0 and PNO states plus ownership of nonincorporated firms in cases where the owner earns less from the firm than from employment - rises strongly with time in Canada. If we focus on the 2004 cohort (the first one for which we have data on the PNO state), approximately 12.5% of the cohort entrants owned a firm of some kind in their first full year after arrival, rising to 28% in year 9.[12] The immigrant rate of firm ownership surpasses the rate for the comparison group (24%) at about year 6 after arrival. Since these are rates in a given year, they the understate total firm ownership experience because of movements in and out of ownership. 41% of immigrants have owned a firm at some point by their 10th year after arrival. Firm ownership is clearly a central feature of the immigrant experience.

[12]We refer to cohorts by their first full year in Canada. Thus, the 2004 cohort consists of immigrants who obtained permanent residence some time in 2003. We do not use the part-year data from the year in which they actually entered.



In Figure 2, we plot firm ownership against years since arrival broken down into our different categories. For this figure, we follow the 2001 entry cohort (the one that is in our data the longest) in terms of its ownership of incorporated firms. However, we only see complete records for nonincorporated firms starting in 2004 and so plot the rates of ownership of those firms for the 2004 entry cohort. In each case, the point near the end of the line using the same symbol as on the line is the ownership rate for that type of firm for the comparison group. In all the ownership categories, immigrants start at a lower proportion ownership just after arrival relative to the comparison group but ultimately match or surpass them. Importantly, the finding that immigrants surpass non-immigrants in total firm ownership by 6 years after arrival comes entirely from nonincorporated firm ownership. By 9 years after arrival, 11.5% of immigrants are in the PNO state compared to 7% for the comparison group, and immigrants surpass the native born in this type of firm ownership by their second year after arrival. In comparison, immigrant ownership of incorporated firms with employees just matches that for the native born at about 9 years after arrival. At 5.7% at year 13, the rate of being in the INC+ state is slightly higher than the same rate for the native born (4.9%) but it is also much lower than the percentage in the PNO state at year 9. This is an important first lesson: immigrants have higher rates of firm ownership after a decade or so in Canada, but that advantage comes almost entirely from higher rates of nonincorporated firm ownership. Moreover, the rate of ownership of incorporated firms with employees - likely the type of firm that governments are hoping immigrant entrepreneurs will open - is persistently low.



The findings that immigrant firm ownership rates rise with time in Canada and ultimately surpass those of the native born fit with results in earlier studies (Li (2001), Schuetze and Antecol (2005), Frenette (2004) and Hou and Wang (2011)). All of these papers focus on the dual questions of the proportion of immigrants who become self-employed (i.e., own nonincorporated firms) and their earnings. All except Li (2001) use Census data where firm earnings are only collected for nonincorporated firms and so their findings pertain only to those firms. Li (2001) uses tax data but also only examines nonincorporated firm ownership.

In Table 2, we present the proportion of each entry class who own an incorporated firm with employees in each year since arrival for the 2000 entry cohort. For the Skilled Worker, Family Class, and Other (mainly refugee) Class entrants, the proportions are very small in the first year after arrival, with about 1% of the Skilled Worker entrants owning an incorporated business in the first year and less in the other two classes. In comparison, for entrants in the Entrepreneur Class - who were admitted on the promise of opening a firm - about 14% own an incorporated firm in their first year in Canada. Interestingly, the latter percentage only rises in their next year in Canada before declining thereafter. Entrants in the other classes, instead, show an increase in their firm ownership rates and by year 13 the Skilled Worker entrant rates have reached about 60% of those for the Entrepreneur Class and are on a rising trend. By 13 years after arrival, 34% of Entrepreneur Class principal applicant immigrants have been in the INC+ state at some point compared to 12% of the Skilled Class entrants.

These patterns combined with the fact that the Skilled Worker and Family Classes are

Table 2: Owners of Incorporated Firms with Employees, 2001 Immigrant Cohort

Year	Family	Skilled +pn	Entrepreneurs	Other
2001	0.5	0.9	14.2	0.1
2002	0.7	1.5	19.8	0.3
2003	0.9	1.9	18.5	0.5
2004	1.3	2.6	16.9	0.6
2005	1.7	3.3	15.9	0.7
2006	2.1	4.2	15.5	1.0
2007	2.7	5.0	15.4	1.3
2008	3.3	5.9	15.0	1.7
2009	3.7	6.4	14.5	1.9
2010	4.1	7.1	15.0	2.1
2011	4.5	7.8	15.2	2.4
2012	4.9	8.4	14.9	2.6
2013	5.2	8.8	14.9	2.9

Percentage of all T1 filers in the entry class given at the top of the column. The Skilled + pn class contains principal applicants who entered in the skilled assessed class or as provincial nominees.

much larger than the Entrepreneur class mean that while 46% of immigrant owned incorporated firms with employees are owned by entrants in the Entrepreneur Class in the first year after arrival, by 9 years after arrival that percentage has fallen to 11% and the Skilled Worker Entrants' percentage is nearly 60%. Of the immigrants who are ever in the INC+ state in the 13 years after arrival, 38% entered in the Skilled Worker Class and 21% entered in the Family Class, compared to only 5% who entered in the Entrepreneur Class. The implication is that outcomes for the classes other than the Entrepreneur Class, and the policies that affect them, are ultimately more important for firm ownership patterns than those for the Entrepreneur Class - the group that the government is bringing in to start firms.

Finally, at the time of an immigrant starting an incorporated firm with employees, 55% of these firms have fewer than 1 typical (for the industry) equivalent employees and another 18% have fewer than 2.[13] Firm sizes rise with time in the economy but only slowly. By 9 years after arrival, still only 6.6% of immigrant owned incorporated firms had more than 10 workers. In contrast, 17.7% of incorporated firms with some employment owned by the comparison group had over 10 workers. Thus, immigrants are not much more likely to open incorporated firms with employees and the firms they do open tend to be smaller than those

[13]The firm tax data contains the total wage bill and the number of T4's issued but not hours of work. Statistics Canada creates a measure of the number of workers in Average Labour Units (ALUs) which are constructed by dividing the total wage bill by the average annual earnings per worker within cells defined by a firms' industry, province, and number of employees. Thus, the ALU approach counts the number of 'typical' workers a firm employs, where typical is defined by industry, province and raw number of workers. Only 5% have more than 10 employees.

owned by the native born. The result that immigrant firms are smaller on average fits with the US literature. (Fairlie and Lofstrom (2013), Kerr and Kerr (2020)) If we multiply rates of ownership of INC+ firms by the mean number of workers per firm separately for immigrants and non-immigrants we get the number of jobs created by entrepreneurs relative to the total population for each group. For immigrants at 13 years after arrival, this number is .15 while for non-immigrants, the matching number is .44. Thus, also measured by total job creation per capita, the immigrant entrepreneurial contribution is lower.[14]

3.2 Comparisons to Other Estimates

Our result that immigrants have higher rates of total firm ownership than non-immigrants fits with findings in several countries (e.g., Fairlie and Lofstrom (2013), Kerr and Kerr (2016), Schuetze and Antecol (2005)) but our conclusion that immigrants are not particularly entrepreneurial runs counter to a common narrative both in policy discussions and some research papers. A substantial set of papers (mainly using survey and census data in which firm ownership is measured as self-reported self-employment spells) uses the terms firm ownership and entrepreneurship interchangeably. Our finding that the immigrant firm ownership advantage arises almost entirely from non-incorporated firms (mainly without employees) is part of the basis of our conclusion that immigrants are not more entrepreneurial. This is supported by results in the next section that imply that ownership of a non-incorporated firm looks like a failed labour market state and by the result in Table 1 that it is not generally a stepping stone to the opening of an incorporated firm with employees.

More recently, some US papers have used a linkage of the US Census's Longitudinal Business Database, the demographic files from the US Census, and a file containing worker earnings (either from the W-2 tax records (Azoulay et al. (2022)) or from the Longitudinal Employer- Household Dynamics (LEHD) that is based on unemployment insurance data (Kerr and Kerr (2016))). The advantage of this data is its universal coverage (a strength shared by our data in the Canadian context), but it has the important shortcoming relative to our data that it does not contain information on firm owners. Because of this, both Azoulay et al. (2022) and Kerr and Kerr (2016) (along with other papers using this data to study entrepreneurs) define firm founders as the top three paid salaried employees of the firm when it is founded. The link to the US demographic Census then allows them to determine if

[14]The mean number of workers per firm with at least one immigrant owner is 2.6 at 13 years after arrival while the mean for non-immigrant firms in 2009 is 8.9. For all immigrant firms (of all ages) in 2009, the mean number of workers is 3.7, implying a jobs per capita for immigrants of .21 - still far below the matching non-immigrant number.

any of these top earners are immigrants. This is the best that can be done with this data but it raises concerns that some of the people denoted as firm owners are not really firm owners (they are just high salaried workers) and that actual firm owners are not captured if they do not pay themselves a salary.(Kerr and Kerr (2016)) In our data, we can see the actual firm owners as well as tax data that matches what is available in the US data. In particular, we observe the Canadian equivalent of the W-2 form (the T4) - the form on which an employer reports remuneration for an employee during a tax year. Using that, we find that only 29% of immigrant owners of incorporated businesses had a T4 associated with the firm (i.e., paid themselves a salary) in their first full year after arrival in Canada. That percentage rose to 39% by 9 years after arrival. The implication is that attempting to capture owners based on salaries is potentially misleading and the extent of errors varies with time in a way that could further complicate ownership measures. As Kerr and Kerr (2016) point out, problems are lessened to the extent that immigrant owned firms hire top earners and comparisons they make with survey data suggest their imputed ownership rates from the administrative data are not unreasonable, but one is still left with unknown amounts of measurement error. In addition, it seems not entirely clear whether the owners that are being counted in this data fit in the incorporated or nonincorporated category. Kerr and Kerr (2016) report on a linkage between the administrative data and Census data showing that 29% of people who list themselves as nonincorporated self-employed in the Census data do not file a 1040 tax form indicating this status.

The other main dataset that has been used in US papers is the Survey of Business Ownership, a random survey of operating businesses with receipts in excess of $1,000. Respondents were asked directly about ownership but there are still some issues. It has a response rate of only 66%[15] but the nature of the non-response is not clear. In addition, it doesn't differentiate between incorporated and non-incorporated firms - though both Azoulay et al. (2022) and Kerr and Kerr (2020) mitigate this problem to some extent by focusing on firms with employees.

The conclusion in Azoulay et al. (2022) that immigrants have greater entrepreneurial ability is based on exercises using both these datasets (along with one built using Fortune 500 firms) in which they examine the number of firms owned per capita for immigrants and non-immigrants, broken down by number of employees. Their strongest result is from the administrative data and counting any firm as an immigrant firm if at least one 'owner' is an immigrant. In that situation (shown in the top left panel of their Figure 1), immigrants have more firms per person of every size. But, as Kerr and Kerr (2020) point out, this

[15] https://www.census.gov/programs-surveys/sbo/technical-documentation/methodology/2012-sbo-methodology.html

approach to assigning immigrant firm ownership is potentially problematic. In particular, if immigrants and non-immigrants have equal proportions who are entrepreneurs and some firms have both immigrant and non-immigrant owners then the ratio of firms to the population will be the same as the entrepreneur rate for immigrants (since every immigrant owner is counted regardless of the ownership structure of the firm) while the same ratio for non-immigrants will under-count their entrepreneur rate (since any entrepreneur who is working in a firm with an immigrant won't be counted). If we move to the SBO data (which seems more reliable) and focus on defining immigrant firms using only the owner with the highest ownership share, there are more firms per capita among immigrants, but only at smaller (under 100 employee) firms. This fits with other findings that immigrant firms tend to be small. Moreover, even at small firm sizes, the differences in per capita firm counts between immigrants and non-immigrants do not appear large. In other words, once data issues are acknowledged, their figures could fit with our conclusion that immigrants are not substantially more entrepreneurial (in the sense of opening INC+ firms) than non-immigrants and the firms they do open tend to be smaller.

4 Empirical Specification

To this point, we have established that immigrants, overall, are not substantially more entrepreneurial than native born Canadians. Moreover, attempts to select immigrants who will be entrepreneurs in Canada do not appear to be very successful. The main firm opening activity is associated with people entering through the Skilled Worker and Family Classes. That raises the possibility that the government might be able to do a better job of selecting future entrepreneurs by using characteristics observed at time of application that are related to firm opening activity once in Canada. Since the characteristics observed and used for immigrant selection in our time period were primarily human capital characteristics, we can alternatively frame the question as whether standard human capital characteristics are predictive of firm opening in general and entrepreneurial firm opening in particular.

We approach this question using a competing risks framework. In particular, we assume that individuals can occupy one of four states in a period: incorporated firm ownership with employees (INC+); incorporated firm ownership with no employees (INC0); ownership of a self-employed (non-incorporated) firm as the main source of income (PNO); or a non-firm ownership state that combines paid employment and non-employment (PNE). We combine employment and non-employment because we want to focus on the movements into firm ownership. When we estimated a specification allowing all the covariates to have different

effects depending on whether the individual is initially employed versus non-employed the estimated coefficients were very similar. Thus, in order to simplify the exposition, we adopt a specification in which we include a dummy variable for the non-employed state so that we allow for a level difference in movements from employment and non-employment into the other states but force the effects of other covariates to be the same for people originating from either employment or non-employment.

In our competing risks framework, we estimate the time until first movement out of the PNE state into each of the other three possible states, using an assumption that all immigrants start in the PNE state just after arrival. Thus, for each of the other possible states, there is a latent time, $T_{PNE,m}$, at which the person would transit to state m if that were the only other possible destination. Associated with each of these latent times is a hazard rate, $h_{PNE,m}(\tau)$, where τ is time, so far, in the PNE state. We assume that the three processes associated with the three exit routes from PNE are independent and that the probability of a tie in time of exit is zero. Then the person is observed to exit to the state with the shortest associated time to exit so that the time spent in the PNE state is given by, $T_{PNE} = min(T_{PNE,INC+}, T_{PNE,INC0}, T_{PNE,PNO})$.

We can estimate this model by estimating the hazard rates, e.g., the probability a person who is currently non-employed/employed moves into the INC+ state in the next period. This can be estimated as a simple probit-type specification with the set of people included in the estimation (the risk set) including all those who have not so far exited the PNE state. Once a person exits to a particular state, the preceding PNE spell is treated as a censored observation on the processes determining exit to the other states. For maximum flexibility, we could allow the effects of the various covariates to differ for each year after arrival by running separate probits corresponding to each year. To reduce computational burden, we implement a restricted specification in which effects are allowed to be different in the first full year after arrival but are then common across all subsequent years. As we will see, there are different effects between the first and subsequent years.

We capture the human capital characteristics of immigrants at the time they acquire PR status using the key variables that form the basis of the point system: education, age, and language skills. Education is represented by a set of 3 dummies corresponding to: some post-secondary education; a bachelor level university degree; and an above-BA university degree. The omitted category is a high school graduate or lower education. For age, there are also 3 dummies: age 25-34; age 35-44; and age 45-54. The omitted category is under age 25. Language ability refers to recorded ability at time of obtaining PR status and is captured by a dummy equal to 1 if the person is recorded as speaking English or French. To

the extent the immigrant screening process is effective, we would also expect that immigrants entering in the Skilled Worker class should have higher levels of human capital compared to the Family and Refugee Classes. We are also interested in the extent to which entrants in the Business Classes open the businesses which was the basis of their admission, controlling for human capital characteristics. Based on this, we include a complete set of controls for the following entry classes: Family; Skilled Worker; Refugees; Business Investors; Business Entrepreneurs; Business Self-Employed; Business Provincial Nominees (immigrants selected by the provinces on the basis of expectations that they will open a business); and Other (which is a very small catch-all category of immigrants in special entry classes). Because immigrants can enter as assessed "principal applicants" or as accompanying family members within any of the assessed classes, we group accompanying family members from all entry classes together in a group, implying that our other categories all refer to principal applicants. We also include indicators for gender and marital status since both could have impacts on the tendency to open a firm, and a set of country of origin indicators to capture persistent cultural differences.

In addition to these time of entry variables, we include a set of variables that take advantage of our rich tax data to capture the relationship between earnings and employment paths followed by immigrants and their tendency to open firms. We see these variables, in part, as further measures of human capital (on the assumption that higher earnings reflect higher skills) and, in part, as a way to better understand the various firm ownership states. As we have already seen, flows in and out of the PNO state appear to fit with it being more like another labour market state, and we are interested in whether the earnings patterns accompanying those flows suggest it is a good or bad labour market state. Based on this, we create a flexible representation of earnings and employment movements over the prior two years. More specifically, we calculate the earnings quintiles for all workers (immigrant and non-immigrant) for each year and then assign workers to a 6 by 6 grid defined by those quintiles and the non-earnings (no-work) state. We include a complete set of 35 dummies corresponding to all but one of the cells in this grid, thereby capturing any earnings path in the previous two years. Recall that we do not estimate flows out of employed and non-employed states separately. Instead, the non-employed elements of this matrix allow for differences in flows from those states. However, having no earnings at all in a year is an extreme measure of non-employment. To capture shorter spells of non-employment in a year we also include an indicator for whether the person received any Employment Insurance (EI) benefits during the year as a separate regressor. We also include a linear years-since-entry variable to capture general improvements in adaptation to the Canadian labour market over and above those reflected in the earnings and employment paths. Since our self-employment

state only includes people whose main source of income is from self-employment, we include indicators for whether the person had any self-employment income in the previous year to allow for the possibility that people move in gradual steps into firm ownership. We allow for these effects to be different depending on whether the person reported positive or negative self-employment income. Finally, we include a complete set of cohort and location effects in order to capture general trends across entry cohorts in the costs of opening a firm, of maintaining a vacancy, and in nonemployment benefits as well as differences in those factors across space.[16]

5 Results

In this section, we present the results from the estimation of our main specification. We present the results for the processes determining movement into both the incorporated with employees (INC+) and primarily non-incorporated firm ownership (PNO) states. The estimated effects of covariates on the movement into ownership of incorporated firms without employees (INC0) are generally similar to those for the INC+ category, so to save on space, we relegate the INCO results to Appendix A and report on differences relative to INC+ estimates in our discussion in the main text.[17] Recall that we estimate simple probits. We report partial derivatives of the event represented in the dependent variable (the starting of a firm of a specific type) with respect to the covariates, evaluating those derivatives at a value of the covariate vector pertaining to males and containing the modal value for each other discrete covariate and the mean value for continuous covariates. Standard errors are clustered at the individual level.[18] To help in interpreting the coefficients, note that the unconditional probability that a person moves into INC+ from non-employment is 0.007 and from employment is 0.008. Further, the probability of moving into PNO is 0.059 for the nonemployed and 0.025 for the employed.

Table 3 contains the estimated effects of entry characteristics. Most of these characteristics are obtained from the immigrant arrival records and, so, represent levers that the government could pull in attempting to select future entrepreneurs. Recall that we allow the effects of these and other covariates to differ for movements into firm ownership in the

[16]Since we include time since arrival and cohort effects, time effects are not separately identified and any general time factors are captured in the combination of cohort effects and time since arrival effects.

[17]While our earlier tables and figures are based on the universe of workers and firms in our time period, we estimate our hazard models using a 40% random sample in order to reduce our computational burden.

[18]Following Wooldridge (2005), we form the variance-covariance matrix for the resulting partial derivatives using the Delta Method. We provide more details on our precise procedures in Appendix B.

first complete year after arrival and in later years (where, all later years are pooled together). The estimated effects imply quite small impacts of education on movements into INC+. For movements in the first full year after arrival, having either some post-secondary or a post-graduate education does not alter the rates of opening these firms relative to high school or less educated entrants. Entrants with a Bachelor degree do have higher INC+ opening rates in the first year but the effect is not large (amounting to an increase of .13%). Similarly, in subsequent years there is a positive effect of having both some post-secondary or a BA education relative to the high school educated but these effects amount to about 5% of the mean rates of movement into INC+ ownership and only an increase of .035% in absolute terms. Age (which can be seen as roughly corresponding to experience since we are controlling for education) has a positive effect on INC+ in the first year after arrival but a negative effect in subsequent years. In the post-entry year specification, we include years since obtaining permanent residence in Canada. It has a very small negative effect and its inclusion implies that age is (roughly) capturing foreign acquired experience. Thus, for the most part, what we might consider the main human capital related characteristics have small effects on entering INC+ status. The small effects of work experience echoes results in Gendron-Carrier (2018). On the other side, speaking French or English (Canada's official languages) has positive effects on entering INC+ status. Being married also has positive effects while being female reduces the probability of opening a firm, which may correspond to discriminatory barriers facing female potential entrepreneurs. It is noteworthy, also, that all the factors have much smaller effects in the subsequent years than in the first year after arrival. Thus, any impact of skill related factors that the government can manipulate at time of entry appear to fade with time in Canada.

For the process corresponding to movements into PNO (Primarily Nonincorporated Ownership) in the first full year after arrival (Column 3), we find that education has a substantial negative effect. In subsequent years, the effect of education turns positive but, as with the INC+ process, the effects are small. Having a BA represents a .0028 increase in the probability of moving into PNO compared to being high school educated, which is small compared to the mean rate of .025 for the movement into PNO for employed workers. As with INC+, age at arrival has positive effects on the probability of opening a nonincorporated firm in the first year with very small effects in subsequent years. Speaking English or French has a positive but, again, a small effect in subsequent years. Years since landing in Canada has a relatively strong negative effect, amounting to a decline in the probability of moving into PNO of .019 after ten years.

Table 4 contains estimated marginal effects from the same specification but for the entry class variables. Recall that we divide immigrants between the Principal Applicants (PA's)

Table 3: Estimation Results, Individual Characteristics

	INC+ First Yr	INC+ Later Yrs	PNO First Yr	PNO Later Yrs
age at landing (omitted: ¡25)				
25-34	0.0033***	-0.00032*	0.023***	0.0015*
	(0.0006)	(0.0002)	(0.0015)	(0.00072)
35-44	0.0071***	-0.001***	0.053***	0.0031***
	(0.0008)	(0.0002)	(0.0018)	(0.0008)
45-54	0.0065***	-0.0023***	0.066***	-0.0023*
	(0.0009)	(0.0002)	(0.0023)	(0.0009)
female	-0.0073***	-0.0023***	-0.037***	-0.029***
	(0.0006)	(0.0002)	(0.0012)	(0.0006)
married	0.0056***	0.0022***	0.0058**	-0.0011
	(0.0005)	(0.0002)	(0.0012)	(0.0007)
education at landing (omitted: HS or less)		.		
some postsecondary	-0.00045	0.00044**	0.0014	0.0038***
	(0.0005)	(0.0002)	(0.0015)	(0.0007)
Bachelor's degree	0.0013*	0.00035*	-0.012***	0.0028***
	(0.0005)	(0.00014)	(0.0015)	(0.0008)
post graduate degree	0.0008	0.0001	-0.0072***	0.0017
	(0.0006)	(0.0002)	(0.0019)	(0.001)
Speaks Eng or Fr	0.0065***	0.0003*	0.014***	0.0017*
	(0.0006)	(0.0001)	(0.0014)	(0.0007)
Years since entry	.	-0.00007**	.	-0.0019***
	.	(0.00002)	.	(0.0001)
EI in t-1	.	-0.00026	.	0.018***
	.	(0.00014)	.	(0.0009)
Neg Self-empl inc in t-1	.	0.0025***	.	0.18***
	.	(0.0003)	.	(0.0029)
Pos Self-empl inc in t-1	.	0.006***	.	0.028***
	.	(0.0003)	.	(0.003)
Cohort Effects	yes	yes	yes	yes
Loc. Effects	yes	yes	yes	yes
Origin Effects	yes	yes	yes	yes
pseudo R-sq	0.14	.068	0.077	0.14
Observations	699,061	2,696,827	699,746	2,705589

***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels, respectively.

in a class (the member of the family who is assessed according to the criteria for the specific class) and non-PA's (accompanying family members who are not assessed at all). The base case is the Family Class. This is one of the largest entry classes but one for which there is no skills related selection. Given this, it is interesting to note that entering as the principal applicant in the Skilled Class has a very small and not statistically significant effect on entering the INC+ state relative to entering in the Family Class. Of course, we control for education and language ability but the initial skills assessment goes beyond these to include proven previous work experience and intended occupation. As a result, entering in the Skilled Class still likely indicates greater skills on average than Family Class entrants. Thus, the lack of an effect of being assessed in the Skilled Class fits with the results on education and experience indicating that human capital related skills as measured in our data have little effect on opening an INC+ firm. Results in Picot and Ostrovsky (2017) imply a qualification to this conclusion. They find that immigrants entering in the Skilled class are approximately twice as likely as native born individuals to open an incorporated firm in a Knowledge-based industry, something they attribute to Skilled class immigrants being much more likely to have a STEM university degree. We do not see the area of a degree in our data and so cannot assess this argument but it is worth noting that some specific types of human capital appear to be useful in establishing innovative firms even if our general measures show little relationship. This also fits with results for the US (Hunt and Gauthier-Loiselle (2010)).

On the other hand, entering as the PA in the Entrepreneur Class has a very strong effect. It increases the probability of opening an INC+ firm by 0.30 in the first year and 0.034 in subsequent years, which is very large compared to a base probability of approximately 0.01. Entering in the Entrepreneur Class means that the individual has shown both some experience in running a firm and the means to open a firm in Canada. Thus, this indicates that firm-related human capital is important. Of course, we have already seen that the entrants in this class are both more likely to open a firm and more likely to leave firm ownership so that their ownership rates in a particular year a decade after arrival are not that much larger than those for entrants in the other classes. Moreover, Picot and Ostrovsky (2017) show that Business Class entrants are under-represented in knowledge-based industries and tend to be concentrated in traditional industries such as wholesale and retail trade and food services. It is worth noting that the effects of covariates on the probability of moving into incorporated firm ownership without employees (INC0) are quite similar to those for the INC+ process reported here. The key exception is that being the PA in the Entrepreneur Class has a much smaller, though still positive, effect on entering INC0. This result fits with INC0 being a mixed state that shares some of the features of INC+ but may also include some elements of tax avoidance behaviour.

Table 4: Estimation Results, Entry Class

	INC+ First Yr	INC+ Later Yrs	PNO First Yr	PNO Later Yrs
skilled: PA	0.0001	0.00012	-0.028***	-0.0033***
	(0.0006)	(0.0002)	(0.0016)	(0.0009)
business: entrepreneurs PA	0.30***	0.034***	0.084***	0.052***
	(0.013)	(0.0034)	(0.0082)	(0.0080)
business: self-employed PA	0.021***	0.0034	0.22***	0.021*
	(0.005)	(0.0017)	(0.014)	(0.0071)
business: investors & other PA	0.021***	0.0052***	0.066***	0.0026
	(0.003)	(0.0008)	(0.0049)	(0.0025)
business: PN PA	0.017***	0.00035	-0.039***	0.013***
	(0.0017)	(0.0004)	(0.0027)	(0.0027)
skilled and business: non-PA	0.0045*	0.0011***	-0.024***	-0.0053***
	(0.0007)	(0.0002)	(0.0015)	(0.0008)
refugees	0.0018	-0.00085***	0.0030	-0.0049***
	(0.001)	(0.0002)	(0.0021)	(0.0001)
other	0.013**	-0.00024	0.029***	0.0019
	(0.0065)	(0.00029)	(0.0024)	(0.0014)
Cohort Effects	yes	yes	yes	yes
Loc. Effects	yes	yes	yes	yes
Origin Effects	yes	yes	yes	yes
Observations	699,061	2,696,827	699,746	2,705589

The omitted category is the family class. Entrants in that class are not assessed for skills or other characteristics. PA refers to Principal Applicant - the family member who is formally assessed according to the criteria in a given entry class. ***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels, respectively.

Entrants in the Self-Employment Class (which is smaller and with lower experience and capital requirements), the Investor Class (which only requires capital, not experience), and the Provincial Nominee Business Class (immigrants selected by the Provinces based on some assessment of their ability to open a firm) are also more likely to open an INC+ firm than either the Family or Skilled Classes, though to a much smaller extent than Entrepreneur Class entrants. Refugees, on the other hand, have different outcomes in the first versus later years.

For entry into PNO, being in the Skilled Class actually has a negative and statistically significant effect. This echoes results for education indicating that human capital is weakly or negatively related to opening a non-incorporated firm. Entering in the Self-Employment Class has a strong positive effect on this type of firm opening in the first year after arrival (which is potentially not surprising since this was the basis of admission). Both Investor and Entrepreneur Class entrants are also more likely to open a PNO firm in their first year. Thus, overall, there is some suggestion that entrepreneurial skills of various types have a

positive relationship to opening a nonincorporated firm but human capital skills are mainly negatively related to it.

The next piece of evidence we consider is the effect of the earnings and nonemployment paths that individuals follow in Canada. Recall that we placed each immigrant in Canada for at least two years in a cell in a 6 x 6 matrix defined by earnings quintiles and nonemployment in each of the previous two years. We included 35 dummy variables corresponding to the cells of the 6x6 matrix. The omitted category is persistent nonemployment, i.e., not reporting any employment income in each of the previous two tax years.

Table 5 contains the estimated partial derivative effects for these dummy variables for the INC+ process. There is not a single consistent pattern in these estimates. In broad terms, below-diagonal elements of the matrix - corresponding to people whose earnings improved over time - are essentially zero apart from the bottom row, where the effects are positive. This pattern suggests that upward movements within the middle part of the earnings distribution have little relationship to opening INC+ firms but more substantial jumps into the top quintile are positively related to the probability of opening these firms. Those increases in probability, though, tend to be smaller than the positive coefficients above the diagonal, especially for people who were in the upper quintiles in t-2 and then had their earnings fall in t-1. The latter pattern could fit with people working less in paid employment in the year before they launch their firm. That the strongest effects are for people in the top quintile in t-2 or who moved into that quintile in t-1 may fit with results in Levine and Rubinstein (2017) showing that people who open incorporated firms were highly paid as employees, and with results in Gendron-Carrier (2018) that experience in high paying firms has a positive effect on incorporated firm ownership.

The estimates of the same coefficients for the PNO process, in Table 6, are much larger and more often statistically significant. They show a clear pattern with the coefficients moving from generally positive in the first row (representing people who were employed in year t-2 but not in t-1) to more and more negative as we move down each column. That is, the more successful a person was in terms of earned income, particularly in the previous year, the less likely they were to open a non-incorporated firm. Men in the top of the distribution in both years were 7% less likely to open a firm than a person who was in the top quintile in year t-2 but didn't work in t-1. People who moved up into the top three quintiles in t-1 or managed to stay in that part of the distribution were less likely to open a non-incorporated firm virtually regardless of their earnings in t-2. These results fit with a notion that non-incorporated firm opening is more a route of last resort than pursuing an innovative idea, which echoes results in other papers using longitudinal data (Georgarakos and Tatsiramos

(2009) and Blume et al. (2009)). To the extent that high previous earnings indicate higher earnings related human capital, it also fits with our other estimates in showing that such human capital is negatively related to opening a nonincorporated firm. The estimated effect of receiving EI in the previous year (i.e., having an unemployment spell, even if the person did have positive earnings for the year) in Table 3 fit with these general patterns - showing no relationship to the probability of opening an INC+ firm but a sizeable and statistically significant positive association with opening a PNO firm.

Table 5: Entry into INC+ Process: Effects of Earnings Path for Previous 2 Years

		t-2					
		Q0	Q1	Q2	Q3	Q4	Q5
t-1	Q0	0.000	0.000	0.002***	0.007***	0.010**	0.006*
		(.)	(0.000)	(0.001)	(0.001)	(0.002)	(0.003)
	Q1	0.001**	0.001*	0.001*	0.004***	0.003*	0.011*
		(0.000)	(0.000)	(0.000)	(0.001)	(0.002)	(0.005)
	Q2	0.002***	0.001***	0.002***	0.003***	0.007***	0.006**
		(0.001)	(0.000)	(0.000)	(0.000)	(0.001)	(0.002)
	Q3	0.002**	0.001*	0.000	0.000	0.003***	0.011***
		(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.002)
	Q4	0.002	0.003	0.000	0.000	-0.000*	0.006***
		(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
	Q5	0.004	0.006*	0.007***	0.003***	0.001***	0.002***
		(0.002)	(0.003)	(0.002)	(0.001)	(0.000)	(0.000)

Q0 corresponds to non-employment. Q1, ... Q5 correspond to earnings quintile groups. The numbers are marginal effects of being in a given category relative to the base of being non-employed in both of the previous two years. ***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels.

Overall, the results of estimates of individual characteristics indicate that human capital as reflected in education, assessment by the Canadian government, and past earnings have, at best, a weak relationship to the probability a person opens an incorporated firm with employees. But it has a negative relationship with opening an non-incorporated firm. That is, opening a non-incorporated firm is associated with low human capital. There is evidence that prior experience in running a firm and having capital, as reflected in entry through business classes, is strongly positively related to opening both types of firms. But it is the entrants through the non-business classes who ultimately open the majority of firms, especially since the business class entrants tend to both open and close firms at higher rates. Thus, the fact that what they are being selected on - work related human capital - has little relation to opening the INC+ firms that the government wants is important. The one caveat to this conclusion is the finding in Picot and Ostrovsky (2017) mentioned earlier that entrants in the Skilled class are more likely to open incorporated firms in knowledge-based

Table 6: Entry into PNO Process: Effects of Earnings Path for Previous 2 Years

		t-2					
		Q0	Q1	Q2	Q3	Q4	Q5
t-1	Q0	0.000	0.013***	0.018***	0.020***	0.008	-0.008
		(.)	(0.001)	(0.002)	(0.003)	(0.005)	(0.007)
	Q1	-0.025***	-0.017***	-0.011***	-0.007**	0.001	-0.006
		(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.010)
	Q2	-0.048***	-0.048***	-0.051***	-0.033***	-0.014***	-0.0126***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.005)
	Q3	-0.064***	-0.069***	-0.070***	-0.071***	-0.052***	-0.034***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)
	Q4	-0.071***	-0.072***	-0.072***	-0.075***	-0.076***	-0.060***
		(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
	Q5	-0.070***	-0.075***	-0.076***	-0.076***	-0.078***	-0.078***
		(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)

Q0 corresponds to non-employment. Q1, ... Q5 correspond to earnings quintile groups. The numbers are marginal effects of being in a given category relative to the base of being non-employed in both of the previous two years. ***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels.

industries which may indicate positive effects for certain types of university degrees.

6 Conclusion

Many immigrant receiving countries have components of their immigration systems that target entrepreneurs. This is done, presumably, in the hope that immigrant entrepreneurs will open firms and create jobs in the host economy - a hope that gets some support in the observation that a disproportionate number of firms in Silicon Valley were started by immigrants.(Saxenian (2002)) In this paper, we use rich Canadian administrative data to examine the process by which immigrants enter into firm ownership. We see the immigrant characteristics that the government sees at the time of admission and can then follow them through tax records to the time of their first firm ownership. Matching earlier work (e.g., Fairlie and Lofstrom (2013) and Schuetze and Antecol (2005)), we find that within a decade after arrival, immigrants are more likely than the native born to own firms. But we also find that this advantage is entirely accounted for by the ownership of nonincorporated firms. Those firms rarely have employees and, as others have observed, tend to look more like locations of last resort than innovative firms (Levine and Rubinstein (2017),Blume et al. (2009)). In our data, immigrants who start nonincorporated firms tend to be lower educated, have less Canadian experience and to have recently experienced a spell of unemployment or low earnings. At the other end of the spectrum are incorporated firms with employees, which

Levine and Rubinstein (2017) argue are more likely to be the locations of innovative activity. Immigrants have very low rates of owning those types of firms right after arrival, catching up to the native born about 10 years after arrival. By that point, the trajectory of their ownership rates is flattening: immigrants become, on average, only slightly better than the native born in ownership of the firms that policy makers likely care about but they are not exceptional in this sense. So, the answer to the question posed in our title is no - immigrants do not appear to be much more entrepreneurial than the native born in the sense of opening firms that look 'entrepreneurial' (incorporated firms with employees).

This result bears an interesting relationship to the larger debate about the impact of immigration on receiving economies. Many papers, starting with David Card's Mariel Boatlift paper (Card (1990)), have found that immigration has something close to a zero impact on wages and the employment rate in the medium to long run. One potential explanation for this can be found in the model of labour demand integrating a search and bargaining mechanism in Beaudry et al. (2018). Working with US data, they show that employment in local labour markets increases 1 for 1 with population in those markets. In the context of their model, this fits with the number of entrepreneurs being a set proportion of the population in combination with the entrepreneurs facing span of control problems, and they provide evidence in favour of this interpretation. In this situation, if an immigration inflow has the same proportion of entrepreneurs as the existing population in the receiving economy then job creation will match the new labour supply and both the employment rate and wages will not change. This matched proportionality is what we are arguing is present in the Canadian data.[19]

But even if immigration currently makes little more than a proportionate contribution to entrepreneurial talent, there remains the prospect that its contribution could be increased if governments selected immigrants more carefully for entrepreneurial talent or, more generally, human capital. We find, however, that human capital appears to play little role in the process of opening incorporated firms with employees. Initiating ownership of those firms is at best weakly related to education, Canadian experience, or, for the most part, the recent earnings history of the immigrant. This is important, in part, because the Canadian immigration system, like some others, selects immigrants based on human capital related skills and those immigrants (plus Family Class immigrants who enter based on kinship rather than skills) make up the vast majority of the people who end up owning firms. Of all those who ever

[19]Azoulay et al. (2022) also present a model in which an immigration inflow will have no effect on wages as long as the distribution of entrepreneurial ability is the same for immigrants and the native born. Their claim that immigrants have a dominant distribution of entrepreneurial ability would, in their model, imply that immigration leads to wage increases. The fact that this is not what is found in the empirical literature is another point that raises questions about their empirical claims.

open an incorporated firm, 5% enter in the Entrepreneur Class compared to 39% for the skill assessed class and 21% for the Family Class. The low proportion of firms accounted for by Entrepreneur Class entrants combined with the fact that two-thirds of those entrants never open a firm speaks to the difficulty of trying to select directly for entrepreneurial talent. The Canadian attempts in this time period, at least, were largely unsuccessful. Overall, it is not clear that governments can increase the entrepreneurial contribution of immigration with standard selection mechanisms. The only advantage of more careful selection for skills is that it is associated with a reduction in the proportion of immigrants who end up owning a nonincorporated firm.

The one caveat to these conclusions may be found in the literature on immigration and innovation in the tech and science sectors. A set of papers argues that highly educated immigrants in STEM fields bring contributions in terms of innovations and the opening of tech firms.(Hunt and Gauthier-Loiselle (2010), Blit et al. (2020), Brown et al. (2019) Picot and Ostrovsky (2017), Peri et al. (2015), Saxenian (2002), etc.). Our results do not contradict those findings. Instead, they provide some insight to immigrant entrepreneurship more generally.

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Appendices

For on-line publication

A Partial Derivatives and Standard Errors

In equation 15.47 in Wooldridge (2005), Wooldridge proposes getting the partial derivatives of a probit in which there is an endogenous variable addressed using as a control function approach as the average across individuals. That is, following his notation, write the index function determining whether the dummy dependent variable takes a value of 1 as,

$$y_1^* = z_1\delta_1 + \alpha_2 y_2 + \theta\nu_2 + e_1 \tag{1}$$

where y_1^* is the index underlying the probit, z_1 is a set of exogenous variables that directly determine y_1^* , y_2 is the right hand side endogenous variable, ν_2 are the residuals from the first stage regression of y_2 on the set of instruments, and e_1 is an error term. We are assuming joint normality so that e_1 is normally distributed. We estimate a probit based on this and obtain estimates of δ_1, α_2, and θ. Then, we can form derivatives of the probability with respect to z_1 as,

$$\frac{1}{N}\sum_i \phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i})\hat{\delta} \tag{2}$$

where, $\phi(.)$ is the standard normal density. That is, we get the derivative for each observation and average across all individuals. We do the same for the derivative with respect to y_2.

To get the standard errors for these, we just need to use the Delta method. First, create the variance-covariance matrix for the partial effects for person i, which I will call V_i.

$$V_i = \frac{\partial\phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i})\hat{\delta}}{\partial\delta'} V_{\hat{\delta}} \frac{\partial\phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i})\hat{\delta}}{\partial\delta} \tag{3}$$

To construct this, note that,

$$\frac{\partial\phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i})\hat{\delta}}{\partial\delta'} = \phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i})\cdot(-x\beta)\hat{\delta}x' + I_k\phi(z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i}) \tag{4}$$

where, $x\beta = z_{1i}\hat{\delta}_1 + \hat{\alpha}_2 y_{2i} + \hat{\theta}\nu_{2i}$ and I_k is the kxk identity matrix and k is the number of elements in the δ vector.

Then, if we assume that all observations are independent, the overall variance-covariance matrix is,

$$V = \frac{1}{N^2} \sum_i V_i \tag{5}$$

B Results for Incorporation Without Employees

In this section, we present the estimation results for entry into the third state: owning an incorporated firms with no employees.

Table 7: Estimation Results, Individual Characteristics

	INC0 First Yr	INC0 Later Yrs
age at landing (omitted: ¡25)		
25-34	0.0023***	-0.0012***
	(0.0005)	(0.0002)
35-44	0.0043***	-0.0024***
	(0.0006)	(0.0002)
45-54	0.0021***	-0.0044***
	(0.0006)	(0.0003)
female	-0.0079***	-0.0040***
	(0.0006)	(0.0002)
married	0.0031***	0.0022***
	(0.0004)	(0.0002)
education at landing (omitted: HS or less)		.
some postsecondary	0.00062	0.0011***
	(0.00048)	(0.0002)
Bachelor's degree	0.00046	0.0014***
	(0.00048)	(0.00019)
post graduate degree	0.00006	0.00097***
	(0.0006)	(0.00022)
Speaks Eng or Fr	0.0043***	0.00069***
	(0.0005)	(0.00018)
Years since entry	.	-0.00049
	.	(0.00037)
EI in t-1	.	0.00084***
	.	(0.00021)
Loc. Effects	yes	yes
Origin Effects	yes	yes
Cohort Effects	yes	yes
pseudo R-sq	0.09	.055
Observations	696332	2,691135

***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels, respectively.

Table 8: Estimation Results, Entry Class

	INC0 First Yr	INC0 Later Yrs
skilled: PA	-0.0028***	0.00029
	(0.0005)	(0.00021)
business: entrepreneurs PA	0.058***	0.0060*
	(0.0059)	(0.0026)
business: self-employed PA	0.025	0.0064**
	(0.0056)	(0.0025)
business: investors & other PA	0.013***	0.0038***
	(0.0022)	(0.001)
business: PN PA	0.0034**	0.0011
	(0.0011)	(0.00059)
skilled and business: non-PA	-0.00088	0.0013***
	(0.0005)	(0.00022)
refugees	0.0043***	0.000032
	(0.0009)	(0.00029)
other	0.0065	-0.00084*
	(0.001)	(0.00039)

The omitted category is the family class. Entrants in that class are not assessed for skills or other characteristics. PA refers to Principal Applicant - the family member who is formally assessed according to the criteria in a given entry class. ***, **, and * correspond to statistical significance a the 1%, 5% and 10% levels, respectively.