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

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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. We extend the IMG relicensing model of Kugler and Sauer (2005) to incorporate two different approaches to immigrant selection: employer nomination systems and point systems. Analysis of the model indicates that point systems can allow IMGs to immigrate who would be unable to gain entry to the receiving country under an employer nomination system and who are subsequently unable to relicense and work as physicians in the receiving country. We apply the model to the case of IMGs migrating to the US and Canada since the 1960s and evaluate the empirical predictions from the model based on an analysis of the occupational outcomes of IMGs in Canada (where a point system has been in place) and in the US (where IMGs enter through employer nomination). In Canada, IMGs are less likely to be employed as a physician than are IMGs in the US and a large percentage of the IMGs in Canada either find work in lower skill occupations or are not employed. The empirical findings are consistent with our hypotheses based on the theoretical framework on the effects of immigrant selection systems on the probability of working as a physician in the two countries.

JEL classification: J24, J31, J61, J62, J71, J80

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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 higher 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 (even if s/he is not working as a physician).

However, if the IMG instead is only able to find employment in a lower 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.[1]

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 immigration route is likely to be a high hurdle for potential immigrants to pass since employers may be reluctant to go to the time and 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.[2] 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

[1]The issue of the ethical and economic implications of the recruitment of medical degree holders from developing countries is an important research topic. However, we are considering this issue only from the perspective of the receiving country.

[2]For example, Houle and Yssaad (2010) report that in a sample of immigrants who applied for immigration from outside of Canada between October 1, 2000, and September 30, 2001 and were age 18 to 59 at landing, only seven percent had pre-arranged employment. Using the same data, Imai, Stacey, and Warman (2011) find that immigrants who had pre-arranged employment obtained much better occupational matches.

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? 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, Rinne, and Zimmermann (2011)).

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. In order to be eligible for licensure and board certification, the individual must also complete a period of residency training lasting two to ten years 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 defined to be a person who completed his/her medical training outside of either the US or Canada (see Whelan et al. (2002)). This is indicative of the high degree of comparability and integration of medical education and certification across these two countries. 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 steam of new immigrants landing in Canada relative to the US. Antecol, Cobb-Clark, and Trejo (2003) use Census data for Australia (where a point system was also in place), Canada and the US using Census data for 1990/1991. They do find a skill deficit for US immigrants relative to immigrants landing in either Australia or Canada but this deficit disappears after they exclude immigrants from Latin America. They 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. However, the point system is not found to change the average characteristics of immigrants coming from a given country. Beach, Green, and Worswick (2007) focus on the effectiveness of the Canadian point system (without benchmarking against the US experience). They analyze the characteristics at landing of immigrants in Canada using administrative data and find that changes in the weights placed on different characteristics under the point system grid did have a significant impact on the average characteristics of the subsequent entry cohorts, with the impact on changes in points for education being especially responsive. An earlier study by Green and Green (1995) also analyzed the effectiveness of the Canadian point system and concluded that the points system criteria did have an impact on the occupational composition but that its degree of effectiveness was limited by the large number of different criteria used in calculating the total point value for the applicant.

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 higher skill versus lower 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 notes that the H1-B temporary-professional-worker visa and the J-1 exchange-visitor visa are the only options for most IMGs. Both visas require an employer sponsor .[3] 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 note 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 through 2006), we see three different regimes in terms of whether an IMG without pre-arranged employment was able to enter Canada as a landed immigrant through the point system.[4] The first regime (1976-85) can be thought of as a point system which either required pre-arranged

[3]Mullan, Politzer, and David (1995) find that the majority of IMGs who participate in GME in the United States ultimately enter US practices.

[4]We report estimates for the pre 1976 cohorts; however, we have concerns regarding the representativeness of the samples given the fact that our data are taken from the 2006 Canadian Census, several decades after the arrival of the pre-1976 immigrants. In addition, a period of openness to physicians occurred between 1971 and 1975 when physicians were on the preferred list of occupations for the point system. However, this policy change in 1971 was made due to a perceived shortage of physicians and then physicians were removed from the occupation list in 1975 once the number of physicians who had entered was deemed to be sufficient to meet the demand. Consequently, we see these two policy changes as endogenous and we expect that the occupational outcomes of IMGs who entered under this regime are likely to have been biased towards more positive outcomes in consequence.

employment (1981-85) or had an occupational restriction against physicians unless they had pre-arranged employment (1976-81).[5] The second regime (1986-2001) can be thought of as a point system with occupational restrictions but where two changes in policy may have limited their effectiveness. First, the size of the immigrant intake was expanding (especially for the economic class) and new avenues to permanency were opening up for prospective immigrants with high levels of education. In addition, the importance of occupational criteria relative to educational criteria was dropping (especially after 1993) making it relatively easier for IMGs to enter if they could convince the visa officer that working as a physician was not their intended occupation. The third regime coincided with the coming into effect of the Immigration and Refugee Protection Act (IRPA) in 2002 which removed occupational targeting from the point system and focused instead on 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 foreign 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.[6]

The first regime most 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 third regime least 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 would face in terms of working as a physician. The second regime falls somewhere in between the first and third regimes in terms of its comparability to the US employer nomination system. One key feature of Canadian immigration policy over this period was a large expansion of the total inflow beginning in 1987. In 1985, 84,345 immigrants landed in Canada but by 1988 that number had nearly doubled to 161,584 and

[5]Between 1982 and 1985, the economic stream of immigrants to Canada was basically shut down for immigrants who did not have pre-arranged employment in response to the weak labour market conditions at the time (Green and Green (1995)).

[6]This historical material is based on Dumont et al. (2008), Green and Green (1995) and McWhinney (1998).

over the period 1989 through 2001, the total intake was above 200,000 in virtually every year (Citizenship and Immigration Canada (2011)). As part of this expansion of the Canadian immigration program, the share entering through the economic class as a whole (of which the point system is a subset) grew considerably from 36% in 1986 to 45.2% in 1990 then to 55.5% in 1996. It may be that these changes to the level of immigrants entering under the economic categories made it easier for IMGs to enter Canada either through the point system (possibly by misrepresenting their intended occupation) or through other parts of the economic admission categories - possibilities we consider below.

Dumont et al. (2008) note that while physicians were excluded from entry though the point system between 1986 and 2001, some physicians may have found entry by applying as either entrepreneurs, self-employed individuals or under the investor category, three alternative streams of skilled worker flows that did not face the same occupational restrictions. In fact, the investor category was introduce on January 1, 1986, and would have been a relatively easy way for a highly educated IMG with enough financial resources to enter Canada as a landed immigrant given that the intake of economic immigrants was greatly expanded in the late 1980s and early 1990s.

Finally, Parent and Worswick (2004) note that immigrant selection for those intending to land in the mostly French speaking province of Canada was very similar to the federal immigrant selection policy between 1978 (when the Quebec government's involvement in immigrant selection began) until 1996 with the introduction of the "employabilité et mobilité" program which stressed broad skills that made potential immigrants relatively flexible and able to take on jobs in different occupations even if their main intended occupation did not correspond to one of the "occupations in demand". This could be thought of as a pre-cursor to the introduction of IRPA in 2002 and would have made it easier for IMGs intending to land in Quebec to gain landed immigrant status. In this way the Quebec point grid corresponded more closely to our theoretical model of a points system without occupational restrictions compared to our model of a points system with occupational restrictions.

Taking these policy changes in the 1986 through 1996 period together, we see a pattern

of deterioration in the occupational restrictions (or at least their effectiveness) over the 1986-2001 period in Canada. In each case, the route that IMGs took to gain permanent residency status in Canada would not have been available under a pure employer nomination system.

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. We argue that these policy differences can be treated as exogenous policy variation for the purposes of our analysis for the following reasons. The decision to use a point system rather than employer nomination as the principal way of attracting skilled immigrant 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 has been to trust government officials to select skilled immigrants, whereas the US approach has been to trust employers to be able to identify the best skilled immigrants. We do not feel that these different approaches to immigrant selection are 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 (except with regard to the direct impact of having a pre-arranged spot in relicensing program for immigrants admitted under an employer nomination program). In terms of the variation across time in the use of occupational restrictions in the Canadian point system, we believe that each of the three post 1976 regimes should be considered as an exogenous policy change at least with regard to the impact it had on the labour market outcomes of IMGs. None of these policy changes were targeted explicitly at physicians but rather were changes in the extent to which occupational restrictions were imposed on various immigrant selection categories.

4 Previous 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. A significant body of US literature exists on physicians' remuneration (see, for example, Bashaw and Heywood (2001)). However, there appears to be relatively little research explicitly on the labour market outcomes of foreign-born physicians in the United States.[7] 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 international medical graduates account for one-quarter of the 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 to relicense for these immigrants and show that it is possible for there to be both positive and negative selection into relicensing.[8] In the former case, the higher skilled IMGs enter

[7] An exception is a recent study by McDonald, Warman, and Worswick (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. A limitation of their analysis relates to the fact that the US Census does not allow for the identification of medical degree holders unless they are working as physicians. As well, prior to the 2006 Canadian Census, country of education was not reported directly and had to be imputed based on age at arrival Canada.

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

relicensing while the lower skilled work in the unlicensed sector (due to the cost of relicensing being considered too high given the benefits). The fact that the OLS returns are found to be lower than the returns estimated using an instrumental variables method indicates that negative selection existed with the higher skilled IMGs choosing against relicensing and instead entering the unlicensed sector after arrival. While the Kugler and Sauer (2005) study sheds light on important issues related to the relicensing decision of IMGs, it is less informative with regard to the effect of immigrant selection systems on these outcomes since potential immigrants of Jewish descent were free to immigrate to Israel. Consequently, there was not a point system in place nor was there a requirement that an employer sponsor the IMG applicants for immigration.

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 immigration 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

out-of-pocket costs and psychological costs associated with acquiring a licence 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 re-licensing in the first period is based 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 Re-licensing

We employ the basic structure of the Kugler and Sauer model and apply it to the case of a pool of potential immigrants with international medical degrees applying to migrate to a receiving country such as the US or Canada. 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 and 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. Consequently, it is important to account for this high degree of heterogeneity in our model.

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[9] 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 or out of relicensing (based in part on the individual's skill) as done by Kugler and Sauer, we focus on the probability that an IMG will be unable to complete a relicensing program.[10] 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 required language fluency).

5.3 IMG Selection through Employer Nomination

In the first period, we assume that employers can 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 carries out the relicensing program, they become a permanent resident and are 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 not be willing to hire an applicant who is unable to complete the relicensing program. However, we assume that the receiving

[9] We do not distinguish between the quality of the foreign medical training and the transferability of that training (the case where the skills would be highly valued in the country where they were obtained but they do not transfer easily to the receiving country's labour market).

[10] In our empirical analysis, we do account for the possibility of selection into other higher skilled occupations 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 higher skill job as opposed to being either not employed or working in a lower skill occupation (other possibilities in our empirical analysis).

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 (or in an attempt to control health care costs). 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 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, work experience and language fluency. 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 then 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 under the point system 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.[11] Another variation on this approach is only to 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, 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.

However, this does assume that the immigration authorities are effective in terms of limiting entry based on intended occupation. Within a point system, it may be possible for an IMG to misrepresent their intended occupation and even their education levels since having a medical degree may be the criterion used by the visa officer to prevent entry of an IMG. If it is possible for some but not all of the lower skill IMGs to enter through the point system with occupational restrictions in this way then equation (3) may not hold.

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

[11] Alternatively, one could build occupational points into the points grid rewarding intended occupations that are on the preferred list making it difficult or even impossible to be admitted unless the intended occupation is one in which the government feels that more labour supply from immigrants is needed.

system with occupational restrictions that bar IMGs without pre-arranged employment, such as was in place in Canada over the period 1975 to 1986. 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 will 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.

Over the intermediate period, 1987 to 2001, the federal Skilled Worker and Professionals Program had a point system with occupational restrictions and physicians were banned from consideration over this period unless they had pre-arranged employment. For these IMGs, the model predicts that they will have the same average skill level and probability of completing relicensing as the IMGs admitted over the period 1975 through 1986 or those admitted under the employer nomination system of the US. However, as described in section 3, the large expansion of immigrants entering under the economic categories as well as reduction in importance placed on occupation relative to education criteria may have meant that the occupational restrictions were not fully enforced for all economic applicants. Consequently, this can be best thought of as a period of transition between a point system with occupational restrictions (1975 through 1986) and a point system without occupational restrictions (2002-2006). We will evaluate these theoretical predictions by comparing the occupational outcomes of IMGs residing in both Canada and the US.

6 The Data and Estimation Sample

The Canadian data used in the estimation are taken from the 2006 Canadian confidential census master file.[12] 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, where the degree was obtained, and whether

[12]We chose not to use earlier census master files for Canada due to the fact that they did not ask for the location where the respondent's highest education was obtained.

or not the person is currently working as a physician. 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).[13] 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.[14] 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.

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).[15]

In Table 1, sample means are presented based on the location where medical training occurred, separately for Canada and the US. In our Canadian sample, a much lower percentage of the medical degree holders reported studying in Canada (70.4% for men and 63.4% for women) compared with the percentage of medical degree holders in the US who studied in the US (85.3% for men and 78.9% for women). 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.[16] In the US data, IMGs are most likely to have studied in Eastern Asia, South Asia and South America. This initial statistical snapshot reveals that both countries have a significant percentage of medical degree holders with foreign degrees

[13]We use the NSCG weights in all of our analysis to allow for generalization of the results to the US population of medical degree holders meeting the sample selection restrictions. We also make use of weights in the Canadian Census.

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

[15]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.

[16]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[17], 2) working in some other higher skill occupation, 3) working in a lower skill occupation, 4) not working. For those who studied in Canada, 91.2% of men and 88.1% of women are working as a physician and in each case this is higher than the equivalent statistics in the US data (87.1% for men and 78.1% for women). 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% for men and 54.8% for women, 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% for men and 33.0% for women. For both men and women, the proportion of medical degree holders trained outside of the country of residence and working in the other higher skill occupation group is higher for both men and women in Canada than in the US (but the difference is small for women). When the equivalent comparison is made for lower 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 strictly enforced 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 by gender for the foreign born and foreign trained subsamples of medical degree holders according to whether the person is working as a physician in Canada. We see large cross country differences. The UK group of countries has a large

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

share of those IMGs who are working as physicians (36% for men and 21% for women) compared to their share of those not working as a physician (1% each for men and women). In contrast, the share of immigrants from East Asia in the working as a physician category is relatively small (at 6% for men and 9% for women) compared to their share in the not working as a physician category (20% for men and 27% for women). 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 cohort groupings to match the policy regimes with dummies for: 1) 2002-06, 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.

We also see large difference across year of arrival groupings. A large share of the IMGs admitted to Canada in our sample arrived since 1986, and for the cohorts since 1993, 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 represent 37% of the men and women who are not working as a physician in our sample.[18] This is strong preliminary evidence in support of 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

[18]It is important to recall that these individuals are permanent residents and that if they were participating in a relicensing program, they would appear in our sample in the 'working as a physician' category.

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 raises the question as to whether the immigrant selection system in Canada effectively excluded IMGs who did not have pre-arranged employment. As noted above, this is the latter part of the 1986-2001 period which can be thought of a transitional period in the sense that a number of policy initiatives were (or had been) put in place that made it easier for an IMG to enter Canada without facing an occupational restriction.

While considerable variation in the US data is found by country of birth in Table 4, the patterns are not simple and do not always match up with what was found for Canada. For example, the South Asian born men comprise 26.1% 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 (a similar pattern is found for South Asian women) representing a high degree of successful integration. However, the same pattern does not exist in Table 3 where South Asian born men and women 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. It may be the case that the different immigrant selection systems means that South Asian born individuals with foreign medical degrees do not find it easy to gain entry into the US but if they do gain entry they are able to relicense and find work as a physician. In contrast, under the Canadian point system, South Asian born individuals with foreign medical degrees find it relatively easy to enter Canada as immigrants but then are in no way guaranteed to be admitted or 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 was the case for Canada, we see higher rates of working as physician 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. However, in order to fully disentangle the roles of immigrant status, period of arrival, and place of medical training, we need to employ multivariate models in which the outcomes of interest are: 1) whether an IMG is working as a physician and, more generally, 2) the occupational outcomes of IMGs.

7.1 Working as a Physician

We estimate reduced form models over the binary outcome of working as a physician or not. The index 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 the default as well as an indicator for having arrived before the age of 17[19]); 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 cohort and assimilation effects towards working as a physician with time in the new country. We explore this issue in the US analysis by interacting the cohort effects with a year 1993 dummy variable for the cohorts present in both survey years, but do not find evidence to indicate assimilation effects are important for IMGs in the US. Unfortunately, we cannot do the same analysis for Canada due to the fact that we have only a single year of data. However, we believe cohort effects are likely to be much more important than assimilation effects in the Canada case due to the large change in policy over time in Canada. 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.

In Table 5, marginal effects are presented that are derived from logit estimation of (4) separately by gender for Canada. We estimate two versions of the model. The first contains a single dummy variable for having completed the medical degree outside of Canada and another dummy that equals one if the medical degree was completed in the US. In the second model, the dummy for studying medicine outside of Canada is replaced by a set of 10 dummies placed on country of study groupings. The estimates from the simpler model are presented in the first column for men and the third column for women. The marginal effect of having studied outside of Canada (but not in the US) is a drop in the probability of working as a physician of 24.4% for men and 38.8% for women indicating that there exist

[19]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.

significant challenges for IMGs in Canada to complete relicensing and work as a physician. The marginal effects related to the US indicator variable are positive and significant in each case with the effect three times as large for women) indicating that US medical graduates in Canada are more likely to work as physicians than are IMGs who studied in other countries (but still significantly less likely than Canadian-educated individuals).

Comparing these effects to those in the second and fourth columns where a richer set of place of study controls and place of birth controls are employed, we see important variation in the probability of working as a physician by place of study. The coefficient on the indicator for having completed a medical degree in the US is negative (-14.4%) for men but not statistically significant for women. Similarly, the coefficients on the UK group place of study variable is not significant for men and only marginally so for women with an effect of -10.8%. Large negative marginal probabilities are associated with having received a medical degree from virtually all of the place of study groupings with the effects varying from -26.2% for Western Europe to -59.2% for East Asia for men and -33.2% for Western Europe and -62.1% for East Asia for women.

In Table 6, the equivalent models are estimated to those in Table 5 with the only difference being the US place of study dummy is replaced by a Canadian placed of study dummy. The country of study effects differ substantially in the US analysis. Comparing the first and third columns of Table 6 to their counterparts in Table 5, we see much smaller coefficients on the indicator for having an international medical degree (-.0843 for men in the US compared to -.242 for men in Canada, and -.182 for women in the US compared to -.388 for women in Canada). Making equivalent comparison using the models with more detailed place of study controls we see marginal effects for the place of study controls that are much closer to zero in the US analysis. For men, the individual source country controls are not significant for Western Europe, Eastern Europe, Africa, Western Asia, South Asia and Developed Asia in the US analysis. These are all countries that were associated with large negative marginal probabilities in the analysis for men in Canada. The effects for East Asia, South America and Caribbean are significant and range from -14.3% of -18.2% but are much smaller in

absolute value than their equivalents in the Canadian analysis for men. In the US data, broadly similar effects are found for women as were found for men. However, the negative effect associated with a degree from Eastern Europe is larger for women in the US than for men (-30.3% versus a statistically insignificant -11.4%) and similar differences are found for East Asia, South America and the Caribbean. For these groups of women, their experiences at finding work as physicians may be more similar to those of men and women residing in Canada who have medical degrees from these countries.

In Figure 1, we present these marginal probabilities associated with the place of study variables for the case of men. The large negative effects are apparent for the IMGs who reside in Canada but who studied in each of the countries except for the US and the UK group. For the IMGs in the US, we do not see as large of differences in the probability of working as a physician (relative to those who studied in the US). 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). However, given that a point system with occupational restrictions was in place for many years prior to 2002, this indicates that the occupational restrictions may not have been effective over that entire period since our model predicts that IMGs admitted under the point system in this case should only be those nominated by an employer so that they should have a probability of working as a physician which is similar to those immigrating to the US. Given a distribution of skills for IMGs from a particular place of education grouping, the US immigrant selection system selects 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.

It is important to note that the US estimates for female IMGs in a sense lie between the Canadian estimates and the US estimates for male IMGs. One possible explanation is that these immigrant women are more likely to have immigrated to the US under family

reunification visas or as the spouses of male immigrants educated in another country. In this case, the foreign medical credentials of female IMGs in the US may be less likely on average to have been pre-screened (through employer nomination for a visa) than were their male counterparts making it more difficult for at least some of these women to find employment as physicians.

In the second and fourth columns of Tables 5 and 6, we also present the coefficients for the two aggregated country of birth variables: Non-English language countries in Europe and 'Other', with English language countries being the default group.[20] The 'place of birth' effects are generally not individually significant in either the Canadian or US analysis with the exception of the model for women estimated over the Canadian Census data where the 'Other' category has an effect of -18.6% on the probability of working as a physician. 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.

None of the marginal probabilities associated with the immigrant, permanent resident and temporary resident controls in the Canadian analysis of Table 5 are individually significant with the exception of the -7.6% effect on the immigrant dummy in the third column for women and the -8.4% effect associated with being a temporary resident in the fourth column for women. In the US analysis of Table 6, more of these effects are significant; however, the magnitudes of these effects are all relatively small with the exception of the permanent resident indicator for women and the temporary resident indicator for both men and women. Arriving as a child is associated with lower probabilities of working as a physician for men in the US.

The next group of variables in each table relate to the immigrant's arrival cohort. In the Canadian analysis, we see large negative effects of having arrived in Canada as part of the more recent immigrant arrival cohorts. In the first column, with only limited controls for place of study, we see especially large cohort effects with 20.8% lower probabilities of working

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

as a physician for men and 26% lower probabilities of working as a physician for women for those who arrived after 2001 relative to the 1982 to 1985 default cohort. The equivalent effect for the1996-2001 cohort is -17.7% for men and -25.8% for women. For women, the coefficient on the 1993-95 cohort is also significant at -15.1%.

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 for men and after 1989 for women (in the models without place of study controls) 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)). However, as discussed in section 3, the large expansion of the immigration program (especially for economic immigrants), coupled with the introduction of new routes to permanent resident status that did not bar IMGs are consistent with the idea that lower skill IMGs could have found a way into the country over this period of transition between the hard occupational restrictions/employer nomination requirements of the 1976-85 period and the point system without occupational restrictions of the 2002-06 period.

Dumont et al. (2008) provide another possible explanation for the increased entry of IMGs after 1985. They 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 enough education and language fluency along with intending to work in an occupation on the preferred list and the IMG could enter as the accompanying spouse. They note that between 1986 and 2001, approximately 29% of all landed immigrants intending to work as a general practitioner were dependents (with the equivalent figure for specialist physicians being 12%). This indicates a loss of control of the inflow of physicians that occurred with the expansion

of the intake of economic immigrants after 1985. As the number of economic immigrants rose, there were more avenues through which IMGs could avoid the occupational restriction and these options would not have existed in the US where, for example, an IMG realistically could only accompany his/her spouse to the US if the spouse had pre-arranged employment.

The marginal effects on the cohort controls in Table 6 for the US analysis (relative to the 1980-1986 default cohort), are generally much closer to zero than their counterparts in the Canadian analysis.[21] In terms of the post 1986 cohorts, for both men and women, the only marginal effect that is individually significant is the effect for men in the 1987-93 cohort and this is only at the 10% level of significance in the models with and without the detailed place of study controls. This means that the worsening of the probability of working as a physician that is apparent for both men and women in Canada is not present for IMGs in the US.[22] The cross cohort pattern in the model without the detailed place of study controls moves closely with the pattern from the model that contains the place of study 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.

Taking the Canadian and US cross cohort patterns together, they are generally consistent with the predictions of our theoretical model. The cross cohort patterns over the 1975 through 2002 period in the US are near zero (with the exception of the 1975-79 positive effect for women) and certainly much smaller than the pronounced declines across cohorts

[21] In the US analysis, we also estimated the model with a set of interactions of these 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. See Borjas (1985) for a discussion. The coefficient 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 so we report results from this simpler specification in order to facilitate comparisons with the Canadian analysis.

[22] However, it should be noted that the standard errors are somewhat large for the more recent US cohorts especially for the 1997-03 cohort for women. This is driven by the fact that not many IMGs were admitted with permanent residency status over this period which is consistent with the idea that IMGs first enter as temporary residents then convert later to permanent status. Recall that the arrival cohort controls only turn on for the foreign born who are citizens or landed immigrants so there are not many observations for which the 1997-03 cohort variable equals one. This is not an issue in the Canadian analysis since a much larger share of the IMGs who are resident in Canada enter as permanent residents.

in the post 1986 period for Canada and this is true for both male and female IMGs. These cross country differences in the cohort profiles are especially large when we compare those generated from the models without the detailed place of study controls. The findings for Canada in the post 1986 period are consistent with the removal of occupational restrictions under the point system with the adoption of IRPA in early 2002 leading to a new inflow of IMGs with lower probabilities of working as physicians. In addition, changes between 1986 and 2001 to both the level of economic immigration and the stringency with which the occupational restrictions were imposed appear to have led to significantly lower probabilities of working as a physician for the cohorts in the 1990s compared to those prior to 1986.[23]

7.2 Multinomial Logit Estimation of Occupational Model

Next, we investigate the occupational outcomes of medical degree holders. Of particular interest is whether or not IMGs who do not work as physicians are employed in other higher skill occupations. Our model is based on the possible outcomes: 1) working as a physician, 2) working in another higher skill occupation[24], 3) working in a lower skill occupation[25], or 4) not working (either unemployed or not in the labour force).[26] The specification of each index function of the model follows the general structure of equation (4).[27]

In Table 7, the marginal effects from the multinomial logit estimation are presented

[23]It is worth noting that the hypothesis appears to fit the patterns for men more clearly than the patterns for women. The decline in rates of working as an IMG for women in the US prior to the1980 arrival cohorts is much larger than what was found for men. A similar pattern of high rates of working as a physician are present for some of the same cohorts of female IMGs in Canada. Due to the low rate of having a medical degree for women in these earlier generations, this may reflect non random selection across time that is more or less common to female IMGs in both countries.

[24]The other higher skill occupation group includes: computer scientists, computer analysts, mathematicians, scientists, social scientists, engineers, nurses, pharmacists, teachers, managers, architects, accountants, actuaries, clergy, counselors, social workers, lawyers, judges, librarians, insurance occupations and business occupations.

[25]The lower skill occupation group includes: transportation/material moving, precision/production, installation/maintenance/repair, service, sales, other admin, secretaries/receptionists/typists, farmers/foresters/fishermen, construction/extraction, technologists, technicians, clerks and book-keepers.

[26]See Green (1999) for a similar multinomial model of occupational outcomes of immigrants applied to the Canadian case.

[27]We re-estimated the econometrical model using the multinomial probit estimator and found qualitatively similar results.

separately for men and women in Canada. In order to reduce the number of tables, we focus attention on estimates using the model with the detailed place of study controls. For individuals who received their medical degrees from countries other than Canada, the US and the UK group, strong negative marginal effects are present in terms of lower probabilities of working as a physician ranging from -23.7% for Western Europe to -58.1% for East Asia for men and from -32% for Western Europe to -62.9% for East Asia for women. The multinomial logit analysis allows us to separate these differences according to the three sub-categories of the 'not working as a physician' category from the simple logit analysis. While many of the coefficients on the place of study controls are significant, for most countries the lower probability of working as a physician is typically associated with a higher probability of being either in the lower skilled occupation category or in the not working category. For example, male IMGs in Canada with medical degrees from South Asia are 35.4% less likely to work as physicians and are 30.9% more likely to be either working in a lower skill occupation or not working (relative to men with Canadian medical degrees). A similar pattern is present for female IMGs but with a relatively greater probability being placed on the not working category for IMGs with degrees from these countries. Figure 2 illustrates these estimates for men. 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 higher skill category but larger still probabilities of working in both the lower 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.

The results also support the theoretical prediction that IMGs admitted under a point system (without occupational restrictions) have lower average skill levels and higher probabilities of being unable to relicense as a physician. The fact that such a large fraction of the IMGs are either employed in lower 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 higher 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 higher skill occupation for male IMGs.

The strong pattern of decreasing probability of working as a physician for more recent arrival cohorts is present for both men and women as was the case in Table 5, but the multinomial logit estimation allows us to see the breakdown of these effects across the different categories within the 'not working as a physician' category. The negative cohort effects for more recent cohorts of male IMGs related to working as a physician are also associated with positive marginal effects for the three other categories (however, these effects are only clearly significant for men for the 1996-01 cohort). For female IMGs, the negative arrival cohort effects in the 'working as a physician' category are larger in absolute value than what is found for men, and correspond to a large increase in the probability of working either in lower skill occupations or not working. For example, female IMGs who arrived in the 1996-2001 period have a 21.8% lower probability of working as a physician, an 11.1% higher probability of working in a lower skill occupation, and a 6.8% higher probability of not working relative to the female IMGs in the default category (those arriving between 1982 and 1985).

Taken together, these MNL effects represent more cause for concern in terms of Canadian immigration policy's capacity to select IMGs who will find employment in jobs that are suited to their skill levels. Given the high level of training of a medical graduate, one would expect that if the person was unable to work as a physician, he/she would still have the human capital needed to find employment in some other higher skill occupation. However, this does not appear to be the case. One possibility is that it may be related to poor language skills which would create a barrier to the IMG working either as a physician or in another high skill job but may be less of an impediment to finding work in a low skill job.

In Table 8, marginal effects are presented from multinomial logit analysis of the occupational outcomes of medical degree holders using the US data. For men the marginal effects associated with the UK group, Western Europe, Eastern Europe, Africa, Western Asia and South Asia place of study groups are not individually significant, a result consistent with what was found in the logit estimation for these groups of men in Table 5. For male IMGs who studied in East Asia, South America and the Caribbean, we see lower probabilities of working as a physician that range from -13.1 to -19%. For each of these three groups, there is either a higher probability of working in a lower skill occupation (East Asia and South America) or of not working (Caribbean). Women educated in Eastern Europe have a much lower probability of working as a physician (-0.519) but this is only significant at the 10% level and the equivalent coefficient on the lower skilled occupation for this group of female IMGs is positive but not statistically significant. As was found in Table 7, medical degree holders trained in East Asia, South America and the Caribbean are less likely to work as a physician (than those trained in the US) and we now see that this coincides with higher probabilities of being in the lower skill occupations. This is similar to what was found in Table 7 for female IMGs who studied in these countries and reside in Canada. Their lower probabilities of working as a physician also coincide with a higher probability of working in lower skill occupations.

Figure 3 illustrates the place of study effects for males in the US and is comparable to Figure 2 which contains the equivalent effects from the Canadian analysis for men. 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 analysis represented by Figure 3. Comparing the patterns in Figure 2 and Figure 3, 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 lower 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. However,

it is worth noting that the patterns for female IMGs in the US are in a sense closer to those of female IMGs in Canada relative to the pronounced differences seen for male IMGs in the US and Canada. As already stated, this could be due to the fact that female IMGs may be more likely to be tied movers in the US compared to their male counterparts and so they may be more likely to be accompanying spouses where their husbands enter Canada with pre-arranged employment.

Finally, the arrival cohort patterns in the multinomial logit analysis for both men and women in the US in Table 8 do not reveal clear cohort patterns at least over the post 1980 period. This is consistent with the logit estimates in Table 6 and is in contrast to the cohort patterns found in the multinomial logit estimates for both male and female IMGs in Canada from Table 7.

In summary, the empirical findings generally support the predictions of our theoretical model at least with respect to the employer nomination model for the US and the point system model without occupational restrictions for Canada. The lower probability of working as a physician for IMGs in Canada relative to the US is consistent with the idea that a point system without effective occupational restrictions is likely to admit a large fraction of IMGs who will be unable to work as a physician relative to an employer nomination approach to the admission of skilled immigrants. In addition, the fact that the IMGs who do not work as physicians are more concentrated in the less skilled occupation or the not working category in Canada compared with the US is also consistent with the prediction of the model that the average skill level of IMGs admitted under this type of point system will be lower than those admitted under an employer nomination system. The comparison of the source country specific probabilities of working as a physician and working in other high skill or low skill occupations is also consistent with our hypothesis since it indicates that the employer nomination system of the US selected higher skill IMGs from non-traditional source countries whereas the Canadian system allowed a wider range of the skill distribution into Canada from these countries. Finally, the cross cohort patterns in the probabilities of IMGs working as physicians or in other occupations are also consistent with our hypothesis that the Canadian

selection system was less restrictive than the US employer nomination system in terms of the skills required in order to immigrate after: 1) the elimination of occupational restrictions in the point system in early 2002 and 2) (to a lesser extent) after the expansion of the inflow of economic immigrants and the partial relaxation of occupational restrictions over the 1986 to 2001 period.

7.3 Alternative Explanations to the Immigrant Selection Policy Interpretation

While the estimates are supportive of our hypotheses, it is important to reflect on other possible explanations for our results. One possibility is that the IMGs selected in each country had similar skill distributions but that the required skill level was higher for relicensing in Canada relative to the US. Given the high degree of integration between the American and Canadian systems of relicensing and credential recognition for physicians, we do not believe this to be the case. However, if it were the case, the relatively poor outcomes of IMGs arriving in Canada demonstrates the dangers of a disconnect between immigrant selection policy and relicensing policy in a regulated profession such as medicine. It is also worth noting that if the US had an increase across time in its required skill level for relicensing (which could be thought of as an increase in η_e) this would not lead to an increase in IMGs unable to work as a physician since only IMGs who met the new higher skill level would be admitted under the employer nomination system. Consequently, we believe that even if differences in the medical relicensing process exist between Canada and the US, our empirical results still show an important role played for immigrant selection regimes in determining the fraction of IMGs who go on to work as physicians and the fraction who instead work in other high skill occupations versus low skill occupations.

Another possibility is that the distribution of IMGs wishing to migrate to the US has a higher mean than the distribution of IMGs wishing to migrate to Canada. Given the high physician salaries in the US relative to Canada (see McDonald, Warman, and Worswick

(2011)), it seems likely that high skill IMGs may prefer to migrate to the US which would shift up the mean of the skill distribution and could explain the high rates of working as a physician. However, for the same reasons, we would expect middle and low skill IMGs to also want to work in the US so that while the total number of IMGs wishing to migrate to the US may rise due to this preference for the US over Canada it is unclear that the distribution of skill would be affected. Even if it were the case that the US skill distribution for IMGs wishing to migrate to the US had a higher mean than the skill distribution for IMGs wishing to migrate to Canada, our empirical results still show a high rate of not working as a physician and of working in low skill occupations for the Canadian IMGs which we take as evidence of the importance of the immigrant selection system since an employer nomination system would exclude the IMG applicants with low skill.

8 Conclusions

The substantial number of immigrants with medical degrees in Canada and the United States who are not employed as physicians is a cause for concern given the shortages of physicians in some areas, particularly those areas that are more rural or remote. The Canadian point system for the selection of skilled immigrants may contribute to this occupational mismatch by recognizing the value of a foreign medical degree in terms of the immigrant selection criteria without taking into account the individual's qualifications to practice medicine in Canada. In contrast, the lack of a comparable point system for US immigration coupled with the fact that employers can sponsor skilled workers ultimately leading to permanent residency in the US means that a very different selection system is in place, one where credential recognition by employers may ensure that the international medical graduate (IMG) who becomes a resident of the US is much more likely to be able to find suitable employment given his/her training than is the case under the Canadian selection system.

Logit analysis of the incidence of working as a physician among medical degree holders in Canada indicates that those individuals with medical degrees from non-English language

countries are much less likely to work as a physician than are holders of domestic medical degrees. In contrast, the equivalent analysis for the US indicates either no difference or much smaller differences in incidences of working as a physician for individuals with medical degrees from these countries. These findings are consistent with our theoretical analysis indicating that the different immigrant selection systems in Canada and the US are leading to an intake of foreign medical degree holders into Canada who are unable to find work as physicians but that the equivalent system in the US prevents the entry of equivalent individuals.

A multinomial logit analysis that distinguished between the skill level of the alternative occupation as well as the unemployed/NLF outcome leads to similar conclusions. In addition, the results show that for Canada, the medical degree holders from non-English language countries 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. Our analysis supports the hypothesis that differences in immigrant selection policy mean that foreign medical degree holders are more likely to be able to immigrate to Canada than to the US, making the problem of credential recognition a relatively larger one for Canada relative to the US.

The cross cohort patterns since 1975 for the US indicate that declines in the probability of working as a physician were either zero or small and this is consistent with our theoretical findings that an employer nomination system where the standard for receiving a job offer does not change would lead to the same average skills and probability of relicensing as a physician for IMGs across time. For Canada, we see similar probabilities of working as a physician for IMGs admitted between 1976 and 1985, a period in which either a point system with a strict occupational restriction against physicians was in place unless the IMG had pre-arranged employment. However, after 1985, we see a decline in the probability of working as a physician for IMGs which coincided with a large expansion of the economic class of immigrants and an erosion of the effectiveness of the occupational restrictions against physicians. After the switch to a point system without occupation restrictions was in put

in place in 2002, we observe much lower probabilities of working as a physician for IMGs in Canada relative to those arriving in the early 1980s.

In terms of US policy implications, our analysis sheds light on the likely impact on the supply of relatively low skill workers to regulated professions due to the introduction of a point system such as the one in Canada where selection is based primarily on human capital proxy variables without accounting for probabilities of credential recognition. Introducing a system like this in the US could exacerbate problems related to the recognition of foreign medical credentials and could lead to similar problems in terms of recognition of foreign credentials in other professions that are regulated in a similar manner. In terms of Canadian policy implications, given the relatively poor labour market outcomes in Canada of IMGs from non-English language countries, an improvement in outcomes is likely to occur if occupational restrictions limiting admission of IMGs are reinstated to prevent immigrants without pre-arranged employment from being admitted. Changes to Canadian immigration policy after 2006 have moved the system in this direction since applicants under the Skilled Worker program must either have pre-arranged employment or their intended occupation must be on a list of occupations. However, 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.

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. In order to address this question one would need to look at all occupations and all 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 present within an employer nomination system either theoretically or empirically for the case of the US immigration since 1975 or the case of the Canadian immigration during the 1982-85 period in Canada when a de facto employer nomination system was in place.

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

Canada			US		
	Men	Women		Men	Women
Canada	70.4	63.4	US	85.3	78.9
US	2.4	1.7	Canada	0.9	0.6
UK/Ireland/Aus/NZ[a]	8.1	4.1	UK/Ireland/Aus/NZ[a]	0.8	0.9
Western Europe	1.9	1.8	Western Europe	1.6	1.0
Eastern Europe	3.2	7.9	Eastern Europe	0.7	2.8
Africa[b]	2.1	2.3	Africa[b]	0.5	0.4
Western Asia	2.7	2.7	Western Asia	0.9	0.4
South Asia	2.9	5.5	South Asia	2.7	4.0
Eastern Asia	3.0	7.3	Eastern Asia	2.2	6.6
Developed Asia[c]	1.3	1.0	Developed Asia[c]	0.8	0.7
South America	1.3	1.6	South America	2.4	2.4
Caribbean	0.7	0.8	Caribbean	1.4	1.3
Sample	9,192	6,383		6,719	2,417

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 Medical Degree Holders: Canada and US, 29-65

Canada			US		
Studied in Canada	Men	Women	Studied in US	Men	Women
Physician (incl. specialist)	91.2	88.1	Physician (incl. specialist)	87.1	78.2
Other Higher Skill Occup.	4.6	4.7	Other High Skill Occup.	7.4	9.8
Lower Skill Occupation	1.8	3.7	Low Skill Occupation	1.8	4.7
Not Working	2.5	3.6	Not Working	3.7	7.3
Sample Size	6,471	4,041	Sample Size	5,091	1,697
Studied outside Canada	Men	Women	Studied outside US	Men	Women
Physician (incl. specialist)	57.2	33.0	Physician (incl. specialist)	73.5	54.8
Other Higher Skill Occup.	12.7	14.5	Other Higher Skill Occup.	8.8	13.3
Lower Skill Occupation	15.2	21.1	Lower Skill Occupation	10.7	18.2
Not Working	14.9	31.4	Not Working	7.0	13.7
Sample Size	2,721	2,342	Sample Size	1,628	720

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 Immigrants in Canada whose medical degree was obtained outside of Canada, 29-65

	Men			Women		
	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	41.4	37.2
Place of Study						
US	2.2	0.9	1.6	3.3	0.5	1.3
UK/Ire/Aus/NZ[b]	35.9	3.6	20.7	21.3	2.0	7.6
Western Europe	4.7	3.0	3.9	6.1	1.8	3.1
Eastern Europe	7.3	14.0	10.5	19.2	23.4	22.2
Africa[c]	13.4	10.0	11.8	9.4	8.2	8.6
Western Asia	7.0	17.9	12.1	6.2	9.9	8.8
South Asia	13.0	14.7	13.8	18.2	16.8	17.2
Developed Asia[d]	4.4	6.2	5.2	1.9	2.7	2.5
East Asia	5.9	20.0	12.6	8.7	27.9	22.2
South America	3.9	6.4	5.1	3.5	5.4	4.8
Caribbean	2.0	3.0	2.5	2.1	1.5	1.7
Period of Landing						
2002-06	23.1	36.8	29.6	22.4	36.7	32.5
1996-01	16.1	28.9	22.1	22.1	35.8	31.7
1993-95	2.4	3.5	2.9	4.1	4.2	4.2
1990-92	7.6	7.1	7.3	7.2	6.5	6.7
1986-89	9.1	6.1	7.7	8.6	3.0	4.7
1982-85	12	8.9	10.6	13.1	8.1	9.6
1976-81	10	3.7	7.0	6.6	2.6	3.8
1971-75	13.7	2.9	8.6	10.2	1.5	4.1
1967-71	*	*	2.7	*	*	*
1962-66	0.8	*	*	*	*	*
Before 1961	*	*	*	*	*	*
Arrived age 17 or less	4.0	2.7	3.4	3.1	1.0	1.6
N	1,160	1,030	2,190	615	1,450	2,065

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: Also includes Israel and South Africa

c: Excludes South Africa

d:Includes Japan, South Korea, Taiwan, Singapore and Hong Kong.

Table 4: Characteristics of Immigrants in the US whose medical degree was obtained outside of the US, 29-65

	Men			Women		
	Working as Physician	Not Working as a Physician	Total	Working as Physician	Not Working as a Physician	Total
Permanent resident	27.2	38.7	30.5	22.8	36.0	29.3
Place of birth:						
Canada	5.9	2.4	4.9	4.2	0.2	2.2
UK/Ireland/Aus./NZ	5.3	3.5	4.7	2.3	1.1	1.7
Western Europe	4.5	4.8	4.6	6.4	1.0	3.7
Eastern Europe	4.6	7.7	5.5	13.0	13.3	13.2
Africa	5.1	5.3	5.1	4.4	1.0	2.8
Western Asia	9.5	5.6	8.4	4.7	1.5	3.1
South Asia	26.3	15.1	23.0	30.7	11.5	21.3
East Asia	15.2	21.1	16.9	23.0	42.3	32.4
Developed Asia	7.5	3.3	6.3	3.6	5.2	4.3
South America	9.7	20.0	12.7	3.3	14.6	8.8
Caribbean	5.9	11.4	7.5	4.4	7.5	5.9
Other Country	0.5	0.0	0.4	0.0	0.8	0.4
Arrived 1997-03	2.7	7.5	4.1	5.2	6.3	5.8
Arrived 1994-96	4.6	6.2	5.1	7.4	15.9	11.6
Arrived 1987-93	14.2	33.6	19.8	18.6	31.5	24.9
Arrived 1980-86	17.1	20.1	18.0	19.3	23.4	21.3
Arrived 1975-79	16.5	9.6	14.5	13.1	5.9	9.6
Arrived 1970-74	20.8	9.9	17.6	18.2	11.2	14.8
Arrived 1965-69	15.0	5.1	12.1	12.2	4.2	8.3
Arrived 1960-64	5.9	5.5	5.8	3.9	0.9	2.4
Arrived before 1960	3.1	2.6	3.0	2.1	0.6	1.4
Arrived as a child	7.5	4.7	6.7	4.8	4.1	4.5
Sample Size	1,110	271	1,381	391	228	619

Notes: Authors' calculations based on the 1993 and 2003 US National Survey of College Graduates. All figures are in percentage terms.

Table 5: Marginal Effects from Logit Estimation of Model of Working as a Physician, Individuals Holding a Medical Degree, Canada

	Men		Women	
	Limited Country Controls	Full Country Controls	Limited Country Controls	Full Country Controls
Place of Study				
Not in Canada	-0.242**	-	-0.388**	-
	[0.0199]		[0.0301]	
US	0.0679**	-0.144**	0.201**	-0.0619
	[0.0139]	[0.0431]	[0.0174]	[0.0641]
UK/Ireland/Aus./NZ	-	-0.0439	-	-0.108+
		[0.0289]		[0.0597]
Western Europe	-	-0.262**	-	-0.332**
		[0.0529]		[0.0718]
Eastern Europe	-	-0.478**	-	-0.540**
		[0.0476]		[0.0442]
Africa	-	-0.299**	-	-0.428**
		[0.0519]		[0.0637]
Western Asia	-	-0.406**	-	-0.412**
		[0.0479]		[0.0598]
South Asia	-	-0.377**	-	-0.403**
		[0.0461]		[0.0458]
East Asia	-	-0.592**	-	-0.621**
		[0.0411]		[0.0300]
Developed Asia	-	-0.365**	-	-0.468**
		[0.0660]		[0.0750]
South America	-	-0.458**	-	-0.458**
		[0.0676]		[0.0658]
Caribbean	-	-0.534**	-	-0.434**
		[0.0693]		[0.0767]
Place of Birth				
Non–English /Europe	-	-0.0266	-	-0.0714
		[0.0291]		[0.0567]
Other	-	-0.0416+	-	-0.186**
		[0.0235]		[0.0469]
Immigrant	-0.0343+	0.00206	-0.0758*	0.0611
	[0.0191]	[0.0257]	[0.0386]	[0.0529]
Permanent Resident	0.0173	-0.00214	-0.0370	-0.0836*
	[0.0169]	[0.0212]	[0.0334]	[0.0383]
Temporary Resident	-0.00527	0.0162	-0.0946+	-0.0266
	[0.0223]	[0.0268]	[0.0510]	[0.0627]
Child Immigrant	-0.0542+	-0.0355	-0.0104	-0.00827
	[0.0314]	[0.0301]	[0.0492]	[0.0511]
Arrival Cohort				
Arrived 2002-06	-0.208**	-0.145**	-0.260**	-0.210**
	[0.0460]	[0.0452]	[0.0550]	[0.0592]
Arrived 1996-01	-0.177**	-0.127**	-0.258**	-0.220**
	[0.0340]	[0.0325]	[0.0432]	[0.0457]
Arrived 1993-95	-0.102+	-0.0862	-0.151*	-0.110
	[0.0546]	[0.0583]	[0.0767]	[0.0802]

Arrived 1990-92	-0.0217	-0.0288	-0.0980+	-0.120*
	[0.0256]	[0.0278]	[0.0539]	[0.0586]
Arrived 1986-89	0.00781	0.00774	0.0460	0.0603
	[0.0217]	[0.0232]	[0.0400]	[0.0425]
Arrived 1976-81	0.0708**	0.0603**	0.0597	0.0336
	[0.0131]	[0.0160]	[0.0424]	[0.0488]
Arrived 1971-75	0.0960**	0.0860**	0.194**	0.183**
	[0.0101]	[0.0134]	[0.0209]	[0.0265]
Arrived 1967-70	0.0760**	0.0547**	0.184**	0.159**
	[0.0154]	[0.0207]	[0.0261]	[0.0372]
Arrived 1962-66	0.0562*	0.0149	0.176**	0.131+
	[0.0278]	[0.0411]	[0.0399]	[0.0696]
Arrived before 1961	0.0789**	0.0626*	-0.0174	-0.100
	[0.0186]	[0.0245]	[0.0823]	[0.0988]
Age	0.0153**	0.0131**	0.0296**	0.0338**
	[0.00401]	[0.00425]	[0.00750]	[0.00799]
$Age^2/100$	-0.0190**	-0.0172**	-0.0386**	-0.0441**
	[0.00424]	[0.00447]	[0.00835]	[0.00887]
Sample Size	9,192	9,192	6,383	6,383

Note:

1) Models also included controls for marital status, major city and province.
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: Estimates are generated by the authors based on Statistics Canada, 2006 Canadian Census: 20 Percent Master File.

Table 6: Marginal Effects from Logit Estimation of Model of Working as a Physician, Individuals Holding a Medical Degree, US

	Men		Women	
	Limited Country Controls	Full Country Controls	Limited Country Controls	Full Country Controls
Place of Study				
Not in US	-0.0843**	-	-0.182**	-
	[0.0251]		[0.0479]	
Canada	0.107**	0.0888**	0.232**	0.213**
	[0.0126]	[0.0209]	[0.0164]	[0.0246]
UK/Ireland/Aus./NZ	-	-0.0166	-	0.126+
		[0.0423]		[0.0667]
Western Europe	-	-0.0437	-	0.0517
		[0.0518]		[0.0903]
Eastern Europe	-	-0.114	-	-0.303*
		[0.0701]		[0.131]
Africa	-	-0.00475	-	0.121
		[0.0565]		[0.0791]
Western Asia	-	-0.00758	-	-0.00895
		[0.0451]		[0.126]
South Asia	-	0.00358	-	0.0767
		[0.0303]		[0.0508]
East Asia	-	-0.143**	-	-0.346**
		[0.0464]		[0.0697]
Developed Asia	-	-0.000552	-	-0.143
		[0.0470]		[0.138]
South America	-	-0.142**	-	-0.375**
		[0.0493]		[0.0932]
Caribbean	-	-0.182**	-	-0.352**
		[0.0594]		[0.115]
Place of Birth				
Non–English /Europe	-	-0.0207	-	0.0845
		[0.0365]		[0.0751]
Other	-	-0.00152	-	-0.00343
		[0.0285]		[0.0801]
Immigrant	-0.0608*	-0.0731+	-0.0234	-0.0223
	[0.0291]	[0.0432]	[0.0553]	[0.0901]
Permanent Resident	-0.0549+	-0.0509+	-0.130*	-0.191**
	[0.0287]	[0.0284]	[0.0565]	[0.0592]
Temporary Resident	-0.136*	-0.160*	-0.196*	-0.185
	[0.0641]	[0.0739]	[0.0993]	[0.141]
Child Immigrant	-0.131*	-0.102*	-0.0466	-0.0251
	[0.0533]	[0.0482]	[0.0760]	[0.0711]
Arrival Cohort				
Arrived 1997-03	-0.113	-0.129	-0.0892	-0.129
	[0.0872]	[0.102]	[0.163]	[0.150]
Arrived 1994-96	-0.00510	-0.00592	-0.106	-0.108
	[0.0484]	[0.0495]	[0.0978]	[0.0919]
Arrived 1987-93	-0.0856+	-0.0723+	-0.105	-0.0975
	[0.0441]	[0.0402]	[0.0672]	[0.0689]

Arrived 1975-79	0.0570**	0.0526**	0.153**	0.128**
	[0.0188]	[0.0199]	[0.0308]	[0.0354]
Arrived 1970-74	0.0792**	0.0731**	0.137**	0.120**
	[0.0156]	[0.0172]	[0.0365]	[0.0433]
Arrived 1965-69	0.0973**	0.0957**	0.194**	0.203**
	[0.0115]	[0.0119]	[0.0240]	[0.0220]
Arrived 1960-64	0.0550*	0.0559*	0.187**	0.179**
	[0.0232]	[0.0228]	[0.0335]	[0.0373]
Arrived before 1960	0.0580*	0.0611*	0.159**	0.127*
	[0.0266]	[0.0255]	[0.0444]	[0.0605]
Age	0.0206**	0.0213**	0.0177	0.0171
	[0.00669]	[0.00668]	[0.0164]	[0.0165]
$Age^2/100$	-0.0270**	-0.0276**	-0.0305+	-0.0299+
	[0.00668]	[0.00668]	[0.0177]	[0.0179]
1993 Survey Indicator	0.0344**	0.0346**	0.00160	0.0100
	[0.0125]	[0.0126]	[0.0271]	[0.0274]
Sample Size	6,719	6,719	2,417	2,417

Note:

1) Models also include controls for marital status and region.
2) Robust standard errors in square brackets.
3) **, * and + denote significance at 1%, 5% and 10% level of significance.
4) See Table 4 notes for definitions of the region of education variables

Source: Estimates are generated by the authors using the public use files of the 1993 and 2003 NCGS.

Table 7: Marginal Effects from Multinomial Logit Estimation of Occupational Outcomes, Individuals Holding a Medical Degree, Canada

	Men				Women			
	Physician	Other High Skilled	Low Skilled	Not Working	Physician	Other High Skilled	Low Skilled	Not Working
Place of Study								
US	-0.129**	0.098**	0.005	0.026	-0.073	0.057	-0.033	0.049
	[0.040]	[0.035]	[0.016]	[0.019]	[0.062]	[0.042]	[0.026]	[0.045]
UK/Ire./Aus./NZ	-0.035	0.015	0.007	0.012	-0.105+	0.027	-0.014	0.092*
	[0.027]	[0.018]	[0.017]	[0.014]	[0.058]	[0.042]	[0.025]	[0.046]
Western Europe	-0.237**	0.128**	0.058+	0.052+	-0.320**	0.141*	0.035	0.144*
	[0.050]	[0.038]	[0.032]	[0.030]	[0.075]	[0.066]	[0.040]	[0.069]
Eastern Europe	-0.481**	0.088**	0.214**	0.179**	-0.535**	0.157**	0.186**	0.193**
	[0.052]	[0.030]	[0.057]	[0.050]	[0.047]	[0.052]	[0.053]	[0.062]
Africa	-0.277**	0.051	0.097**	0.129**	-0.425**	0.035	0.077+	0.312**
	[0.052]	[0.037]	[0.033]	[0.040]	[0.069]	[0.036]	[0.046]	[0.075]
Western Asia	-0.394**	0.088**	0.152**	0.153**	-0.406**	0.019	0.095+	0.292**
	[0.050]	[0.033]	[0.042]	[0.043]	[0.065]	[0.030]	[0.057]	[0.067]
South Asia	-0.354**	0.045+	0.195**	0.114**	-0.400**	0.013	0.140**	0.247**
	[0.048]	[0.025]	[0.044]	[0.037]	[0.049]	[0.024]	[0.046]	[0.054]
East Asia	-0.581**	0.199**	0.248**	0.134**	-0.629**	0.133**	0.262**	0.234**
	[0.043]	[0.041]	[0.051]	[0.038]	[0.032]	[0.042]	[0.057]	[0.053]
Developed Asia	-0.343**	0.059+	0.088*	0.196**	-0.461**	0.021	0.127	0.313**
	[0.069]	[0.034]	[0.039]	[0.058]	[0.083]	[0.046]	[0.079]	[0.089]
South America	-0.445**	0.124**	0.223**	0.098*	-0.467**	0.089	0.219**	0.159**
	[0.067]	[0.046]	[0.058]	[0.043]	[0.068]	[0.055]	[0.072]	[0.059]
Caribbean	-0.519**	0.030	0.286**	0.203**	-0.454**	-0.032	0.332**	0.154*
	[0.072]	[0.048]	[0.081]	[0.069]	[0.078]	[0.030]	[0.090]	[0.078]
Place of Birth								
Non–Eng./Europe	-0.032	0.020	0.019	-0.007	-0.069	0.004	0.004	0.061
	[0.029]	[0.020]	[0.020]	[0.010]	[0.053]	[0.028]	[0.027]	[0.040]
Other	-0.044+	0.005	0.021	0.018	-0.170**	0.066*	0.019	0.085**
	[0.023]	[0.014]	[0.016]	[0.012]	[0.043]	[0.031]	[0.024]	[0.030]
Immigrant	0.006	0.002	-0.010	0.002	0.049	-0.008	-0.009	-0.032
	[0.024]	[0.017]	[0.012]	[0.012]	[0.047]	[0.030]	[0.029]	[0.025]
Permanent Resident	-0.000	-0.009	-0.001	0.010	-0.062+	-0.031*	0.033+	0.060**
	[0.020]	[0.013]	[0.006]	[0.010]	[0.036]	[0.013]	[0.019]	[0.020]
Temporary Resident	-0.003	0.030	-0.023**	-0.004	-0.017	0.041	-0.027	0.002
	[0.029]	[0.025]	[0.004]	[0.013]	[0.057]	[0.044]	[0.024]	[0.029]
Arrived as child	-0.034	0.003	-0.005	0.035+	-0.014	0.003	-0.020	0.030
	[0.029]	[0.020]	[0.008]	[0.019]	[0.049]	[0.032]	[0.022]	[0.035]
Arrived 2002-06	-0.121**	0.040	0.018	0.063*	-0.198**	0.065+	0.043	0.090**
	[0.042]	[0.028]	[0.013]	[0.028]	[0.058]	[0.036]	[0.028]	[0.034]
Arrived 1996-01	-0.114**	0.057*	0.032*	0.025+	-0.218**	0.039+	0.111**	0.068**
	[0.031]	[0.023]	[0.014]	[0.014]	[0.045]	[0.022]	[0.032]	[0.024]
Arrived 1993-95	-0.084	0.047	0.029	0.008	-0.116	0.010	0.087+	0.019
	[0.058]	[0.042]	[0.022]	[0.019]	[0.078]	[0.034]	[0.048]	[0.031]
Arrived 1990-92	-0.020	-0.001	0.029+	-0.008	-0.125*	-0.013	0.118**	0.020
	[0.026]	[0.017]	[0.016]	[0.009]	[0.058]	[0.022]	[0.043]	[0.024]
Arrived 1986-89	0.007	-0.003	0.006	-0.011	0.047	-0.032+	0.009	-0.025

	[0.022]	[0.017]	[0.010]	[0.008]	[0.040]	[0.017]	[0.026]	[0.016]
Arrived 1976-81	0.050**	-0.016	-0.012*	-0.022**	0.008	-0.035*	0.058	-0.031+
	[0.016]	[0.013]	[0.006]	[0.005]	[0.049]	[0.017]	[0.039]	[0.016]
Arrived 1971-75	0.074**	-0.026*	-0.021**	-0.027**	0.165**	-0.059**	-0.053**	-0.053**
	[0.014]	[0.012]	[0.004]	[0.004]	[0.023]	[0.012]	[0.013]	[0.009]
Arrived 1967-70	0.050*	-0.022	-0.013+	-0.015*	0.152**	-0.049**	-0.055**	-0.048**
	[0.020]	[0.016]	[0.008]	[0.007]	[0.030]	[0.015]	[0.016]	[0.014]
Arrived 1962-66	0.003	0.008	0.002	-0.013	0.080	-0.090**	0.090	-0.081**
	[0.044]	[0.038]	[0.022]	[0.012]	[0.098]	[0.005]	[0.097]	[0.005]
Arrived before 1961	0.053*	-0.017	-0.015	-0.022**	-0.099	0.049	0.077	-0.026
	[0.025]	[0.020]	[0.009]	[0.007]	[0.099]	[0.066]	[0.086]	[0.030]
Sample Size	9,192				6,383			

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.

Table 8: Marginal Effects from Multinomial Logit Estimation of Occupational Outcomes, Individuals Holding a Medical Degree, US

	Men				Women			
	Physician	Other High Skilled	Low Skilled	Not Working	Physician	Other High Skilled	Low Skilled	Not Working
Place of Study								
Canada	0.0804**	-0.0566**	-0.0172**	-0.0065	0.183**	-0.0762**	-0.0380**	-0.0688**
	[0.0169]	[0.0116]	[0.00287]	[0.0118]	[0.0267]	[0.0242]	[0.00822]	[0.00764]
UK/Ire./Aus./NZ	-0.0214	0.0212	-0.0123**	0.0126	0.104	-0.0288	-0.0202	-0.0547**
	[0.0372]	[0.0300]	[0.00356]	[0.0207]	[0.0632]	[0.0550]	[0.0244]	[0.0109]
Western Europe	-0.0282	-0.00658	0.00408	0.0307	0.0477	-0.00774	-0.0135	-0.0265
	[0.0385]	[0.0185]	[0.00880]	[0.0327]	[0.0755]	[0.0497]	[0.0344]	[0.0296]
Eastern Europe	-0.0958	0.00471	0.0555	0.0355	-0.519+	0.0577	0.493	-0.0318
	[0.0592]	[0.0414]	[0.0341]	[0.0366]	[0.289]	[0.161]	[0.460]	[0.0366]
Africa	-0.00677	-0.0244	0.0108	0.0204	0.0688	0.0225	-0.0447**	-0.0465**
	[0.0506]	[0.0257]	[0.0215]	[0.0383]	[0.0976]	[0.0953]	[0.00725]	[0.0172]
Western Asia	-0.00762	-0.0207	0.0158	0.0125	0.0345	-0.0287	-0.0448**	0.0390
	[0.0400]	[0.0298]	[0.0186]	[0.0226]	[0.0948]	[0.0630]	[0.00726]	[0.0744]
South Asia	0.00340	-0.0345*	0.0190	0.0121	0.0762+	-0.0541*	-0.00441	-0.0176
	[0.0275]	[0.0147]	[0.0139]	[0.0202]	[0.0428]	[0.0275]	[0.0258]	[0.0215]
East Asia	-0.131**	0.0179	0.0592*	0.0539	-0.346**	0.0860	0.246**	0.0140
	[0.0450]	[0.0231]	[0.0245]	[0.0356]	[0.0757]	[0.0549]	[0.0794]	[0.0266]
Developed Asia	-0.00659	-0.0267	0.0175	0.0158	-0.163	0.0251	0.182	-0.0441**
	[0.0440]	[0.0269]	[0.0280]	[0.0264]	[0.139]	[0.0840]	[0.148]	[0.0166]
South America	-0.106**	-0.00831	0.0962**	0.0177	-0.372**	0.173+	0.152*	0.0477
	[0.0397]	[0.0203]	[0.0319]	[0.0200]	[0.0976]	[0.0920]	[0.0751]	[0.0413]
Caribbean	-0.190**	0.00903	0.0472+	0.134*	-0.323**	0.0495	0.178+	0.0955
	[0.0640]	[0.0283]	[0.0242]	[0.0590]	[0.118]	[0.0760]	[0.0932]	[0.0790]
Place of Birth								
Non–Eng./Europe	-0.0160	0.00421	0.00101	0.0108	0.0558	-0.0153	-0.0462**	0.00574
	[0.0306]	[0.0231]	[0.00970]	[0.0178]	[0.0758]	[0.0513]	[0.00967]	[0.0559]
Other	-0.00472	0.0137	0.00189	-0.0108	-0.00835	-0.00745	-0.0172	0.0330
	[0.0245]	[0.0202]	[0.0107]	[0.00749]	[0.0773]	[0.0527]	[0.0164]	[0.0596]
Immigrant	-0.0553	0.0184	0.0155	0.0214	-0.00540	-0.0309	0.0316	0.00468
	[0.0381]	[0.0267]	[0.0175]	[0.0202]	[0.0790]	[0.0530]	[0.0323]	[0.0499]
Permanent Resident	-0.0564*	0.0494*	0.000523	0.00650	-0.173**	0.0847+	0.0391	0.0493
	[0.0260]	[0.0236]	[0.00520]	[0.0117]	[0.0566]	[0.0498]	[0.0271]	[0.0349]
Temporary Resident	-0.149*	0.109*	0.0183	0.0220	-0.187	0.167	-0.00237	0.0222
	[0.0652]	[0.0545]	[0.0284]	[0.0335]	[0.139]	[0.130]	[0.0308]	[0.0695]
Arrived as child	-0.0812*	0.0320	0.0150	0.0342	-0.0358	0.0432	0.0105	-0.0180
	[0.0407]	[0.0308]	[0.0166]	[0.0238]	[0.0703]	[0.0629]	[0.0310]	[0.0256]
Arrived 1997-03	-0.0286	-0.0503**	0.0716	0.00735	-0.128	-0.00526	-0.00128	0.135
	[0.0703]	[0.0178]	[0.0568]	[0.0330]	[0.149]	[0.0675]	[0.0332]	[0.138]
Arrived 1994-96	0.0244	-0.0441*	0.0181	0.00162	-0.115	0.0766	0.00986	0.0282
	[0.0372]	[0.0172]	[0.0196]	[0.0265]	[0.0868]	[0.0741]	[0.0364]	[0.0536]
Arrived 1987-93	-0.0399	0.0253	0.0196	-0.00497	-0.0763	0.0109	0.0326	0.0328
	[0.0317]	[0.0272]	[0.0128]	[0.0122]	[0.0629]	[0.0451]	[0.0300]	[0.0387]
Arrived 1975-79	0.0284	-0.00524	-0.0109**	-0.0122*	0.102**	-0.0387	-0.0211+	-0.0426**
	[0.0239]	[0.0229]	[0.00262]	[0.00575]	[0.0358]	[0.0308]	[0.0116]	[0.0133]
Arrived 1970-74	0.0381	-0.00578	-0.0133**	-0.0191**	0.0851+	-0.0195	-0.0224+	-0.0431**

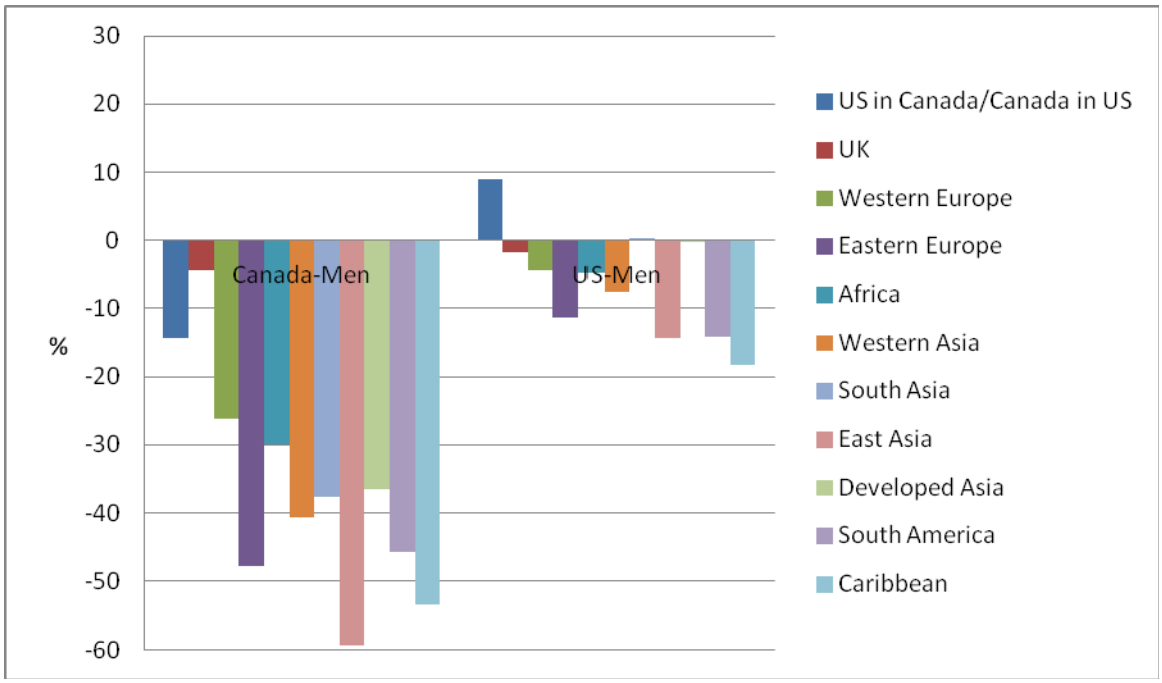
	[0.0238]	[0.0233]	[0.00251]	[0.00357]	[0.0449]	[0.0388]	[0.0122]	[0.0140]
Arrived 1965-69	0.0740**	-0.0427**	-0.0140**	-0.0173**	0.175**	-0.0911**	-0.0410**	-0.0434**
	[0.0149]	[0.0139]	[0.00244]	[0.00389]	[0.0213]	[0.0150]	[0.00713]	[0.0126]
Arrived 1960-64	0.0342	-0.0113	-0.00761	-0.0153**	0.159**	-0.0829**	-0.0308*	-0.0453**
	[0.0239]	[0.0224]	[0.00494]	[0.00527]	[0.0292]	[0.0197]	[0.0130]	[0.0130]
Arrived before 1960	0.0295	-9.23e-05	-0.0145**	-0.0149**	0.109+	-0.0496	-0.0308*	-0.0291
	[0.0429]	[0.0433]	[0.00241]	[0.00505]	[0.0574]	[0.0452]	[0.0145]	[0.0262]
Sample Size	6,719				2,417			

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

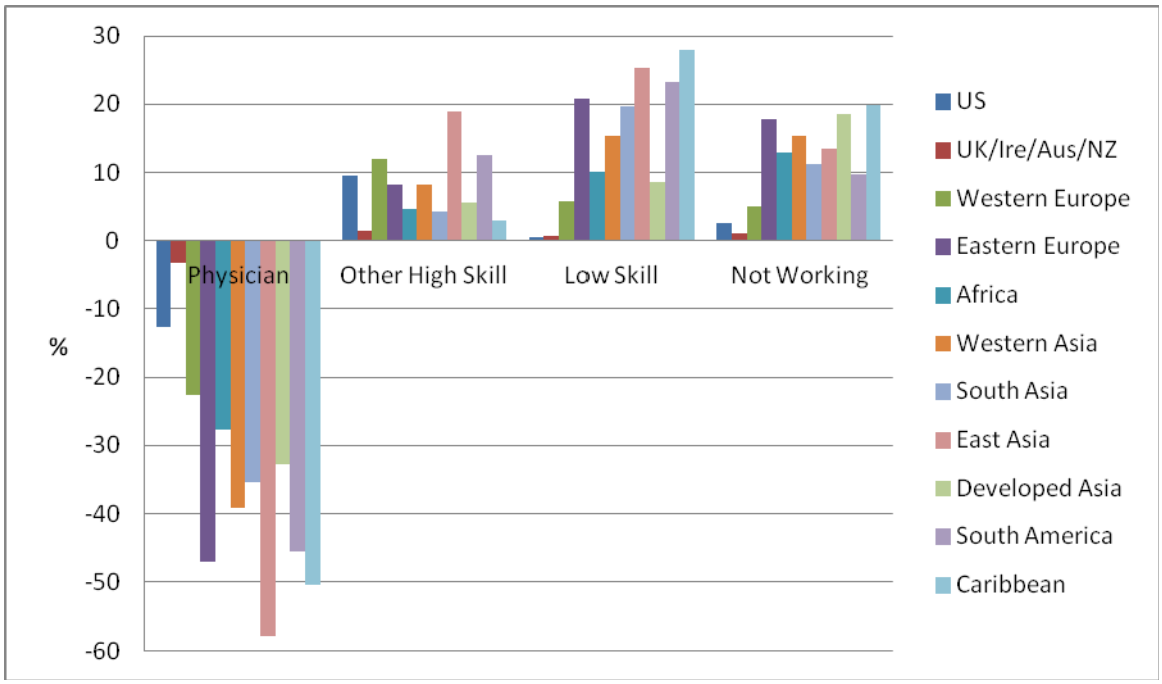
Source: generated by the authors based on the public use files of the 1993 and 2003 NCGS.

Figure 1: Marginal Probabilities for Country of Study from Model of Working as a Physician



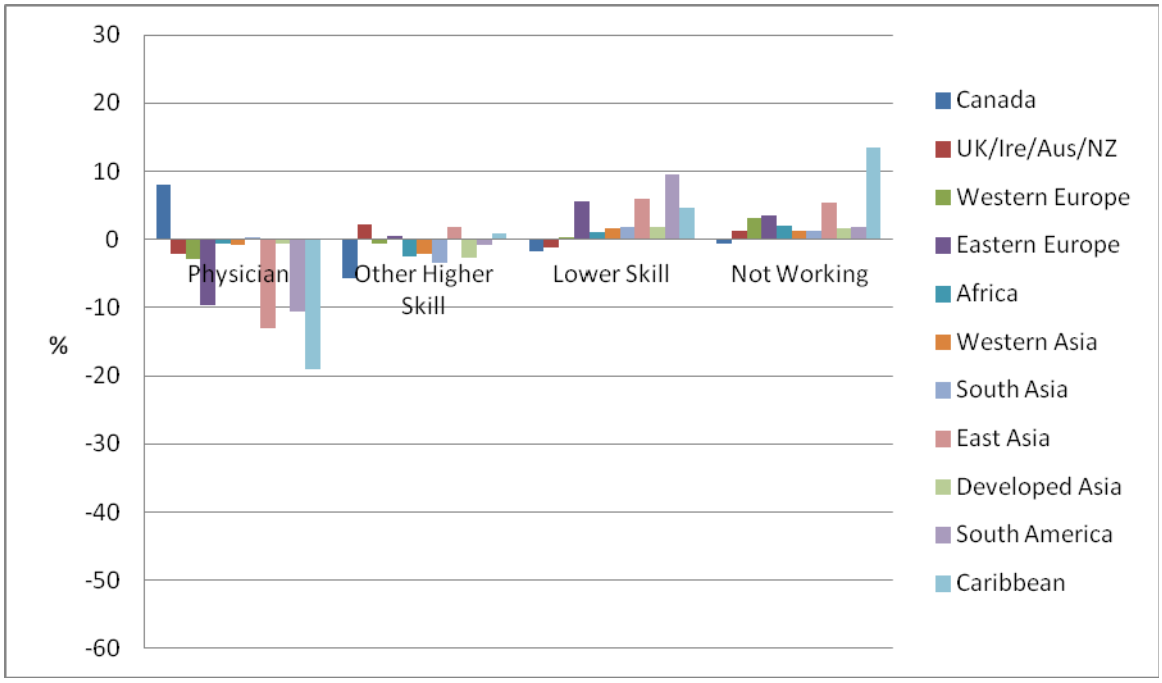
Authors' calculations based on full country controls model estimates of Tables 5 and 6.

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



Authors' calculations based on estimates of Table 7.

Figure 3: Marginal Probabilities for Country of Study from Occupation Model, Male Medical Degree Holders in US



Authors' calculations based on estimates of Table 8.