Immigrant Selection Systems and Occupational Outcomes of International Medical Graduates in Canada and the United States*

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Abstract

We analyze the process of immigrant selection and occupational outcomes of International Medical Graduates (IMGs) in the US and Canada. The IMG relicensing model of Kugler and Sauer (2005) is extended to incorporate two different approaches to immigrant selection: 1) employer nomination systems, and 2) point systems both with and without occupational restrictions. Consistent with the predictions of our model, we find that, in Canada, where a point system has been in place, IMGs are less likely to be employed as physicians than are IMGs in the US, where employer nomination is a more important entry path for IMGs.

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1 Introduction

In major immigrant-receiving countries such as Canada and the US, immigration policy is an important determinant of the supply of workers to different occupations. The labour market performance of immigrants in both of these countries has received considerable attention in the economics literature due to concern that more recent cohorts have received lower earnings than did immigrants of earlier arrival cohorts (for the US see, Chiswick (1978), Borjas (1995), Card (2005), and Smith (2006); for Canada, see Baker and Benjamin (1994) and Aydemir and Skuterud (2005)). While the experiences and immigration policies of both countries have differed in a number of ways, a shared experience of dramatic changes in source country composition since the 1960s has led to significant public policy challenges in terms of integrating new immigrants with very different linguistic and educational backgrounds into the receiving country labour markets. These challenges are especially great when the desired occupations of the potential immigrants are regulated by professional bodies which restrict access to the profession. At the same time, the nature of a country's immigrant selection process determines whether a foreign trained individual is even able to gain access to the receiving country. In this way, immigrant selection policies and professional credential recognition policies act as a double hurdle that potential immigrants must clear before they are able to work in their intended occupations in the receiving country.

The medical profession is an important example of an occupation in which significant hurdles must be overcome before an immigrant with an international medical degree is able to work as a physician. In both Canada and the US, international medical graduates (IMGs) must go through a process of examinations, medical residencies in Canadian or US hospitals, and licensing procedures before they are able to practice medicine. Faced with these costs, these immigrants may instead choose, or be forced, to accept employment in alternative occupations. If the IMG finds work in another high skill occupation then their post migration economic outcomes may be relatively good and the decision to admit the person into the receiving country could be thought of as successful since the person's human capital would have a good return in the new labour market. However, if the IMG instead is only able to find

employment in a low skill occupation (or is unable to find employment) then this constitutes a poor outcome in terms of the immigrant selection policy for the receiving country and a loss of significant human capital for the sending country.

While the certification processes for IMGs are similar in Canada and the US, the two countries' immigration policies differ considerably. Immigration of skilled individuals without family ties to US citizens has been dominated by employer nomination of skilled immigrants (and temporary migrants who eventually gain permanent resident status). The employer nomination pathway to immigration is likely to be a high hurdle for potential immigrants to clear since employers may be reluctant to take the time and go to the expense of offering employment to a candidate if s/he lacks the training or language skills needed to complete relicensing in order to work as a physician in the US. Canadian immigration policy since 1967 has differed from the US system in terms of the primary method of selection of skilled immigrants. While employer nomination in Canada is possible, it is a small part of the flow of skilled immigrants into Canada.[1] Instead, Canada has relied on a point system to allocate relatively scarce spots in the Skilled Worker and Professionals category to the long queue of potential applicants. The points are an index of the characteristics that are associated with immigrants who are expected to be successful in the Canadian economy based on objective criteria at the time of application such as education, occupation and language fluency. However, the Canadian point system has at times included occupational restrictions that have effectively excluded IMGs who were not being nominated by an employer from entering as skilled principal applicants.

We exploit this policy variation both between Canada and the United States and across time in Canada to address two main questions. First, is a point system as effective as an employer nomination system in terms of controlling the intake of immigrants wishing to work in the medical profession? Second, can occupational restrictions within a point system structure control the intake of IMGs as well as an employer nomination system?

[1]Houle and Yssaad (2010) report that only seven percent of recent immigrants to Canada had pre-arranged employment. Imai et al. (2011) find that immigrants who had pre-arranged employment obtained much better occupational matches.

These are key questions for immigration policy with regard to regulated professions given the prevalence of point systems around the world (Australia, New Zealand and the United Kingdom) and the fact that new ones have been proposed but ultimately not implemented in the US (in 2007) and even more recently proposed for Germany (see Hinte et al. (2011)). Our empirical findings support our theoretical analysis indicating that the point system without occupational restrictions that existed in Canada between 2002 and 2006 allowed an inflow of IMGs with relatively low probabilities of working as a physician. In contrast, the probability of working as a physician for IMGs is much higher in the US where admission for IMGs was based primarily on employer nomination.

2 Relicensing Procedures for International Medical Graduates in the US and Canada

Lesky (2011) reviews processes required for foreign-trained medical professionals to work as physicians in both Canada and the United States (see also McMahon (2004), for the US and Boyd and Schellenberg (2007), for Canada). In both countries, medical education entails a four year graduate program and in order to be eligible for licensure and board certification, the individual must also complete a period of residency training which constitutes graduate medical education (GME). In both countries, medical degrees and GME acquired in the other country are generally accepted as equivalent to domestic medical degrees and GME. Consequently, in each country, an IMG is typically defined to be a person who completed his/her medical training outside of either the US or Canada (see Whelan et al. (2002)).[2] This is indicative of the high degree of comparability and integration of medical education and certification across these two countries.

[2]Lesky (2011) concludes that similar educational and examination requirements exist in Canada and the US in order for an IMG to enter GME.

3 Immigration Policy Differences between Canada and the US

A number of authors have compared the labour market outcomes of immigrants in Canada relative to those in the US to see whether the existence of the point system in Canada leads to a more highly skilled stream of new immigrants landing in Canada relative to the US. Antecol et al. (2003) analyze Census data for Australia (where a point system was also in place), Canada and the US and conclude that the comparatively low skill level of US immigrants has more to do with geographic and historical ties to Mexico than with the skill-based immigrant selection systems in place in Australia and Canada. In his analysis of labour market outcomes of immigrants in Canada and the US, Borjas (1991) finds that the point system changes the national origin mix of the incoming immigrants in Canada relative to what it would be in the absence of this skilled immigration program.[3]

In contrast to previous studies, our analysis focuses on a single occupation, physicians. Consequently, the relevant question is not whether the Canadian point system leads to more educated immigrant inflows relative to the US, but whether the policy differences with regard to the admission of IMGs between Canada and the US lead to different probabilities of the IMGs working in the receiving economy as a physician. In addition, in cases where the IMG does not work as a physician, we are interested in understanding whether the IMGs are likely to work in high skill versus low skill occupations (or not work at all) and how these probabilities are affected by the way in which admission was determined.

Lesky (2011) compares the processes for selecting IMGs for entry into Canada and the US. She notes that in Canada, an IMG must be a permanent resident or Canadian citizen in order to apply for a GME position. In contrast, foreign-born IMGs wishing to enter a US residency program may be citizens, permanent residents or have an appropriate temporary visa. She remarks that the H1-B temporary-professional-worker visa and the J-1 exchange-

[3]See also Beach et al. (2007) and Green and Green (1995) for analyses of the effectiveness of the Canadian point system's policy parameters.

visitor visa are the only options for most IMGs. Both visas require an employer sponsor.[4] In terms of Canadian immigration policy towards IMGs, Lesky (2011) notes that IMGs can gain permanent resident status through the point system of the Skilled Workers and Professionals program of immigration which does not require pre-arranged employment.

It is important to highlight that the nature of the Canadian point system has varied in important ways over time and this has had an impact on its receptiveness to IMGs as potential immigrants. Over the relevant period for our analysis (1976-2006), we see two regimes in terms of whether an IMG without pre-arranged employment was able to enter Canada as a landed immigrant through the point system.[5] The first regime (1976-2001) can be thought of as a point system which had an occupational restriction against physicians unless they had pre-arranged employment.[6] The second regime began with the introduction of the Immigration and Refugee Protection Act (IRPA) in 2002 which removed occupational targeting from the point system and focused instead on the perceived human capital of the applicant. Under this regime, it was relatively easy for an IMG to gain admission under the federal point system even if their international medical degree was unlikely to be recognized and even if their fluency in either English or French was likely to be a significant barrier to working as a physician in Canada.[7]

The first regime (1976-2001) more resembles the US employer nomination system in place over the period in that it was not possible in principle to be admitted as an IMG under the point system without pre-arranged employment. In contrast, the second regime (2002-2006) less resembles the US employer nomination system since the introduction of IRPA made admission clearly about perceived human capital, making it relatively easy for IMGs to enter regardless of the challenges they might face in terms of working as a physician.

[4]Mullan et al. (1995) find that the majority of IMGs who participate in GME in the United States ultimately enter US practices.

[5]We report estimates for the pre-1976 cohorts; however, we have concerns regarding the representativeness of the samples given that our data are taken from the 2006 Canadian Census, several decades after the arrival of the pre-1976 immigrants.

[6]An important sub-period is 1982-1985 in which the economic stream of immigrants to Canada was basically shut down for immigrants who did not have pre-arranged employment in response to the very weak labour market conditions at the time (Green and Green (1995)).

[7]See Dumont et al. (2008), Green and Green (1995) and McWhinney (1998).

In summary, our two sources of policy variation are: 1) US/Canada differences related to the use of employer nomination versus a point system in the selection of IMGs and 2) variation through time in the use of occupational restrictions in the implementation of the point system in Canada. For the purposes of our analysis, we argue that these policy differences can be treated as exogenous policy variation. However, in Section 8, we examine this exogeneity assumption and also discuss other possible explanations for our findings.

4 Research on the Economic Outcomes of IMGs

Given the substantial reliance on IMGs in the medical systems of both the US and Canada, there has been interest among researchers in the employment outcomes and geographic distribution of these groups. Using data from the 2001 Canadian Census, Boyd and Schellenberg (2007) analyze the incidence of IMGs not being employed as physicians and find that the country of birth of the IMG is the most important determinant of the probability of finding employment as a doctor. Relatively little research exists on the labour market outcomes of foreign-born physicians in the United States.[8] Instead, the focus of the US literature has been on their importance as part of the US health provision systems. For example, McMahon (2004) finds that IMGs account for one-quarter of all physicians in the United States.

An important recent study by Kugler and Sauer (2005) analyzes the relicensing decisions of immigrant medical degree holders in Israel. Using data on IMGs from the former Soviet Union, they take advantage of the fact that the IMGs arriving in Israel between 1989 and 1993 were assigned to one of two different relicensing tracks depending on past experience. They use this assignment as an instrument in order to separately identify the returns to relicensing as well as the selection into relicensing since a significant fraction of the IMGs chose not to relicense after they arrived in Israel. The authors develop a model of the decision

[8] An exception is the study by McDonald et al. (2011), which employed data from the 2000 US Census and the 2001 Canadian Census to analyze the earnings and school enrolment decisions of immigrants employed as physicians in each country. The US Census does not allow for the identification of medical degree holders unless they are working as physicians; therefore, they were unable to analyze the probability of working as a physician.

to relicense for these immigrants and show that it is possible for there to be both positive and negative selection into relicensing.[9] In the former case, the high skill IMGs are more likely to enter relicensing while the low skilled are more likely to work in the unlicensed sector (due to the cost of relicensing being considered too high given the benefits). The OLS estimates of the returns to relicensing are found to be lower than the IV estimates of the indicating the presence of negative selection.

5 Model

In this section, we present the basic framework of the model of occupational re-licensing based on the model of Kugler and Sauer (2005), then extend it by introducing different immigrant selection systems. We consider the implications for the average skills of entering immigrants and the likelihood of completing relicensing under two immigrant selection rules: 1) the employer nomination approach used in the US for skilled immigrants (typically via temporary work visas leading to permanent residency) and 2) a point system based on a combination of human capital and occupational criteria similar to the one used in the Canadian immigrant selection system.

5.1 Kugler and Sauer Model

There exists a continuum of workers possessing skill type, η, where η is drawn from a distribution $F(\cdot)$ with support $[\underline{\eta}, \overline{\eta}]$. Individuals have a subjective discount rate, r, and are assumed to live for two periods. Each individual must decide whether to work in the unlicensed sector or invest time and out-of-pocket resources into relicensing. It is assumed that costs associated with acquiring a license are relatively lower for the more skilled (higher η) individuals, and the opportunity costs are also relatively higher due to the higher foregone wages. The decision over whether or not to complete relicensing in the first period is based

[9] See also Duleep and Regets (1999) for a two period model of post migration human capital investment for immigrants to the US.

on the costs of relicensing and the wages in both the licensed and unlicensed sectors in each period. As Kugler and Sauer show, an individual will choose to acquire a license and work in the licensed occupation in the second period if the present value of net earnings is higher than would be the case if the individual were to enter the unlicensed sector in the first period and works there in both periods.

5.2 IMGs as Potential Immigrants and a Skill Threshold for Relicensing

The focus of Kugler and Sauer's analysis was on IMGs who had immigrated to Israel and who already possessed medical degrees from the former Soviet Union. These individuals were entitled to reside permanently in Israel and so did not need to meet any other selection requirements. In addition, the fact that the IMGs had completed their medical training in a single country with a good quality of education means that the degree of skill heterogeneity was likely low. In contrast, the degree of heterogeneity in the pool of IMGs wishing to migrate to either the US or Canada is much greater with many different possible countries where the medical education was completed and a great deal of heterogeneity in terms of fluency in the official language(s) of the receiving country.

For notational simplicity, the distribution of skills is assumed to be the same as in section 5.1 but it applies to all potential immigrants and not just those accepted for immigration. The skill term, η, should be thought of as an aggregate index of: 1) innate ability, 2) human capital as valued in the receiving country[10] and 3) language fluency. This aggregate skill variable represents the value of the person's time either working as a physician or participating in the relicensing program in the new country.

Rather than model the selection into of relicensing as done by Kugler and Sauer, we focus on the probability that an IMG will be unable to complete a relicensing program.[11]

[10]We do not distinguish between the quality of the foreign medical training and the transferability of that training

[11]In our empirical analysis, we do account for the possibility of selection into other high skill occupations

We introduce into the model a threshold parameter, η_m, which represents the lowest value of η for which relicensing in the receiving country is possible and assume that part of the skill distribution lies below it, $\underline{\eta} < \eta_m$. Given the high skill and language requirements expected of native born students in medical degree programs in the US or Canada, it is reasonable to assume that at least some IMGs wishing to migrate have values of η that fall below this threshold (if for no other reason than a lack of language fluency).

5.3 IMG Selection through Employer Nomination

In the first period, employers are able to sponsor each applicant with skill level, η, for a temporary visa to allow them to enter the re-licensing program. If the applicant accepts the position and successfully carries out the relicensing program, s/he becomes a permanent resident and is able to work in the licensed occupation in the second period. The key issue for our analysis relates to whether IMGs receive visas in the first period. Assuming that η is observed by employers, they will make offers of visas to the highest skill applicants available. The marginal IMG sponsored for a visa by a firm in the first period will have a skill level that at least satisfies $\eta_e \geq \eta_m$ since employers would be unwilling to hire an applicant who is unable to complete the relicensing program. However, we assume that the receiving country government places a limit on the total number of visas for this occupation so as to ensure that there is not a large negative impact on wages for the physicians already working in the receiving country. Consequently, not all applicants will be accepted. The limit on visas translates into a lower bound on the skill level, η_e, for international applicants in the relicensing programs for this occupation and we assume that $\eta_e > \eta_m$.

The fraction of IMG applicants sponsored by employers for temporary visas to undergo the relicensing is: $1 - F(\eta_e)$. The expected skill level of IMGs admitted to the licensing

but abstract from it here since we see this as a relatively good outcome of the immigration of IMGs since their human capital is being employed in a high skill job as opposed to being either not employed or working in a low skill occupation (other possibilities in our empirical analysis).

program in the first period can be expressed as:

$$\mu_e \equiv E(\eta|\eta \geq \eta_e) > \mu \tag{1}$$

where μ is the unconditional mean of η. The employer nomination scheme allows for the selection of the higher skill individuals and ensures that all of the IMGs who enter the receiving country both complete relicensing and go on to work as physicians.

5.4 Immigrant Selection under a Human Capital Point System

Instead of IMGs being selected through an employer nomination system, consider the implementation of a point system where selection of skilled economic immigrants in general, and IMGs in particular, is based on human capital proxy variables such as education and work experience. In section 5.3, we argue that the number of visas issued for relicensing programs under an employer nomination program would be kept sufficiently low to ensure that there was not a large influx of IMGs that would drive down salaries or employment probabilities of physicians. Under a point system, there is much greater latitude to admit a large number of immigrants within a given occupational grouping so long as there are no occupational restrictions since the total number of immigrants is the target rather than the number of immigrants intending to enter each occupation. Under this kind of point system, individuals with relatively high education levels (such as medical degrees) are very likely to be admitted so long as their fluency in the language(s) of the receiving country is sufficiently high.

We assume that the point system screen excludes part of the lower skill distribution of IMGs. These would be IMGs whose training and/or language fluency is clearly deficient relative to medical training and language skills needed to function successfully as a physician in the receiving country. To represent this, we assume that there is an implicit minimum skill threshold, η_p, for an IMG to be admitted. In addition, we assume that $\eta_p < \eta_m < \eta_e$. The first inequality can be justified by the fact that the skill requirement needed to pass the points test is a lower skill requirement than that needed to complete a medical relicensing

program since: 1) immigration authorities are typically reluctant to treat foreign educational credentials as inferior to domestic credentials (certainly the case historically in Canada); and 2) language fluency needed to function as a physician is greater than the fluency typically needed to be admitted through a general skilled immigration program. The second inequality is taken from Section 5.3 and reflects the scarcity of employer nomination positions due to concerns regarding impact on the earnings of physicians. Taken together this implies that the minimum skill level of an IMG admitted under the point system is lower than the minimum under an employer nomination system ($\eta_p < \eta_e$). This means that the average skill level of IMGs admitted under the point system are lower than under employer nomination:

$$\mu_p \equiv E(\eta|\eta \geq \eta_p) < \mu_e \tag{2}$$

and the proportion of IMGs admitted under the point system who cannot complete relicensing is higher than under employer nomination, since $F(\eta_m) - F(\eta_p) > \mathbf{0}$.

5.5 Immigrant Selection under a Point System with Occupational Restrictions

A human capital point system can be augmented using information on intended occupation. One way to do this is to ban applications of individuals unless their intended occupation is on a preferred list of occupations. Another variation on this approach is to only allow immigrants to be admitted who intend to work in occupations on the preferred list in circumstances in which the immigrants have pre-arranged employment by a recognized employer. Under this implementation of a point system (with a ban on physicians without pre-arrange employment), we would expect the same minimum skill threshold (η_e) and the average skills of the IMGs as under an employer nomination system:

$$\mu_0 \equiv E(\eta|\eta \geq \eta_e) = \mu_e \tag{3}$$

Also, all IMGs admitted would be able to complete relicensing as is the case under the employer nomination system of section 5.3.

5.6 Theoretical Predictions Based on Immigrant Selection Systems of US and Canada since 1975

Based on our analysis of the theoretical model, the rate of IMGs working as physicians should be the same for those admitted under the US employer nomination system or under a point system with occupational restrictions that bar IMGs without pre-arranged employment, such as was in place in Canada over the period 1975 to 2001. In the period after January, 2002, a point system without occupational restrictions was introduced and our theoretical analysis predicts that IMGs admitted over this period should have higher probabilities of being unable to relicense since at least some of them will not have the human capital and/or language skills needed to complete the relicensing process.

6 The Data and Estimation Sample

The Canadian data used in the estimation are primarily taken from the 2006 Census master file. In a robustness analysis of section 8, we also use earlier Census master files for Canada. However, due to the fact that the pre-2006 Census questionnaires did not ask for the location where the respondent's highest education was obtained, we focus mainly on the 2006 Census data in the Canadian part of our analysis. This 20% sample of the Canadian population contains rich personal information. In particular, detailed information on education is available which allows for the identification of who has a medical degree and where the degree was obtained. In particular, the Canadian Census allows for the identification of individuals with medical degrees irrespective of whether or not they are working as physicians. In contrast, the US Census only identifies individuals with medical degrees if they are working as physicians. Fortunately, information equivalent to that in the Canadian Census is available

in the 1993 and 2003 US National Survey of College Graduates (NSCG). Due to the smaller sample sizes of the NSCG data (compared to the Canadian Census), we pool the samples from 1993 and 2003 in our analysis.[12] While the Canadian and American data sources are different, they both contain representative samples of all individuals with medical degrees living within the respective countries.

We present tables and figures based on our analysis of male medical degree holders. Equivalent analysis for female medical degree holders has been carried out. Given the relatively small number of female medical degree holders who trained outside of the US in the NSCG samples, the US estimates for females suffer somewhat in terms of precision. Consequently, we focus on the results for male medical degree holders which we deem to be more reliable.[13].

The age range in the analysis of both the Canadian and the US data is restricted to 29 to 65. We chose the age of 29 as our minimum age (as opposed to a younger age) so as to reduce the probability that a person in our sample has not yet completed a medical degree but would proceed to do so. We restrict both the Canadian sample and the US sample to include only individuals who have a medical degree (regardless of occupation).[14]

In Table 1, sample means are presented based on the location where medical training occurred. In our Canadian sample, a much lower percentage of the male medical degree holders reported studying in Canada (70.4%) compared with the percentage of male medical degree holders in the US who studied in the US (85.3%). Medical degree holders trained outside of Canada are most likely to have been educated in the UK group of countries, Eastern Europe, Eastern Asia and Southern Asia.[15] In the US data, IMGs are most likely to have studied in Eastern Asia, South Asia and South America. This initial snapshot reveals that both countries have a significant percentage of medical degree holders with foreign degrees

[12]The sample size in the 1993 data is 5,639 and in the 2003 data is 3,497.

[13]The results for female IMGs are available upon request

[14]In the NSCG, we can identify not only the highest degree but also the most recent degree. We present the results for the most recent degree but find the results to be identical if we restrict the analysis to the highest degree.

[15]See the notes below the tables for definitions of the country groupings.

but that Canada has a much larger share. This is consistent with the fact that Canada has a larger immigration program per capita than the US and the fact that education is an important determinant of skilled immigration under the Canadian point system.

Table 2 contains the US and Canadian distributions of medical degree holders according to whether they are: 1) working as a physician[16], 2) working in some other high skill occupation, 3) working in a low skill occupation, 4) not working. For those who studied in Canada, 91.2% are working as a physician and in each case this is higher than the equivalent statistics in the US data (87.1%). In contrast, for medical degree holders trained outside of their current country of residence, the patterns are dramatically different. In the US, the percentage of these IMGs working as a physician is only 73.5%, but the difference is larger still in Canada where the percentage of medical degree holders who studied outside Canada and who are working as a physician is only 57.2%. The proportion of medical degree holders trained outside of the country of residence and working in the other high skill occupation group is higher in Canada than in the US. When the equivalent comparison is made for low skill occupations and for not working we see higher probabilities of the IMGs in Canada in these occupational categories than for their counterparts in the US. This is strong preliminary evidence of a much larger problem of finding suitable employment as either a physician or in some other high skill occupation among IMGs in Canada compared with the case in the US. It is also consistent with the analysis of our model that a Canadian-style point system (without occupational restrictions) is more open to the admission of IMGs who are unlikely to work as physicians (or in other high skill occupations) relative to a US-style employer nomination system.

In Table 3, we present means for the Canadian and US samples for the foreign born and foreign trained sub-samples of medical degree holders according to whether the person is working as a physician in his country of residence. Focusing first on the means for Canada, we see large cross country differences. The UK group of countries has a large share of those IMGs who are working as physicians (35.9%) compared to their share of those not working

[16]Throughout our analysis, the term physician is defined to include surgeons and other medical specialists.

as a physician (3.6%). In contrast, the share of immigrants from East Asia in the working as a physician category is relatively small (at 5.9%) compared to their share in the not working as a physician category (20%). Overall, we can say that the medical degree holders who were trained in traditional immigrant source countries (US, the UK group, and Western Europe) have relatively higher representation in the working as a physician group compared to the medical degree holders who were trained in the non-traditional immigrant source countries (Eastern Europe, the Asia groupings, South America and the Caribbean).

In both the Canadian and US analyses, we control for the period of arrival of immigrant medical degree holders. The arrival cohort categories for the US part of the analysis are driven by the grouping in the public use version of the 1993 NSCG data. We used the equivalent grouping for the 2003 NSCG for consistency and include dummies for having arrived in the US in: 1) 1997-2003, 2) 1994-96, 3) 1987-93, 4) 1980-1986 (default), 5) 1975-79, 6) 1970-74, 7) 1965-69, 8) 1960-64, and 9) before 1960. In the Canadian analysis, the Census data record year of arrival in single years and so we created the following cohort groupings: 1) 2002-06, and break up the other regime into 2) 1996-01, 3) 1993-95, 4) 1990-92, 5) 1986-89, 6) 1982-85 (default), 7) 1976-81, 8) 1971-75, 9) 1967-70, 10) 1962-66, and 11) before 1961. The 2002-06 cohort includes immigrants who arrived after the introduction of IRPA which included a human capital based point system without occupational restrictions. The remaining cohorts were designed to span the relevant periods taking into account key year for immigration policy such as the 1982-85 period in which economic immigration was basically shut down with the exception of immigrants with pre-arranged employment.[17]

We also see large difference across year of arrival groupings. A large share of the IMGs admitted to Canada in our sample arrived since 1996, and they are over-represented in the 'not working as a physician' group. The differences are especially stark for the post-IRPA immigrants, the 2002-2006 cohort, which represents 36.8% of the male IMGs who are not working as a physician in our sample.[18] This is strong preliminary evidence in support of

[17]We have explored alternative groupings of the remaining cohort years and do not find that our overall findings are qualitatively affected.

[18]It is important to recall that these individuals are permanent residents and that if they were participating

our model's prediction that the immigrant medical degree holders arriving in the 2002-2006 period would have a high rate of not participating in a relicensing program due to the fact that occupational restrictions were not in place in the point system. The large share of IMGs who were admitted in the 1996 to 2001 period is not consistent with a point system with strictly enforced occupational restrictions that banned physicians. The fact that many more IMGs were admitted to Canada over this period and the fact that a high share of them fall into the not working as a physician category indicates that the immigrant selection system in Canada did not effectively exclude IMGs without pre-arranged employment, at least over this period.

While considerable variation in the US data is found by country of birth in Table 3. South Asian born men comprise 26.3% of all foreign born IMGs who are working as physicians, while only 15.1% of the immigrant men who are not working as physicians are South Asian born representing a high degree of successful integration. However, the same pattern does not exist in the Canadian means where South Asian born male IMGs are roughly equally represented in the 'working as a physician' and the 'not working as a physician' categories. Given the similarities in medical education between Canada and the US, one would expect a similar rate of working as a physician for South Asian IMGs in each country. Once again this is consistent with the predictions of our theoretical model. The different immigrant selection systems across the two immigrant receiving countries can explain these patterns. South Asian born IMGs may find it very difficult in general to gain entry into the US, but for those who do gain entry, they are able to relicense and find work as a physician. In contrast, under the Canadian point system, South Asian born IMGs may find it relatively easy to enter Canada as immigrants but then are in no way guaranteed to be able to complete the relicensing process (perhaps due to a lack of language fluency) and are unable to be employed as physicians. A similar pattern is present for East Asia and to a less extent Eastern Europe.

In contrast to the Canadian statistics, we do not see a trend towards more foreign born IMGs in the US data across arrival cohorts. If anything the trend is towards fewer IMGs. As

in a relicensing program, they would appear in our sample in the 'working as a physician' category.

was the case for Canada, we see higher rates of working as physicians for IMGs from earlier arrival cohorts. In the post-1987 period, the arrival cohorts are more highly represented in the 'not working as a physician' group. However, a comparison of these statistics by cohort to the cohort means in Table 3 for Canada reveals more preliminary evidence that the US employer nomination system for the selection of IMGs has led to higher rates of working as a physician and a more stable number of IMGs admitted relative to the Canadian experience.

7 Econometric Specification and Empirical Results

The statistics presented above suggest that there are low rates of working as a physician for IMGs in Canada relative to the US and that these differences vary by country in which the medical degree was obtained as well as period of arrival in the receiving country. In order to fully disentangle the roles of immigrant status, period of arrival, and place of medical training, we employ a multivariate model. Of particular interest is whether or not IMGs who do not work as physicians are employed in other high skill occupations. Our model is based on the possible outcomes: 1) working as a physician, 2) working in another high skill occupation, 3) working in a low skill occupation, or 4) not working (either unemployed or not in the labour force).[19]

The index associated with each branch of the model has the following general specification:

$$I_i \equiv X_i\alpha + \beta_1 M_i + \sum_{a=1}^{A-1} \gamma_a d_{ai} + \sum_{c=1}^{C-1} \delta_c D_{ci} + \sum_{b=1}^{B-1} \lambda_b R_{bi} + \varepsilon_i \tag{4}$$

Where $I_i \geq 0$ if the medical degree holder is working as a physician (and $I_i < 0$ otherwise), X_i is a set of personal characteristic (including age and its square, marital status, region of residence and size of place of residence), M_i is a vector of controls related to immigrant status (indicators for being a permanent resident or a temporary resident with citizens as

[19]See Green (1999) for a similar model of occupational outcomes of immigrants in Canada.

the default as well as an indicator for having arrived before the age of 17[20]); the d_{ai} variables identify the year of arrival for immigrants, the D_{ci} variables identify the country in which the medical degree was obtained; the R_{bi} variables identify the person's country of birth group if an immigrant; and ε_i is a mean zero error term.

The effects captured by the immigrant arrival cohort controls will reflect both differences across arrival cohorts and assimilation effects towards being in each occupational category with time in the new country. In Section 8, we also report on separate analyses where we allow for both cohort and assimilation effects in both the US and the Canadian analysis with the latter estimated over a set of four Census cross sections (1991, 1996, 2001 and 2006). It is also important to note that the arrival cohort variables in both the Canadian and US analyses are set to zero for temporary residents. This is due to the fact that the arrival year information in the Canadian data is only available for the foreign born who are either Canadian citizens or permanent residents.

We estimate two versions of the model. The first contains a single dummy variable for having completed the medical degree outside of the country of residence and another dummy that equals one if the medical degree was completed in the US in the Canadian analysis and in Canada in the US analysis. In the second version of the model, the dummy for studying medicine outside of the country of residence is replaced by a set of 10 dummies for groupings based on country of study, and two region of birth variables are also included. The estimates from the simpler specification are presented in Table 4 while the estimates from the richer specification are presented in Table 5.

The first four columns of Table 4 contain the marginal effects for Canada related to the four branches of the multinomial outcome model while the next four columns are the equivalent marginal effects for the US analysis.[21] In the Canadian analysis, the marginal effect of having studied outside of Canada (but not in the US) is a drop in the probability of

[20]Permanent residents are the subset of immigrants who do not have the citizenship of the country of residence (either the US or Canada in our analysis). Temporary residents are not considered to be immigrants.

[21]We re-estimated the econometrical model using the multinomial probit estimator which does not require the stringent Independence of Irrelevant Alternatives assumption, implicit in the multinomial logit estimator, and found qualitatively similar results.

working as a physician of 22.6% that coincides with increases in the probability of working in other high skill occupations (6.7%), low skill occupations (8.9%) and in not working (7%). These estimates indicate that there exist significant challenges for IMGs in Canada to complete relicensing and work as a physician. The marginal effects related to the US indicator variable in the first column is positive and significant indicating that US medical graduates in Canada are 5% more likely to work as physicians than are IMGs who studied in other countries (but still significantly less likely than Canadian-educated individuals). In contrast, the 'place of study' effects differ substantially in the US analysis. The marginal effect associated with having a medical degree obtained outside the US in the 'working as a physician' column is much closer to zero (-6.7%) compared to what was found in the Canadian analysis and this coincides with slightly higher probabilities of working in low skill occupations or not working (3.5%). The marginal effects for the 'study in Canada' variable in each column indicate higher probabilities of working as a physician (9.1%) and lower probabilities of being in each of the other three categories relative to individuals residing in the US with other foreign medical degrees.

In Table 4, very few of the marginal effects associated with the immigrant, permanent resident and temporary resident controls are statistically significant in the Canadian analysis. Those that are significant are small in magnitude indicating that, once we control for place of study (even at a highly aggregated level), only small differences in the occupational probabilities can be explained by immigrant status, residency status (permanent/temporary) and having arrived as a child. In the US analysis, more of these effects are significant. However, the magnitudes are all relatively small with the exception of the permanent resident indicator and the temporary resident indicator which indicate that IMGs in the US who are there on temporary visas or have permanent resident status (as opposed to citizenship) are less likely to be working as a physician and more likely to be working in another high skill occupation (with the absolute values of these effects being larger for temporary residents). Arriving as a child is associated with lower probabilities of working as a physician for male IMGs in both the Canadian and US analyses.

The next group of variables in Table 4 relate to the immigrant's arrival cohort. In the Canadian analysis, we see large negative effects with 17.2% lower probabilities of working as a physician for those who arrived between 2002-06 relative to the 1982 to 1985 default cohort. The equivalent effect for the 1996-2001 cohort is -15.6%. These negative marginal effects coincide with positive effects on the probability of not working of 9.6% for the 2002-06 cohort and 4.7% for the 1996-01 cohort and significantly higher probability of being in the other high skill occupational group (6.6%) and the low skill occupation group (4.3%) for the 1996-01 cohort.

For the most recent cohort (2002-06), the very low rates of working as a physician are consistent with the prediction of our model that a movement to a point system without occupational restrictions (with the implementation of IRPA) would lead to a lower skill inflow of IMGs with a relatively low rate of relicensing (relative to the pure employer nomination system of the default 1982-85 period). However, the low 'employment as a physician' probabilities for the IMGs who landed after 1992 is not consistent with the fact that a point system with occupational restrictions existed at the federal level that should have barred IMGs without pre-arranged employment. If this had been the case, then the probabilities of working as a physician for these cohorts should have mirrored those for the default cohort as indicated by equation (3). In Section 8, we explore possible reasons for the low probability of working as a physician for IMGs who arrived in Canada in the mid to late 1990s.

The marginal effects on the cohort controls in Table 4 for the US analysis (relative to the 1980-86 default cohort), are generally much closer to zero than their counterparts in the Canadian analysis. In terms of the post-1986 cohorts, none of the marginal effects related to working as a physician are individually significant and very few of the other marginal effects are individually significant. Therefore the worsening of the probability of working as a physician that is apparent for IMGs in Canada is not present for IMGs in the US.

In Table 5, multinomial logit estimates are presented from the model with more detailed place of study controls as well as region of birth controls for both the Canadian and US analyses. In the Canadian data, we see important variation in the probability of working as

a physician by place of study. The marginal effect on the probability of working as a physician on the indicator for having completed a medical degree in the US is -12.9% which is similar to the combined effects of having a foreign medical degree (-22.6%) and the US indicator (5.0%) in the first column of Table 4. This is associated with a 9.8% higher probability of working in another high skill occupation which indicates that while US trained medical degree holders may be less likely to work as physicians in Canada than are individuals with Canadian medical degrees, a high proportion of them are employed in similarly high skill occupations. The marginal effects in each column of Table 5 for the Canadian analysis related to the UK group place of study variable are not individually significant indicating that they have a similar occupational distribution to those individuals with Canadian medical degrees. Large negative marginal effects on the probability of working as a physician are associated with having received a medical degree from each of the other place of study groupings with the effects varying from -23.7% for Western Europe to -58.1% for East Asia.

In the US analysis of Table 5, we see marginal effects for the place of study controls that are much closer to zero. In terms of the working as a physician outcome, the individual source country marginal effects are not individually significant for Western Europe, Eastern Europe, Africa, Western Asia, South Asia and Developed Asia. These are all countries that were associated with large negative marginal probabilities of working as a physician in the analysis for male IMGs in Canada. The effects for East Asia, South America and Caribbean are significant and range from -13.1% of -19% but are much smaller in absolute value than their equivalents in the Canadian analysis.

In Figure 1, we present these marginal probabilities associated with the place of study variables for the US and Canada based on the estimates of Table 5. The first two bars of each group relate to the men with medical degrees from either the US or the UK group for whom recognition of their educational credentials is relatively easier than for other IMGs. For men with medical degrees from other countries, we see large drops in the probability of working as a physician (relative to a Canadian medical degree holder) associated with somewhat higher probabilities of working in the other high skill category but larger still

probabilities of working in both the low skill and the not working categories. These general patterns indicate broader difficulties gaining a reasonable return on their foreign medical human capital for IMGs from these countries in Canada.

Figure 2 illustrates the place of study effects for males in the US and is comparable to Figure 1. The large negative effects on probability of working as a physician and the positive effects on the probability of working in other occupations (especially the low skill and not working at all) found for male IMGs in Canada are almost completely absent from the US estimates. Comparing the patterns in Figure 1 and Figure 2, we see more evidence in support of this view that employer nomination leads to high probabilities of IMGs working as physicians in the receiving country and low probabilities of working in low skill occupations or not working at all relative to the Canadian case where employer nomination is less likely to be the route that an IMG would take to enter Canada.

The next group of variables in Table 5 are the two aggregated country of birth variables: Non-English language countries in Europe and 'Other', with English language countries being the default group.[22] None of the 'place of birth' effects is individually significant in either the Canadian or US analysis. It is not surprising that these effects are generally not significant since much of the cross country variation in probabilities of working as a physician are being picked up by the country of education controls. As was the case in Table 4, the marginal effects related to the immigrant status indicator, the permanent resident and temporary resident status indicators, and the 'arrived as a child' variable, follow broadly similar patterns in Table 5 as in Table 4.

The final set of variables in Table 5 relates to the period of arrival of immigrant medical degree holders. The cohort patterns for Canada are similar to what was found in Table 4; however, the magnitude of the cross cohort decline in terms of probability of working as a physician is diminished. For example, the marginal effect for the 2002-06 cohort drops from 17.2% to 12.1%. This is consistent with the idea that the cross cohort shift towards new source countries for more recent IMGs immigrating to Canada is captured by the large

[22]Canada is considered an English language country for the purposes of the US analysis.

negative place of study controls in Table 5 whereas at least part of these effects are absorbed by the arrival cohort effects in Table 4 (using the econometric model with the simpler specification of the place of study controls).

In the US analysis, the cross cohort pattern in the model without the detailed place of study controls moves closely with the pattern from the model that contains these controls. Unlike what was found for Canada, the inclusion of detailed place of study controls does not have important effects on the estimated cross cohort profiles. This is not surprising given the relatively small role played by the place of study variables in explaining the probability of working as a physician.

Taken together, the estimates related to place of study are consistent with our theoretical prediction that immigrant selection based on a point system (without occupational restrictions) applies a lower standard for the skill level of the potential IMG than does an employer nomination scheme (as indicated by equation (2) where $\mu_p < \mu_e$ and resulting in a higher probability of being unable to relicense as a physician). The US immigrant selection system appears to select IMGs who are more likely to be able to relicense and work as a physician than are the IMGs selected from the same country of study grouping in Canada. The fact that such a large fraction of the IMGs in Canada are either employed in low skill occupations or are not working is consistent with them having a low level of skill relative to holders of Canadian medical degrees. It is also evidence against the type of negative selection found by Kugler and Sauer (2005) for IMGs in Israel since it does not appear that many of the IMGs trained in non-traditional source countries are employed in other high skill occupations. However, the pattern for US trained physicians is consistent with the idea of negative selection since we see both lower probabilities of working a physician and higher probabilities of working in another high skill occupation.

However, it should be stressed that not all of the observed patterns in the estimates are consistent with our theoretical predictions. Given that: 1) a point system with occupational restrictions was in place in Canada prior to 2002, and 2) IMGs who immigrated to Canada in the 1993-2001 period have 9 to 16 percent lower probabilities of working as a physician than

did their counterparts who arrived earlier, the observed patterns cannot be fully explained by the immigration policy differences discussed so far both across Canada and the US and across time in Canada. As already indicated, we consider other possible explanation below.

8 Alternative Explanations and Robustness Checks

The discussion to this point has focused on the role of immigration policy in each country in determining the probability of working as a physician for IMGs. However, in order to accept the reduced form estimates as being causal in the sense of reflecting the impact that switching from say an employer nomination system (such as the US has) to a human capital point system without occupation restrictions (such as Canada had beginning in 2002), it is essential that the immigration policy variation be exogenous and that no other unobserved differences either across the countries or across time be relevant in terms of affecting the probability of an IMG working as a physician. Below, we assess the validity of these assumptions.

8.1 Exogeneity of Immigration Policy

The decision to use a point system rather than employer nomination as the principal way of attracting skilled immigrants to Canada (compared with the US) is driven by philosophical differences between the two countries related to the roles of government and the private sector. Specifically, the Canadian approach historically has been to trust government officials to select skilled immigrants, whereas the US approach has been to trust employers to select skilled immigrants. We argue that these different approaches to immigrant selection are not endogenous in the sense of being related to any other unobserved factors that would affect the economic outcomes of IMGs after arrival in the receiving country. In terms of the variation across time in the use of occupational restrictions in the Canadian point system, we believe that the elimination of the occupational restriction towards physicians under the Canadian point system in 2002 should be considered as an exogenous policy change at least

with regard to the impact it had on the labour market outcomes of IMGs. This policy change was not targeted explicitly at physicians but rather these were changes in the extent to which a broad class of occupational restrictions were imposed on immigrant selection.

That said, other differences between the labour market for physicians in Canada and the US may be relevant in terms of determining the types of IMGs willing to immigrate to each country and we are unable to account for these differences in our analysis. All we can conclude is that the US/Canada empirical differences in the probability of working as a physician for IMGs are consistent with our theoretical prediction that employer nomination is more likely to restrict the intake of IMGs who are unable to work as a physician in the receiving country relative to a human capital point system without occupational restrictions.

8.2 The Role of Time of Arrival and Immigrant Cohort Differences

As a further robustness check, we also investigated whether the patterns found in Table 4 were robust to the included of immigrant arrival cohort effects. In the US analysis, we estimated the model with a set of interactions of the arrival cohort variables with a 1993 survey year indicator variable to allow for the identification of arrival cohort effects from the effect of years-since-migration.[23] The coefficients on these cohort/year-1993 interactions were mostly not individually significant and the inclusion of these variables did not have an important effect on the estimated coefficients on the other variables in the model. For Canada, we re-estimated the equivalent model to that of Table 4 over four Canadian Census confidential master files: 1991, 1996, 2001 and 2006. As already noted, the weakness of the pre-2006 Census questionnaires is that they did not have questions regarding the country in which the person's highest educational degree was awarded. Consequently, we needed to impute whether the immigrant medical degree holder is likely to have received his medical degree in Canada or elsewhere based on year of arrival in Canada. The pattern of the

[23]See Borjas (1985) for a discussion.

coefficient estimates is similar to what was found in Table 4.[24]Consequently, we do not find evidence to indicate that years-since-migration effects towards working as a physician are behind the large negative coefficient estimates on the 1996-2001 and the 2002-2006 arrival cohort effects for Canada in Table 4.

8.3 Health Human Resource Policy Dynamics in Canada and the United States

The capacity of an IMG to work in the receiving country will depend on the availability of placements in certification and residency programs. If those opportunities vary through time then these policy dynamics could explain any observed differences across arrival cohorts in the probability of working as a physician. First, consider the case of the US where we do not see important variation in immigration policy as it relates to the admission of foreign born IMGs across the immigrant arrival period observed in our data, and where we do not observe significant cross cohort variation in the probability of working as a physician. Boulet et al. (2006) provide an overview of the "international medical graduate pipeline" over the period 1980 to 2004. In Exhibit 3 of their article, they report a steady but slow increase in the total number of certified international medical graduates[25] entering residency programs beginning in 1995 at 5,410 and rising to 6,004 in 2003. However, it is worth noting that this increase is driven mainly by an increase in the number of IMGs who were US citizens at the time of entry into the foreign medical school program (from 413 in 1995 to 1150 in 2003). When one focuses on IMGs who were not US citizens at the time of entry into their foreign medical school program, the number who were certified and entering residency programs was basically static over the period (varying from a high of 4,997 in 1995 to a low of 4,463 in 1998 and being at 4,854 in 2003). Given: 1) the overall stability of these numbers, and 2) the fact that the literature does not report important changes in the medical system's

[24]These results are available from the authors upon request.

[25]Certified international medical graduates are IMGs who have passed the Educational Commission for Foreign Medical Graduates certification process.

openness to IMGs, we conclude that the US IMG system of both certifying and integrating foreign born IMGs into working in the medical profession did not change in important ways over the relevant time period of our analysis.

In the Canadian case, there is evidence in the literature of an important tightening of the number of residency spots available for IMGs in the early 1990s. Dauphinee (2006) reports that, in 1992, a federal/provincial/territorial conference of Deputy Ministers of Health decided to implement a subset of the Barer-Stoddard Report's recommendations including an "... active discouragement of accepting international medical graduates (IMGs) into Canadian residencies and professional positions...". This policy was left in place through 1999. Beginning in 2000, a new strategy was implemented "... designed to improve the efficiency of processing IMG applications and the repatriation of Canadians studying medicine outside of Canada..." (p. 833, Dauphinee, 2006). These policy dynamics are relevant for our analysis and could be the cause of the relatively poor outcomes of IMGs who arrived as immigrants in Canada in the mid to late 1990s as seen by the statistically significant marginal effects for the 1996-2001 cohort variable (-0.156) and the 1993-95 cohort variable (-0.095) from the first column of Table 4.

In Figure 3, we present the share of first year trainees in Canadian medical training programs who were IMGs over the available years 1990-2011.[26] The share of IMGs in the first year of this program fell from a 1990s high of 6.2

We investigated whether the changing health human resource policy in Canada with regard to IMGs in the 1990-2006 period can explain all or part of the observed cross cohort profile of occupational outcomes of IMGs in Canada. We re-estimated the occupational outcomes model for Canada of Table 4, after including a variable for the share of first year trainees who were IMGs in the year of landing in Canada of our immigrant sample. The IMG share variable has a marginal effect on the probability of working as a physician of 0.92 that is significant at the five percent level. This is consistent with the idea that a larger

[26]The values for the years 1990-2002 are taken from Table 1 of Thurber (2003) while the values for 2003-11 are taken from CAPER (2012).

share of residency spots going to IMGs means that it is easier for IMGs to relicense and enter the physician labour force in Canada with full rights to practice medicine. In terms of the marginal effects related to the other variables, they were found to be generally very similar to what was found in the first four columns of Table 5 with the exception of the 1990-2001 arrival cohort controls which were closer to zero and not statistically significant in each case.[27] The marginal effect associated with the 2002-06 cohorts in the model with the IMG share variable included was similar (-0.141) to its counterpart of Table 5 (-0.121) although the level of significance declines from the one percent level to the 10 percent level.[28]

Taken together, the estimates are consistent with the idea that it was the restriction in residency spots for IMGs in the 1990s that led to the relatively poor outcomes of IMGs arriving in Canada in the latter part of that decade and not the nature of the immigrant selection system. However, after IRPA was introduced in 2002, there was a decline in the probability of working as a physician for IMGs who landed in that cohort and that was true in spite of the fact that there was an expansion of the number of residency spots for IMGs beginning in 2000. The health human resources dynamics if anything provide a bias away from finding an effect of IRPA in 2002 on the probability of working as a physician. The expansion of the number of spots in residency programs for IMGs in the post 1999 made it easier for IMGs to gain certification allowing them to work as physicians in Canada. That said, it is important to recognize that the IMG share variable is endogenous to the immigrant selection process.[29] Consequently, these cannot be considered as structural relationships.

[27]For the 1996-2001 cohort, the marginal effect on the probability of working as a physician changes from being -0.114 in Table 5 and is significant at the one percent level to being -0.041 and not statistically significant (with a standard error that is very close to that of the equivalent marginal effect in Table 5). Similarly, the point estimate of the marginal effect on the 1993-95 cohort is much closer to zero at 0.001 compared with -0.084 for the equivalent marginal effect in Table 5.

[28]These results are available from the authors upon request.

[29]We were unable to find an instrument for the share variable.

8.4 Causes for the Growth in IMGs arriving in Canada in the 1990s

A remaining question relates to the reason for the increased number of IMGs entering Canada in the mid to late 1990s (see Table 3), a period in which a human capital point system with an occupational restriction was in effect that should have prevented IMGs from entering the country through the point system. Dumont et al. (2008) note that IMGs may have entered as spouses of principal applicants admitted through the point system. In this case, the IMG's spouse would only need: 1) high enough education and language fluency and 2) the intention to work in an occupation on the preferred list, and the IMG could then enter as the accompanying spouse. They also remark that between 1986 and 2001, approximately 29% of all landed immigrants intending to work as a general practitioner were dependents. This option would not have existed for IMGs wishing to immigrate to the US where, for example, an IMG realistically could only accompany his/her spouse to the US if the spouse had pre-arranged employment which we view as a much higher hurdle to clear than having a spouse who could pass the Canadian point test. It is also worth noting that under the H1B visa, a spouse may accompany the visa holder to the US but may not work without having his/her own visa. This greatly decreases the attractiveness for an IMG to enter the US on his/her spouse's H1B visa relative to entering Canada through the point system as an accompanying spouse since, in the latter case, the spouse of the principal applicant would be a permanent resident upon arrival in Canada with the right to work.

Dumont et al. (2008) also note that some physicians may have found entry to Canada by applying as either self-employed individuals or under the investor category, alternative streams of entry that did not face occupational restrictions. Both of these pathways to permanent residency in Canada for IMGs would have become easier after the intake of economic immigrants was greatly expanded in the late 1980s and early 1990s.[30]

[30]In 1985, 84,345 immigrants landed in Canada but by 1988 that number had nearly doubled to 161,584 and over the period 1989 through 2001, the total intake was above 200,000 in virtually every year (Citizenship and Immigration Canada (2011)). The share entering through the economic class grew from 36% in 1986 to 55.5% in 1996.

Consequently, the expanding intake of economic immigrants in the 1990s allowed for a greater number of IMGs to find their way into Canada using the pathways described above, allowing them to by-pass the occupational restriction in the point system. While they were able to enter Canada and become permanent residents, their pathway to working as a physician was in many cases blocked by the relatively strict health human resource policy in place over the 1992 to 1999 period. This can explain both the growth in IMGs across the arrival years in the 1990s and the fact that there were relatively low probabilities of working as a physician relative to the case of IMGs who arrived in Canada in earlier arrival years.

9 Conclusions

Three main empirical results arise from our analysis of the occupational outcomes of international medical graduates (IMGs) in Canada and the US. First, large US-Canada differences are found in the probability of IMGs working as physicians. Specifically, IMGs in Canada are much less likely to work as physicians (relative to holders of domestic medical degrees) when compared with their counterparts in the US, and this difference is especially large for IMGs from non-English language countries. In addition, the IMGs from non-English language countries in Canada are more likely to be either employed in low skill occupations or to fall into the not working category than are individuals with medical degrees acquired in Canada.

Second, the period following the removal of occupational restrictions barring IMGs from the Canadian human capital point system is associated with a large increase in the number of IMGs entering Canada and very low probabilities of either working as a physician or of working in other high skill professions. In contrast, the IMGs who migrated to Canada under the point system with occupational restrictions of the late 1970s, 1980s and early 1990s had probabilities of working as a physician which were much closer to those of individuals with Canadian or American medical degrees. In contrast to these large differences across arrival cohorts for Canada, the cross cohort patterns since 1975 for the US indicate either no decline

or a small decline in the probability of IMGs working as physicians.

These first two empirical findings are consistent with our theoretical analysis indicating that a human capital point system without occupational restrictions (in place in Canada beginning in 2002) is more likely to allow IMGs to enter the country who are unable to relicense and practice as physicians than is an employer nomination system of immigrant selection (such as was in place in the US over our period of analysis). In addition, the fact that IMGs arriving in Canada prior to the 1990s had relatively high probabilities of working as a physician is also consistent with our theoretical prediction that a human capital point system with an occupational restriction will have a similar capacity to an employer nomination system in terms of preventing the entry of IMGs who are unable to relicense and work as a physician.

Our third key empirical finding is that the cross cohort decline in the probability of working as a physician in Canada beginning in the early 1990s predates the elimination of the occupational restrictions under the point system in 2002. This is evidence against our theoretical prediction that a human capital point system with an occupational restriction is able to prevent the entry of relatively low skill IMGs who are unable to relicense and work as a physician in the receiving economy. We argue that the expansion of the economic class of immigrant admission led to an increased inflow of IMGs entering either as spouses of principal applicants under the point system or under the separate investor and self-employed classes of admission (which were not subject to the occupational restrictions of the point system) leading to an increased inflow of IMGs into Canada by the mid 1990s. This coupled with a tightening of the health human resource policy towards the acceptance of IMGs into medical training programs in Canada between 1992 and 1999 likely caused the decline in the probability of working as physicians for the mid to late 1990s arrival cohorts relative to the earlier arrival cohorts.

Consequently, our analysis suggests that a pure employer nomination system is a more effective method of ensuring that IMGs who enter the economy are able to relicense and work as physicians than a point system without an occupational restriction. In addition,

the inconsistency of the Canadian point system with occupational restrictions in terms of preventing the entry of IMGs who are unable to relicense and work as physicians indicates that an employer nomination system is likely to be a more effective method of selection of IMGs than a point system with an occupation restriction, especially in cases where the occupational restriction does not apply to all economic immigrants.

It is important to note that changes to Canadian immigration policy after 2006 moved the system back in the direction of occupational restrictions since applicants under the Skilled Worker program must either have pre-arranged employment or their intended occupation must be on a list of occupations. While physicians are on the current list of acceptable occupations and so the newly reinstated occupational restrictions do not affect IMGs wishing to immigrate to Canada, there is a limit on the total number of immigrants entering each year under a given occupation.

It is not possible to say from our analysis that an employer nomination system of immigration is superior to a point system based on human capital (or one augmented with occupational restrictions). To address this question one would need to look at all occupations and types of immigrants. However, with the current trend in many countries towards human capital based point systems, our analysis shows the risk that is present in terms of creating severe occupational imbalances (especially with regard to regulated professions) which are not as likely to be present within an employer nomination system.

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Table 1: Location of Study for Male Medical Degree Holders (%), 29-65 in Canada and the US:

	Canada		US
Canada	70.4	US	85.3
US	2.4	Canada	0.9
UK/Ireland/Aus/NZ[a]	8.1	UK/Ireland/Aus/NZ[a]	0.8
Western Europe	1.9	Western Europe	1.6
Eastern Europe	3.2	Eastern Europe	0.7
Africa[b]	2.1	Africa[b]	0.5
Western Asia	2.7	Western Asia	0.9
South Asia	2.9	South Asia	2.7
Eastern Asia	3.0	Eastern Asia	2.2
Developed Asia[c]	1.3	Developed Asia[c]	0.8
South America	1.3	South America	2.4
Caribbean	0.7	Caribbean	1.4
Sample	9,192		6,719

Source: Authors' calculations based on Statistics Canada, "2006 Canadian Census: 20 Percent Master File," and the 1993 and 2003 US National Survey of College Graduates.
Note: All statistics are in percentage terms.
a: Also includes Israel and South Africa
b: Excludes South Africa
c: Includes Japan, South Korea, Taiwan, Singapore and Hong Kong.

Table 2: Occupational Outcomes for Male Medical Degree Holders: Canada and US, 29-65

Studied in Canada	Canada	Studied in US	US
Physician (incl. specialist)	91.2	Physician (incl. specialist)	87.1
Other High Skill Occupation	4.6	Other High Skill Occupation	7.4
Low Skill Occupation	1.8	Low Skill Occupation	1.8
Not Working	2.5	Not Working	3.7
Sample Size	6,471	Sample Size	5,091
Studied outside Canada	Canada	Studied outside US	US
Physician (incl. specialist)	57.2	Physician (incl. specialist)	73.5
Other High Skill Occupation	12.7	Other High Skill Occupation	8.8
Low Skill Occupation	15.2	Low Skill Occupation	10.7
Not Working	14.9	Not Working	7.0
Sample Size	2,721	Sample Size	1,628

Source: Authors' calculations based on Statistics Canada, "2006 Canadian Census: 20 Percent Master File," and the 1993 and 2003 US National Survey of College Graduates.
Note: All statistics are in percentage terms.

Table 3: Characteristics of Male Immigrants in Canada and the US whose medical degree was obtained outside country or residence, 29-65

	Canada			US		
	Working as Physician	Not Working as a Physician	Total	Working as Physician	Not Working as a Physician	Total
Permanent resident[a]	30.0	41.6	35.5	27.2	38.7	30.5
Place of Study						
US/Canada[b]	2.2	0.9	1.6	5.9	2.4	4.9
UK/Ire/Aus/NZ[c]	35.9	3.6	20.7	5.3	3.5	4.7
Western Europe	4.7	3.0	3.9	4.5	4.8	4.6
Eastern Europe	7.3	14.0	10.5	4.6	7.7	5.5
Africa[d]	13.4	10.0	11.8	5.1	5.3	5.1
Western Asia	7.0	17.9	12.1	9.5	5.6	8.4
South Asia	13.0	14.7	13.8	26.3	15.1	23.0
Developed Asia[e]	4.4	6.2	5.2	15.2	21.1	16.9
East Asia	5.9	20.0	12.6	7.5	3.3	6.3
South America	3.9	6.4	5.1	9.7	20.0	12.7
Caribbean	2.0	3.0	2.5	5.9	11.4	7.5
Period of Arrival						
2002-06	23.1	36.8	29.6	-	-	-
1996-01	16.1	28.9	22.1	-	-	-
1993-95	2.4	3.5	2.9	-	-	-
1990-92	7.6	7.1	7.3	-	-	-
1986-89	9.1	6.1	7.7	-	-	-
1982-85	12	8.9	10.6	-	-	-
1976-81	10	3.7	7.0	-	-	-
1971-75	13.7	2.9	8.6	-	-	-
1967-71	*	*	2.7	-	-	-
1962-66	0.8	*	*	-	-	-
Before 1961	*	*	*	-	-	-
1997-03	-	-	-	2.7	7.5	4.1
1994-96	-	-	-	4.6	6.2	5.1
1987-93	-	-	-	14.2	33.6	19.8
1980-86	-	-	-	17.1	20.1	18.0
1975-79	-	-	-	16.5	9.6	14.5
1970-74	-	-	-	20.8	9.9	17.6
1965-69	-	-	-	15.0	5.1	12.1
1960-64	-	-	-	5.9	5.5	5.8
Before 1960	-	-	-	3.1	2.6	3.0
Arrived age 17 or less	4.0	2.7	3.4	7.5	4.7	6.7
N	1,160	1,030	2,190	1,110	271	1,381

Source: Authors' calculations based on Statistics Canada, "2006 Canadian Census: 20 Percent Master File," and the 1993 and 2003 US National Survey of College Graduates. A * denotes a statistic with too small of a sample size to be released by Statistics Canada.

a: This table excludes temporary residents since year of arrival and age at arrival are not reported

b: This is a dummy variable for US trained medical degree holders in the Canadian analysis and Canadian medical degree holders in the US analysis. Note that the default group is Canadian medical degree holders in the Canadian analysis and US medical degree holders in the US analysis.
c:Also includes Israel and South Africa
d: Excludes South Africa
e:Includes Japan, South Korea, Taiwan, Singapore and Hong Kong.

Table 4: Marginal Effects from Multinomial Logit Estimation of Occupational Outcomes, Males Holding a Medical Degree, Limited Place of Study Controls

	Canada				US			
	Physician	Other High Skilled	Low Skilled	Not Working	Physician	Other High Skilled	Low Skilled	Not Working
Place of Study								
Not in Country of	-0.226**	0.067**	0.089**	0.070**	-0.0670**	-0.00420	0.0359**	0.0353*
Residence	[0.019]	[0.012]	[0.012]	[0.013]	[0.0225]	[0.0119]	[0.00928]	[0.0173]
US/Canada[a]	0.050**	-0.003	-0.025**	-0.022**	0.0913**	-0.0578**	-0.0179**	-0.0157**
	[0.016]	[0.014]	[0.003]	[0.005]	[0.0127]	[0.0106]	[0.00296]	[0.00601]
Immigrant	-0.032+	0.013	0.007	0.012	-0.0492+	0.0273	0.0152+	0.00665
	[0.018]	[0.013]	[0.007]	[0.010]	[0.0263]	[0.0225]	[0.00795]	[0.0121]
Permanent Resident	0.016	-0.015	-0.007	0.005	-0.0586*	0.0491*	0.00126	0.00828
	[0.016]	[0.011]	[0.005]	[0.009]	[0.0263]	[0.0238]	[0.00573]	[0.0120]
Temporary Resident	-0.025	0.038*	-0.021**	0.007	-0.140*	0.121*	0.0196	-0.000708
	[0.024]	[0.019]	[0.004]	[0.014]	[0.0571]	[0.0524]	[0.0235]	[0.0169]
Arrived as child	-0.051+	0.008	-0.002	0.045*	-0.104*	0.0369	0.0180	0.0495
	[0.030]	[0.020]	[0.009]	[0.021]	[0.0460]	[0.0331]	[0.0182]	[0.0303]
Period of Arrival								
2002-06	-0.172**	0.046	0.030+	0.096**	-	-	-	-
	[0.043]	[0.028]	[0.015]	[0.033]				
1996-01	-0.156**	0.066**	0.043**	0.047**	-	-	-	-
	[0.032]	[0.024]	[0.015]	[0.018]				
1993-95	-0.095+	0.044	0.030	0.020	-	-	-	-
	[0.053]	[0.037]	[0.022]	[0.024]				
1990-92	-0.010	-0.005	0.023+	-0.008	-	-	-	-
	[0.023]	[0.016]	[0.013]	[0.008]				
1986-89	0.012	-0.008	0.005	-0.009	-	-	-	-
	[0.020]	[0.015]	[0.009]	[0.008]				
1976-81	0.061**	-0.022*	-0.015**	-0.025**	-	-	-	-
	[0.013]	[0.011]	[0.005]	[0.004]				
1971-75	0.085**	-0.033**	-0.023**	-0.029**	-	-	-	-
	[0.011]	[0.009]	[0.004]	[0.003]				
1967-70	0.070**	-0.029*	-0.019**	-0.021**	-	-	-	-
	[0.016]	[0.013]	[0.005]	[0.005]				
1962-66	0.041	-0.005	-0.014	-0.023**	-	-	-	-
	[0.032]	[0.029]	[0.011]	[0.007]				
Before 1961	0.067**	-0.020	-0.019**	-0.027**	-	-	-	-
	[0.021]	[0.018]	[0.007]	[0.005]				
1997-03	-	-	-	-	-0.0201	-0.0508**	0.0639	0.00697
					[0.0594]	[0.0171]	[0.0463]	[0.0294]
1994-96	-	-	-	-	0.0253	-0.0440**	0.0160	0.00271
					[0.0347]	[0.0167]	[0.0186]	[0.0245]
1987-93	-	-	-	-	-0.0474	0.0285	0.0250	-0.00616
					[0.0333]	[0.0281]	[0.0158]	[0.0120]
1975-79	-	-	-	-	0.0310	-0.00537	-0.0112**	-0.0144**
					[0.0237]	[0.0229]	[0.00260]	[0.00512]
1970-74	-	-	-	-	0.0440+	-0.00961	-0.0136**	-0.0208**
					[0.0228]	[0.0223]	[0.00261]	[0.00331]
1965-69	-	-	-	-	0.0766**	-0.0437**	-0.0141**	-0.0187**

					[0.0145]	[0.0137]	[0.00255]	[0.00359]
1960-64	-	-	-	-	0.0329	-0.00913	-0.00761	-0.0162**
					[0.0250]	[0.0235]	[0.00530]	[0.00524]
Before 1960	-	-	-	-	0.0311	-0.00294	-0.0147**	-0.0135*
					[0.0381]	[0.0386]	[0.00250]	[0.00651]
Sample Size	9,192				6,719			

Note:

1) Also includes controls for marital status, major city, province of residence, age and age squared.
2) Robust standard errors in square brackets.
3) **, * and + denote significance at 1%, 5% and 10% level of significance.
4) See Table 3 notes for definitions of the region of education variables

Source: generated by the authors based on Statistics Canada, 2006 Canadian Census: 20 Percent Master File and the public use files of the 1993 and 2003 NCGS.

a: This is a dummy variable for US trained medical degree holders in the Canadian analysis and Canadian medical degree holders in the US analysis. Note that the default group is Canadian medical degree holders in the Canadian analysis and US medical degree holders in the US analysis.

Table 5: Marginal Effects from Multinomial Logit Estimation of Occupational Outcomes, Males Holding a Medical Degree, Detailed Place of Study Controls

	Canada				US			
	Physician	Other High Skilled	Low Skilled	Not Working	Physician	Other High Skilled	Low Skilled	Not Working
Place of Study								
US/Canada[a]	-0.129**	0.098**	0.005	0.026	0.0804**	-0.0566**	-0.0172**	-0.0065
	[0.040]	[0.035]	[0.016]	[0.019]	[0.0169]	[0.0116]	[0.00287]	[0.0118]
UK/Ire./Aus./NZ	-0.035	0.015	0.007	0.012	-0.0214	0.0212	-0.0123**	0.0126
	[0.027]	[0.018]	[0.017]	[0.014]	[0.0372]	[0.0300]	[0.00356]	[0.0207]
Western Europe	-0.237**	0.128**	0.058+	0.052+	-0.0282	-0.00658	0.00408	0.0307
	[0.050]	[0.038]	[0.032]	[0.030]	[0.0385]	[0.0185]	[0.00880]	[0.0327]
Eastern Europe	-0.481**	0.088**	0.214**	0.179**	-0.0958	0.00471	0.0555	0.0355
	[0.052]	[0.030]	[0.057]	[0.050]	[0.0592]	[0.0414]	[0.0341]	[0.0366]
Africa	-0.277**	0.051	0.097**	0.129**	-0.00677	-0.0244	0.0108	0.0204
	[0.052]	[0.037]	[0.033]	[0.040]	[0.0506]	[0.0257]	[0.0215]	[0.0383]
Western Asia	-0.394**	0.088**	0.152**	0.153**	-0.00762	-0.0207	0.0158	0.0125
	[0.050]	[0.033]	[0.042]	[0.043]	[0.0400]	[0.0298]	[0.0186]	[0.0226]
South Asia	-0.354**	0.045+	0.195**	0.114**	0.00340	-0.0345*	0.0190	0.0121
	[0.048]	[0.025]	[0.044]	[0.037]	[0.0275]	[0.0147]	[0.0139]	[0.0202]
East Asia	-0.581**	0.199**	0.248**	0.134**	-0.131**	0.0179	0.0592*	0.0539
	[0.043]	[0.041]	[0.051]	[0.038]	[0.0450]	[0.0231]	[0.0245]	[0.0356]
Developed Asia	-0.343**	0.059+	0.088*	0.196**	-0.00659	-0.0267	0.0175	0.0158
	[0.069]	[0.034]	[0.039]	[0.058]	[0.0440]	[0.0269]	[0.0280]	[0.0264]
South America	-0.445**	0.124**	0.223**	0.098*	-0.106**	-0.00831	0.0962**	0.0177
	[0.067]	[0.046]	[0.058]	[0.043]	[0.0397]	[0.0203]	[0.0319]	[0.0200]
Caribbean	-0.519**	0.030	0.286**	0.203**	-0.190**	0.00903	0.0472+	0.134*
	[0.072]	[0.048]	[0.081]	[0.069]	[0.0640]	[0.0283]	[0.0242]	[0.0590]
Place of Birth								
Non–Eng./Europe	-0.032	0.020	0.019	-0.007	-0.0160	0.00421	0.00101	0.0108
	[0.029]	[0.020]	[0.020]	[0.010]	[0.0306]	[0.0231]	[0.00970]	[0.0178]
Other	-0.044+	0.005	0.021	0.018	-0.00472	0.0137	0.00189	-0.0108
	[0.023]	[0.014]	[0.016]	[0.012]	[0.0245]	[0.0202]	[0.0107]	[0.00749]
Immigrant	0.006	0.002	-0.010	0.002	-0.0553	0.0184	0.0155	0.0214
	[0.024]	[0.017]	[0.012]	[0.012]	[0.0381]	[0.0267]	[0.0175]	[0.0202]
Permanent Resident	-0.000	-0.009	-0.001	0.010	-0.0564*	0.0494*	0.000523	0.00650
	[0.020]	[0.013]	[0.006]	[0.010]	[0.0260]	[0.0236]	[0.00520]	[0.0117]
Temporary Resident	-0.003	0.030	-0.023**	-0.004	-0.149*	0.109*	0.0183	0.0220
	[0.029]	[0.025]	[0.004]	[0.013]	[0.0652]	[0.0545]	[0.0284]	[0.0335]
Arrived as child	-0.034	0.003	-0.005	0.035+	-0.0812*	0.0320	0.0150	0.0342
	[0.029]	[0.020]	[0.008]	[0.019]	[0.0407]	[0.0308]	[0.0166]	[0.0238]
Period of Arrival								
2002-06	-0.121**	0.040	0.018	0.063*	-	-	-	-
	[0.042]	[0.028]	[0.013]	[0.028]				
1996-01	-0.114**	0.057*	0.032*	0.025+	-	-	-	-
	[0.031]	[0.023]	[0.014]	[0.014]				
1993-95	-0.084	0.047	0.029	0.008	-	-	-	-
	[0.058]	[0.042]	[0.022]	[0.019]				
1990-92	-0.020	-0.001	0.029+	-0.008	-	-	-	-
	[0.026]	[0.017]	[0.016]	[0.009]				

1986-89	0.007	-0.003	0.006	-0.011	-	-	-	-
	[0.022]	[0.017]	[0.010]	[0.008]				
1976-81	0.050**	-0.016	-0.012*	-0.022**	-	-	-	-
	[0.016]	[0.013]	[0.006]	[0.005]				
1971-75	0.074**	-0.026*	-0.021**	-0.027**	-	-	-	-
	[0.014]	[0.012]	[0.004]	[0.004]				
1967-70	0.050*	-0.022	-0.013+	-0.015*	-	-	-	-
	[0.020]	[0.016]	[0.008]	[0.007]				
1962-66	0.003	0.008	0.002	-0.013	-	-	-	-
	[0.044]	[0.038]	[0.022]	[0.012]				
Before 1961								
	0.053*	-0.017	-0.015	-0.022**	-	-	-	-
	[0.025]	[0.020]	[0.009]	[0.007]				
1997-03	-	-	-	-	-0.0286	-0.0503**	0.0716	0.00735
					[0.0703]	[0.0178]	[0.0568]	[0.0330]
1994-96	-	-	-	-	0.0244	-0.0441*	0.0181	0.00162
					[0.0372]	[0.0172]	[0.0196]	[0.0265]
1987-93	-	-	-	-	-0.0399	0.0253	0.0196	-0.00497
					[0.0317]	[0.0272]	[0.0128]	[0.0122]
1975-79	-	-	-	-	0.0284	-0.00524	-0.0109**	-0.0122*
					[0.0239]	[0.0229]	[0.00262]	[0.00575]
1970-74	-	-	-	-	0.0381	-0.00578	-0.0133**	-0.0191**
					[0.0238]	[0.0233]	[0.00251]	[0.00357]
1965-69	-	-	-	-	0.0740**	-0.0427**	-0.0140**	-0.0173**
					[0.0149]	[0.0139]	[0.00244]	[0.00389]
1960-64	-	-	-	-	0.0342	-0.0113	-0.00761	-0.0153**
					[0.0239]	[0.0224]	[0.00494]	[0.00527]
Before 1960	-	-	-	-	0.0295	-9.23e-05	-0.0145**	-0.0149**
					[0.0429]	[0.0433]	[0.00241]	[0.00505]
Sample Size		9.192				6,719		

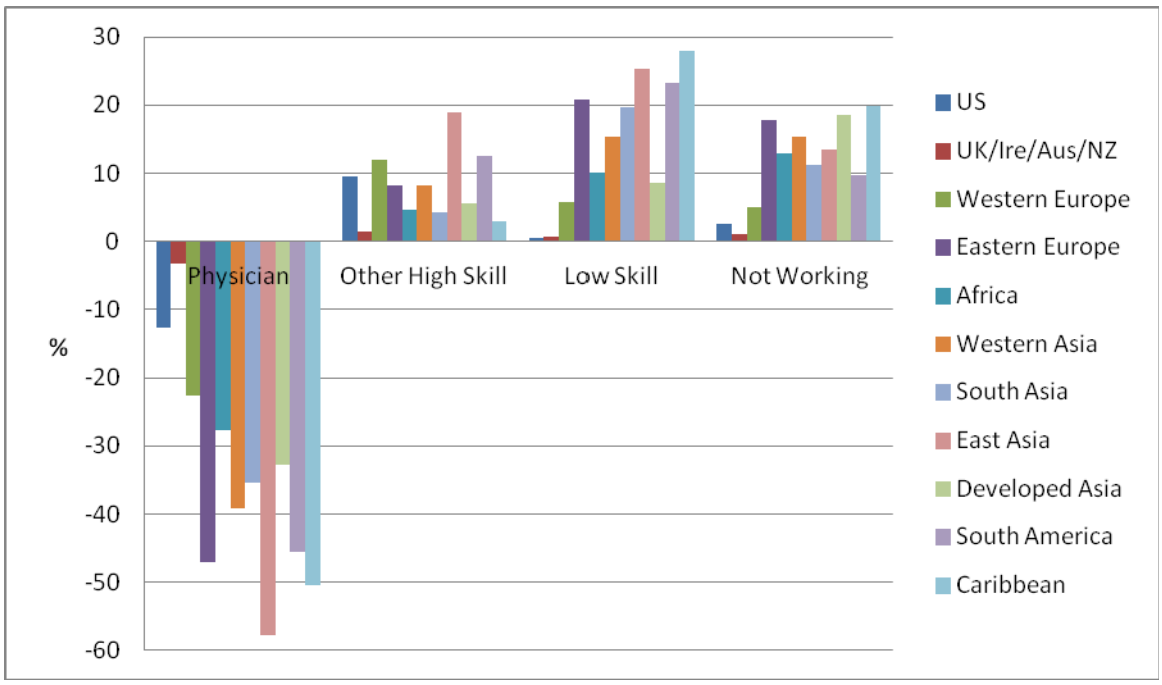
Note:

1) Also includes controls for marital status, major city, region, age and age squared.
2) Robust standard errors in square brackets.
3) ** denotes significance at 1 percent level, * denotes significance at 5 percent level and + denotes significance at 10 percent level.
4) See Table 4 notes for definitions of the region of education variables

Source: generated by the authors based on based on Statistics Canada, Canadian Census: 20 Percent Master File and the public use files of the 1993 and 2003 NCGS.

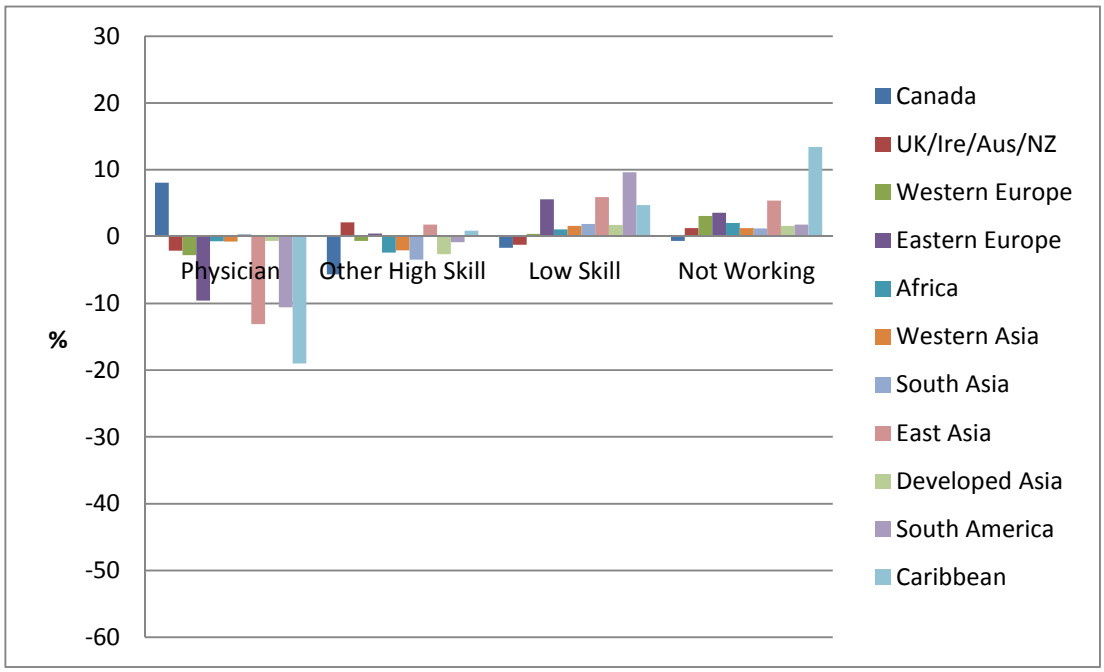
a: This is a dummy variable for US trained medical degree holders in the Canadian analysis and Canadian medical degree holders in the US analysis. Note that the default group is Canadian medical degree holders in the Canadian analysis and US medical degree holders in the US analysis.

Figure 1: Marginal Probabilities for Country of Study from Occupation Model, Male Medical Degree Holders in Canada



Authors' calculations based on estimates of Table 5.

Figure 2: Marginal Probabilities for Country of Study from Occupation Model, Male Medical Degree Holders in US



Authors' calculations based on estimates of Table 5.

Figure 3
Share of First Year Trainees in Canadian Training programs who were IMGs